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(54)【発明の名称】 有機発光素子

(57)【特許請求の範囲】

【請求項 1】

正極；

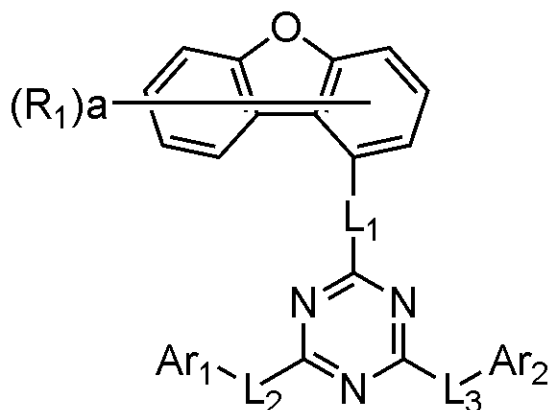
負極；および

前記正極と前記負極との間の発光層を含み、

前記発光層は、下記化学式 1 A で表される化合物および下記化学式 2 で表される化合物
を含む、有機発光素子：

[化学式 1 A]

【化 5 6 9】



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前記化学式 1 A 中、

Ar₁ および Ar₂ はそれぞれ独立して、置換または非置換の炭素数 6 ～ 60 のアリール；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ～ 60 のヘテロアリールであり、

L₁ ～ L₃ はそれぞれ独立して、単結合；または、置換または非置換の炭素数 6 ～ 60 のアリーレンであり、

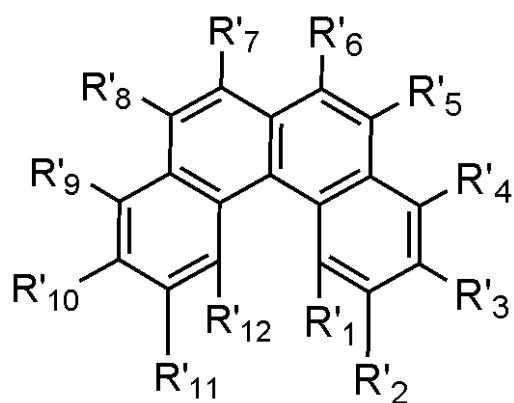
R₁ は、水素；重水素；置換または非置換の炭素数 6 ～ 60 のアリール；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ～ 60 のヘテロアリールであり、

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a は 0 ～ 7 の整数であり、

【化学式 2】

【化 5 6 7】



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前記化学式 2 中、

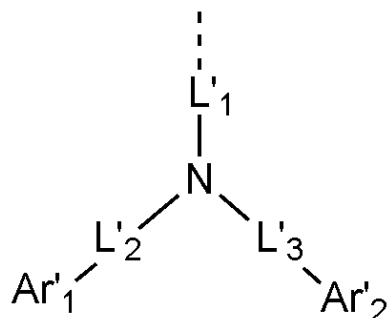
R'₁ ～ R'₁₂ のうちいずれか 1 つは、下記化学式 3 であり、残りは水素または重水素であり、

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【化学式 3】

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【化 5 6 8】



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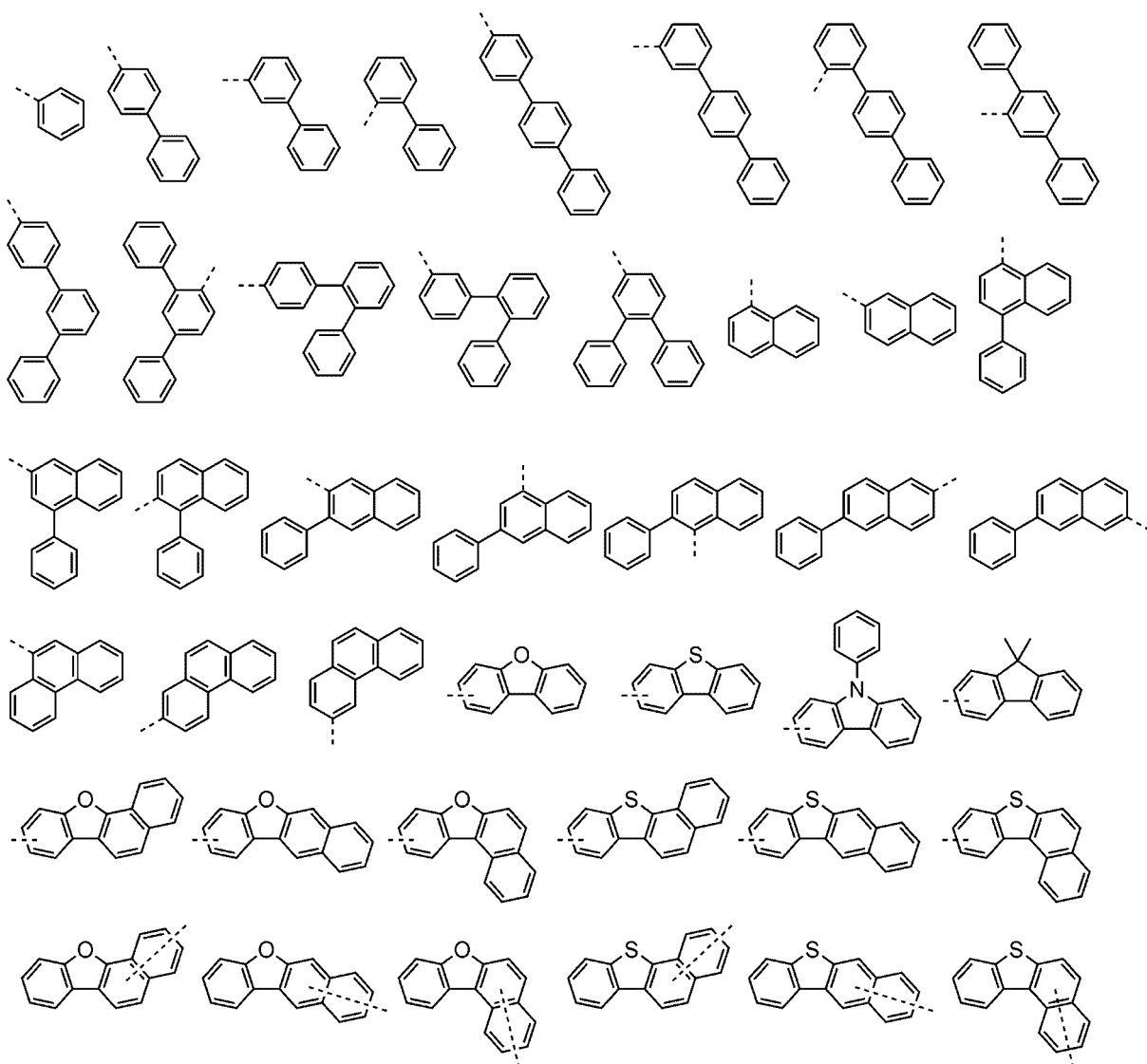
前記化学式 3 中、

L'_1 は、単結合、置換または非置換のフェニレン、置換または非置換のビフェニルジイル、または、置換または非置換のナフタレンジイルであり、

L'_2 および L'_3 はそれぞれ独立して、単結合；置換または非置換の炭素数 6～60 のアリーレン；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2～60 のヘテロアリーレンであり、

Ar'_1 および Ar'_2 はそれぞれ独立して、下記で構成される群より選択されるいずれか 1 つ、

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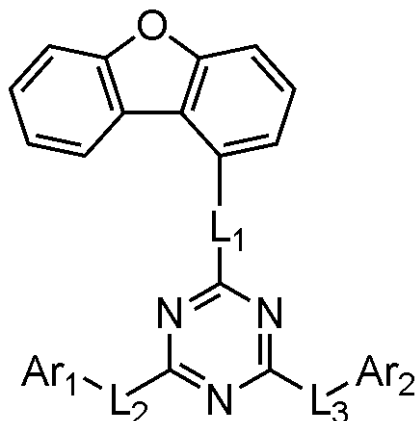
である。

【請求項 2】

化学式 1 で表される化合物は、下記化学式 1-1 ~ 化学式 1-3 のうちいずれか 1 つで表される、請求項 1 に記載の有機発光素子：

〔化学式 1-1〕

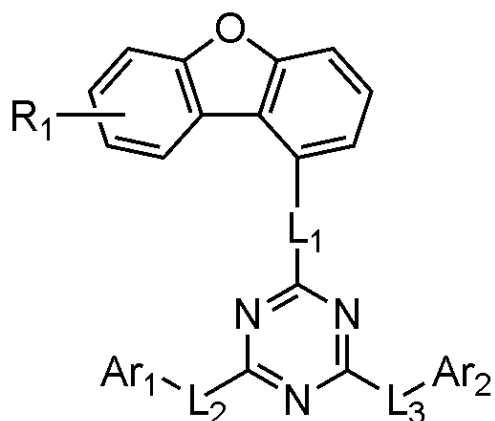
〔化 5 7 0〕



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〔化学式 1-2〕

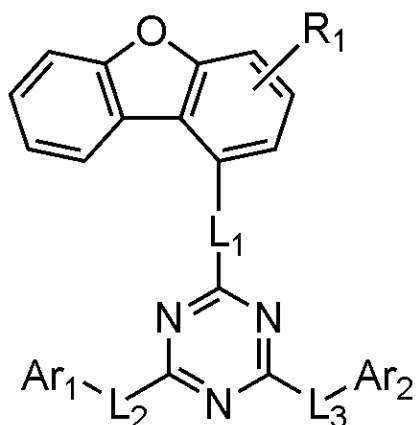
〔化 5 7 1〕



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〔化学式 1-3〕

〔化 5 7 2〕



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前記化学式 1-1 ~ 1-3 中、

Ar₁ および Ar₂、L₁ ~ L₃ および R₁ は、請求項 1 で定義した通りである。

【請求項 3】

Ar₁ および Ar₂ はそれぞれ独立して、フェニル、ビフェニル、ターフェニル、

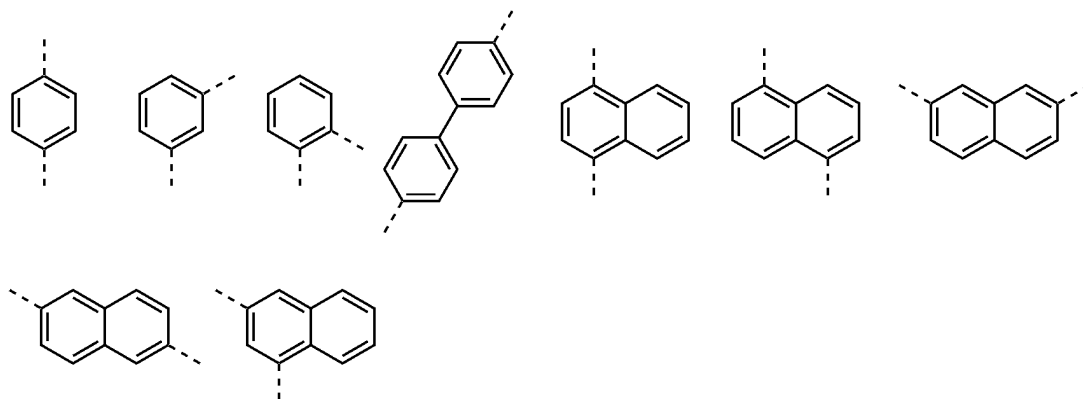
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ナフチル、フェナントレニル、ジベンゾフラニル、またはジベンゾチオフェニルである、請求項 1 または 2 に記載の有機発光素子。

【請求項 4】

$L_1 \sim L_3$ はそれぞれ独立して、単結合または下記で構成される群より選択されるいずれか 1 つである、請求項 1 から 3 のいずれか一項に記載の有機発光素子：

【化 5 7 3】



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【請求項 5】

R_1 は、水素、重水素、フェニル、ビフェニリル、ターフェニリル、ナフチル、フェナントレニル、トリフェニレニル、ナフチルフェニル、フェニルナフチル、フルオランテニル、ジベンゾフラニル、ジベンゾチオフェニル、ベンゾナフトフラニル、またはベンゾナフトチオフェニルである、請求項 1 に記載の有機発光素子。

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【請求項 6】

a は 0 または 1 である、請求項 1 に記載の有機発光素子。

【請求項 7】

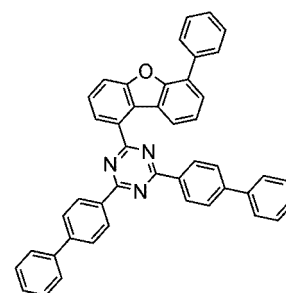
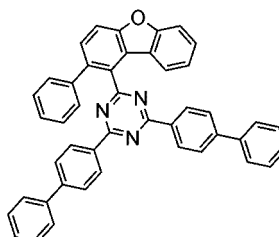
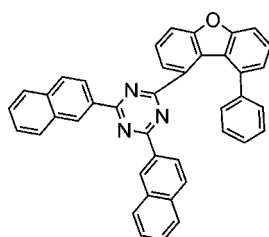
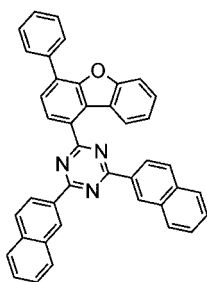
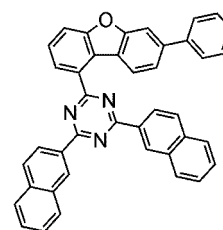
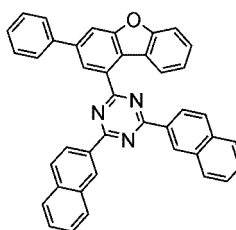
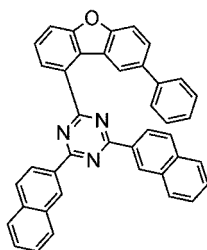
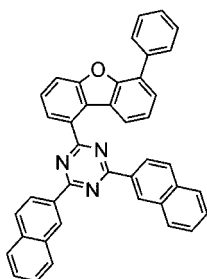
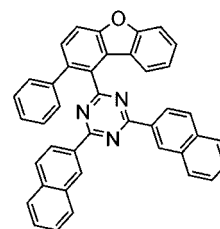
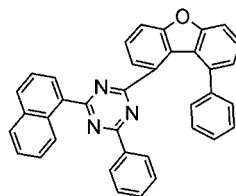
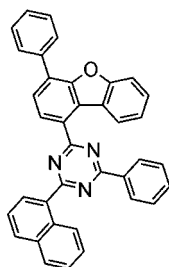
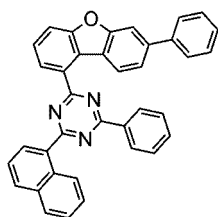
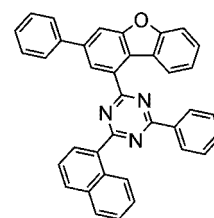
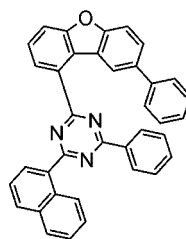
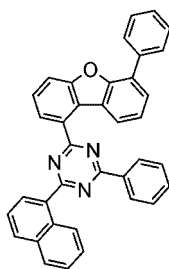
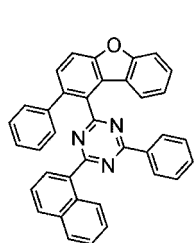
前記化学式 1 で表される化合物は、下記で構成される群より選択されるいずれか 1 つである、請求項 1 に記載の有機発光素子：

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【化 5 7 4】



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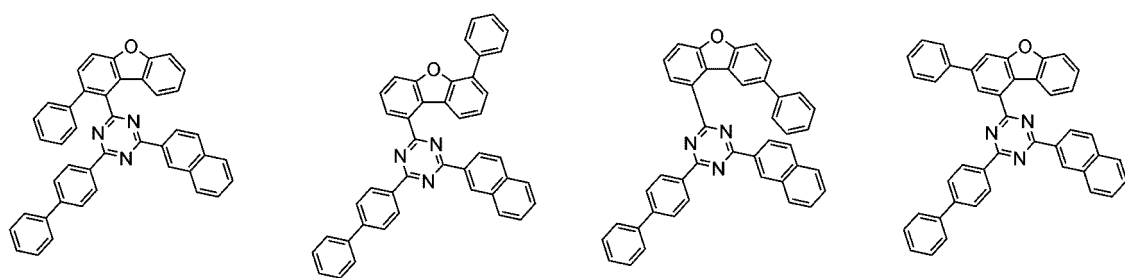
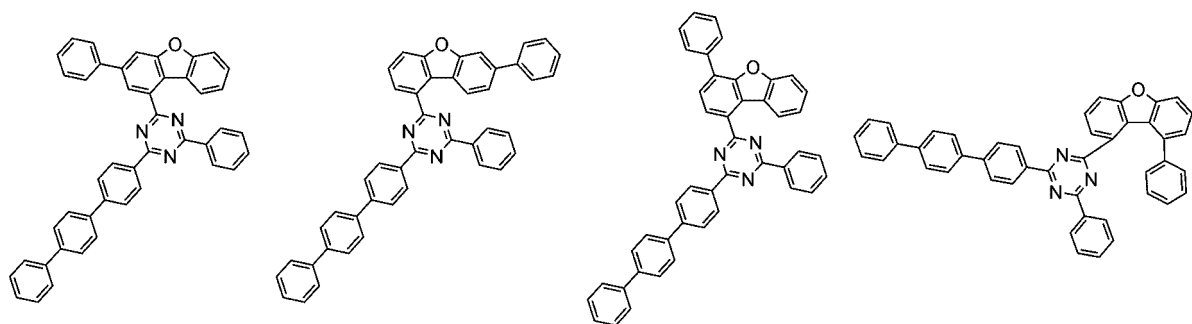
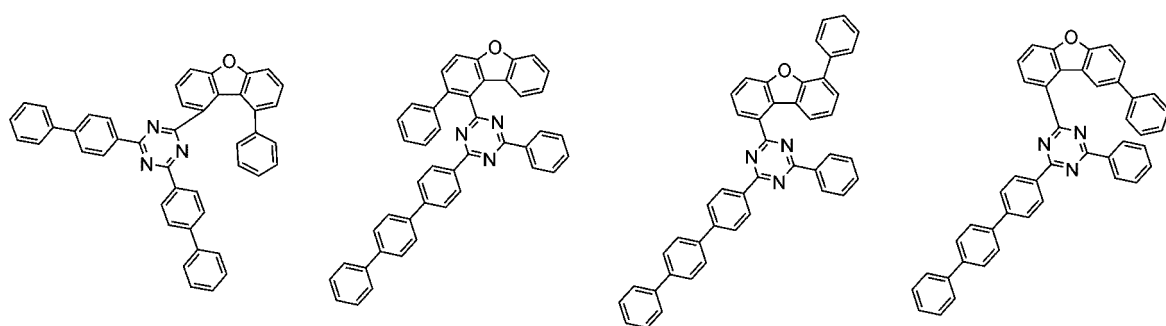
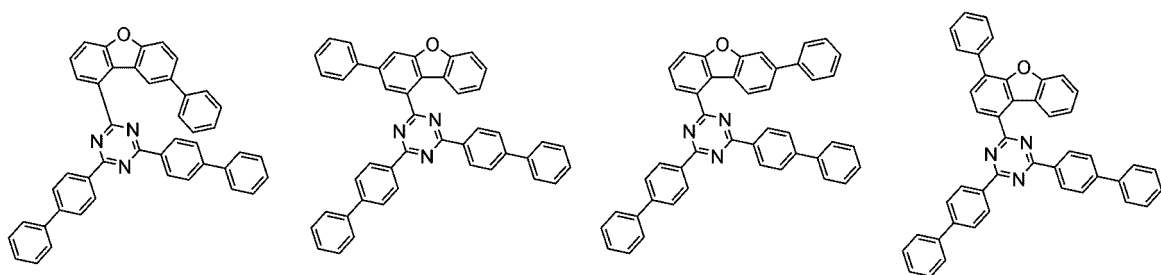
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【化 1 7】



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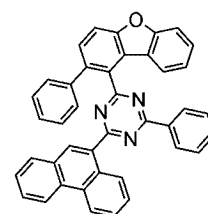
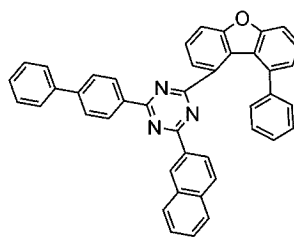
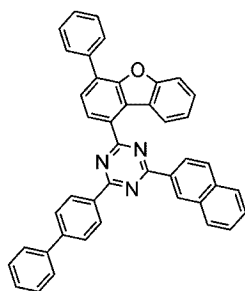
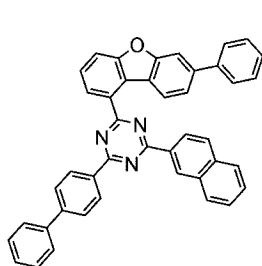
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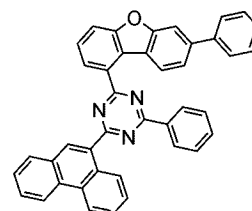
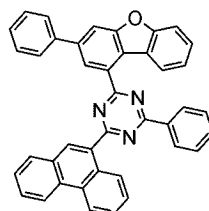
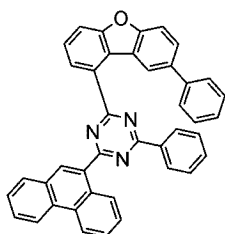
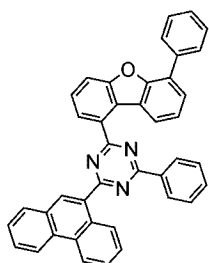
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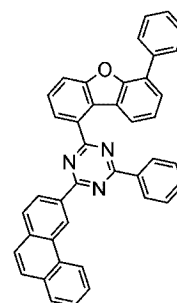
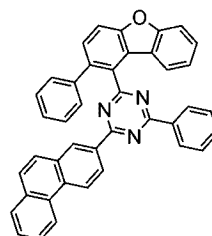
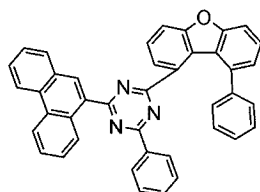
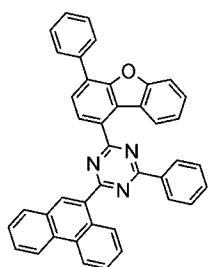
【化 5 7 5】



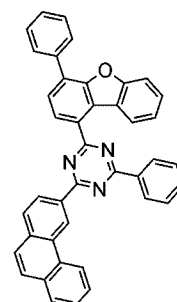
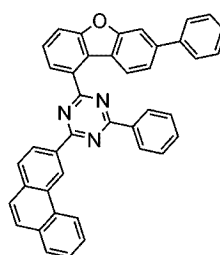
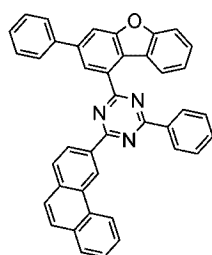
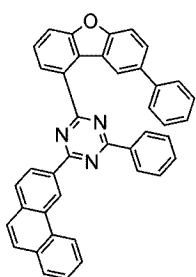
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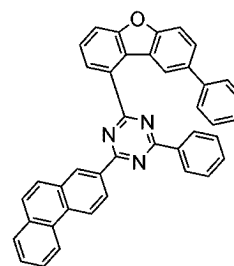
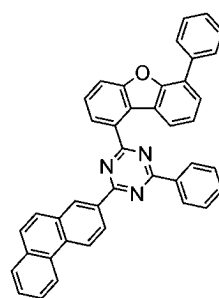
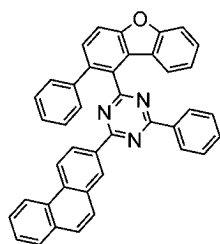
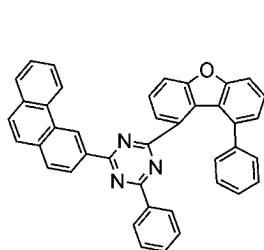
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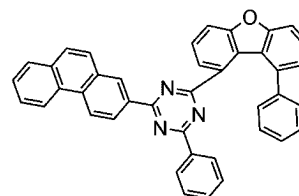
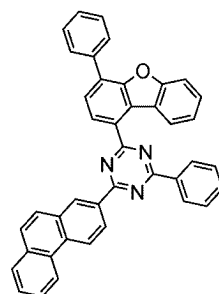
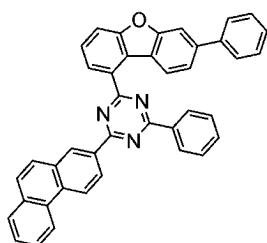
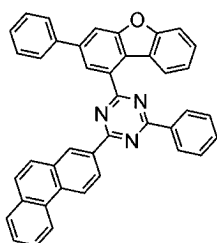
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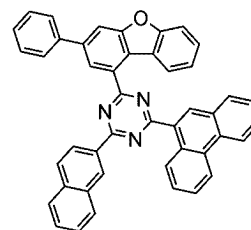
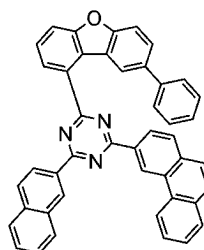
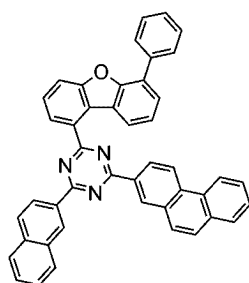
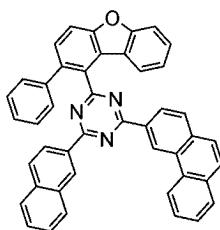
【化 5 7 6】



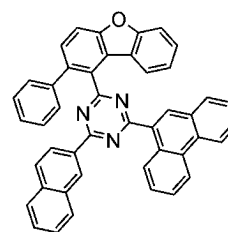
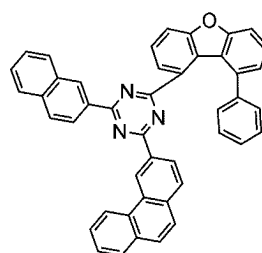
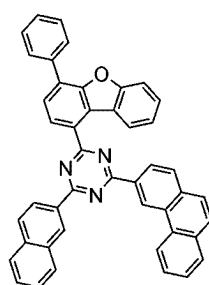
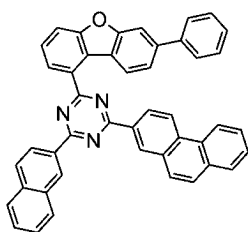
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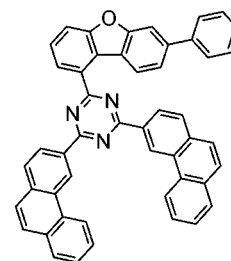
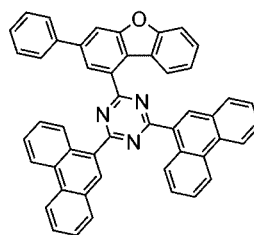
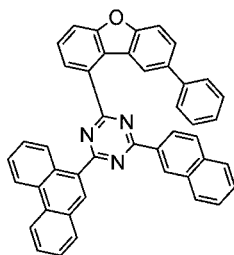
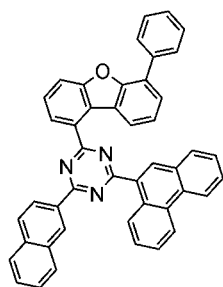
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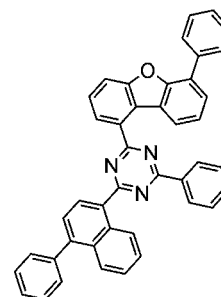
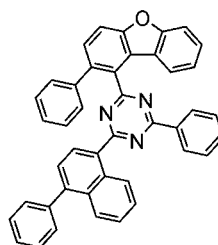
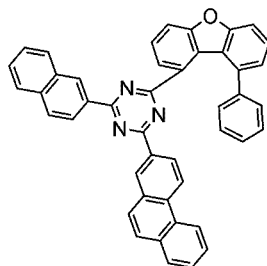
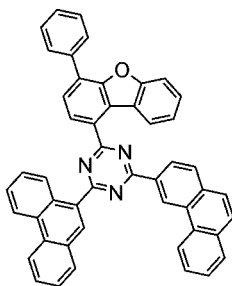
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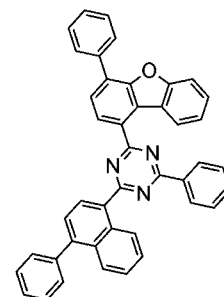
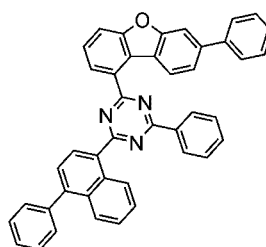
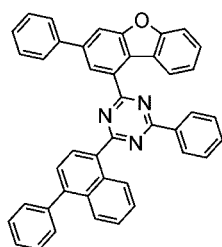
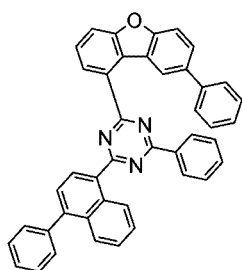
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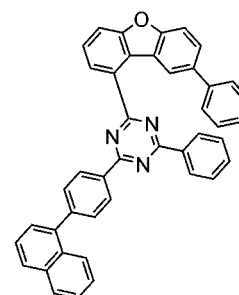
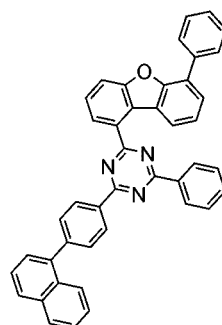
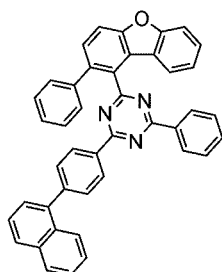
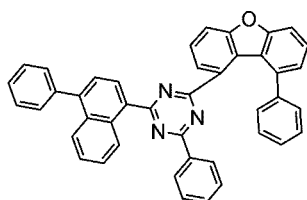
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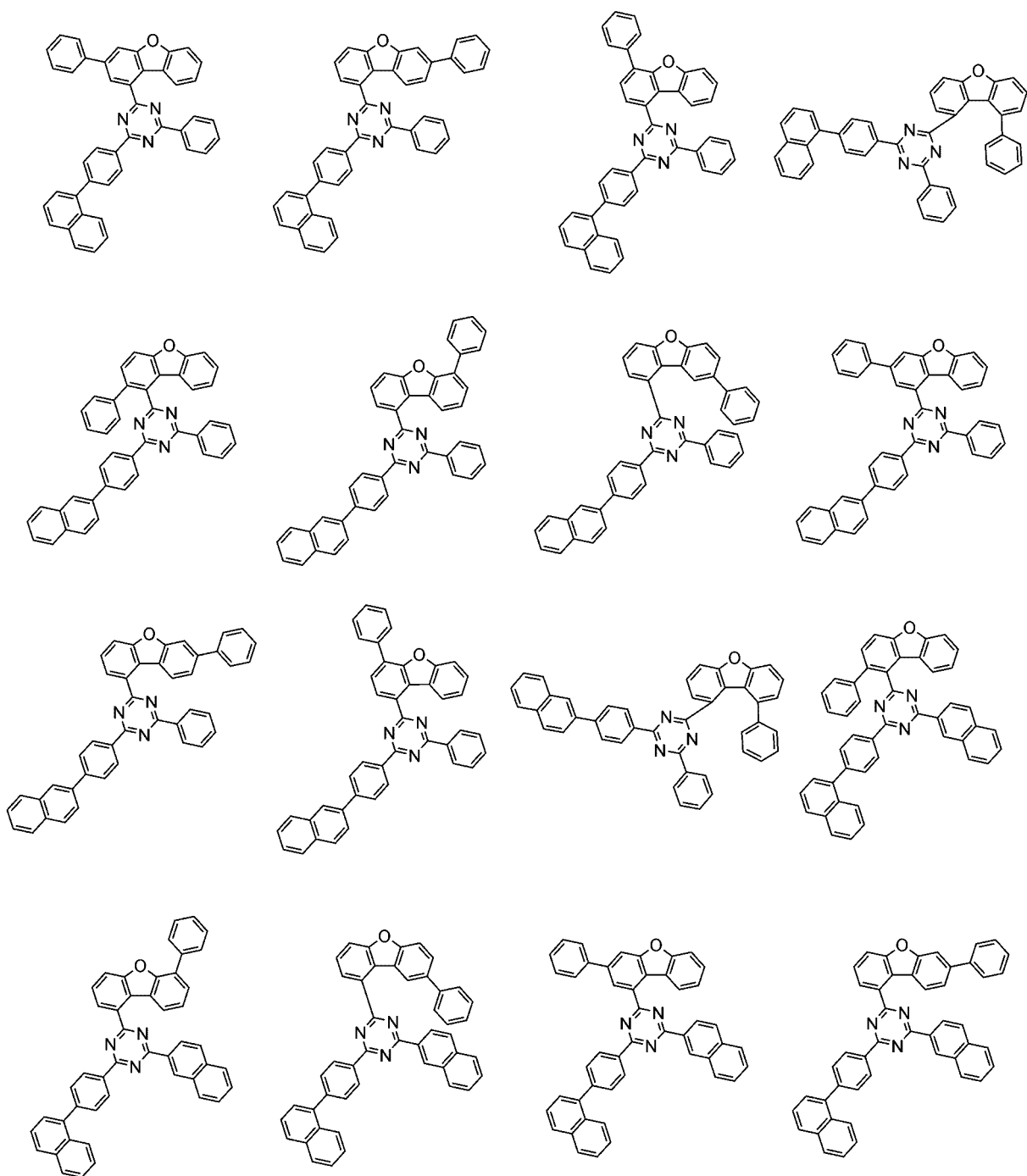
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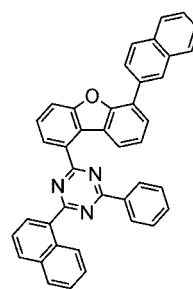
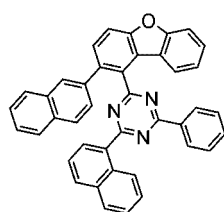
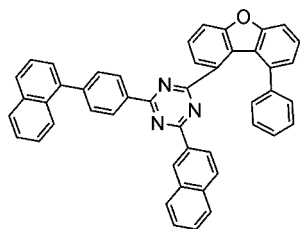
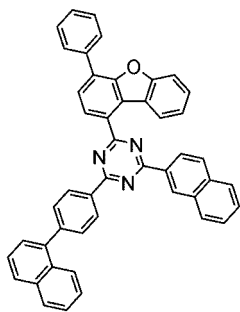
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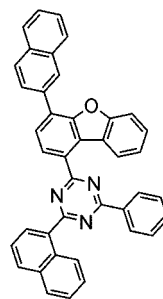
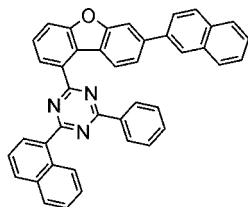
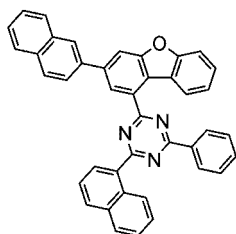
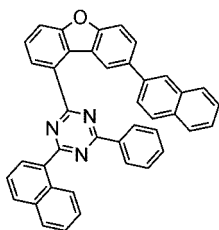
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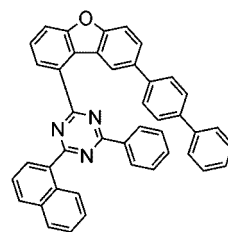
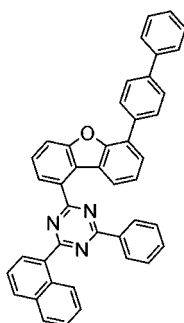
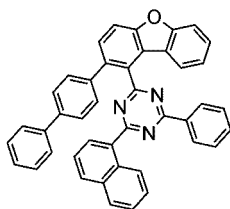
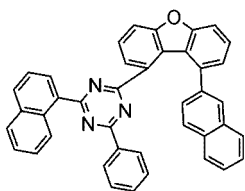
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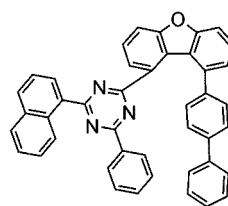
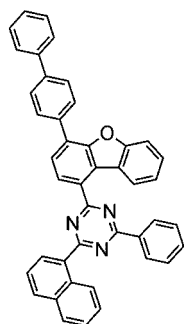
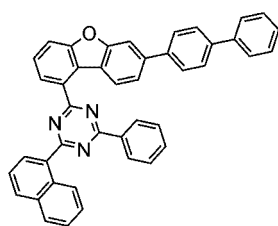
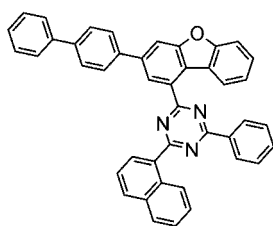
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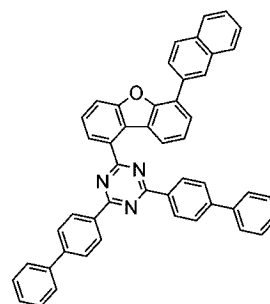
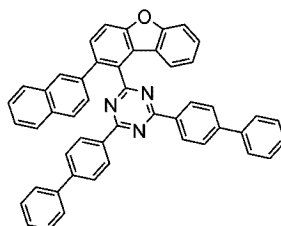
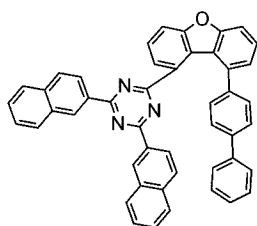
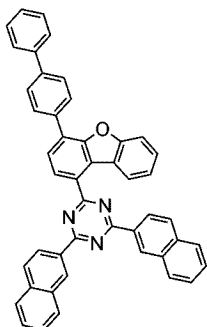
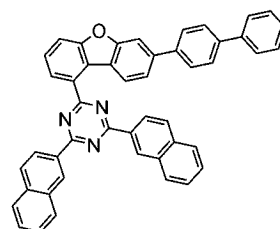
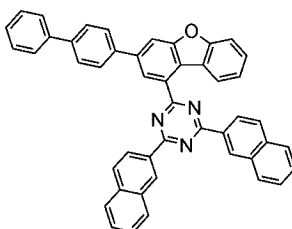
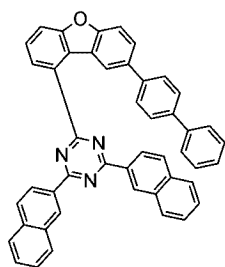
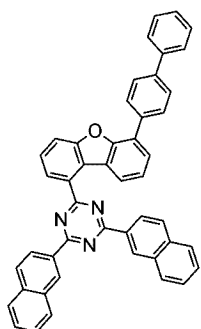
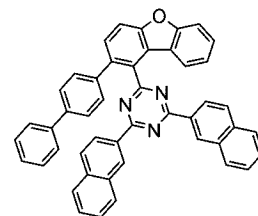
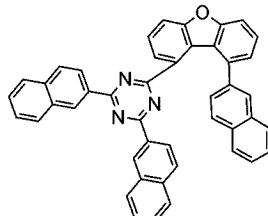
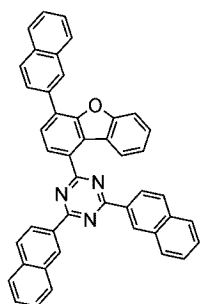
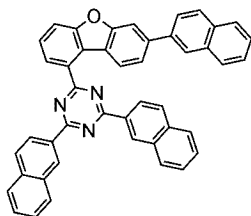
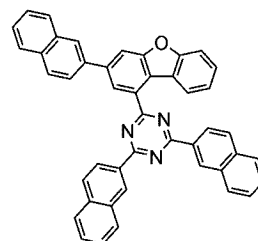
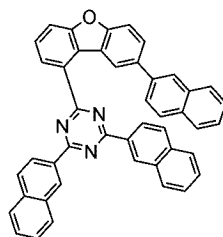
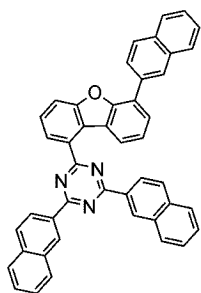
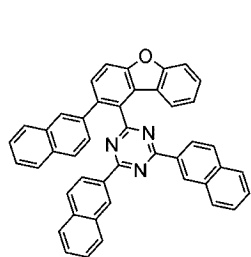
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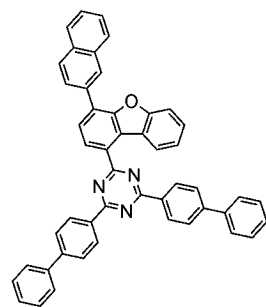
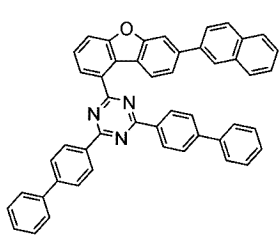
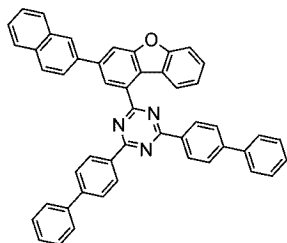
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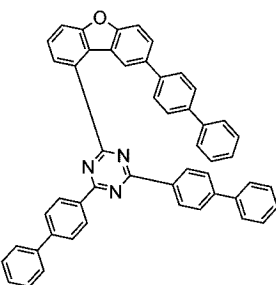
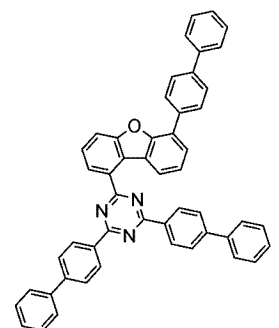
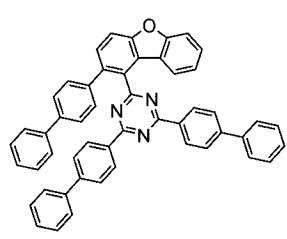
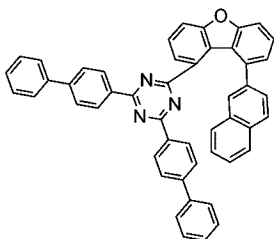
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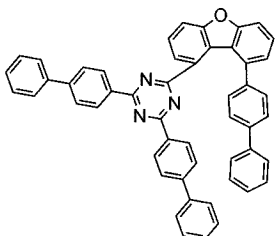
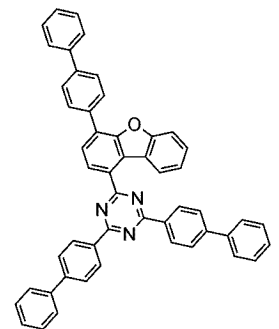
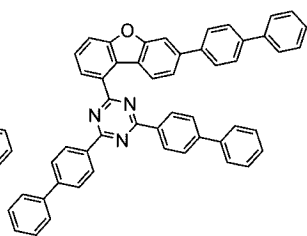
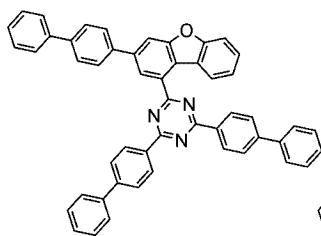
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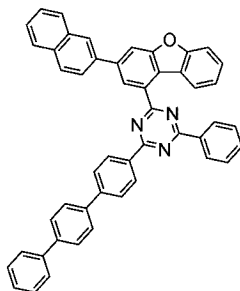
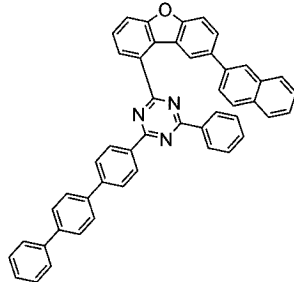
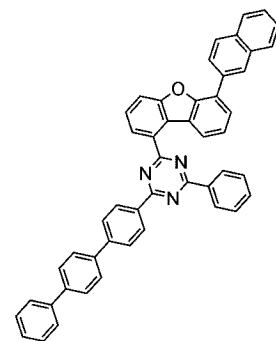
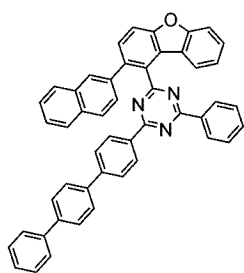
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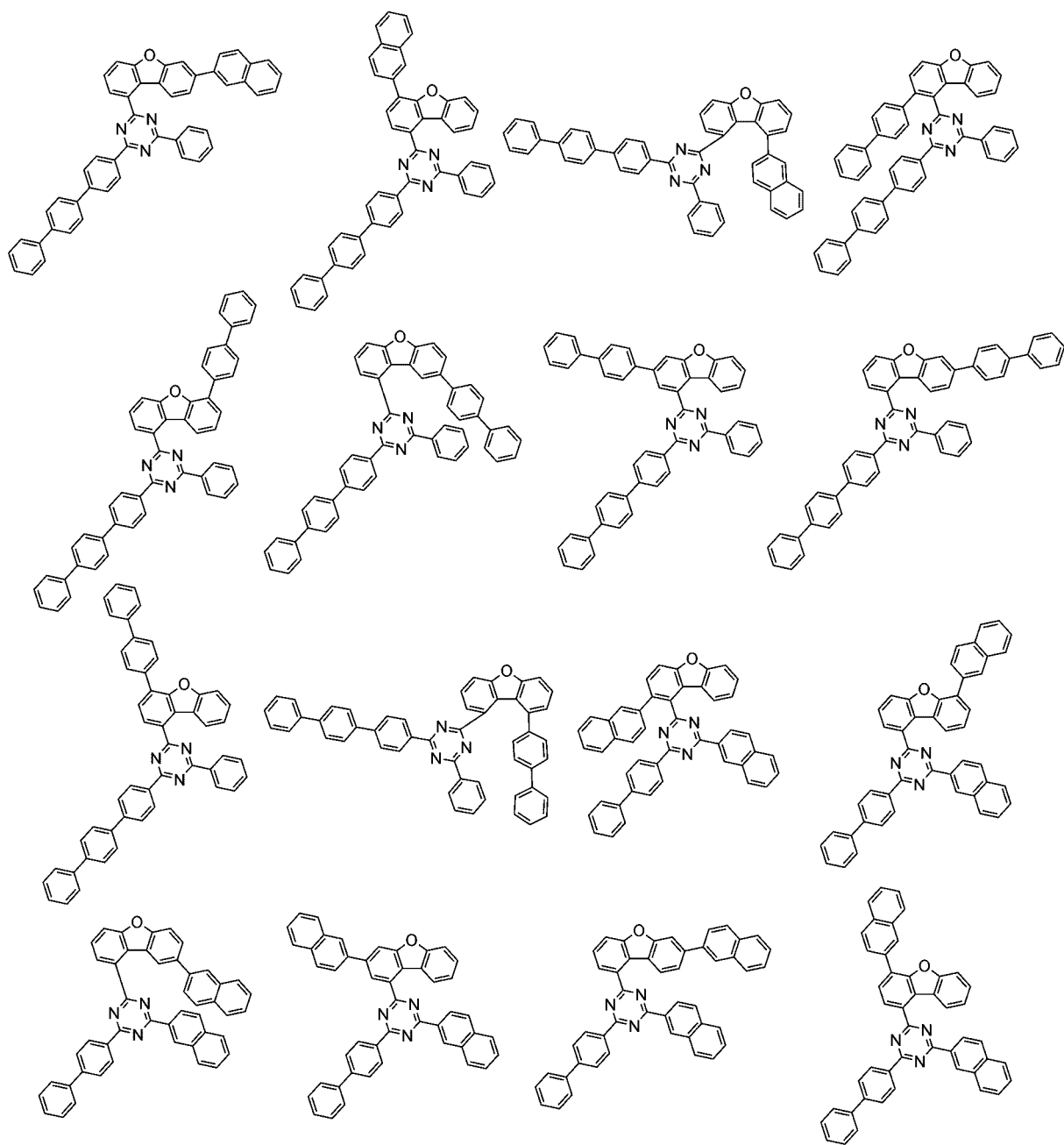


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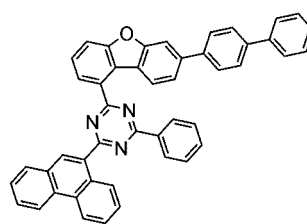
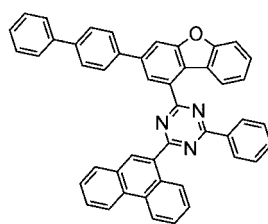
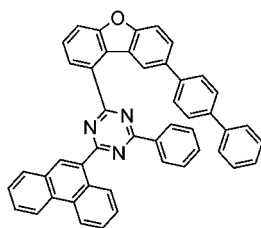
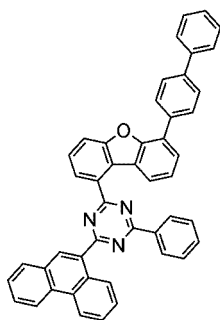
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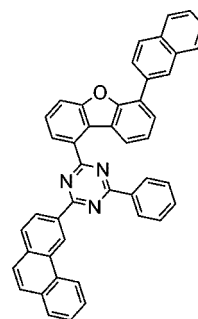
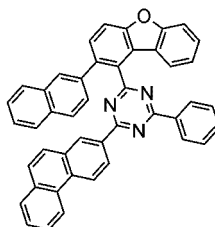
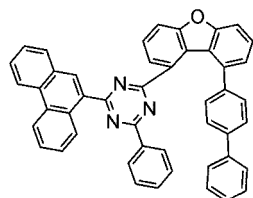
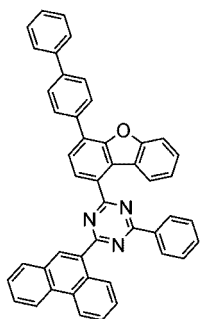
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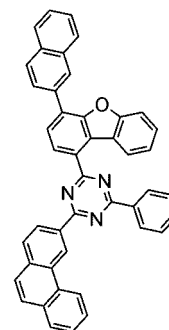
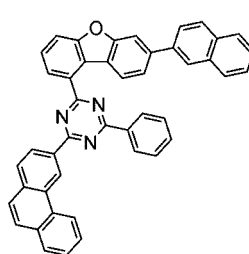
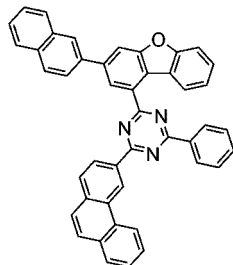
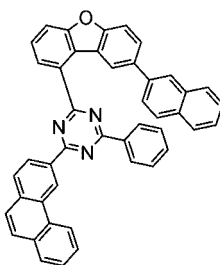
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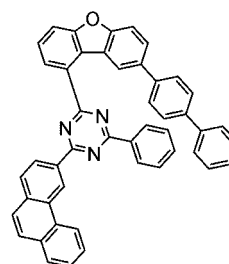
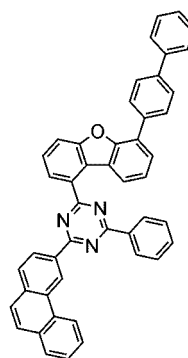
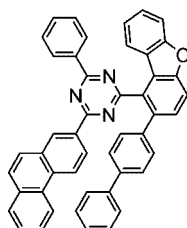
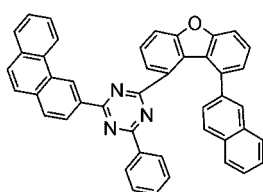
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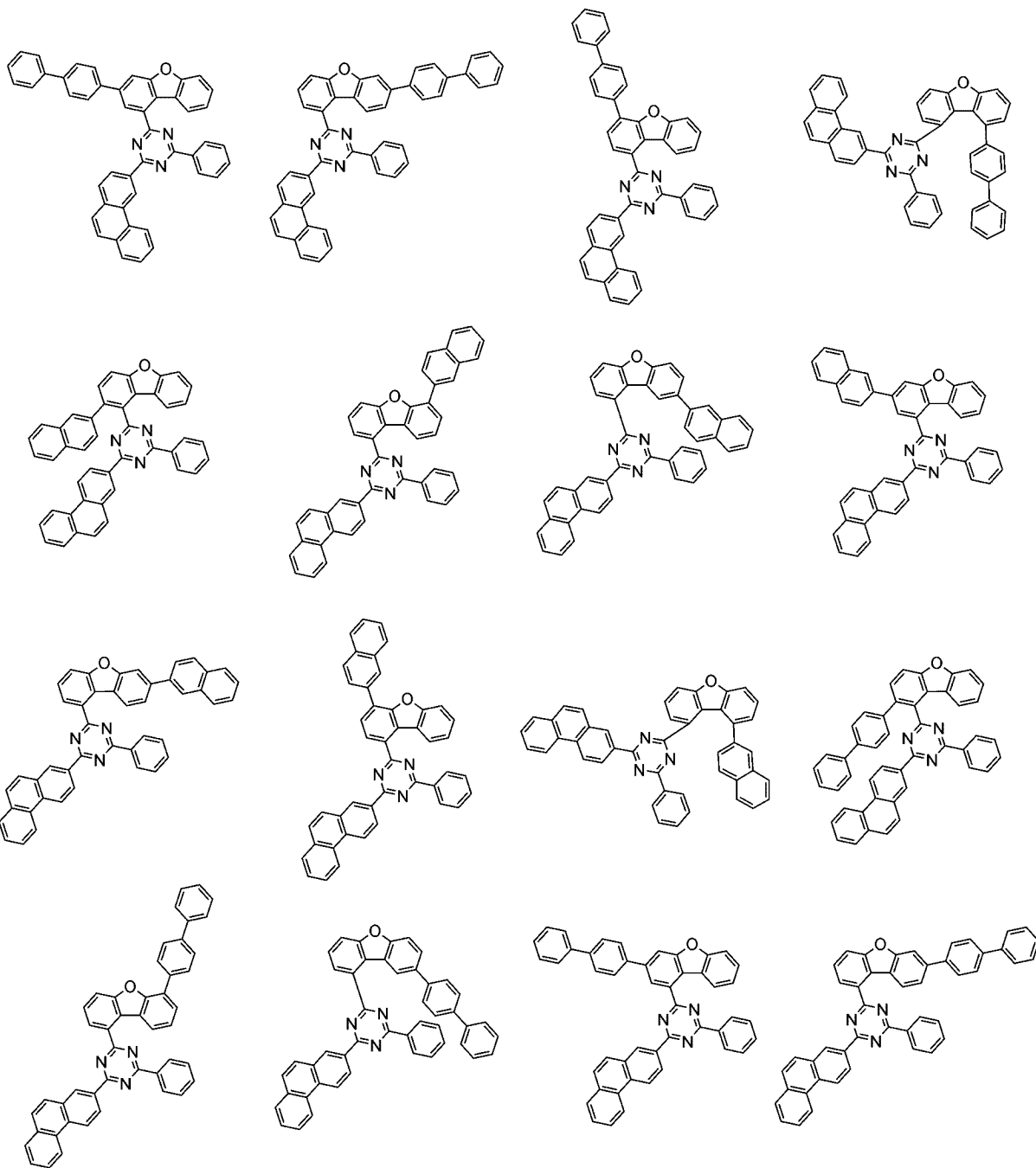
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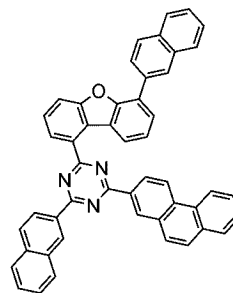
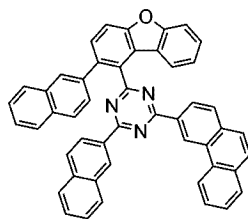
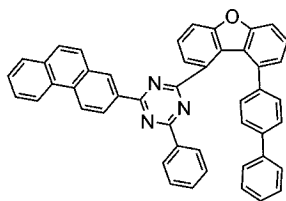
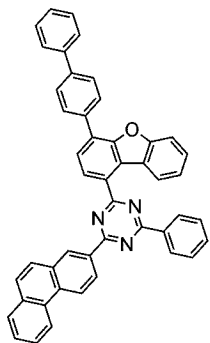
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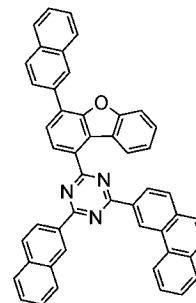
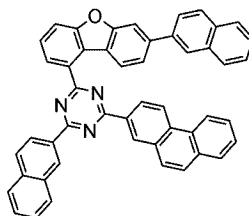
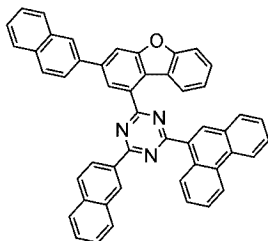
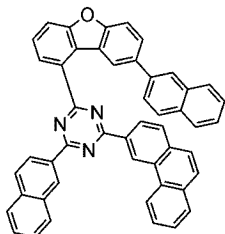
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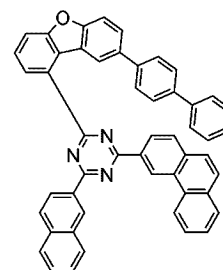
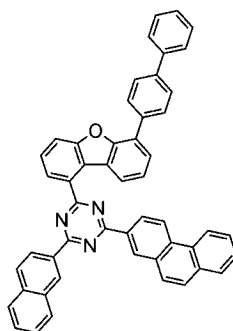
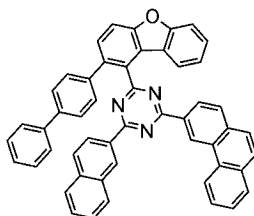
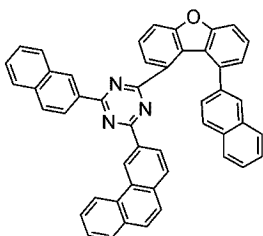
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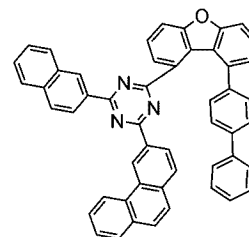
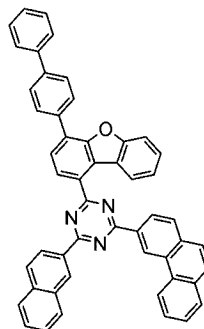
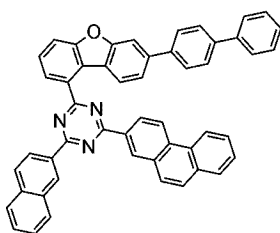
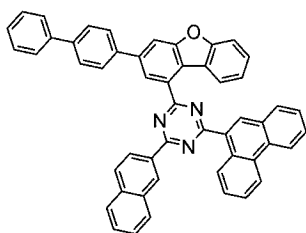
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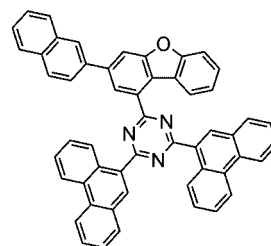
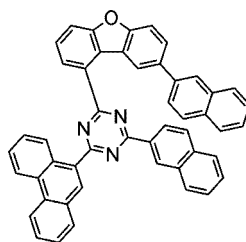
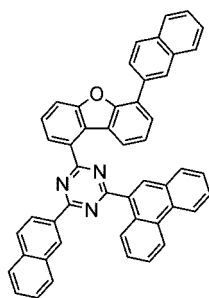
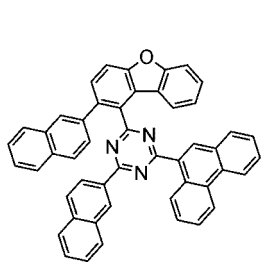
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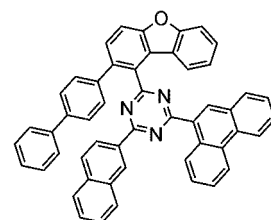
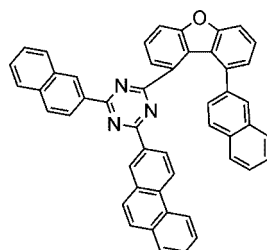
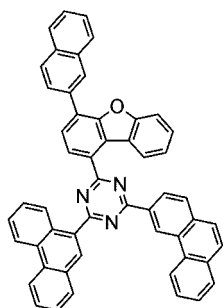
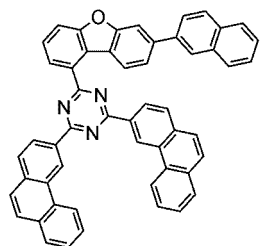
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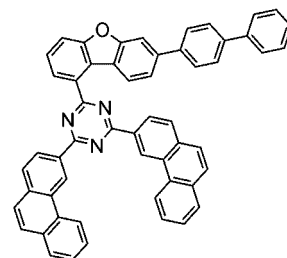
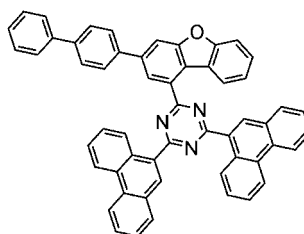
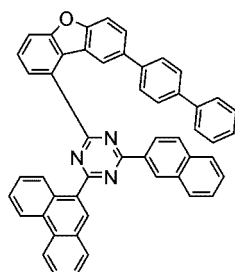
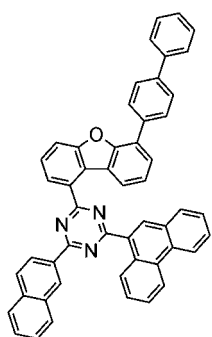
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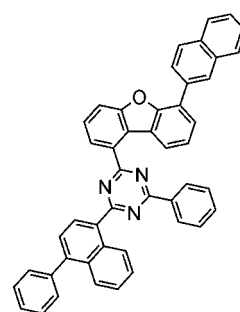
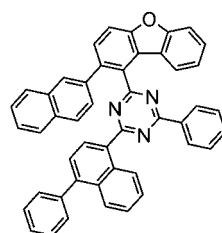
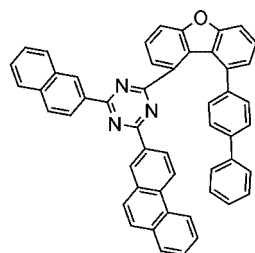
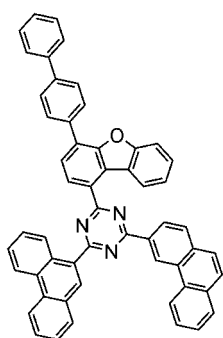
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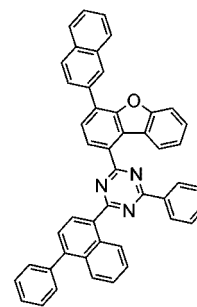
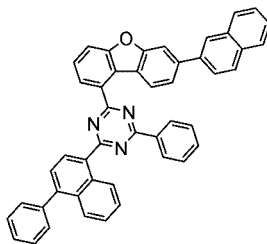
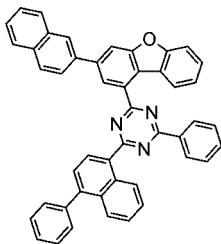


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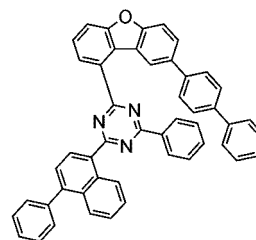
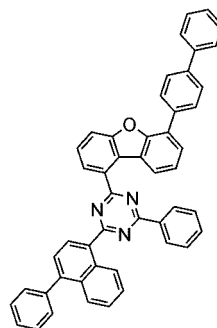
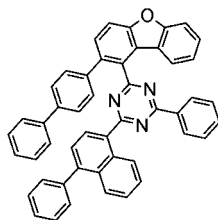
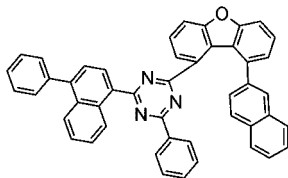


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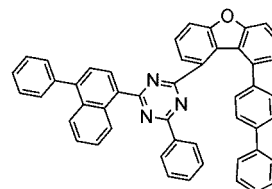
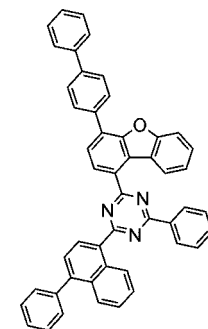
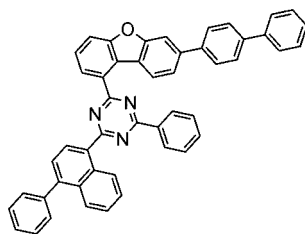
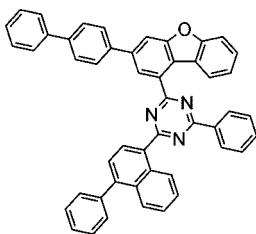
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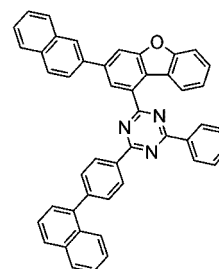
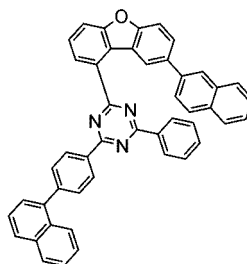
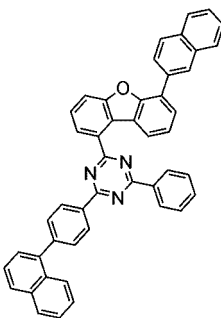
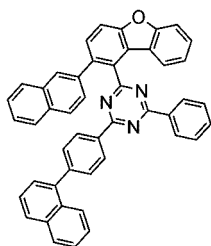
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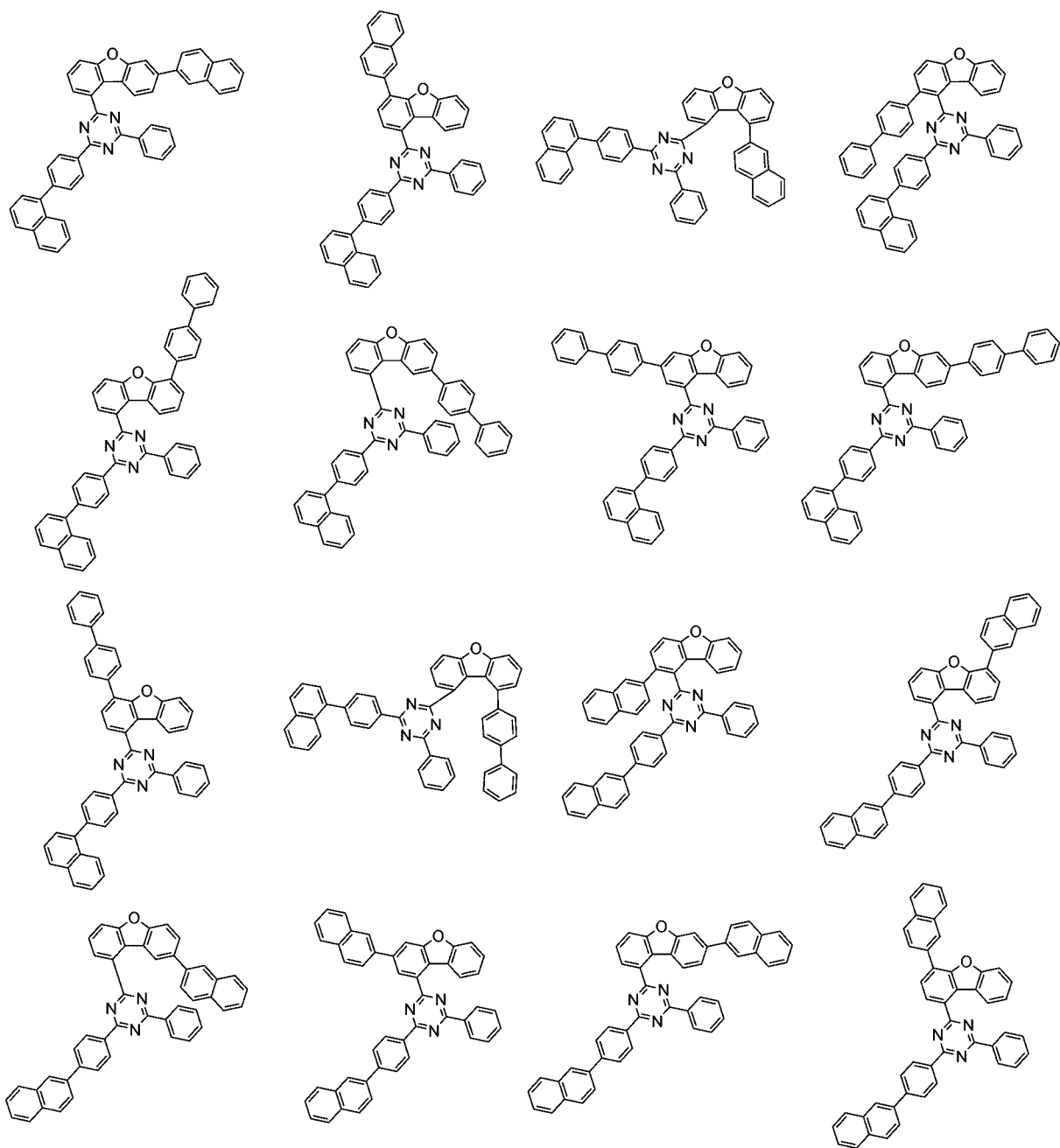


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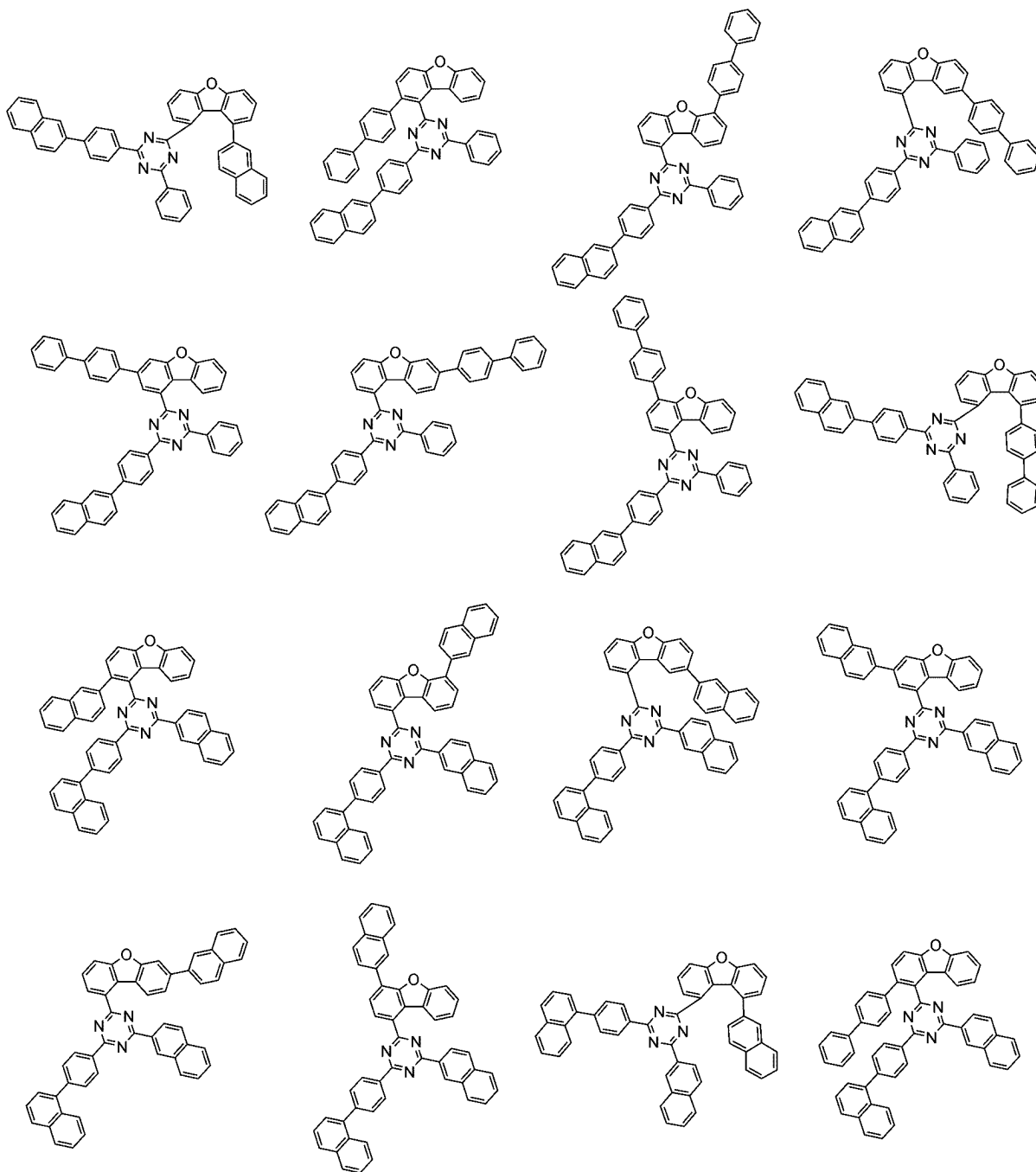
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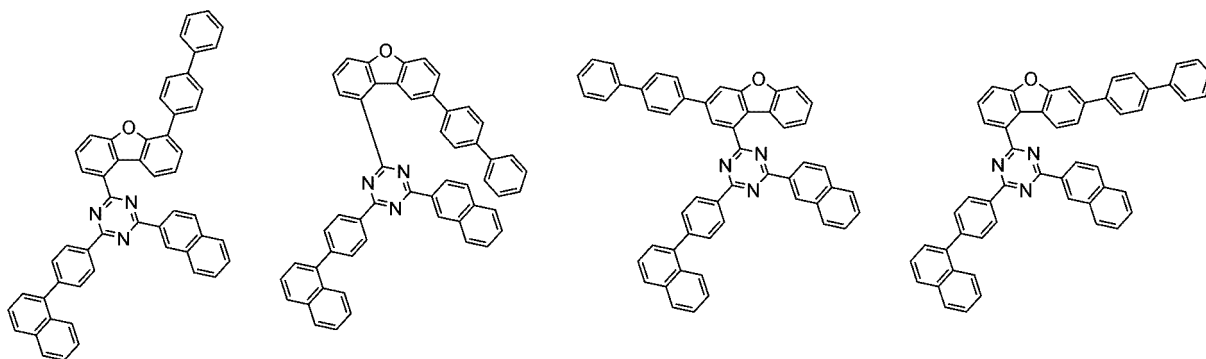
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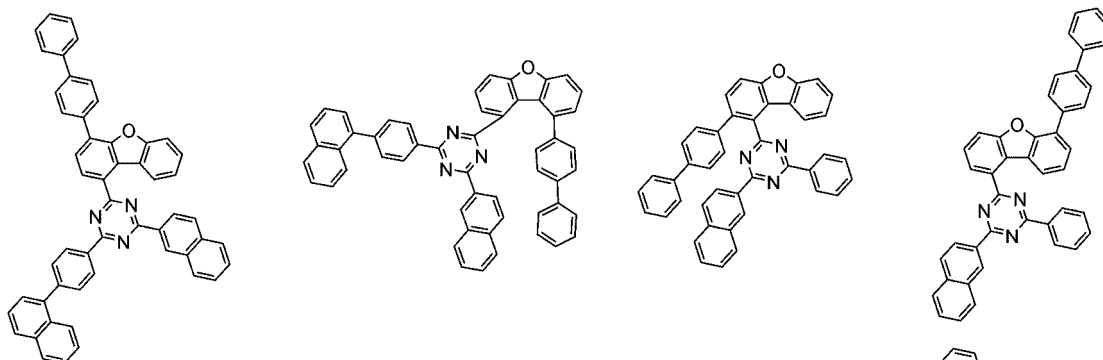
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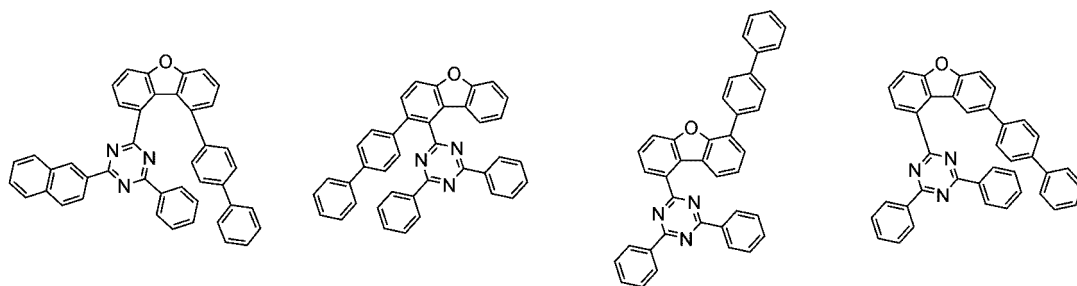
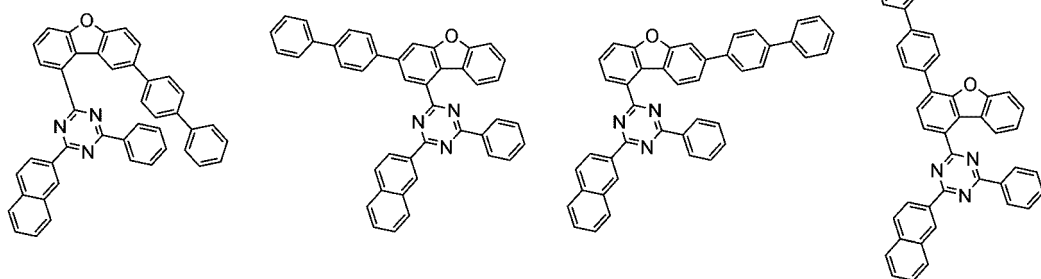
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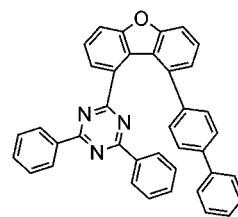
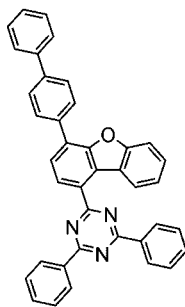
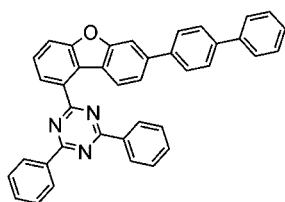
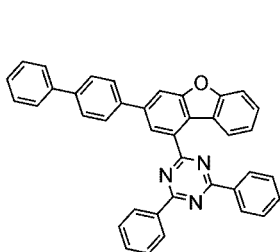


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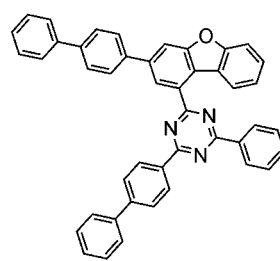
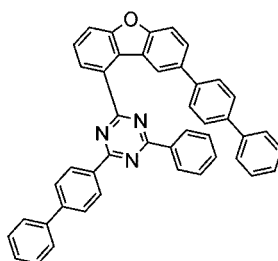
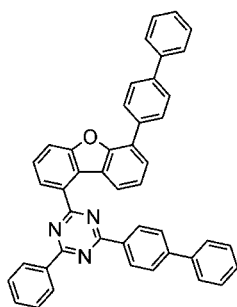
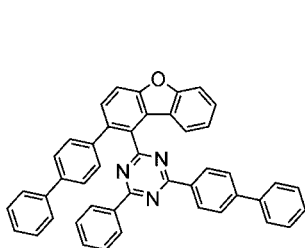
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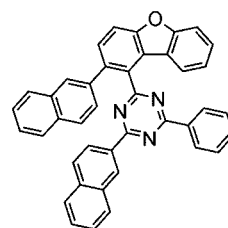
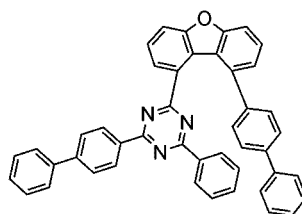
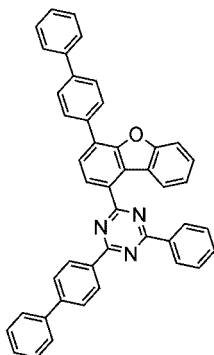
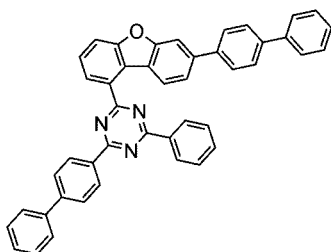
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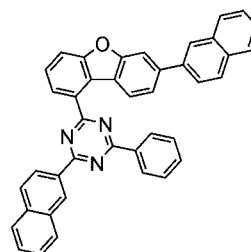
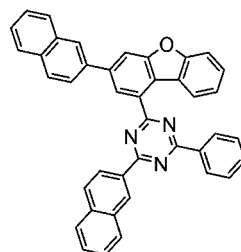
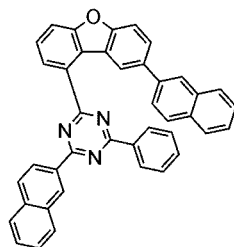
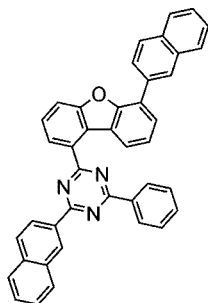
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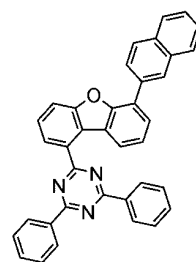
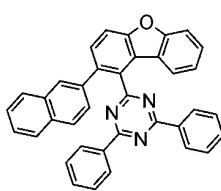
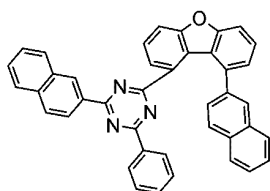
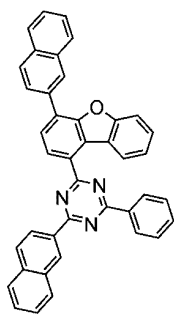
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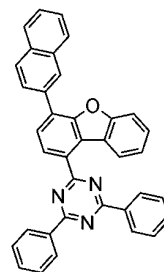
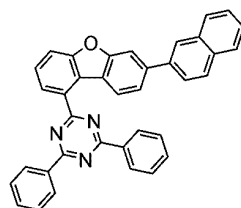
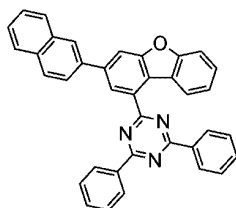
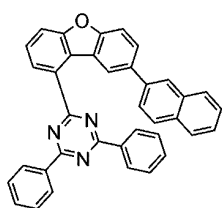
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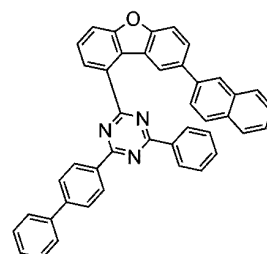
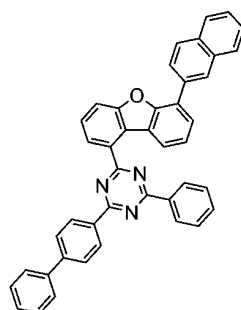
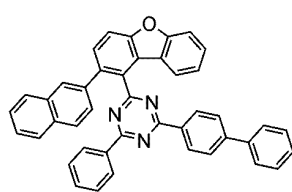
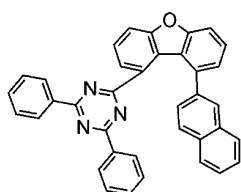
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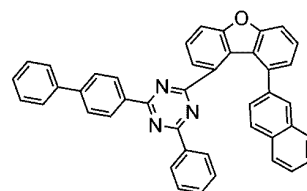
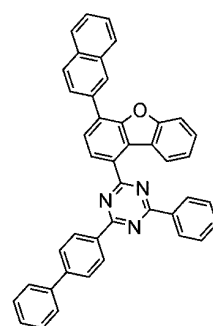
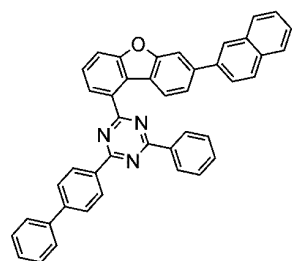
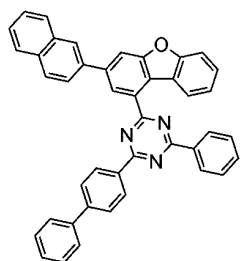
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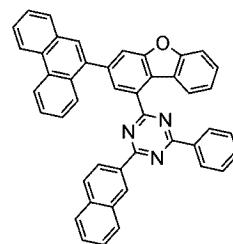
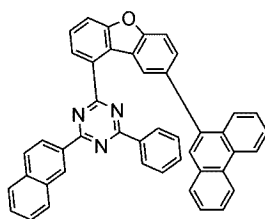
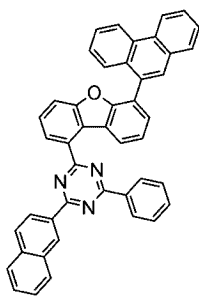
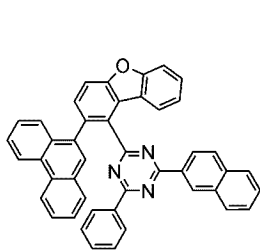
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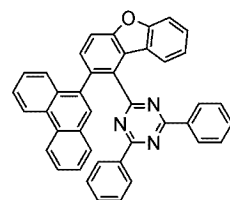
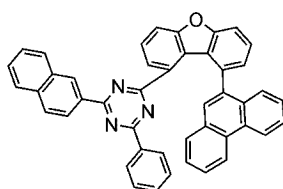
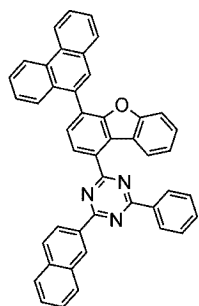
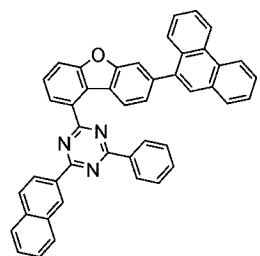
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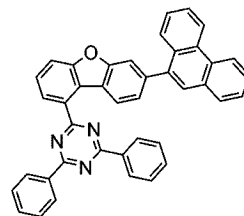
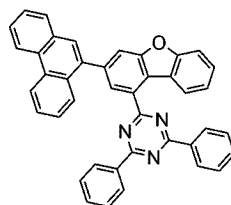
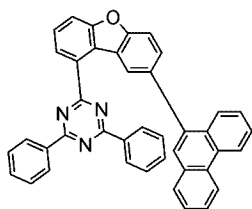
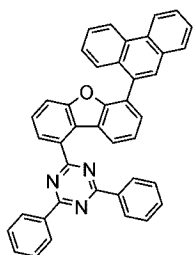
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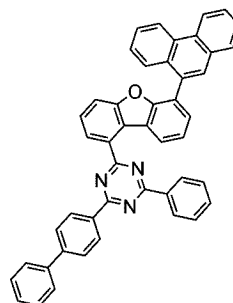
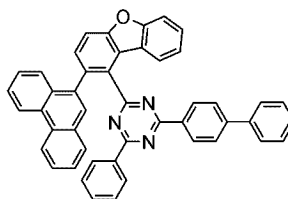
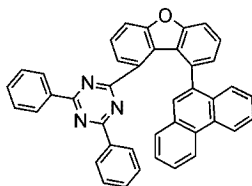
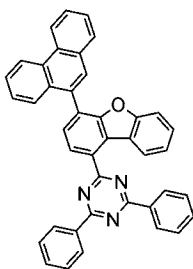
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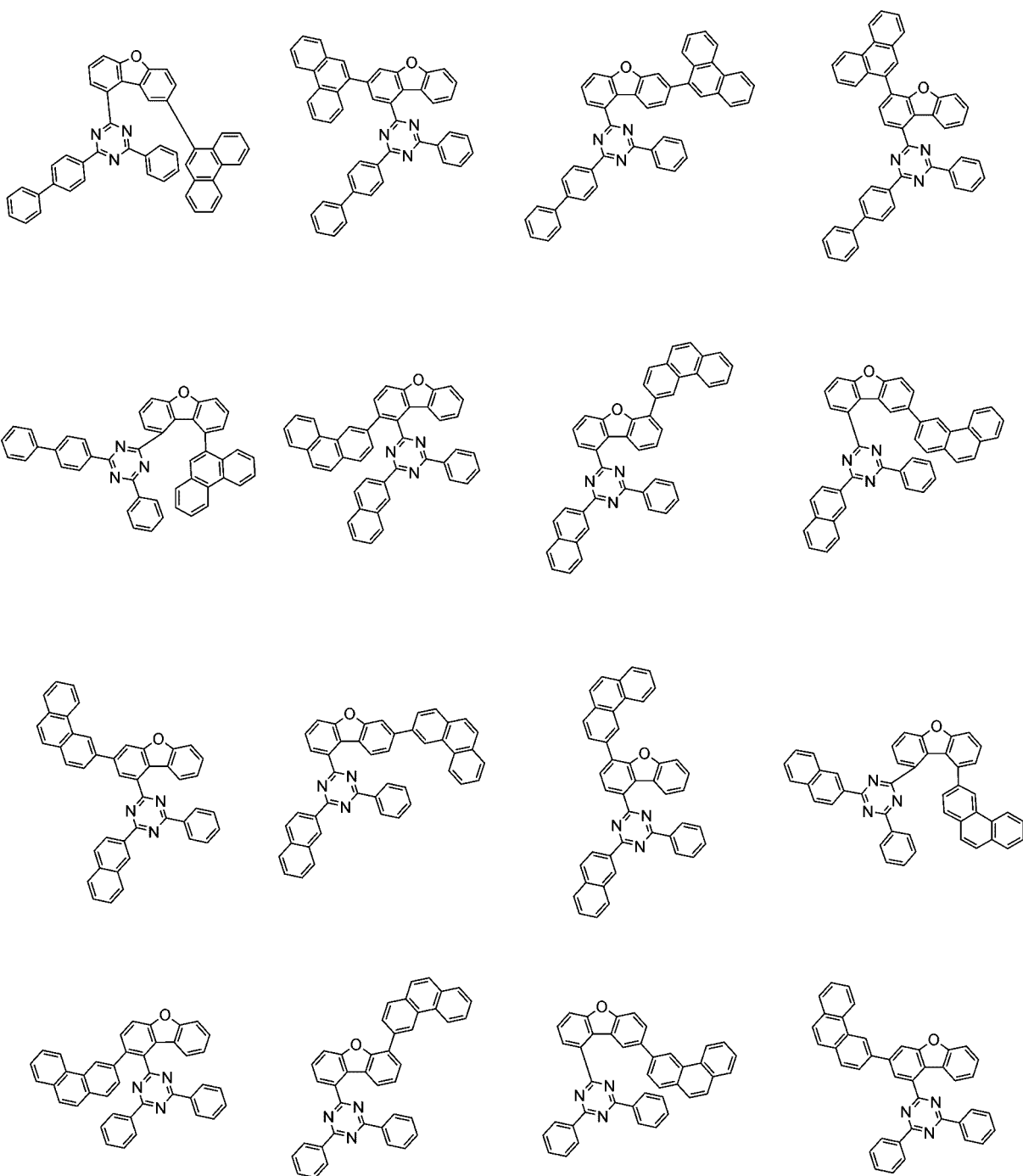
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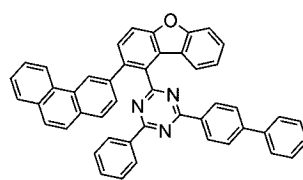
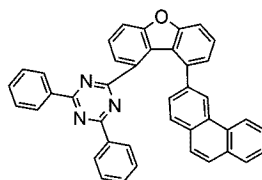
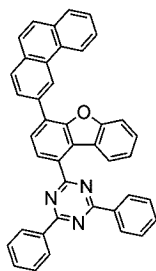
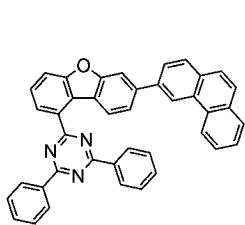
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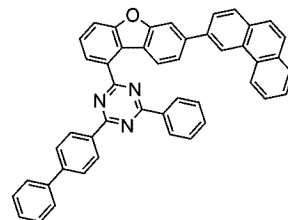
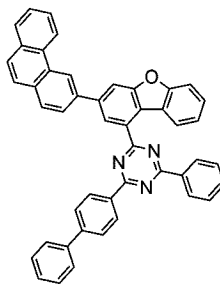
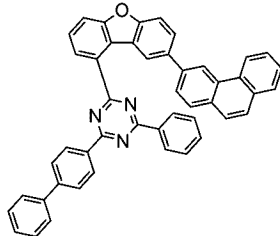
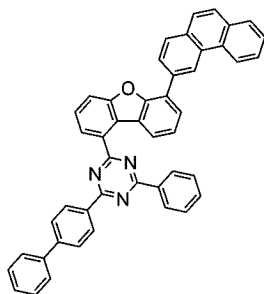
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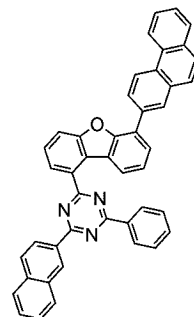
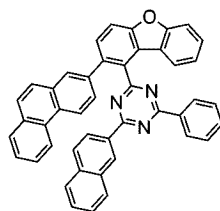
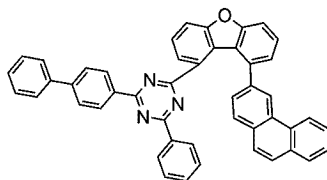
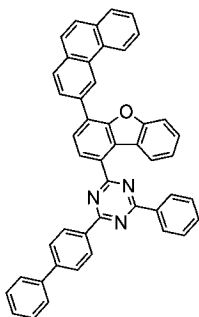
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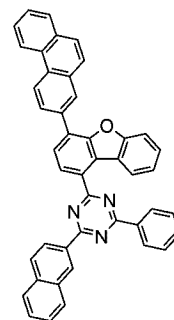
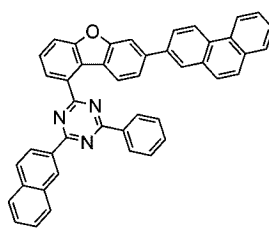
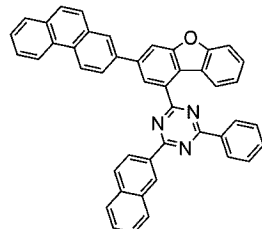
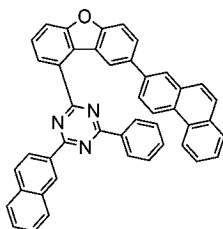
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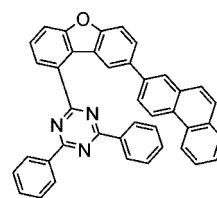
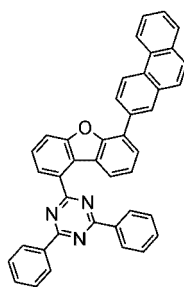
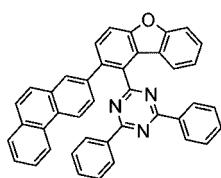
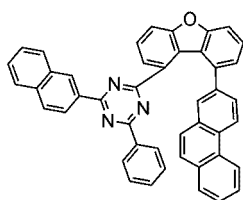
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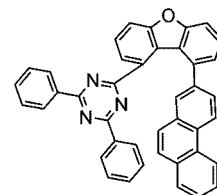
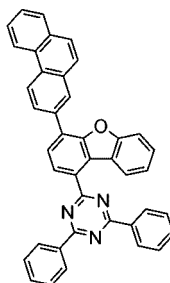
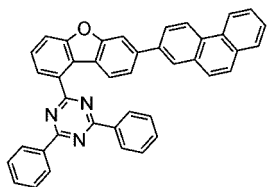
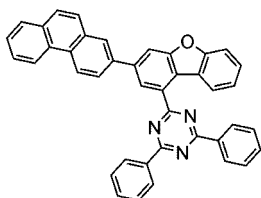
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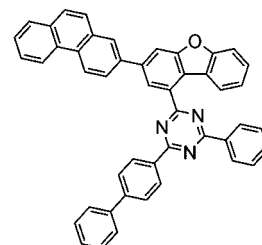
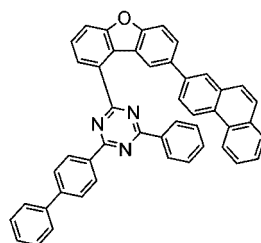
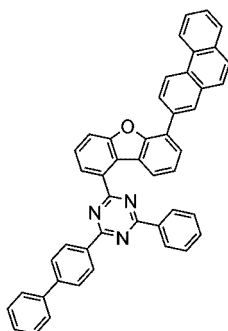
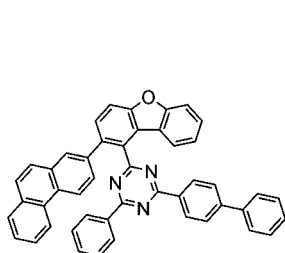
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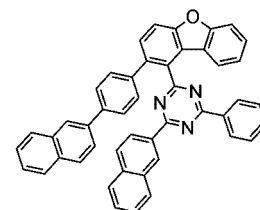
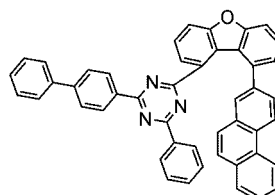
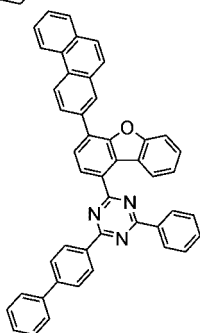
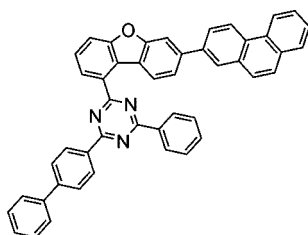
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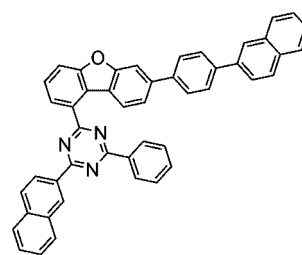
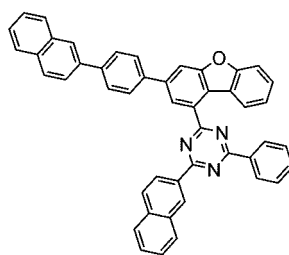
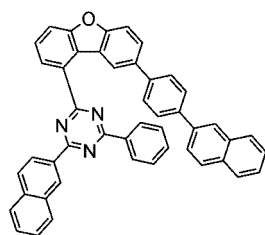
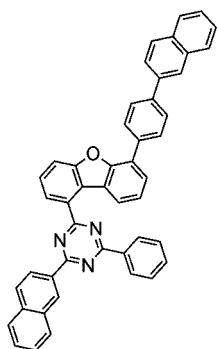
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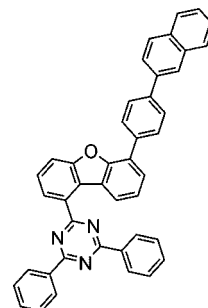
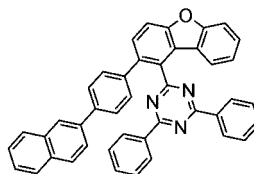
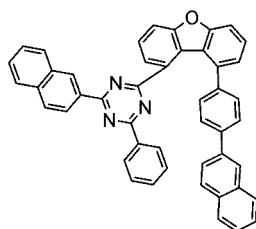
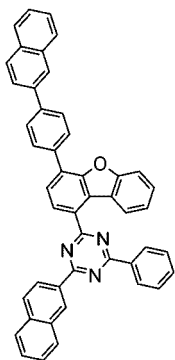
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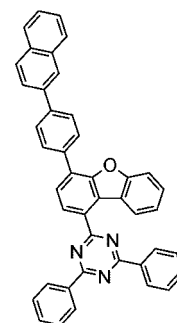
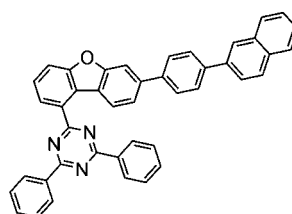
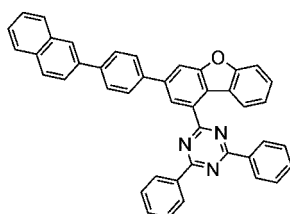
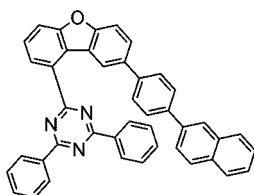
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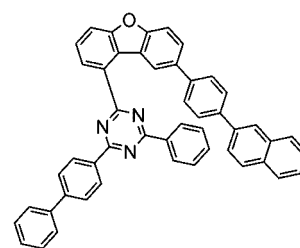
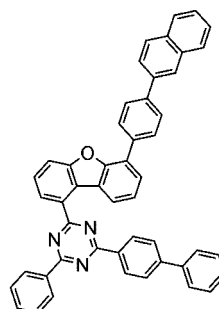
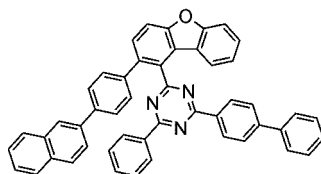
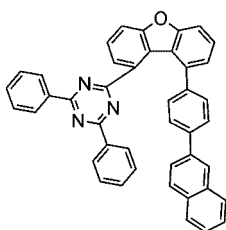
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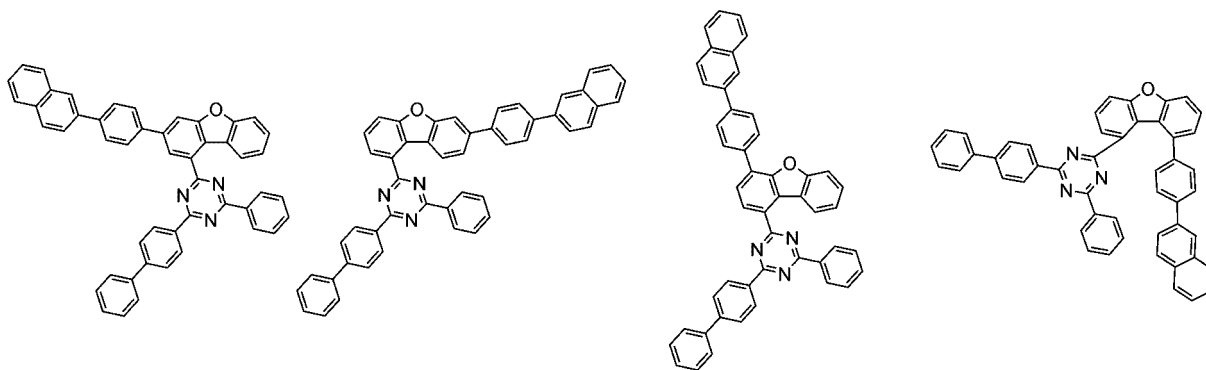
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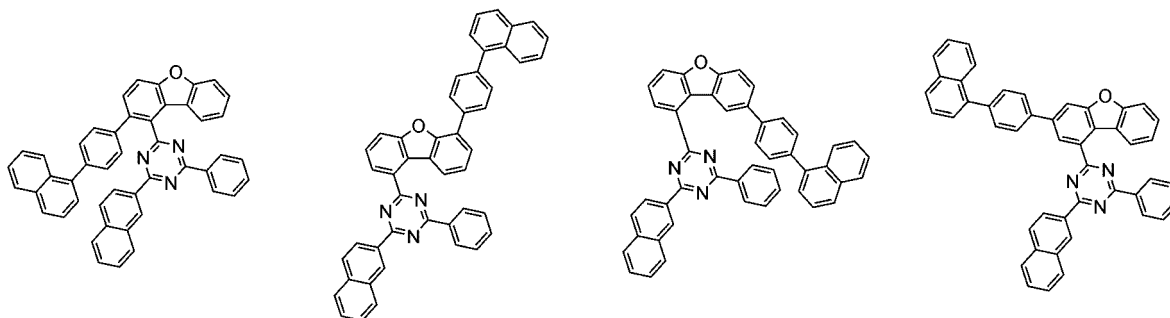
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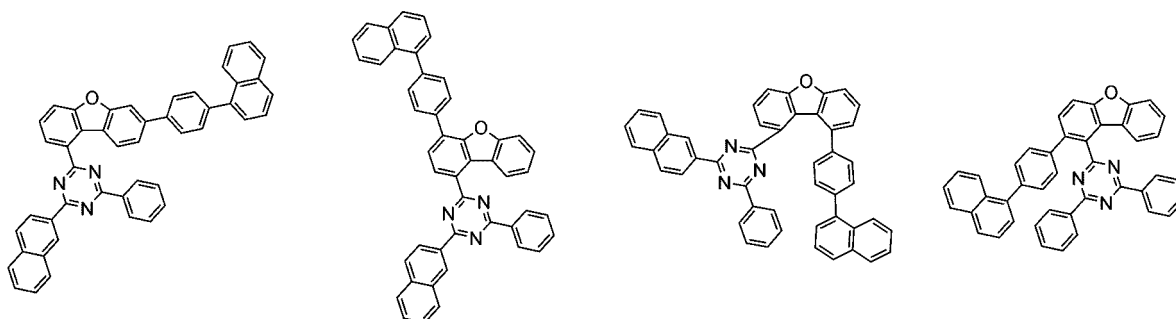
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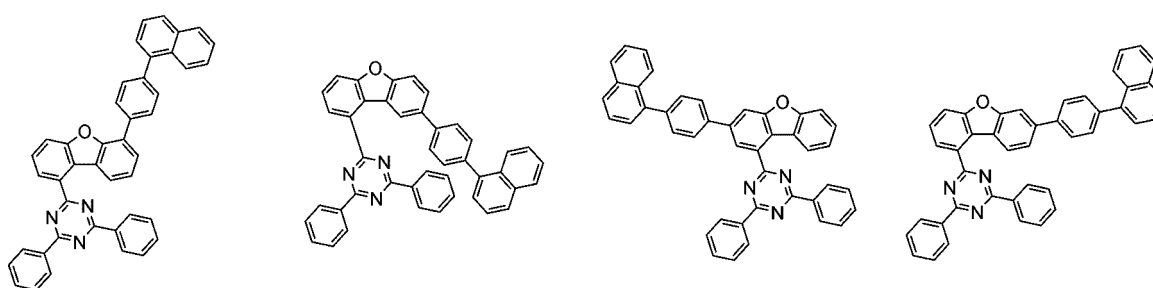
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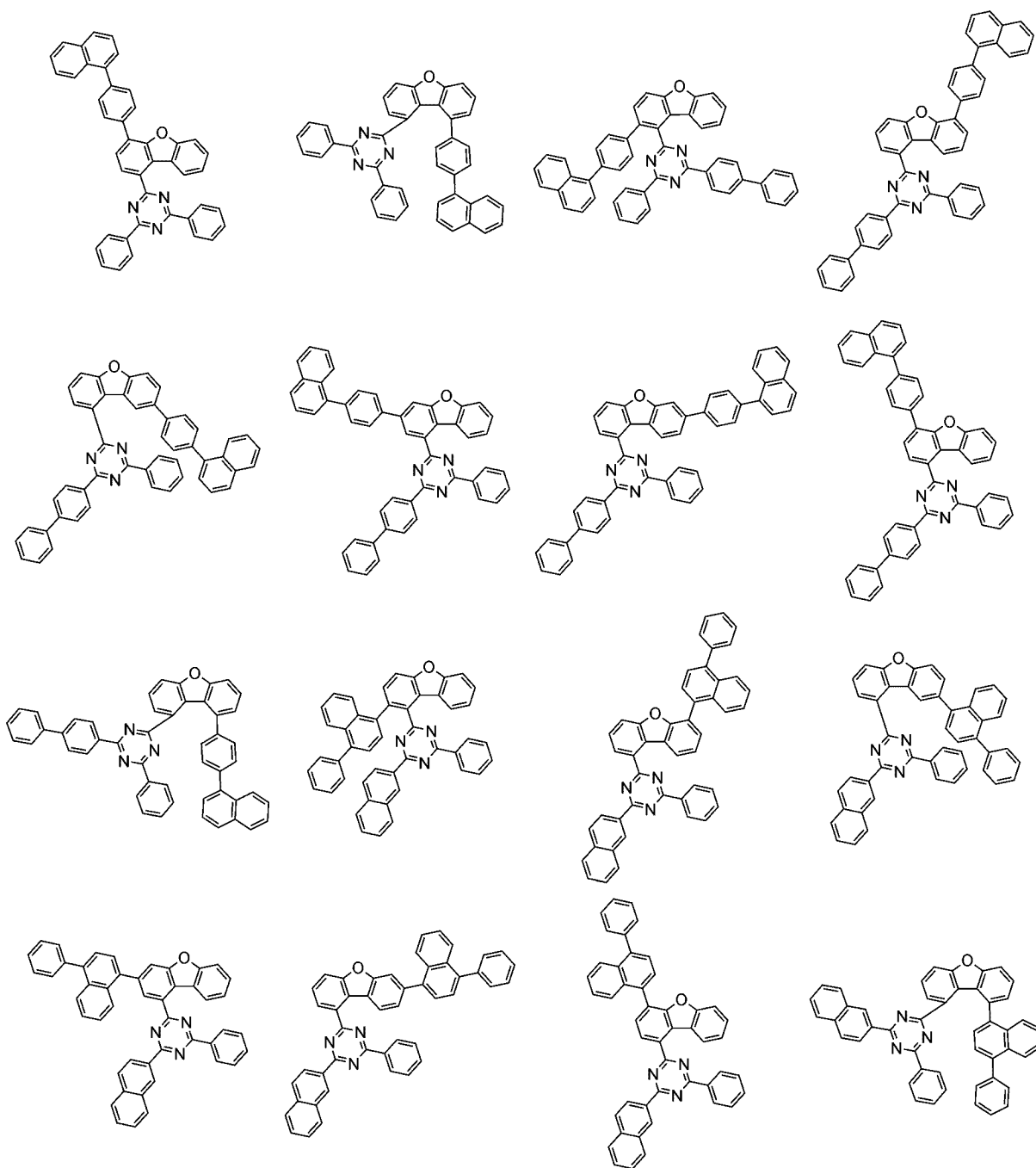
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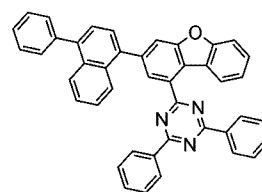
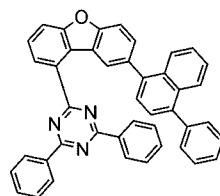
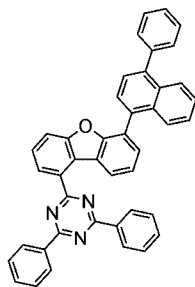
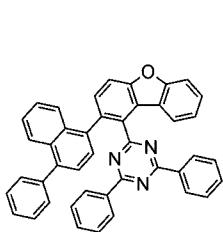
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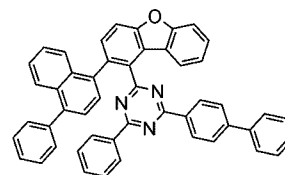
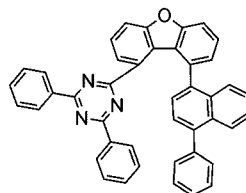
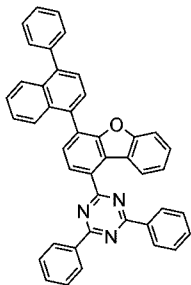
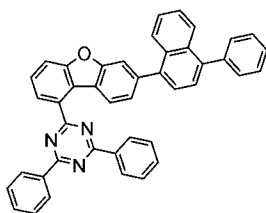
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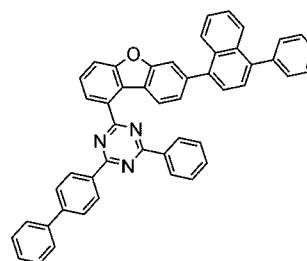
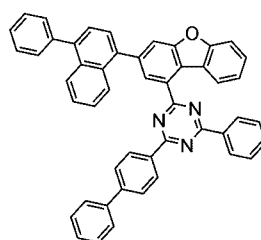
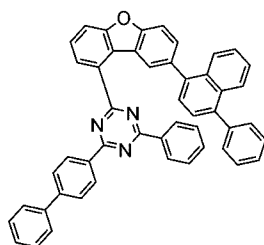
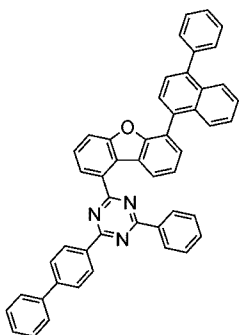
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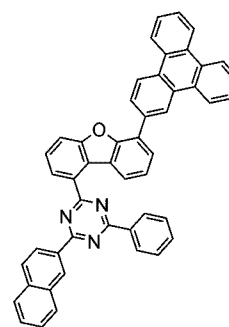
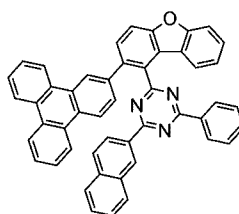
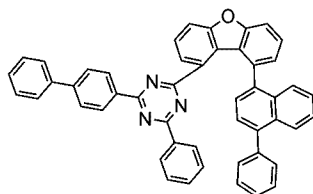
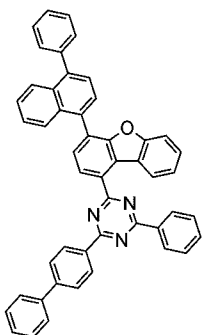
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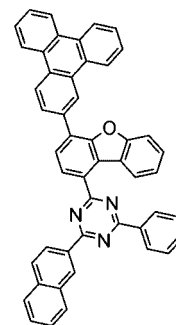
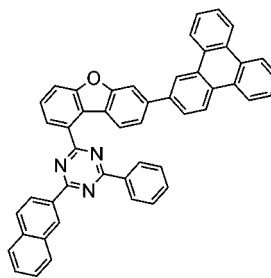
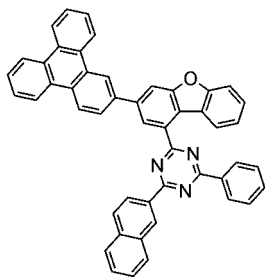
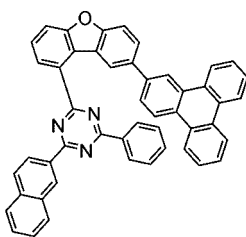
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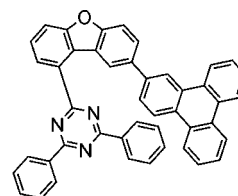
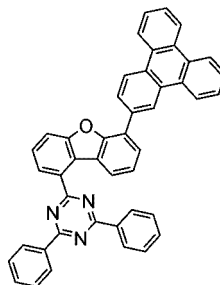
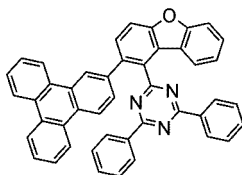
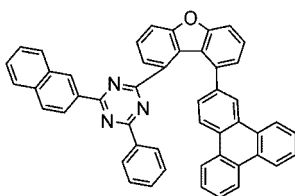
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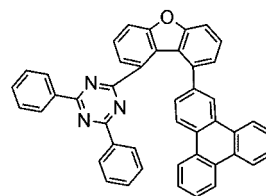
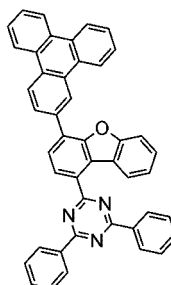
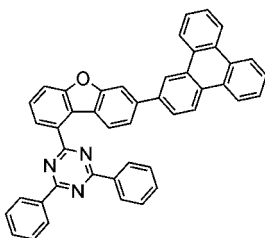
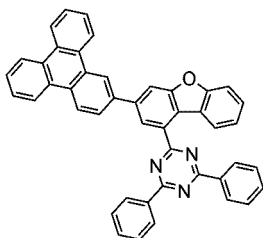
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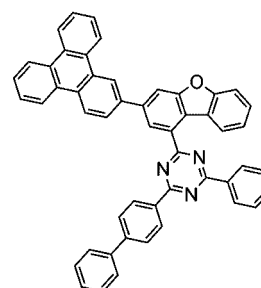
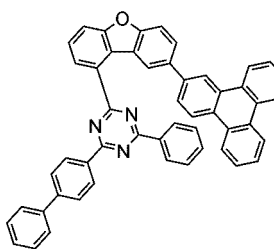
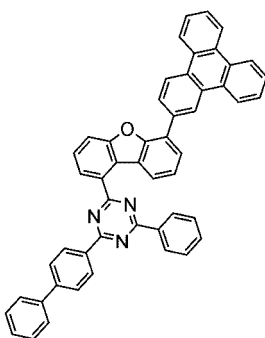
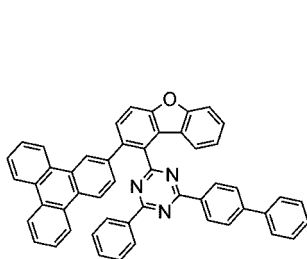
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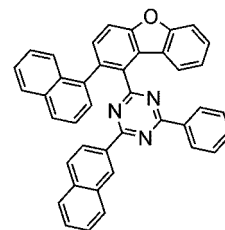
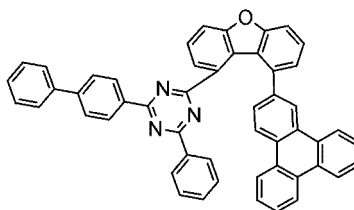
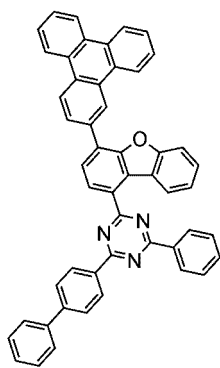
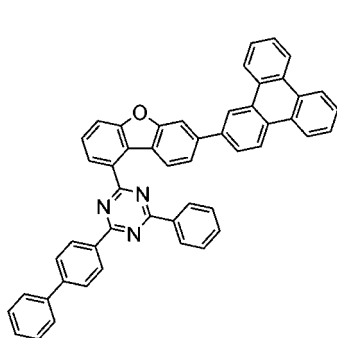
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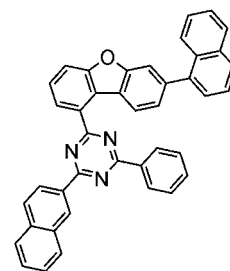
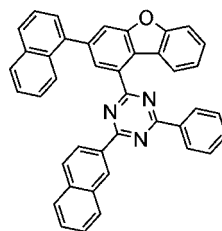
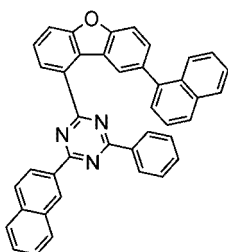
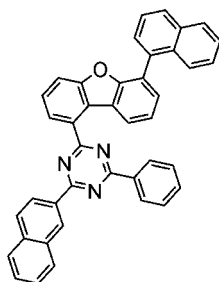
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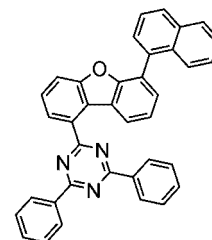
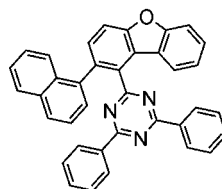
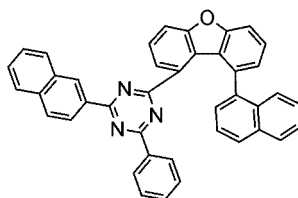
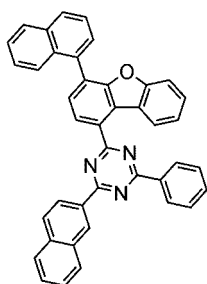
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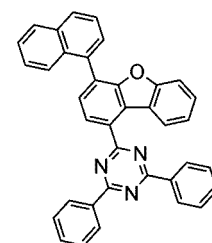
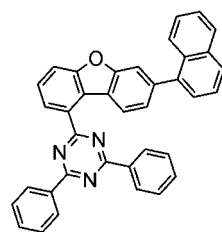
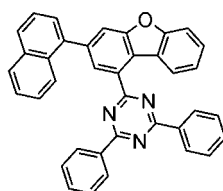
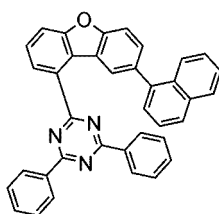
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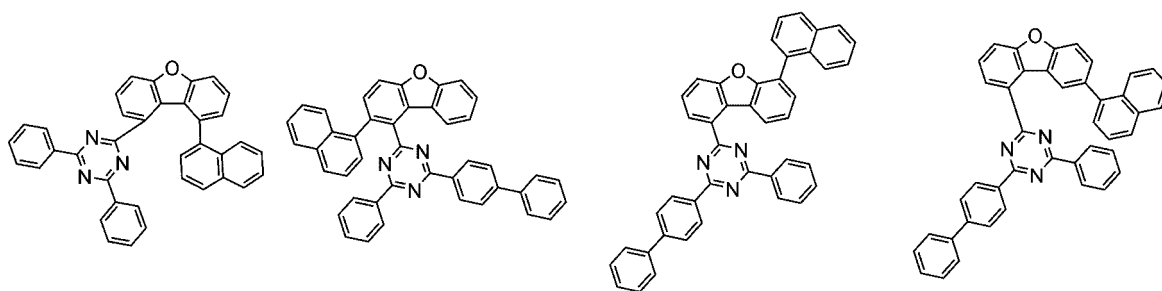
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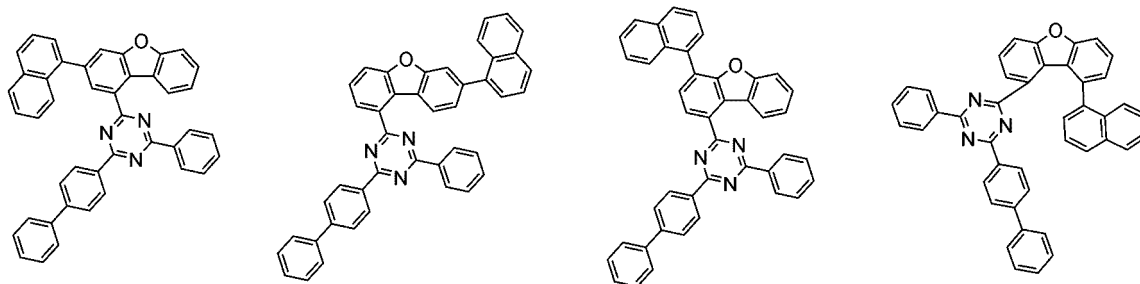
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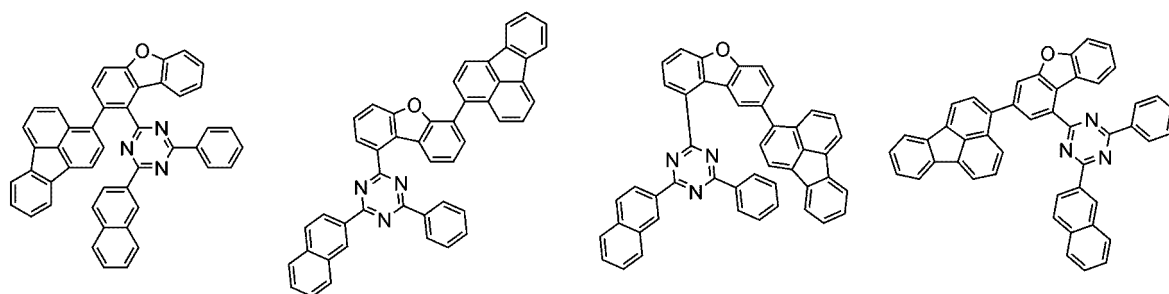
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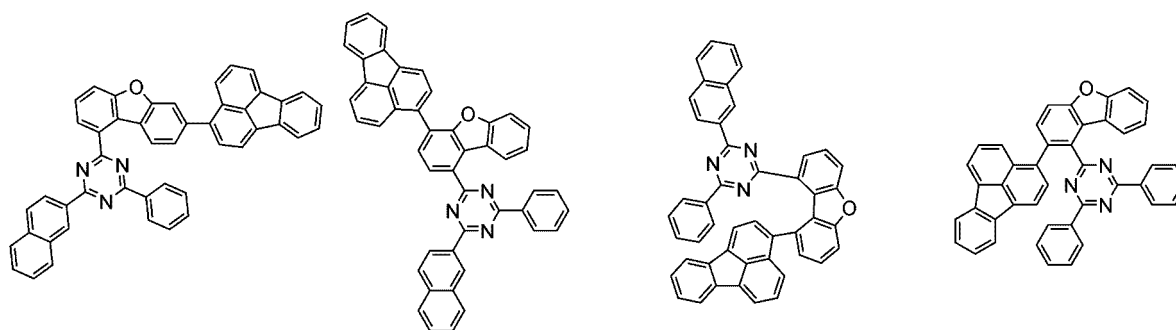
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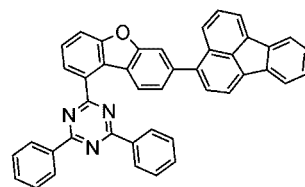
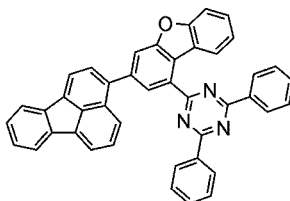
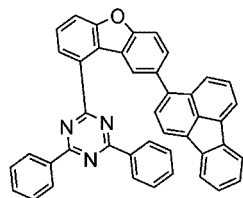
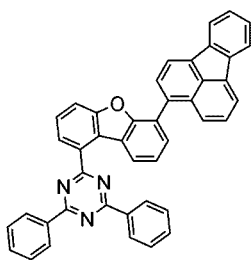
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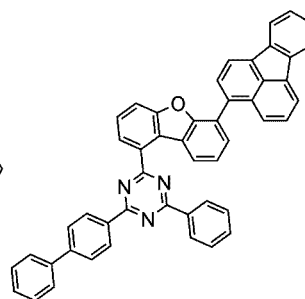
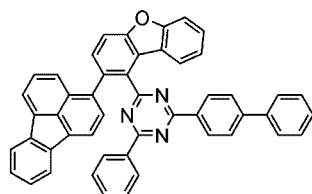
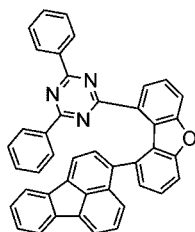
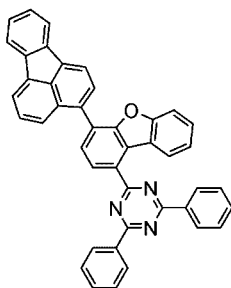
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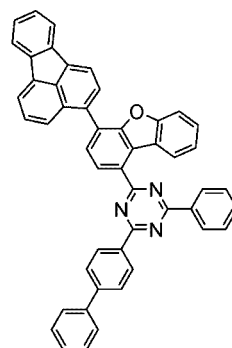
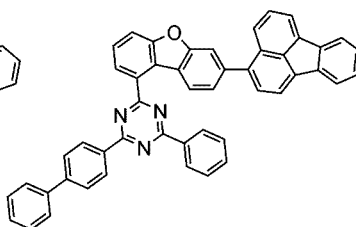
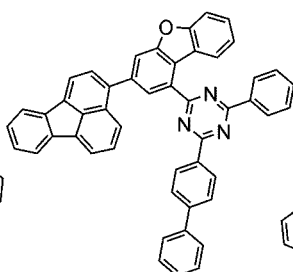
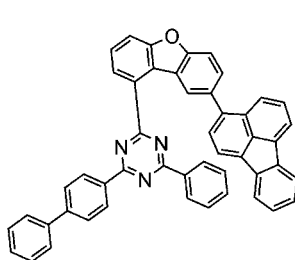
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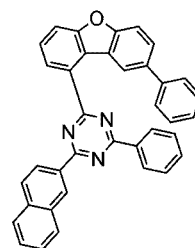
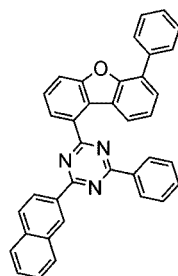
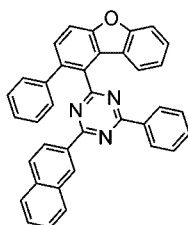
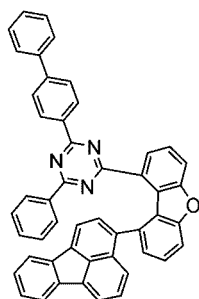
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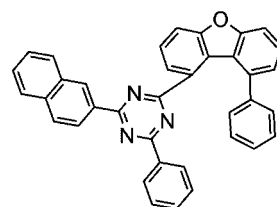
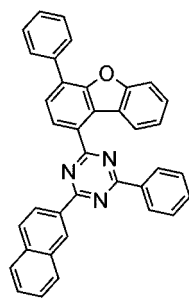
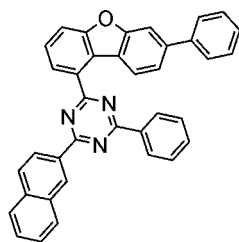
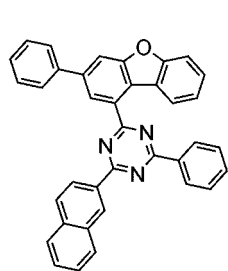
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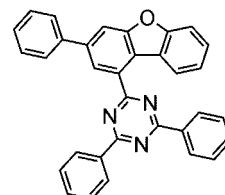
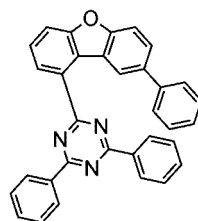
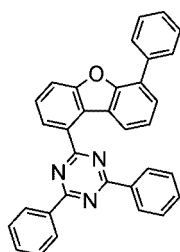
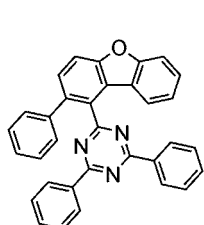
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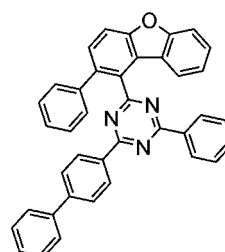
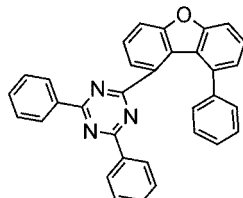
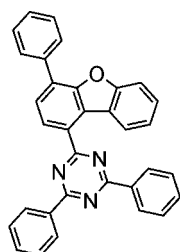
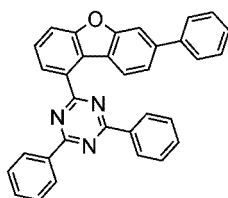
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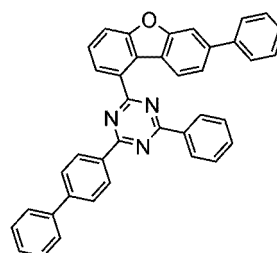
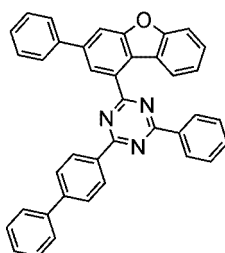
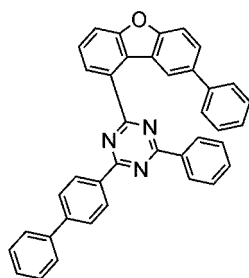
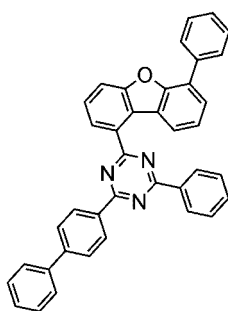
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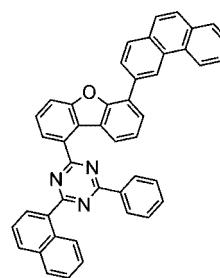
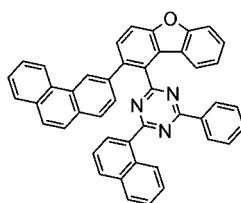
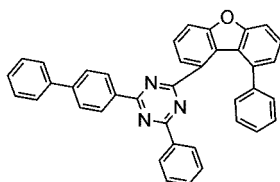
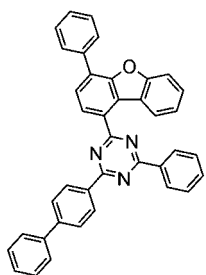
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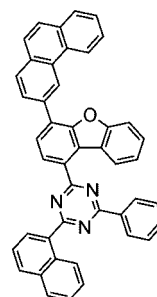
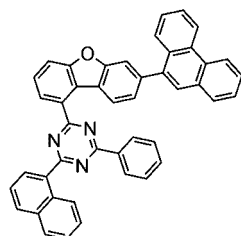
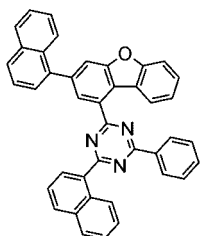
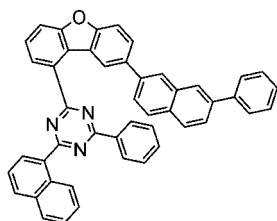
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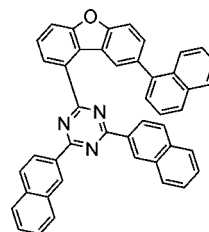
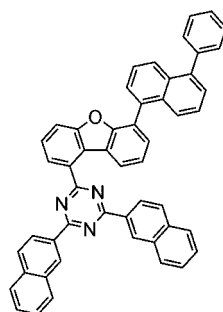
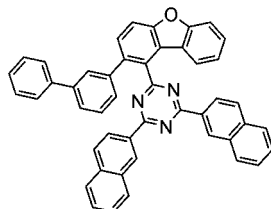
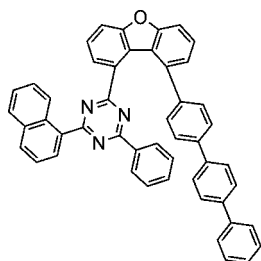
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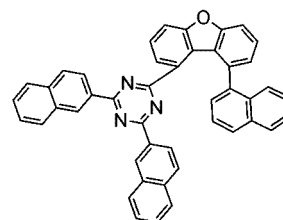
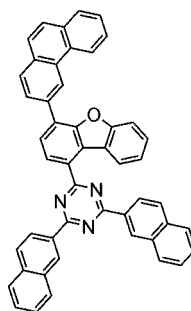
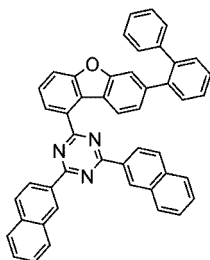
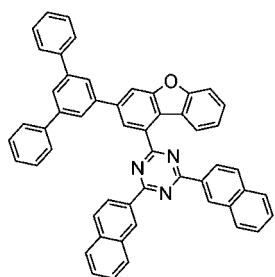
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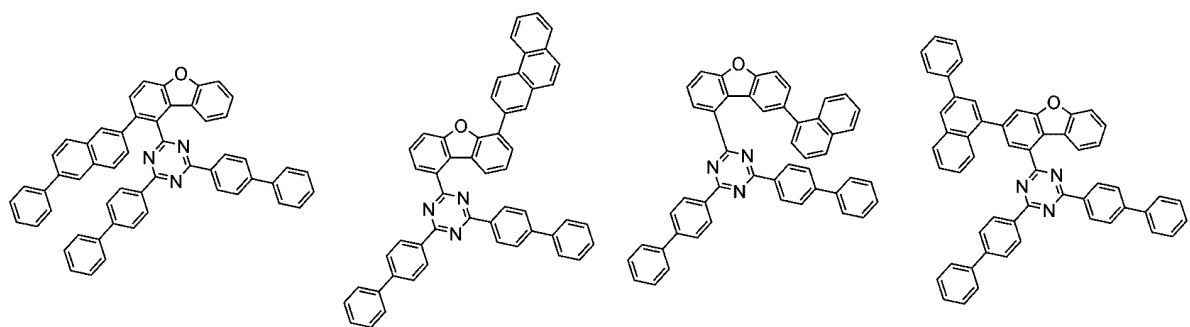
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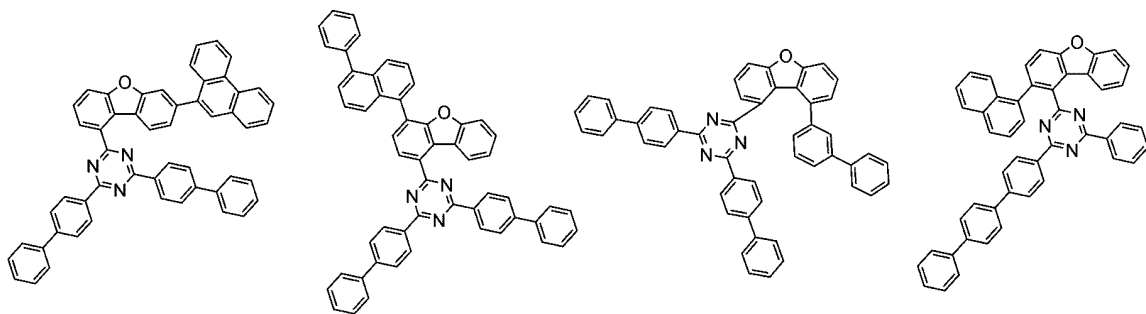
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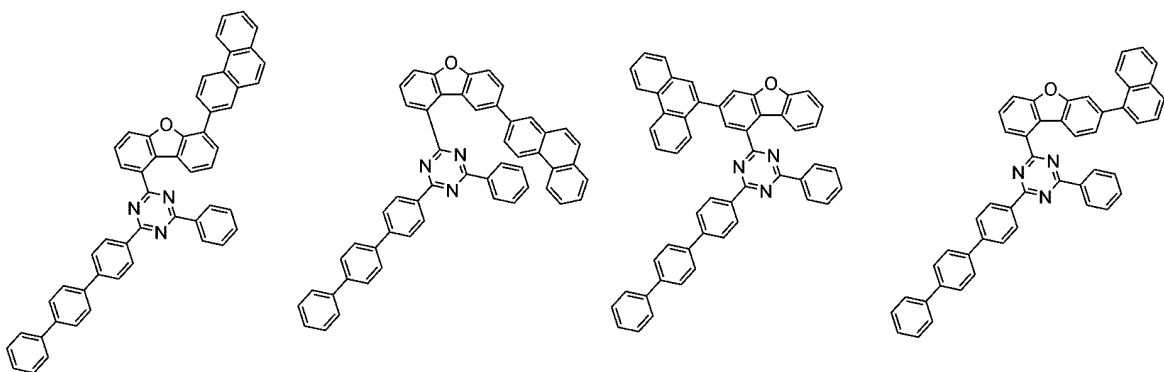
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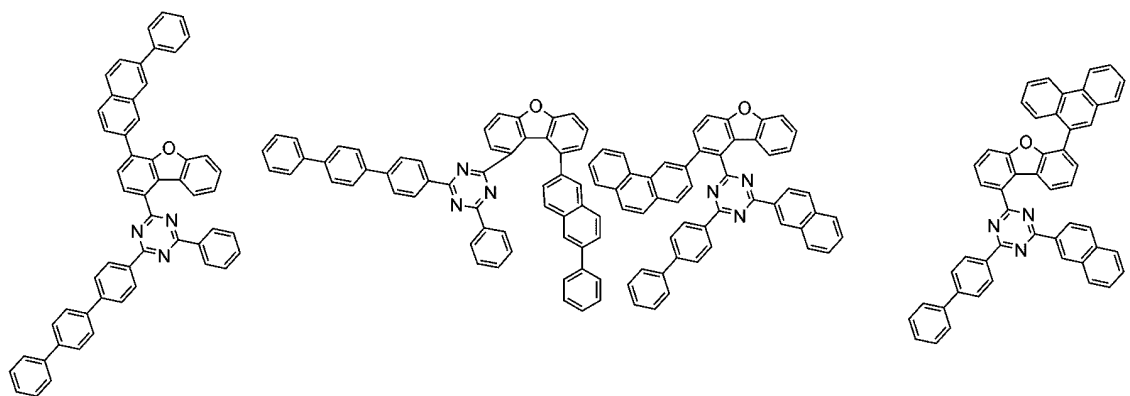
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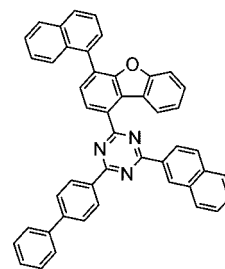
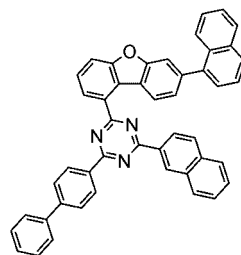
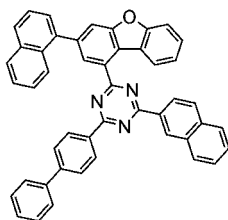
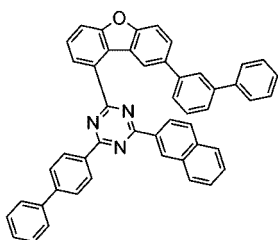
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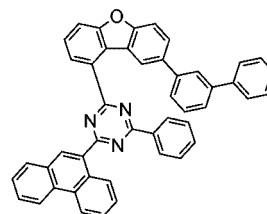
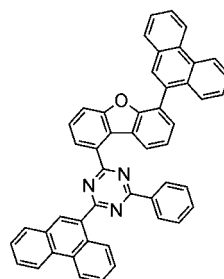
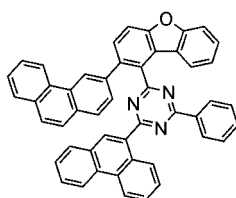
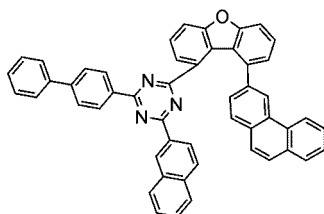
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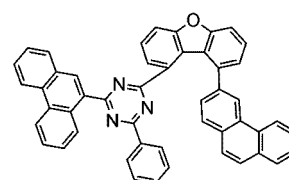
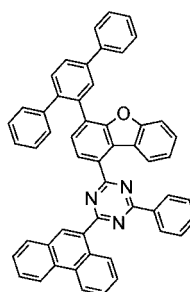
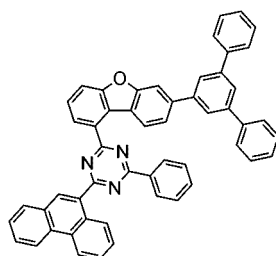
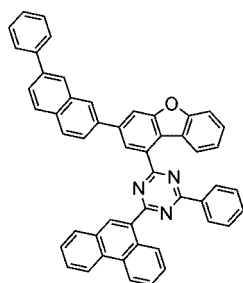
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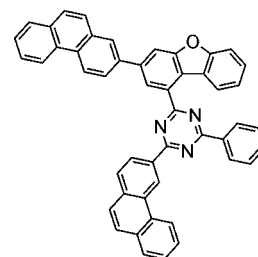
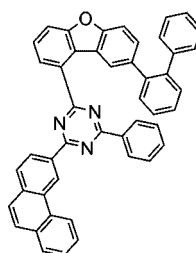
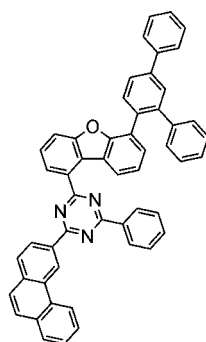
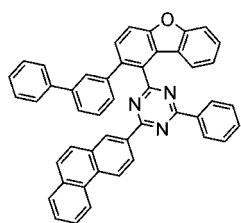
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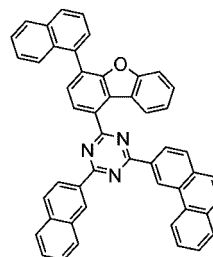
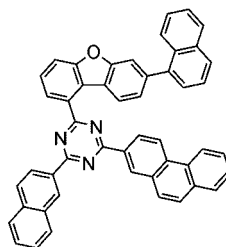
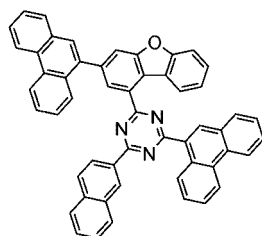
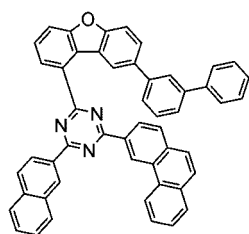
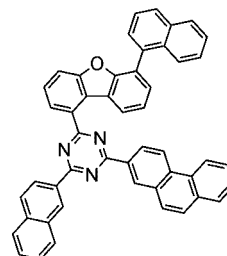
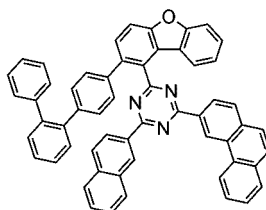
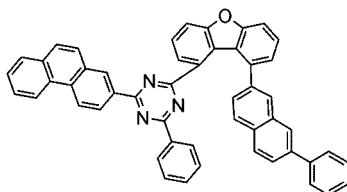
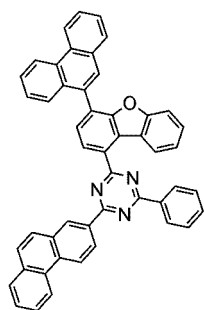
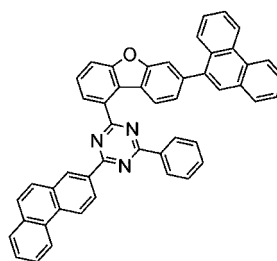
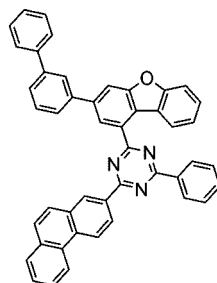
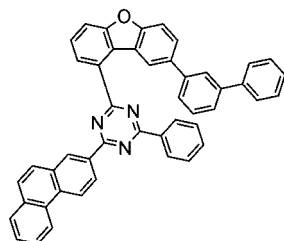
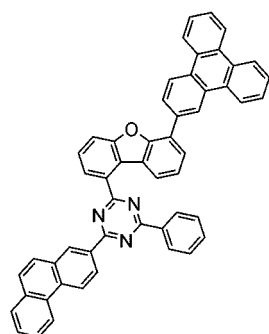
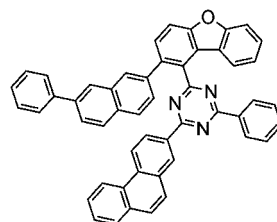
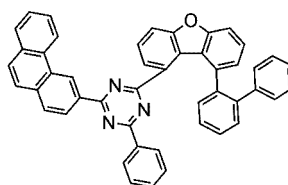
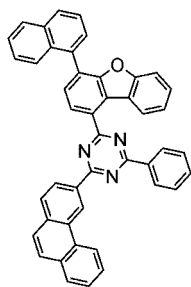
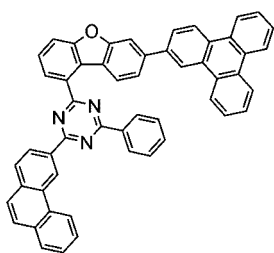
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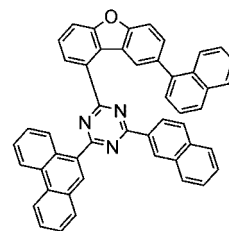
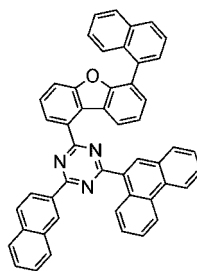
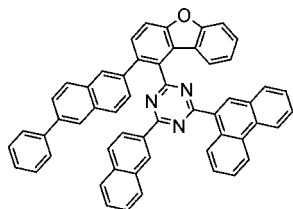
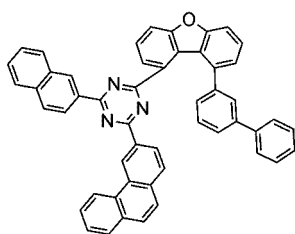
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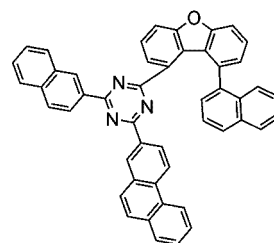
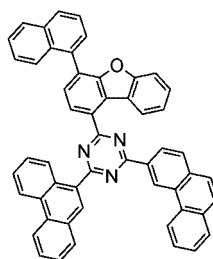
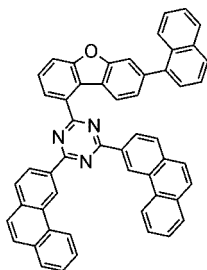
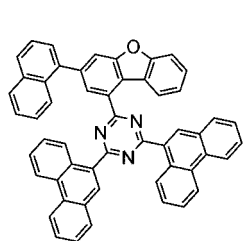
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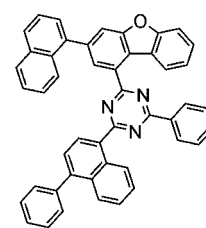
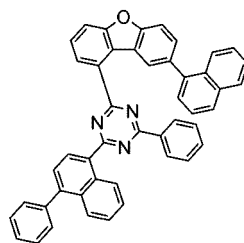
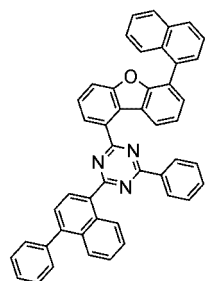
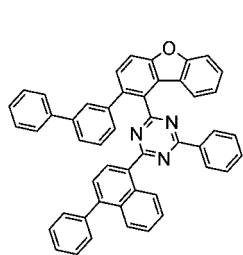
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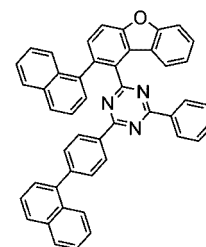
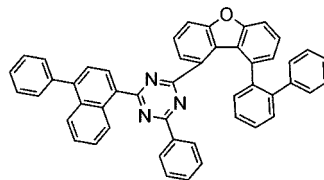
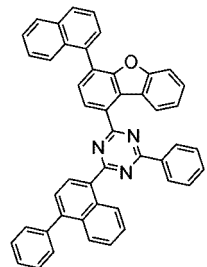
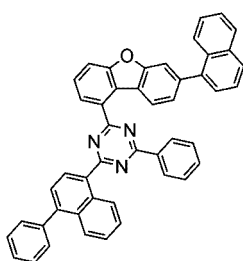
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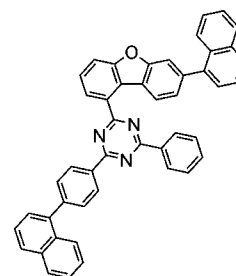
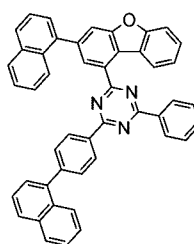
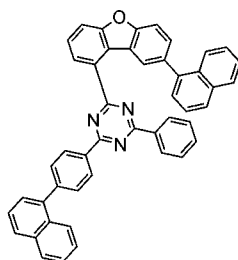
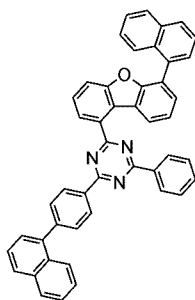
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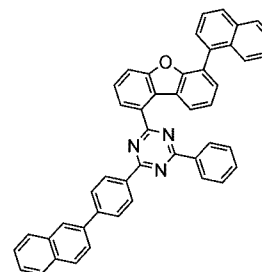
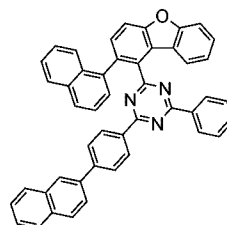
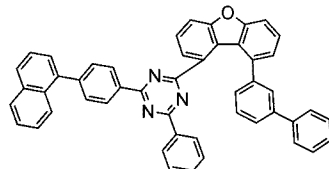
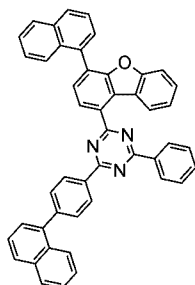
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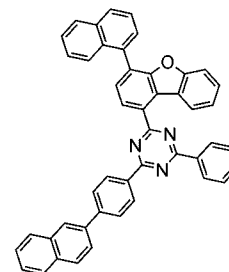
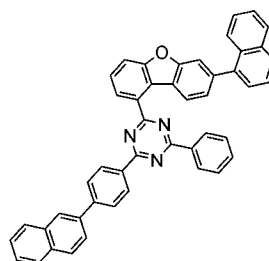
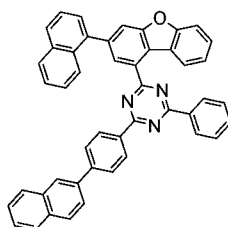
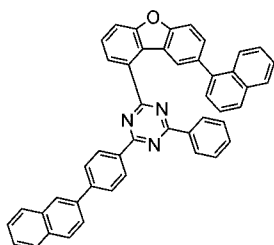
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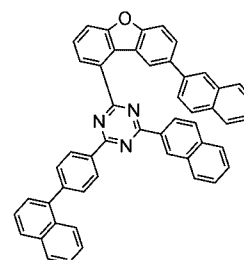
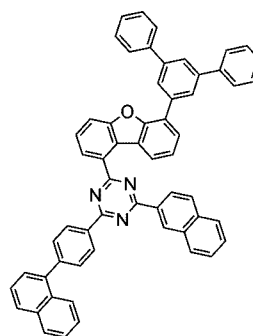
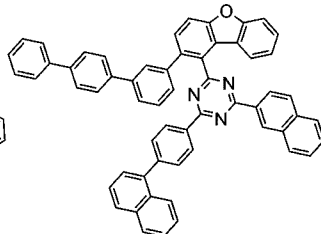
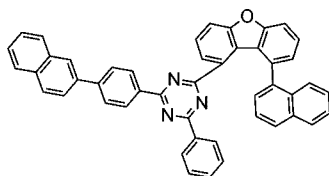
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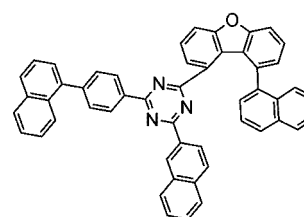
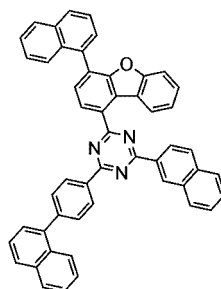
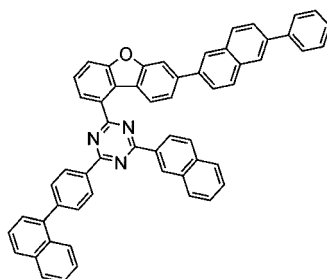
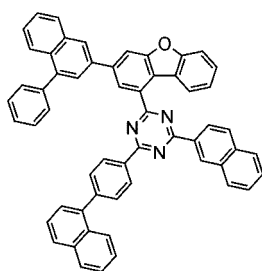


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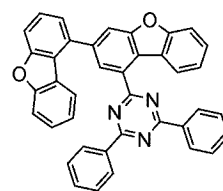
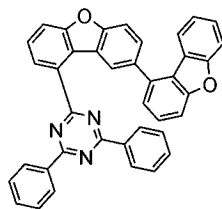
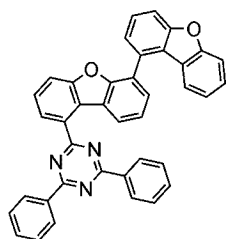
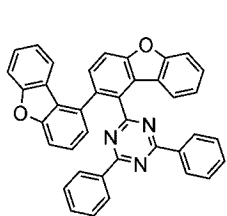
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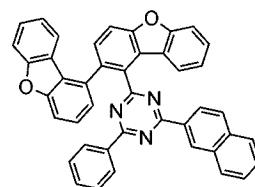
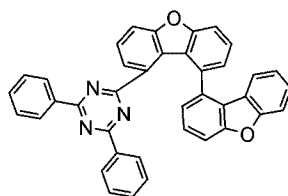
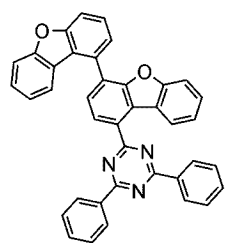
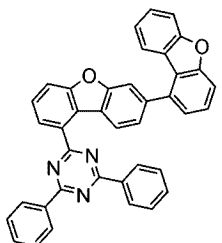


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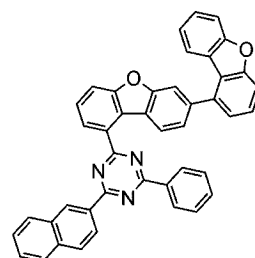
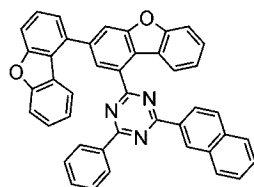
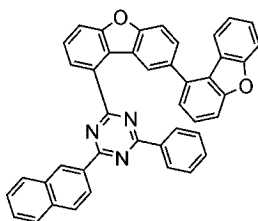
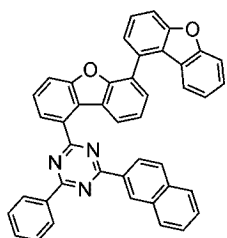
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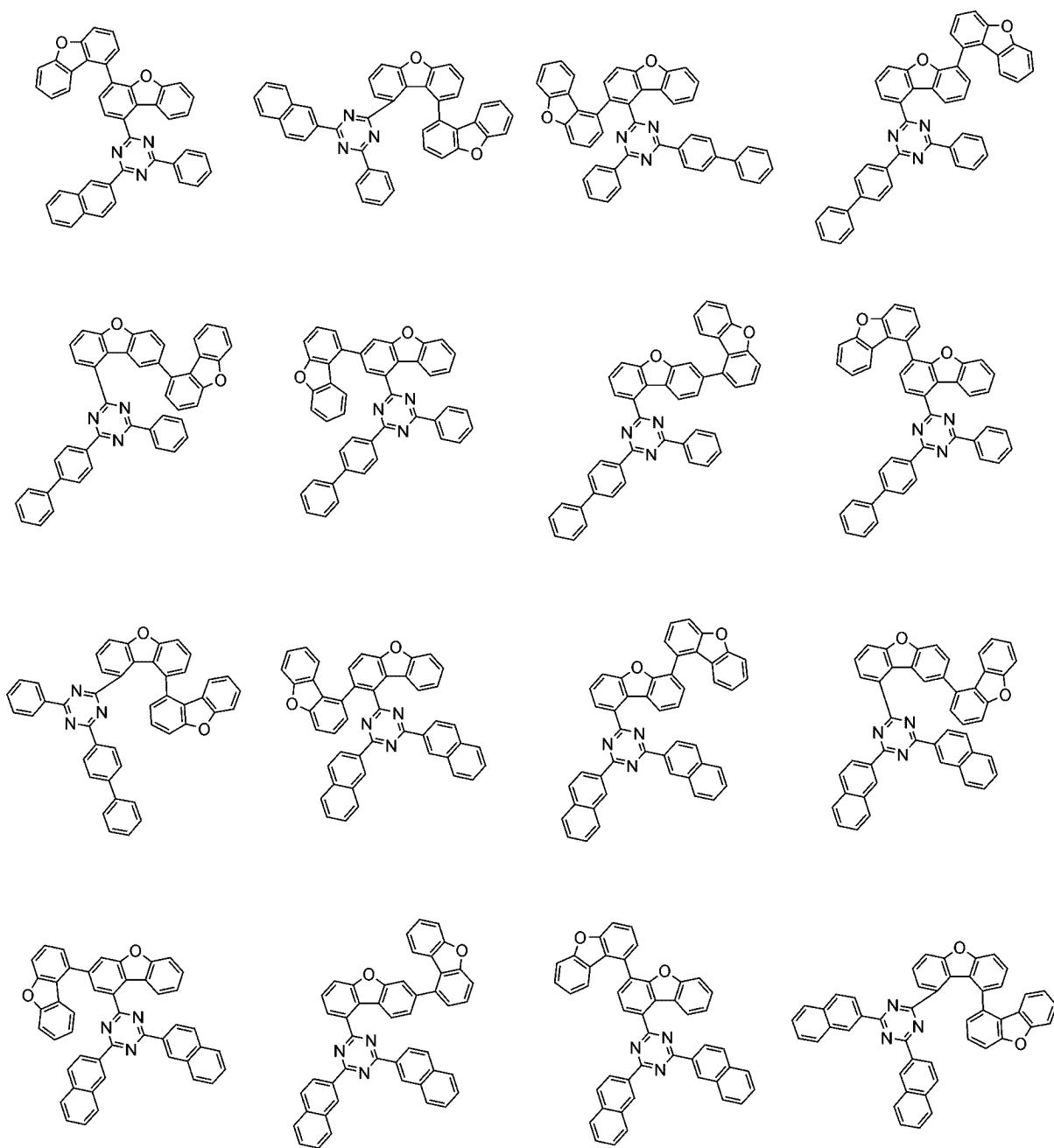


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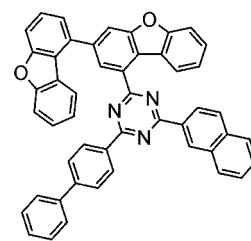
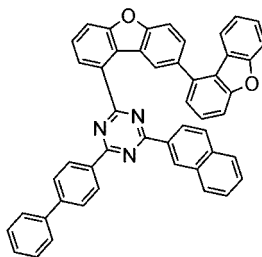
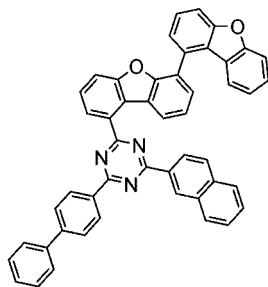
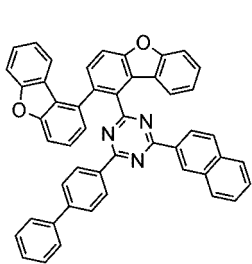
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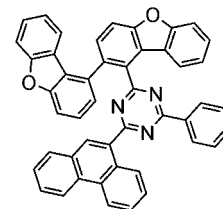
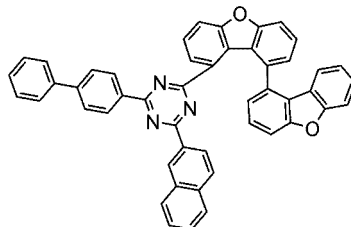
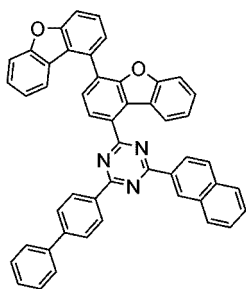
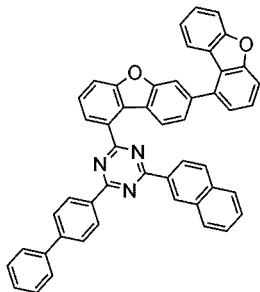
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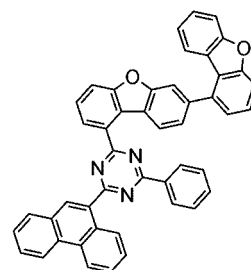
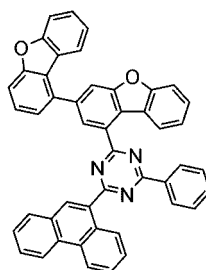
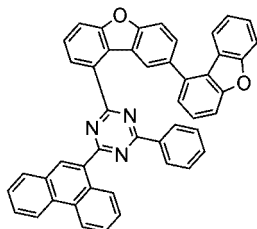
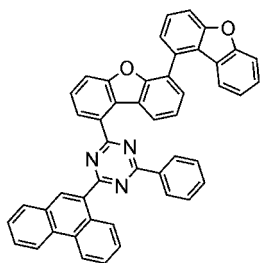
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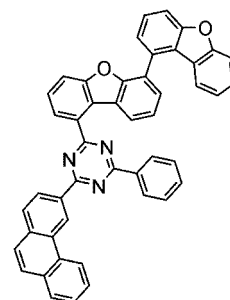
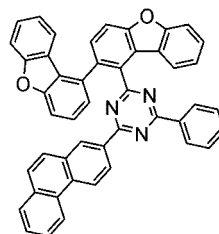
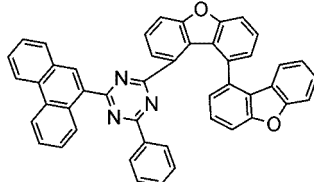
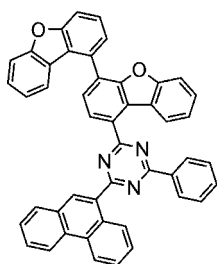
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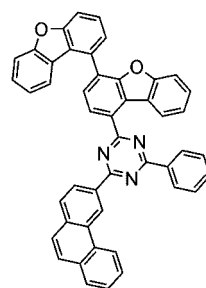
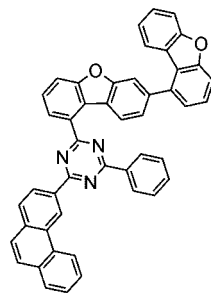
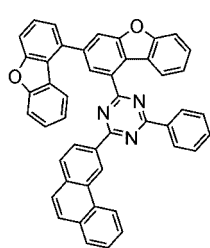
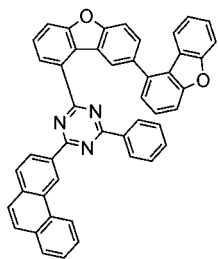
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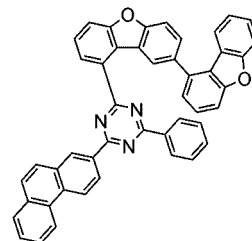
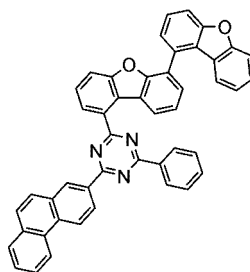
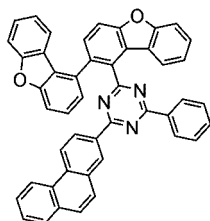
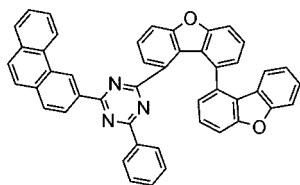
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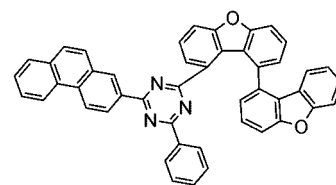
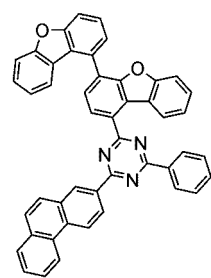
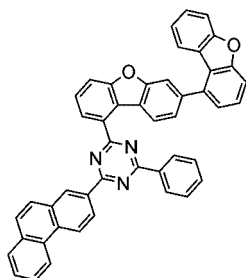
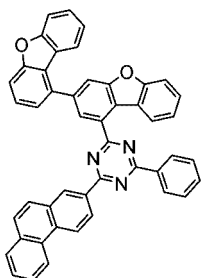
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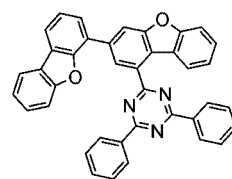
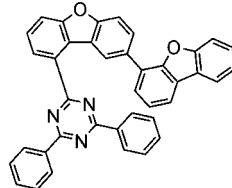
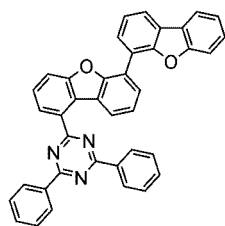
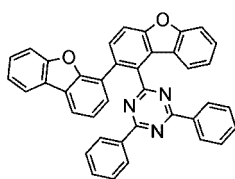
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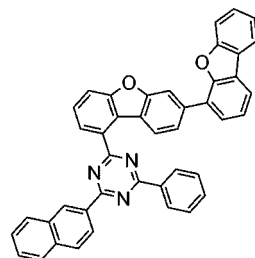
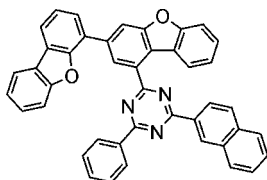
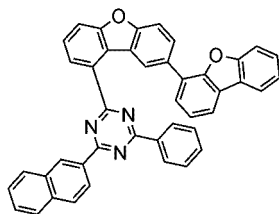
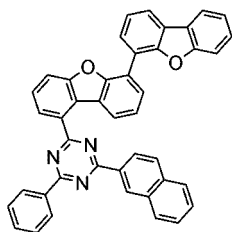
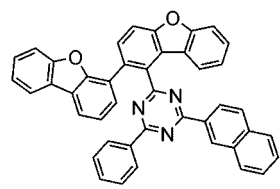
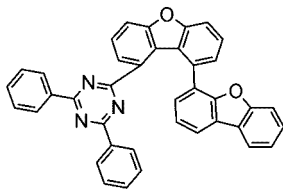
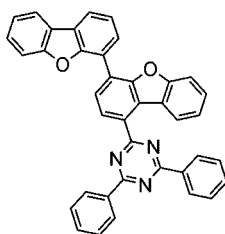
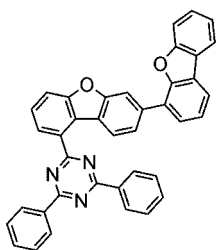
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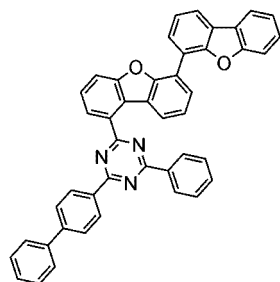
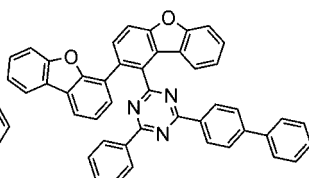
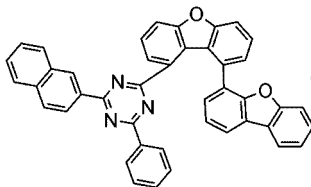
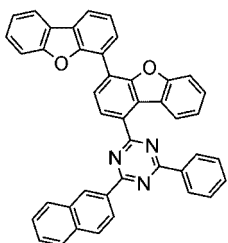
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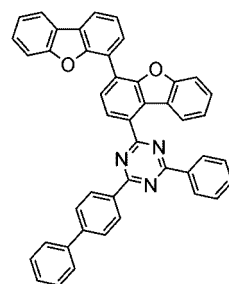
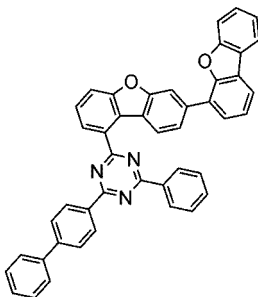
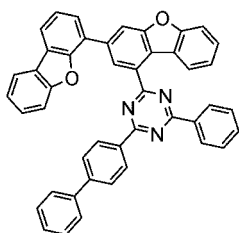
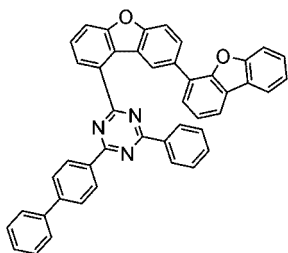
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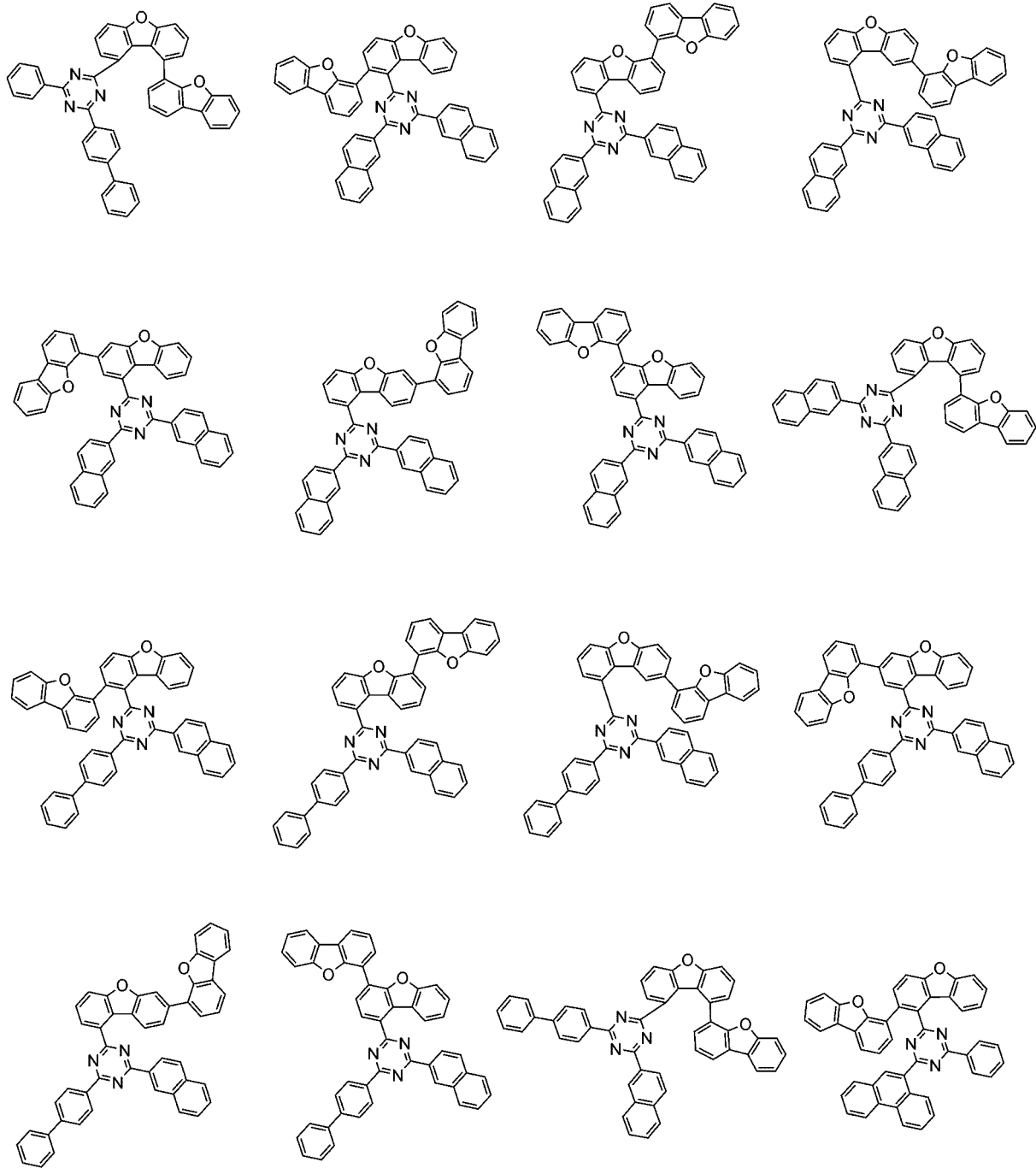


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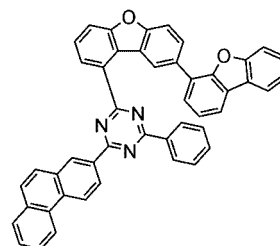
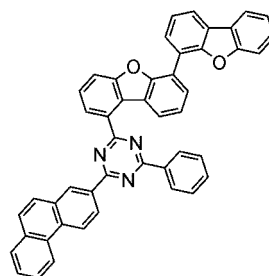
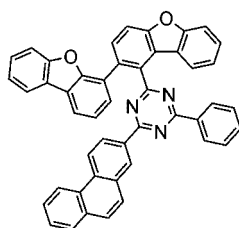
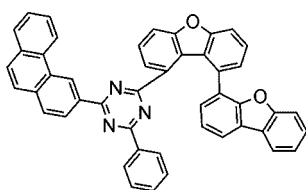
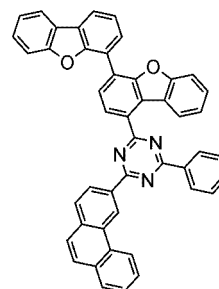
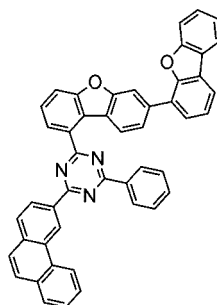
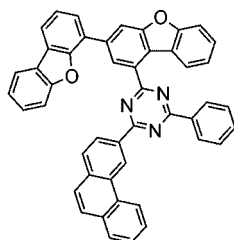
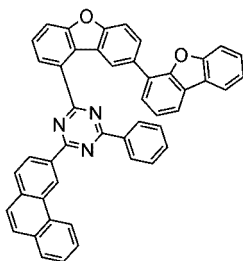
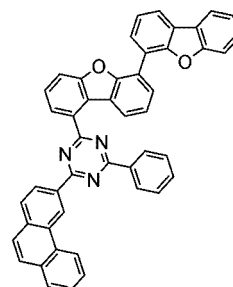
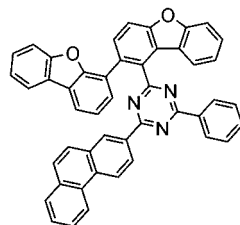
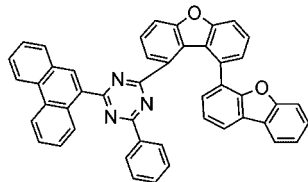
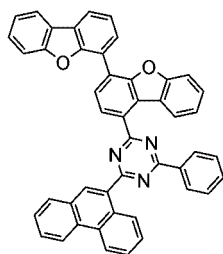
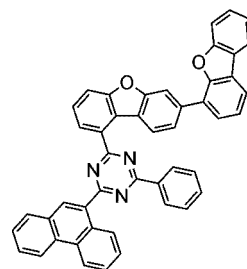
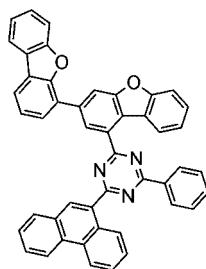
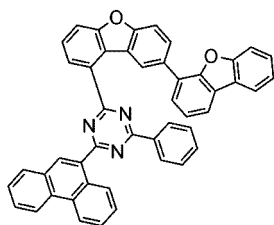
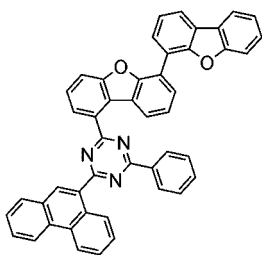
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【化 6 0 4】



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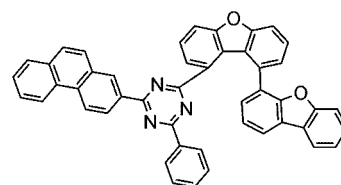
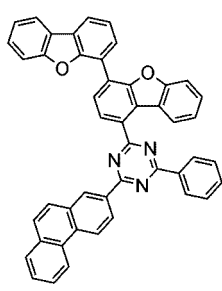
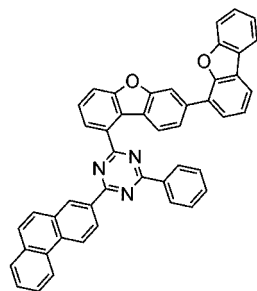
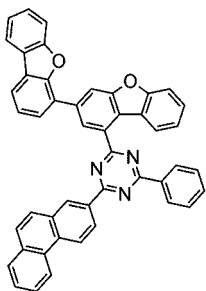
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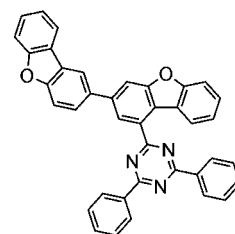
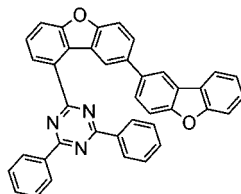
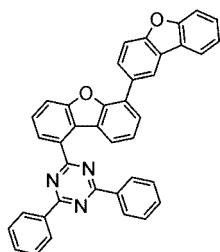
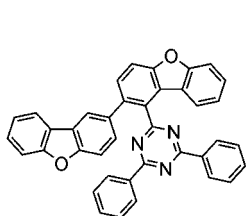
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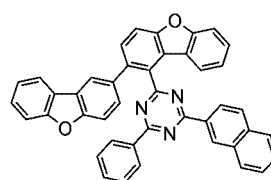
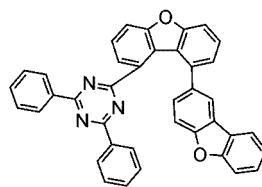
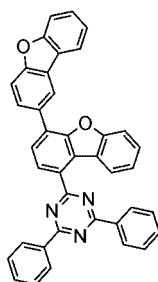
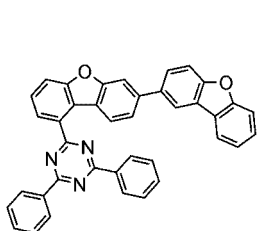
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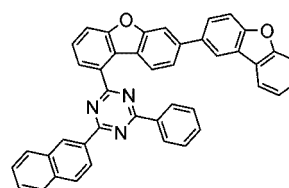
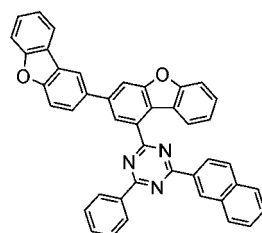
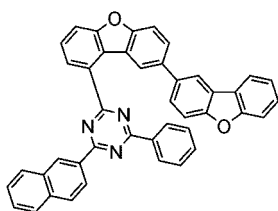
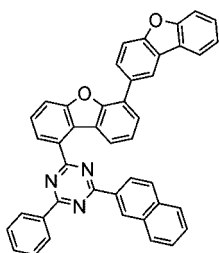
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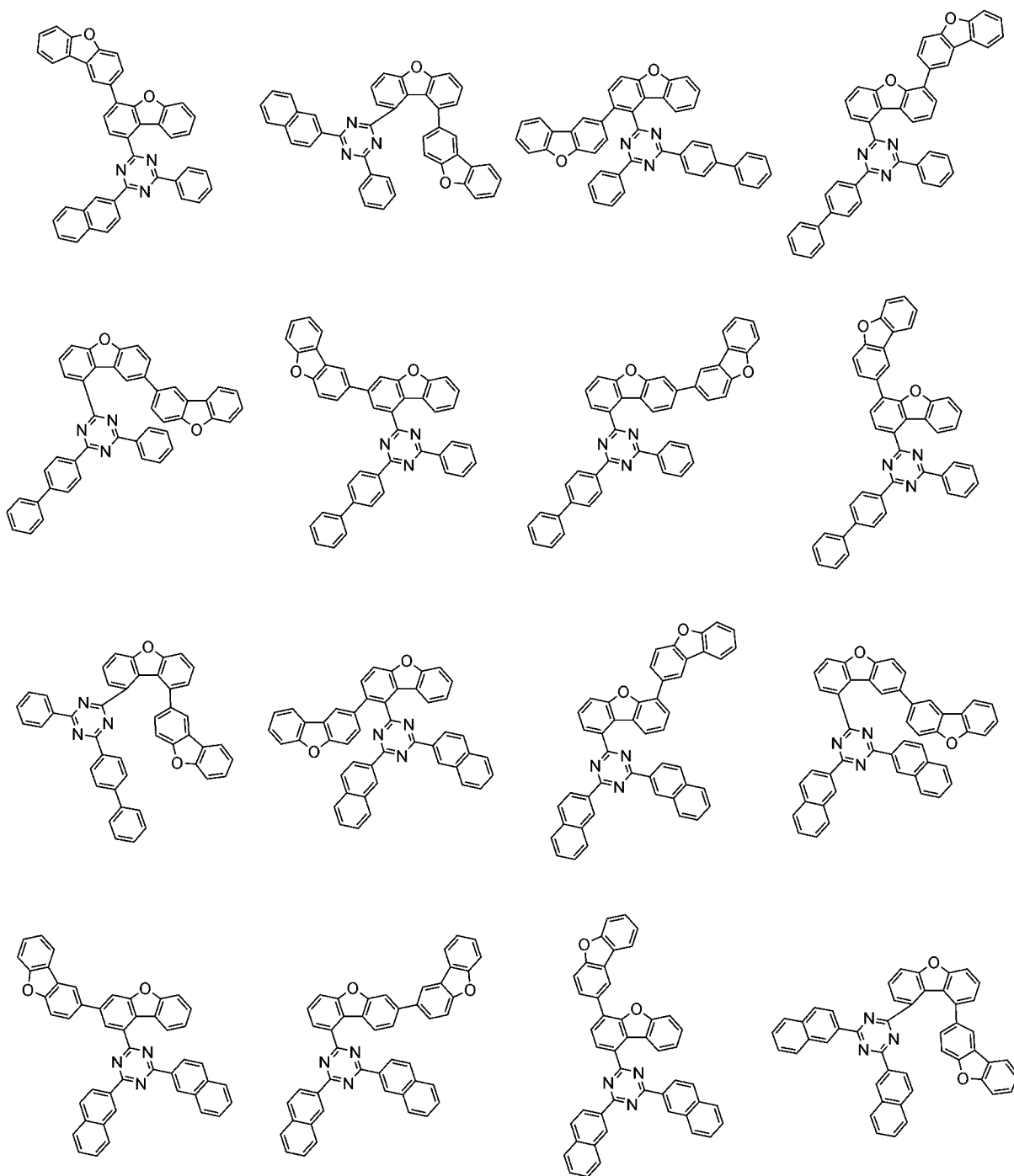
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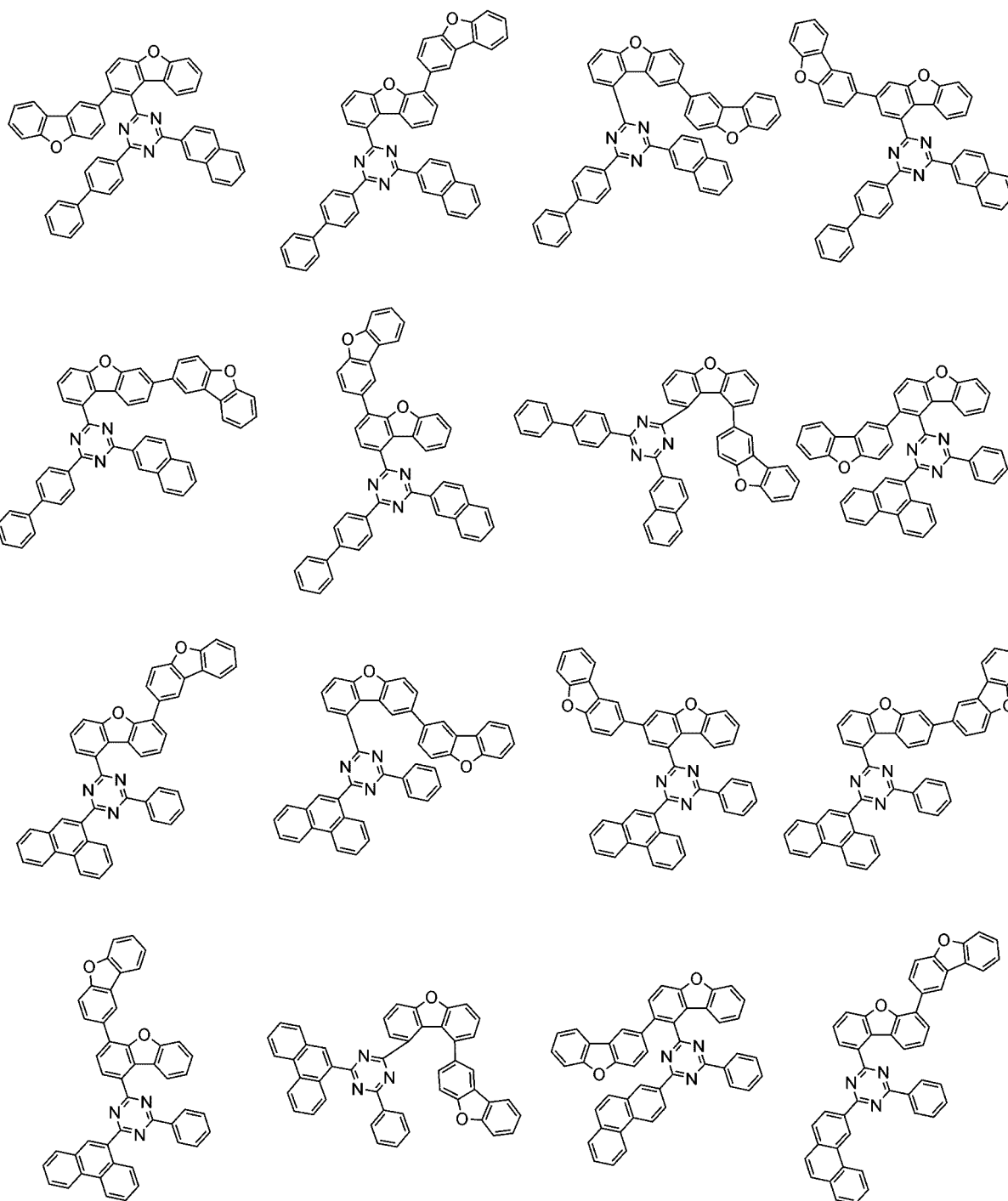
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【化 6 6】



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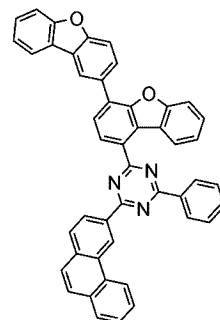
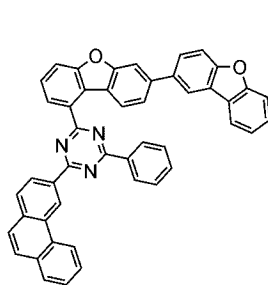
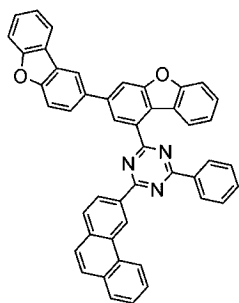
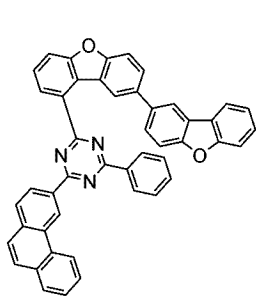
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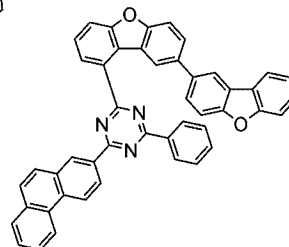
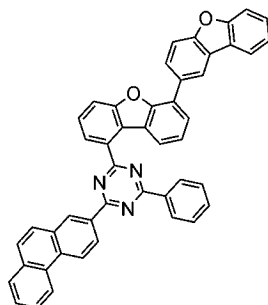
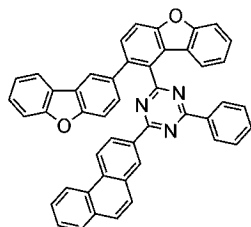
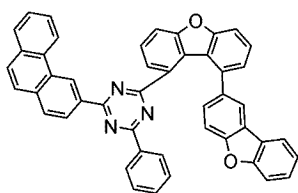
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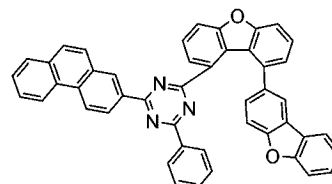
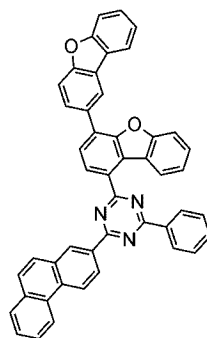
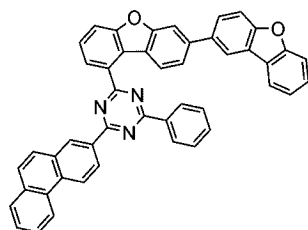
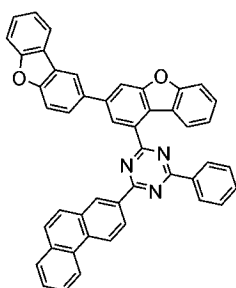
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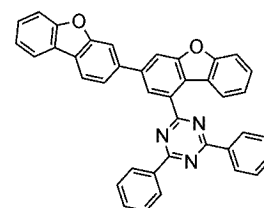
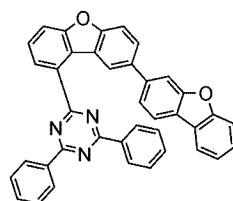
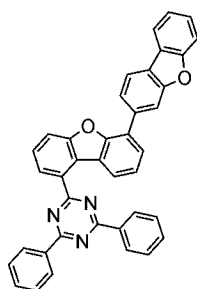
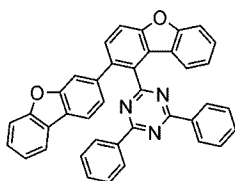
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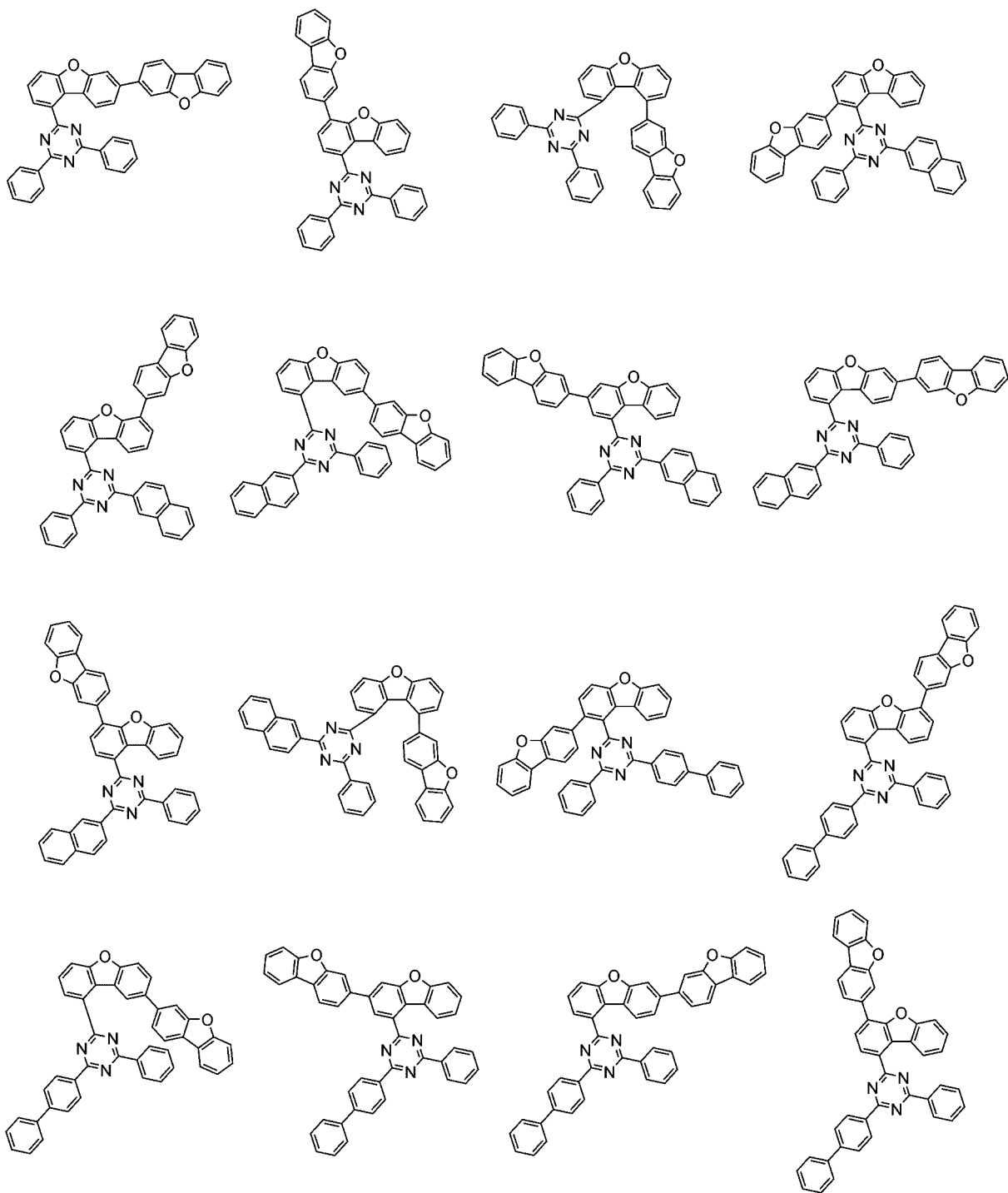
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【化 6 8】



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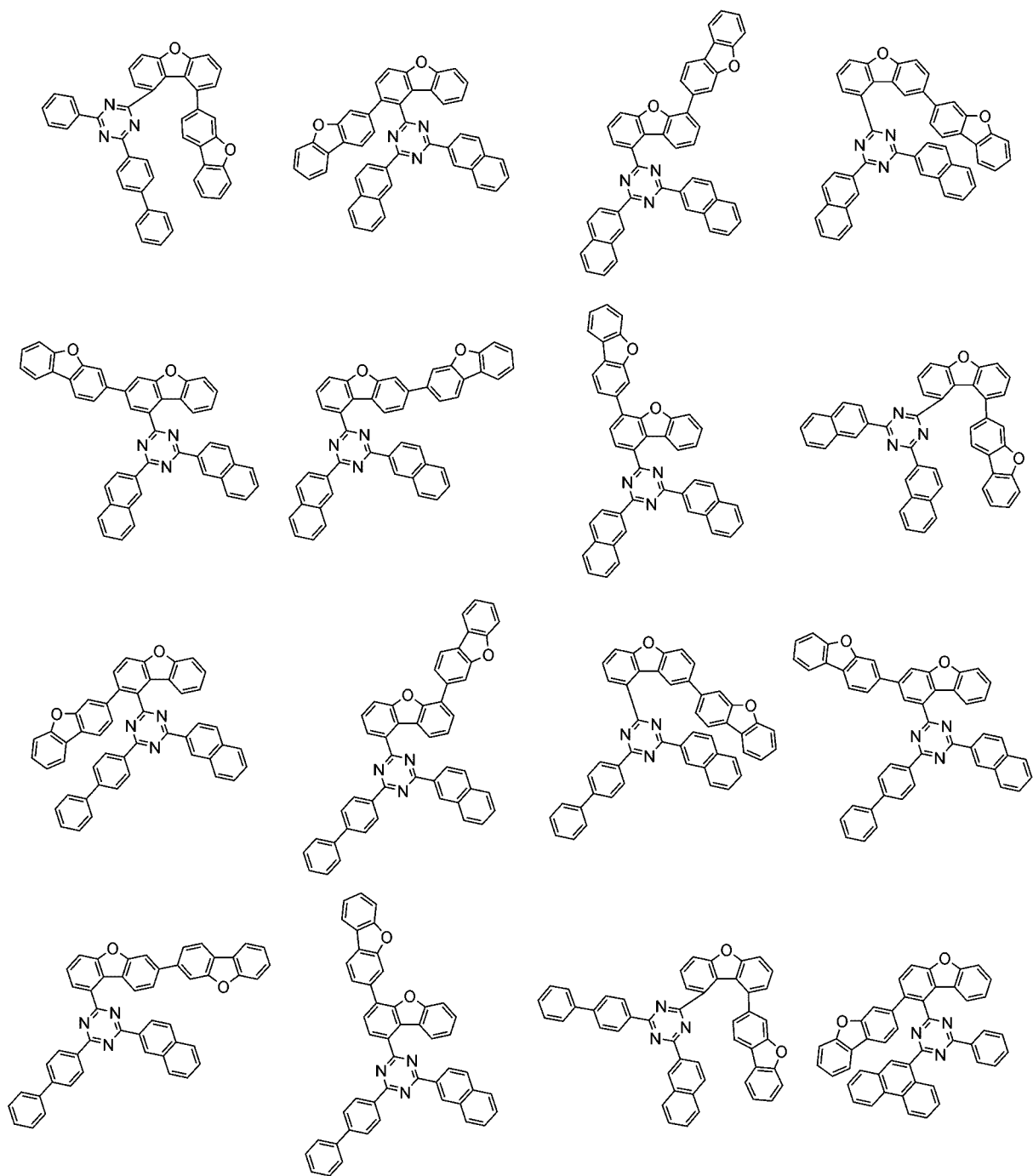
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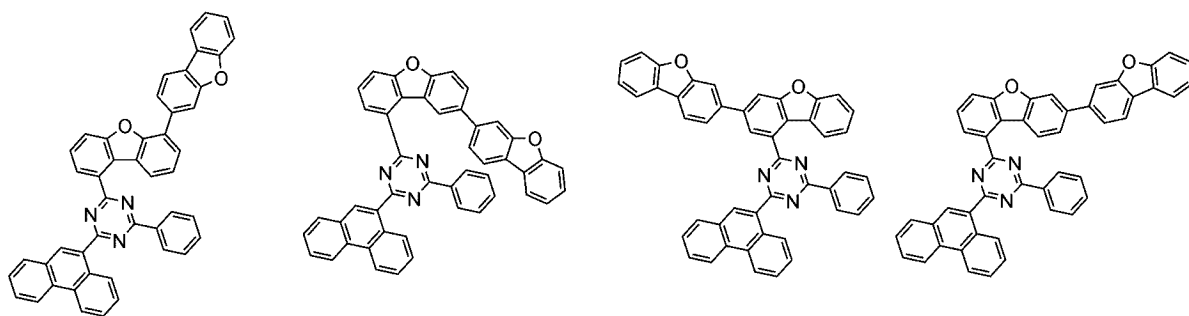
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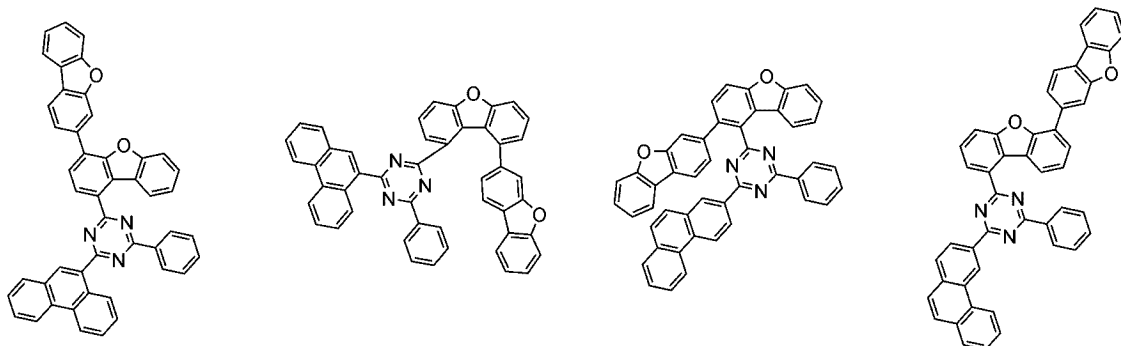
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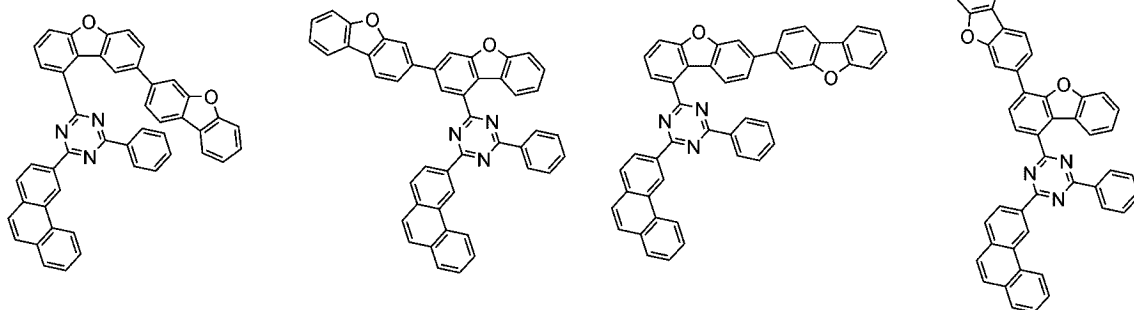
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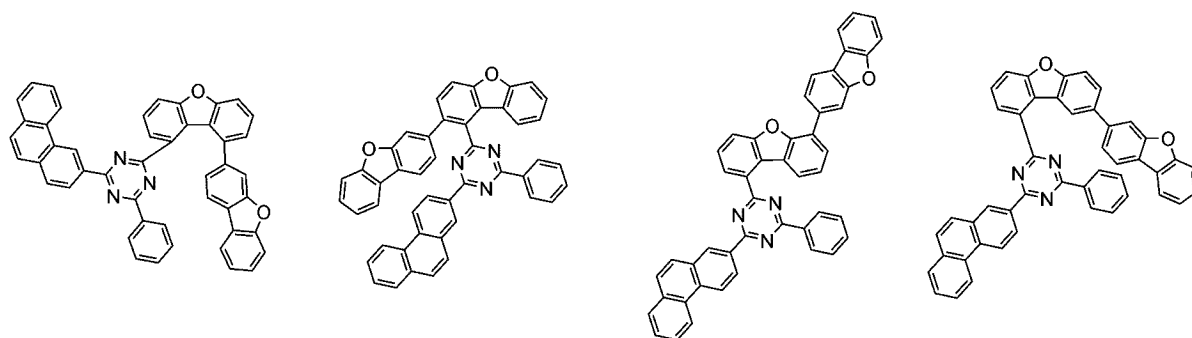
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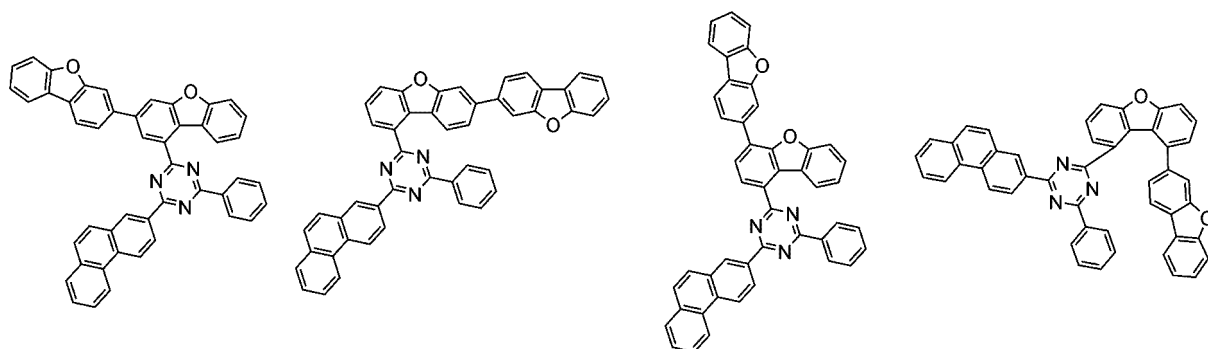
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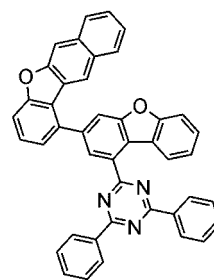
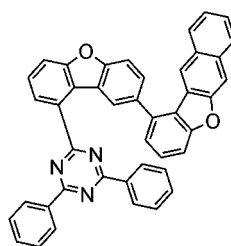
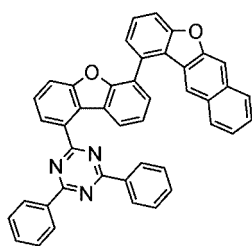
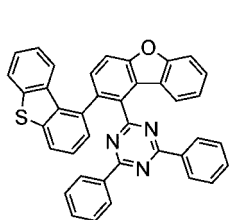
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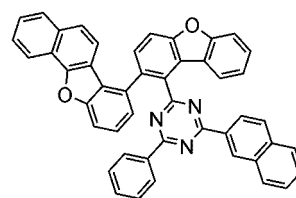
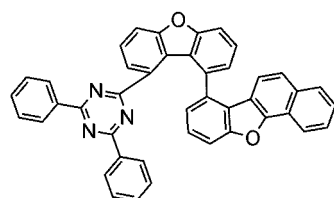
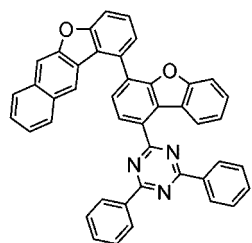
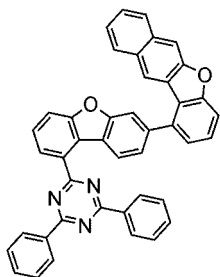
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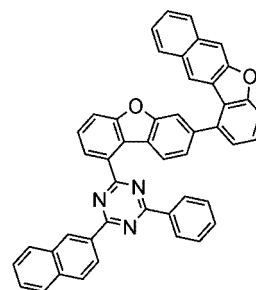
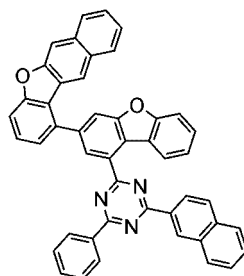
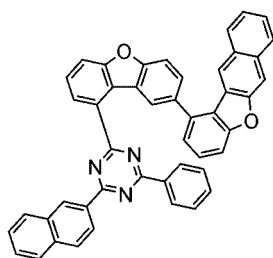
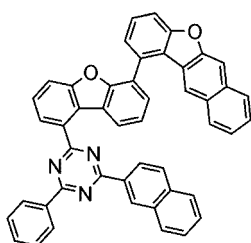
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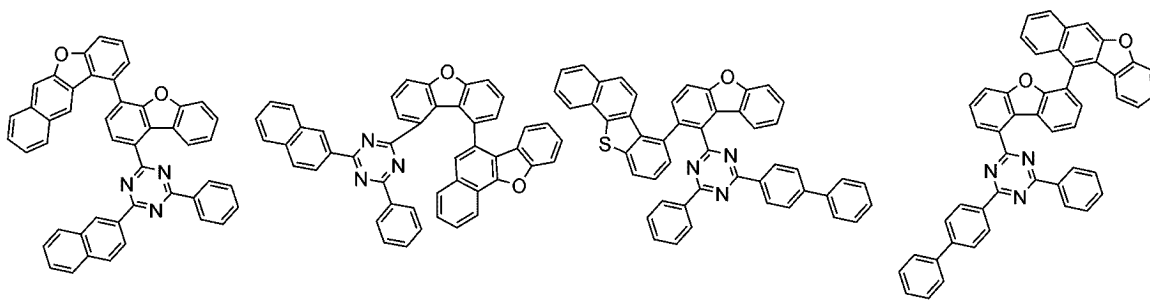


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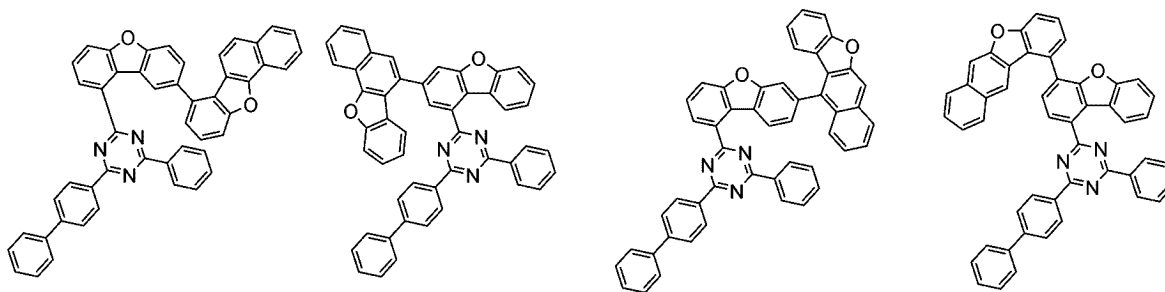
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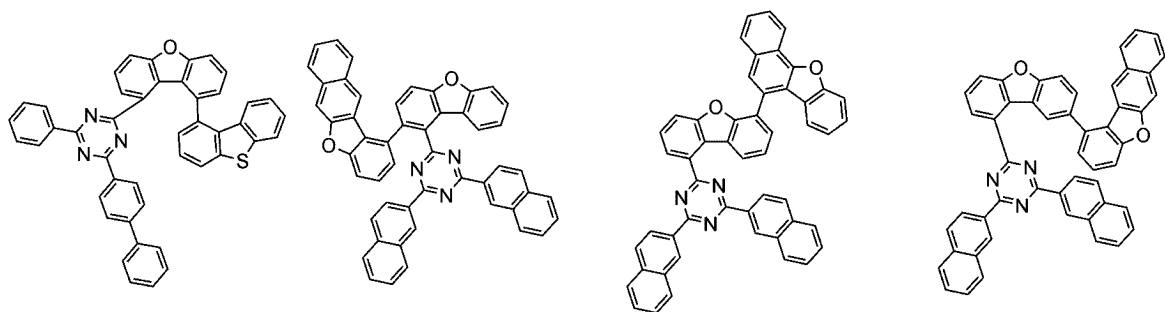
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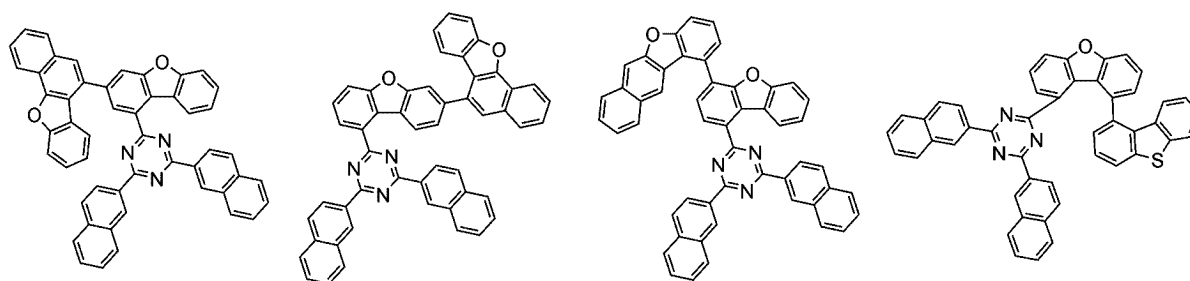
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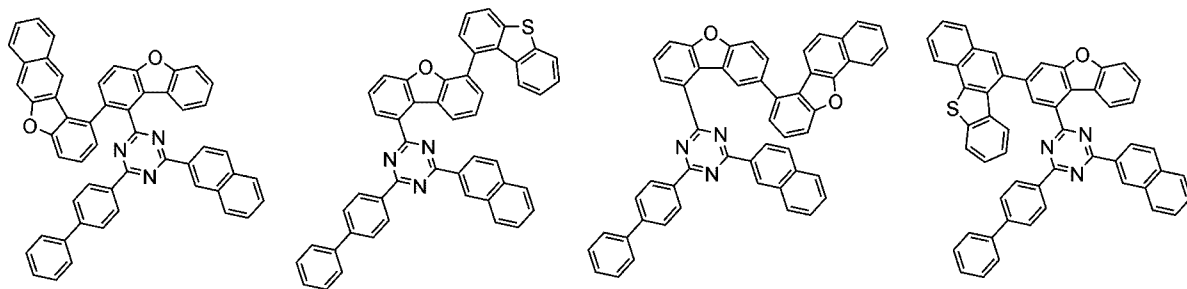
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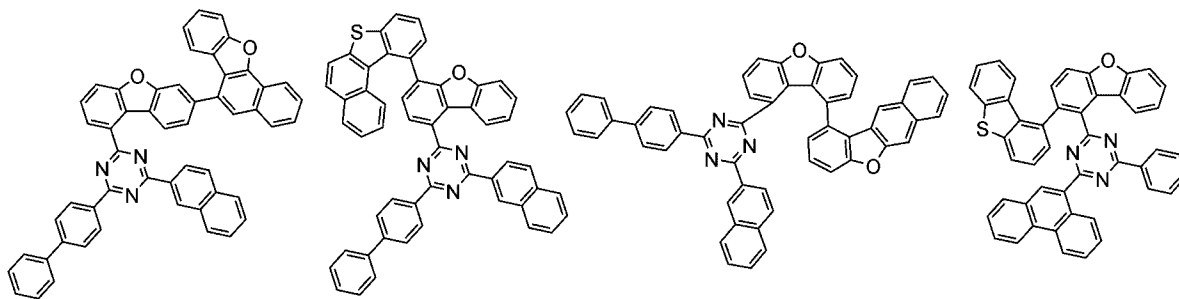
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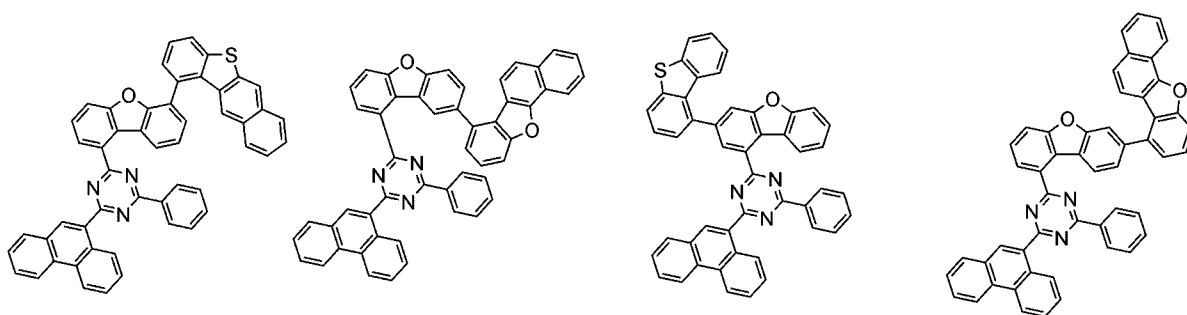
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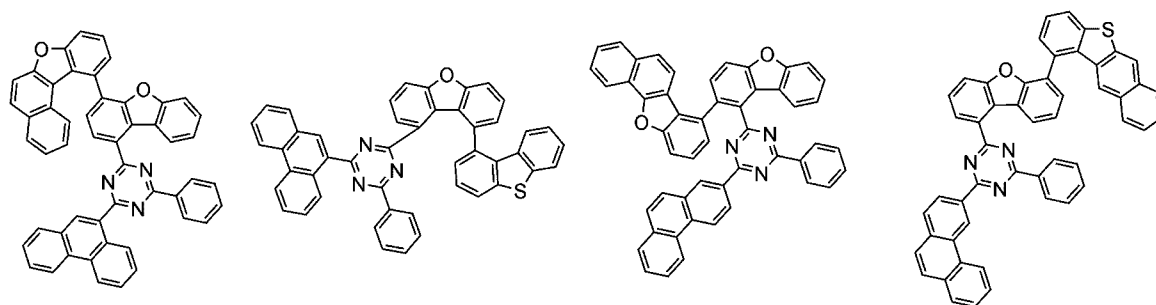
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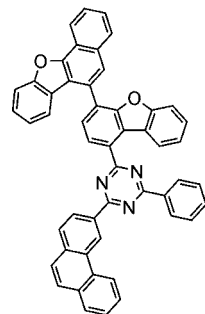
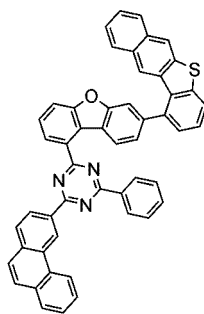
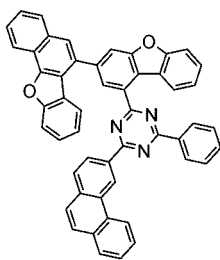
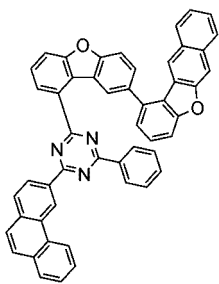
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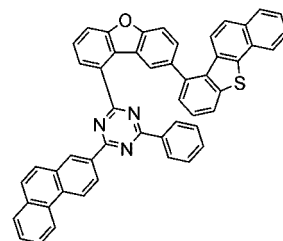
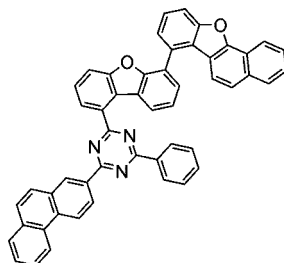
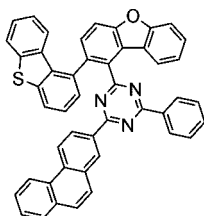
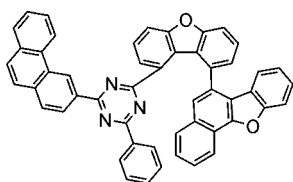
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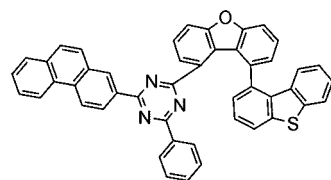
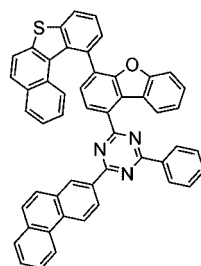
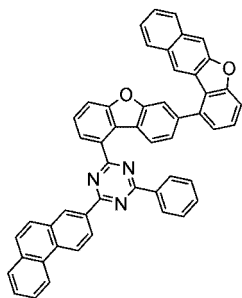
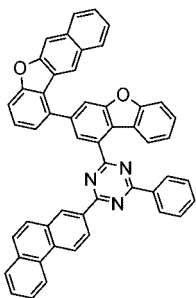
【化 7 5】



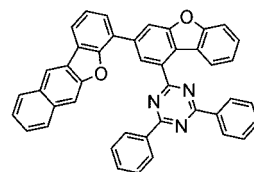
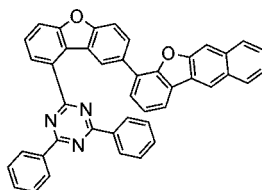
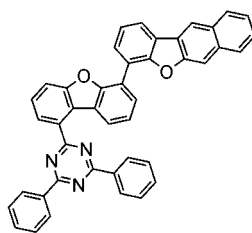
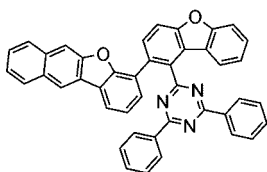
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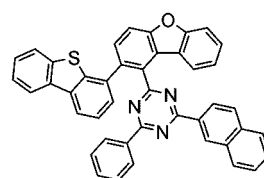
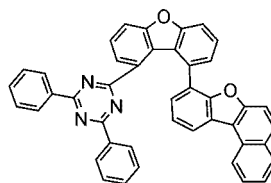
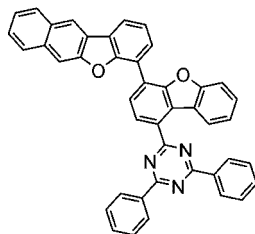
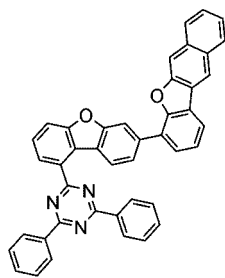
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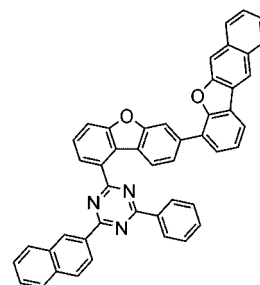
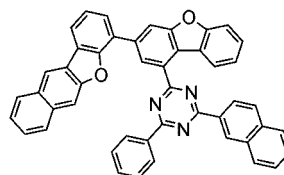
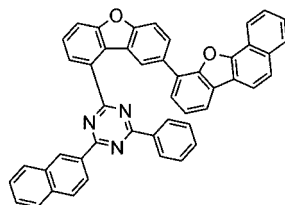
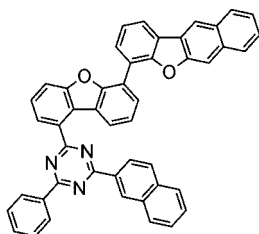
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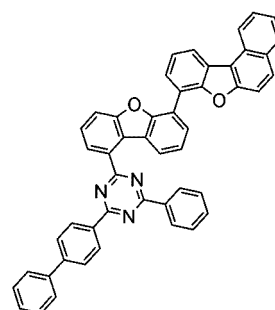
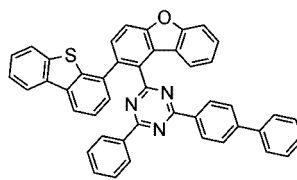
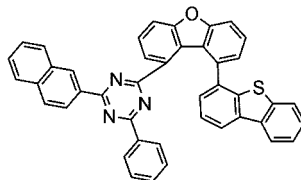
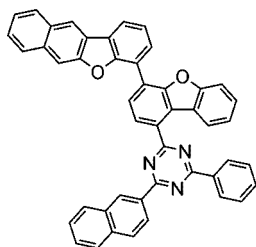
【化 7 6】



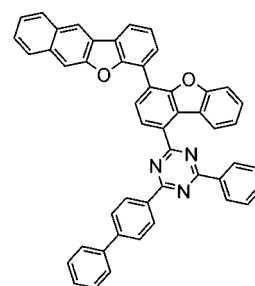
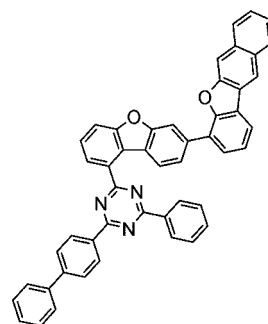
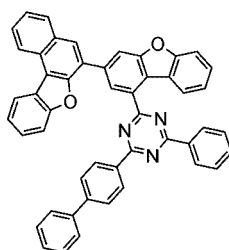
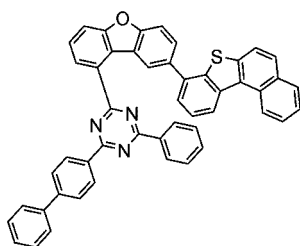
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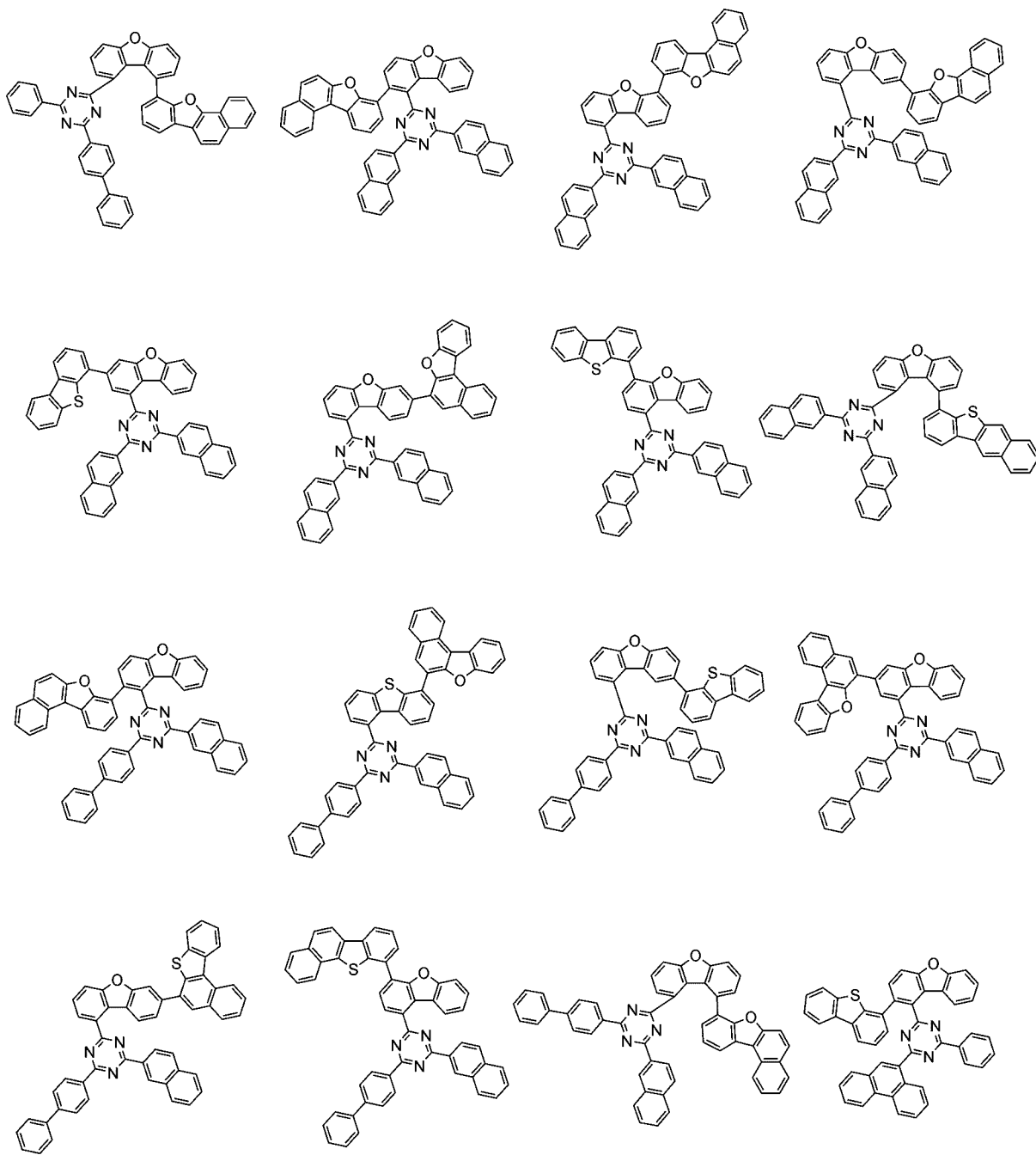
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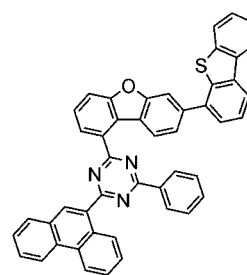
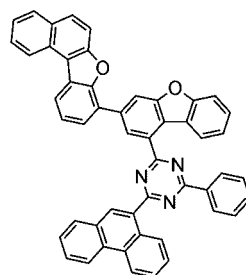
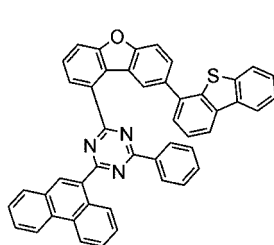
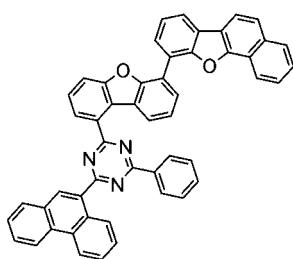
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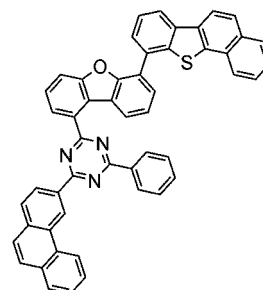
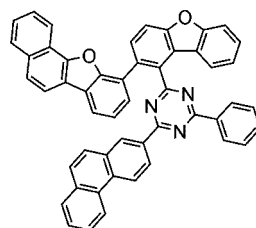
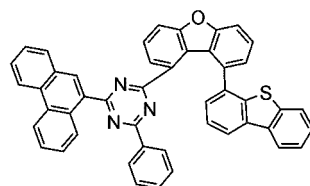
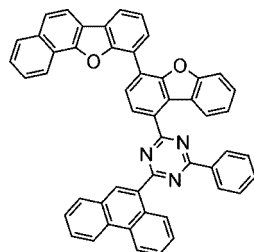
【化 6 0 8】



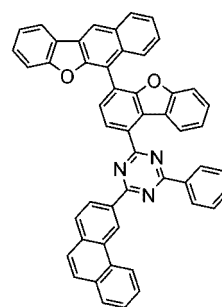
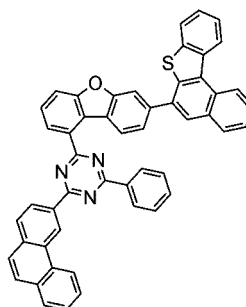
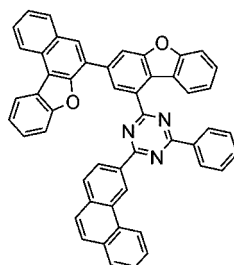
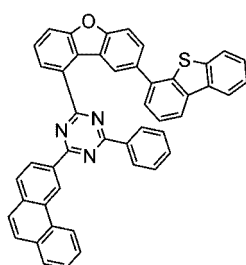
【化 7 8】



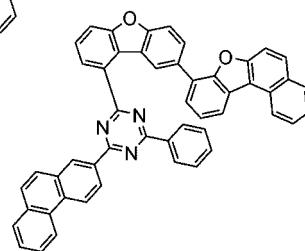
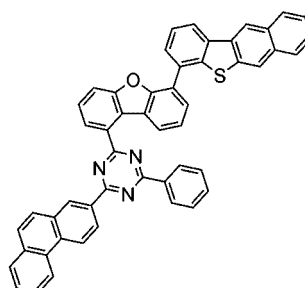
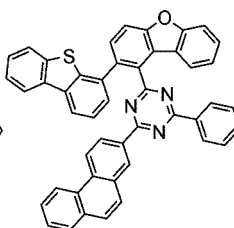
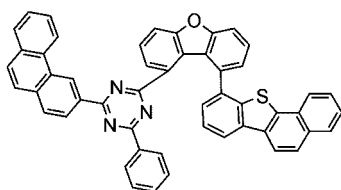
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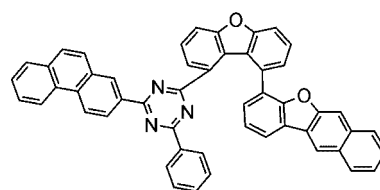
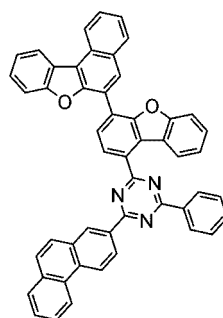
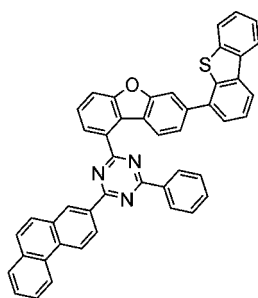
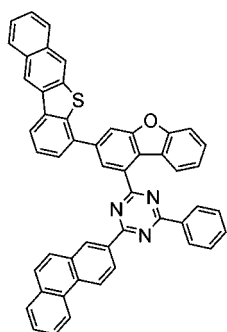
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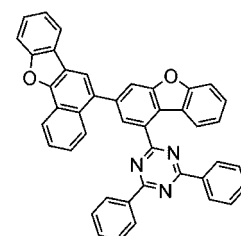
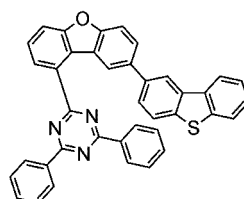
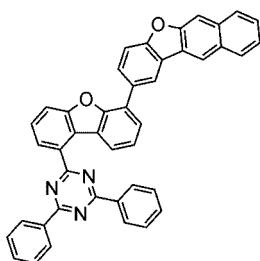
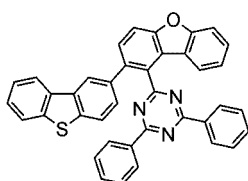
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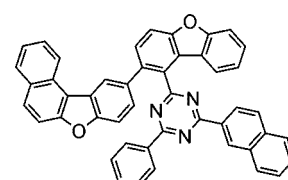
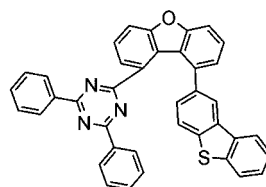
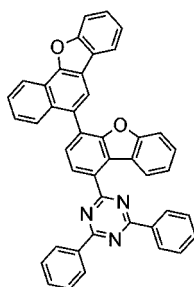
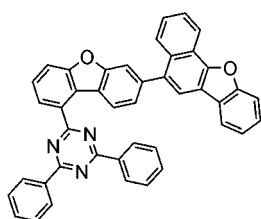
【化 7 9】



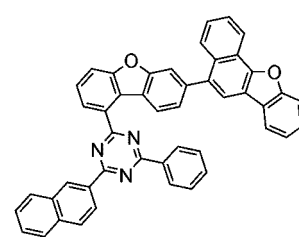
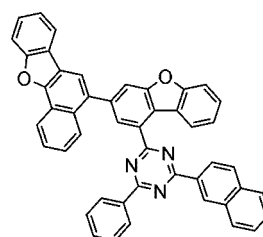
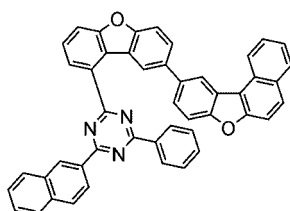
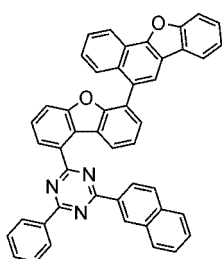
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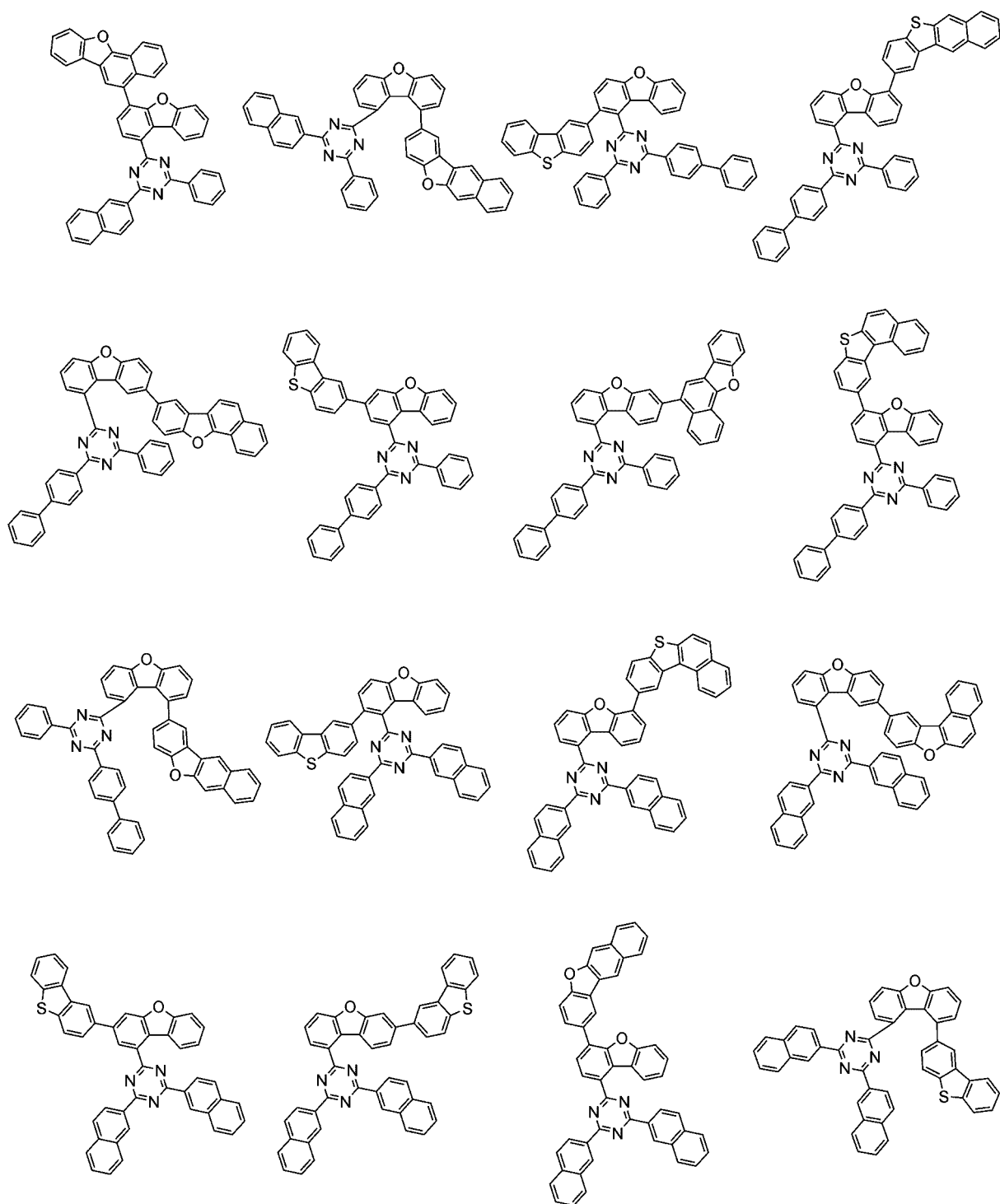
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【化 80】



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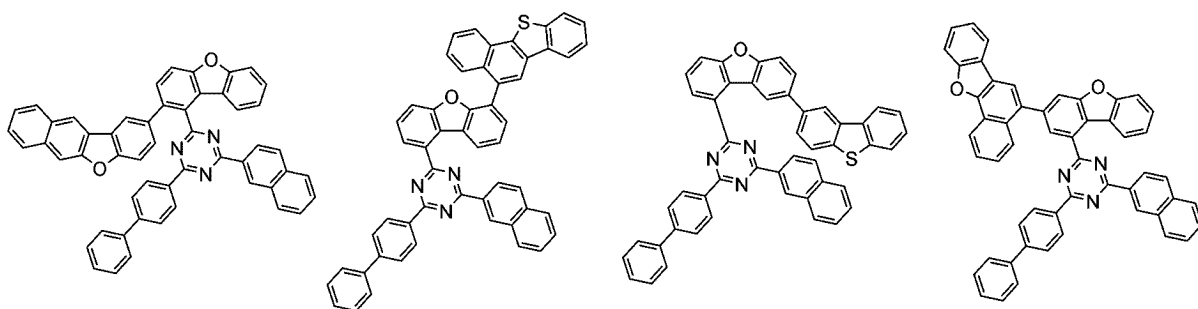
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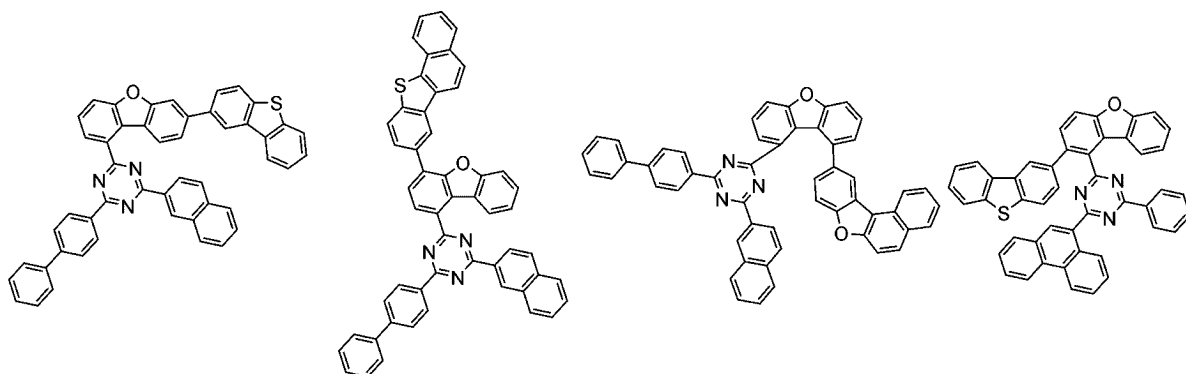
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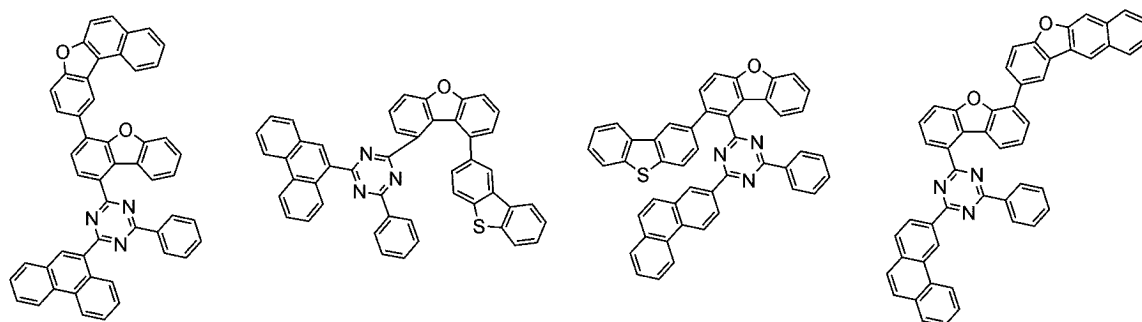
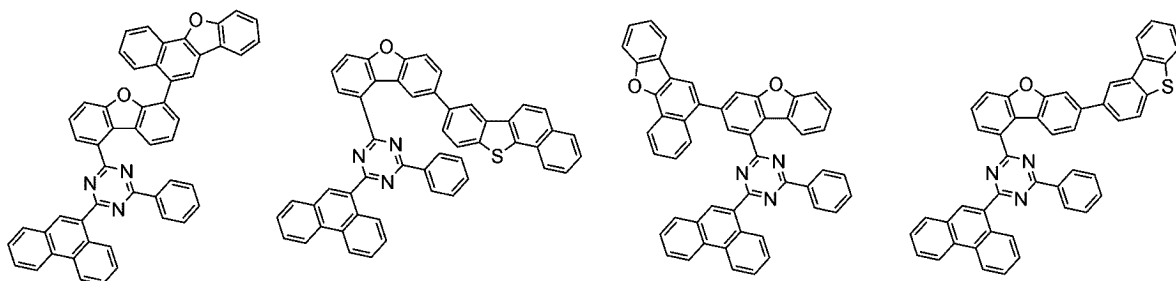
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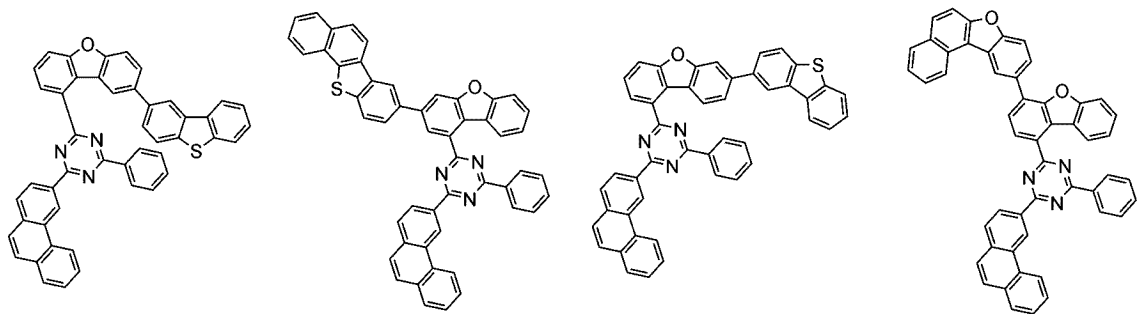


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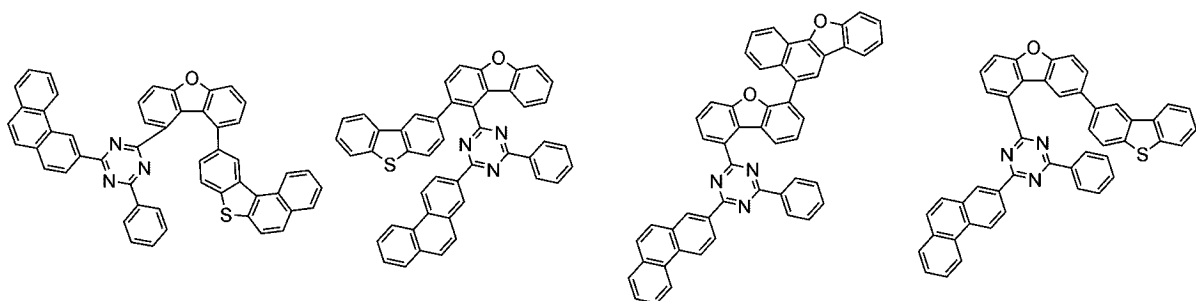
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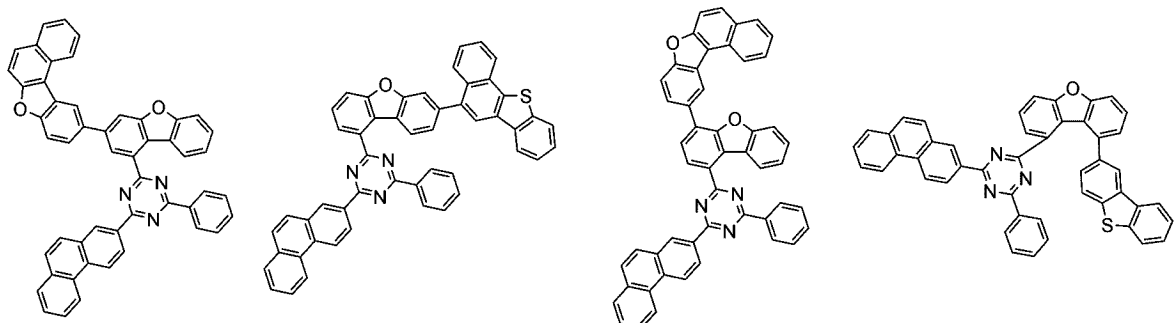
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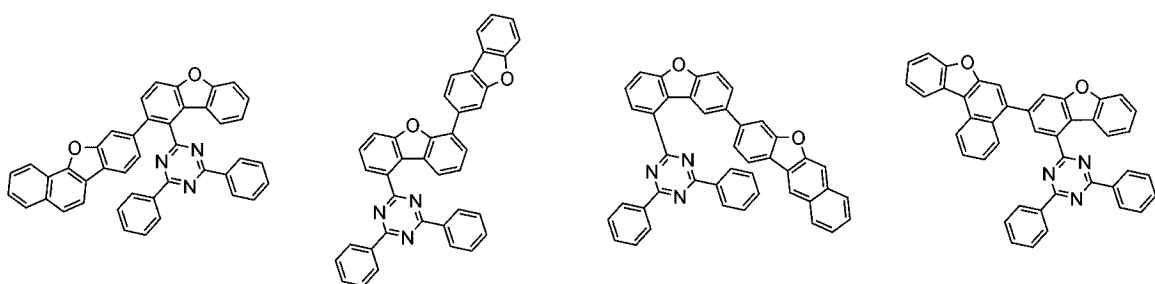
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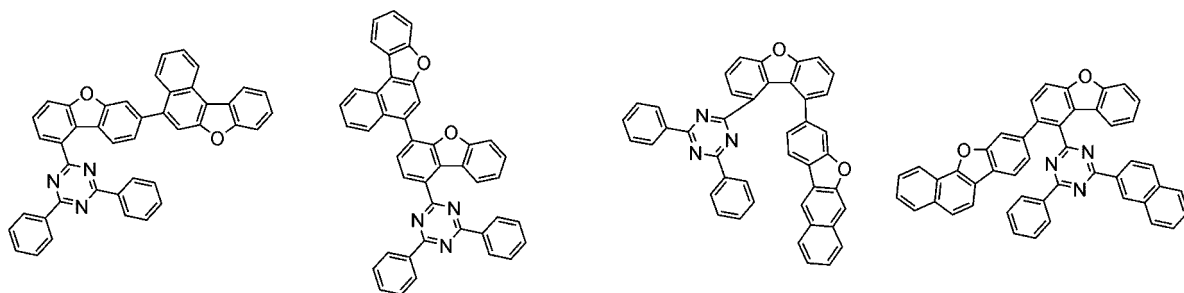
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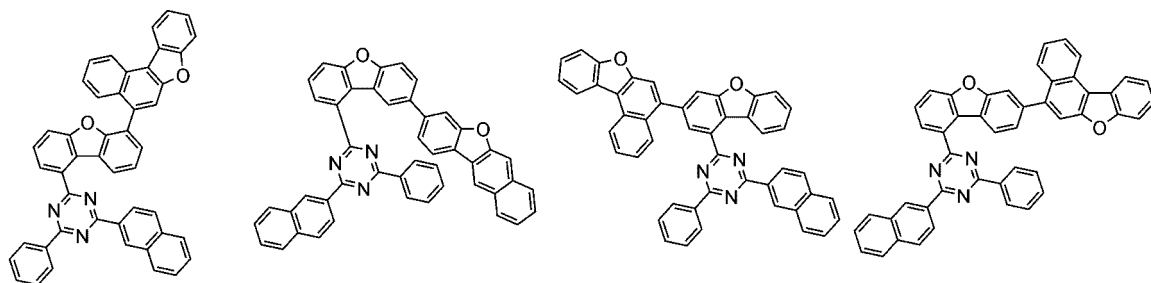
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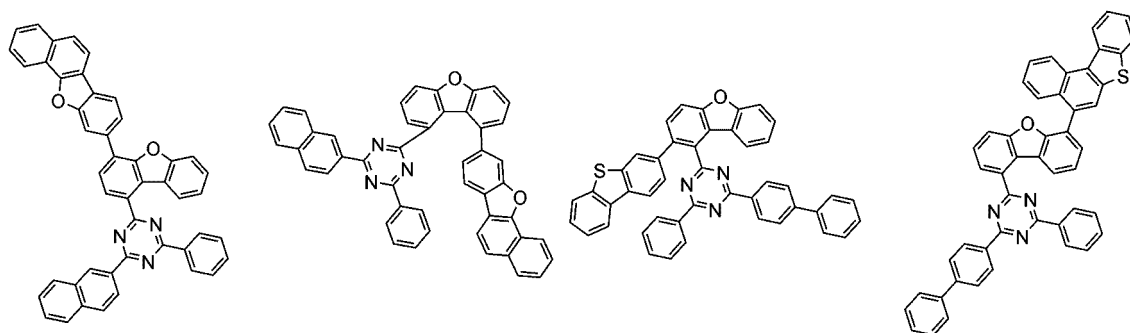
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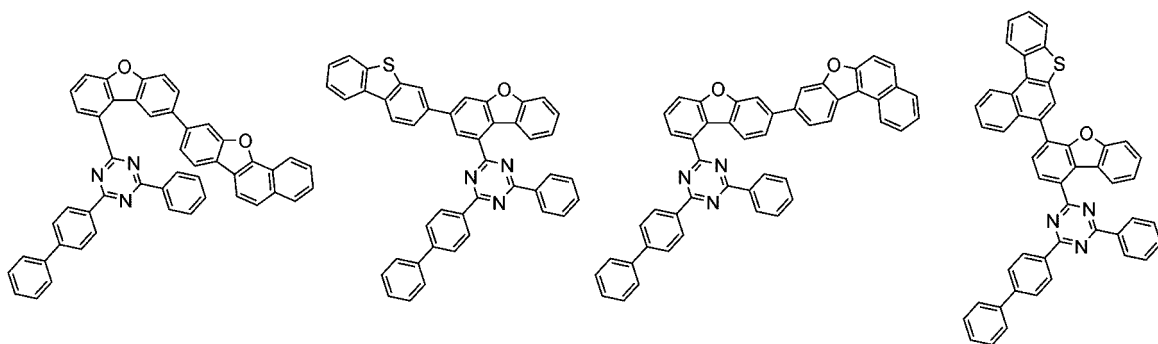
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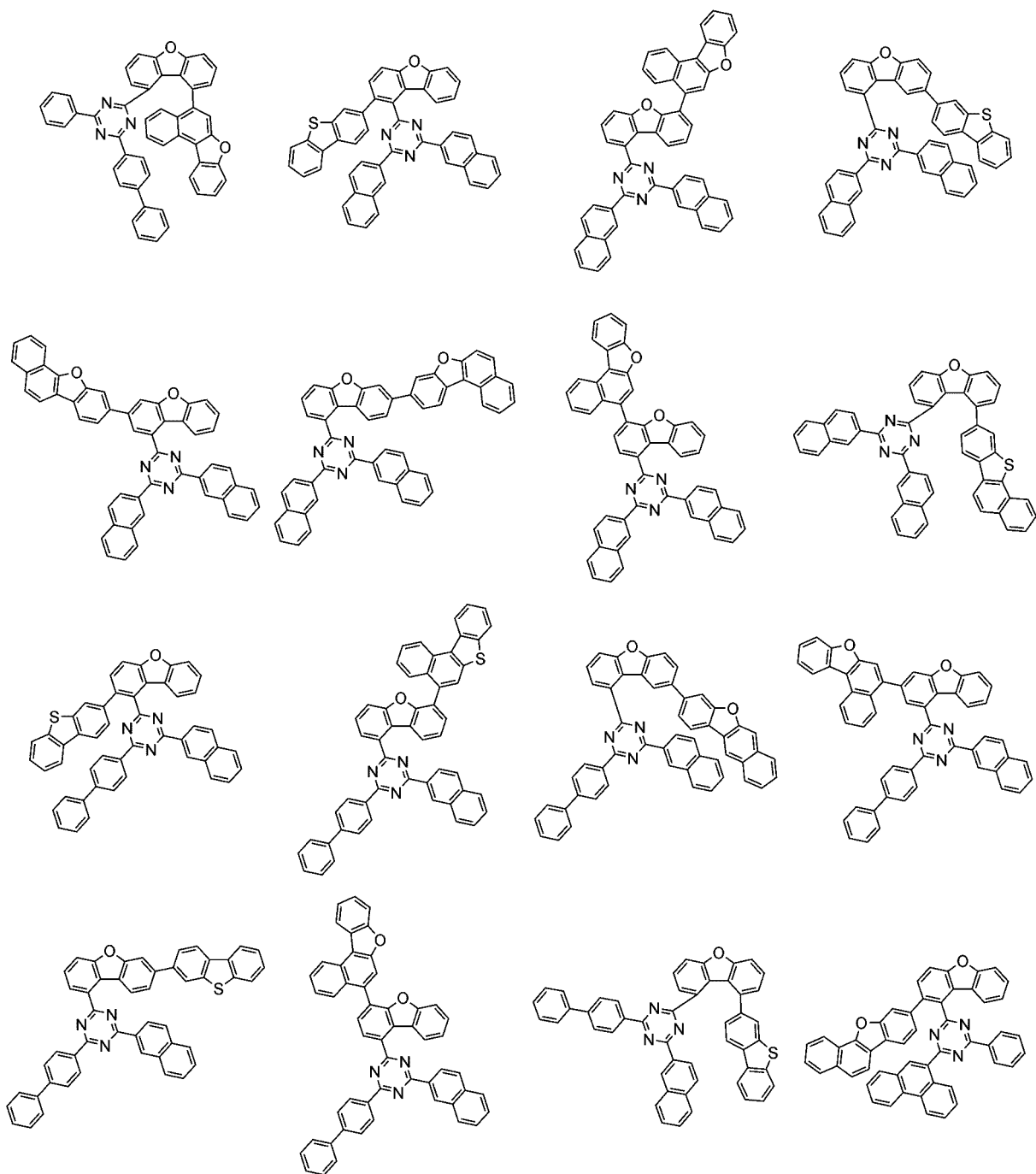
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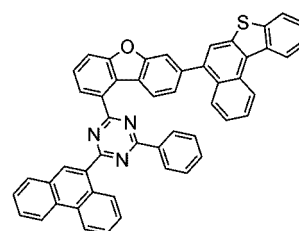
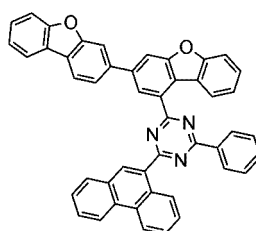
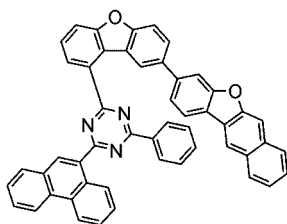
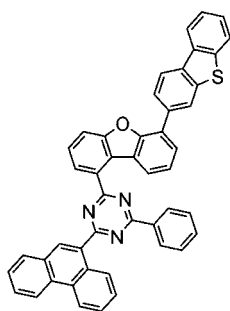
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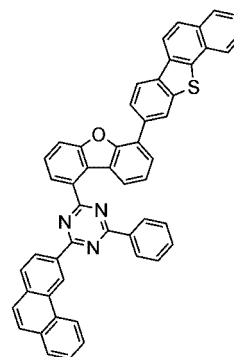
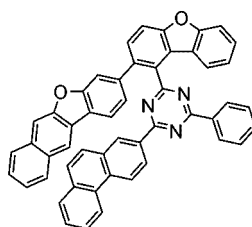
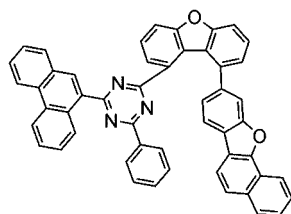
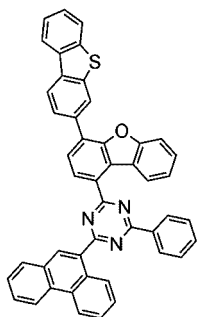
【化 6 0 9】



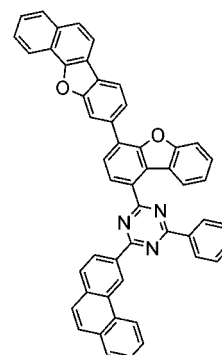
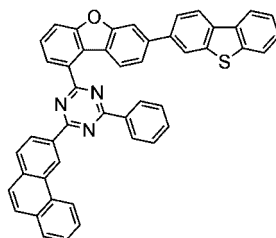
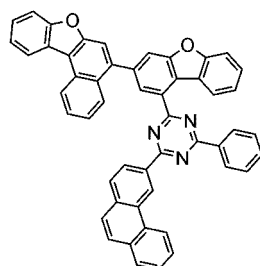
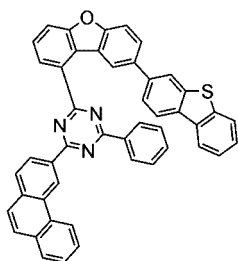
【化 8 5】



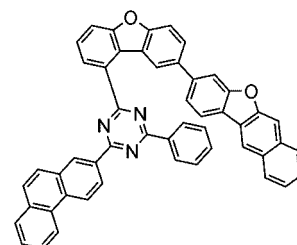
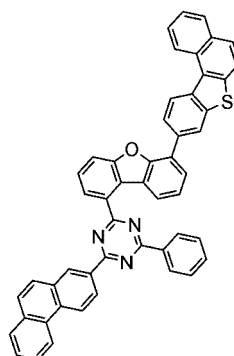
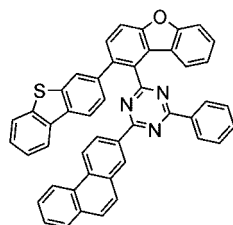
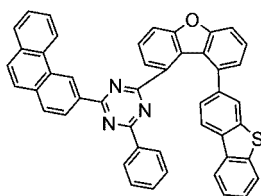
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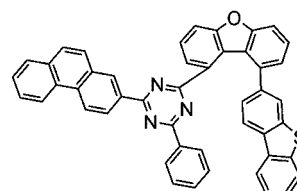
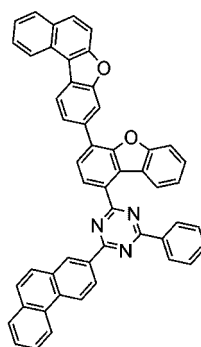
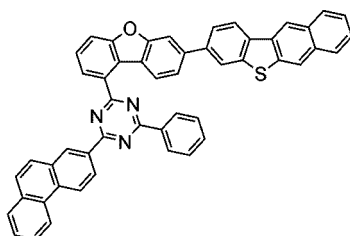
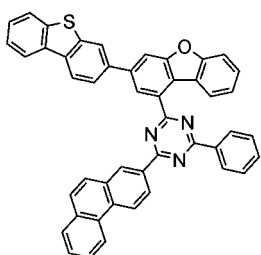


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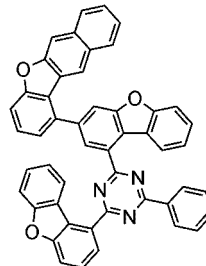
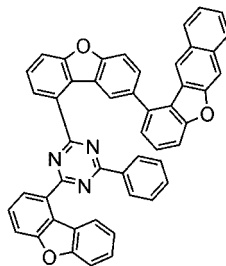
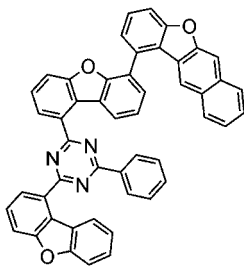
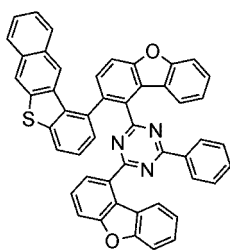
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【化 8 6】

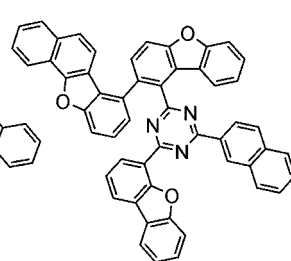
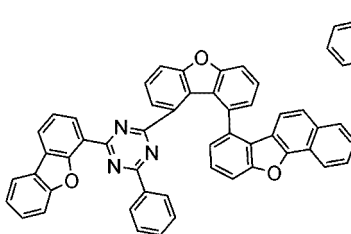
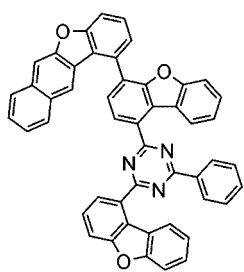
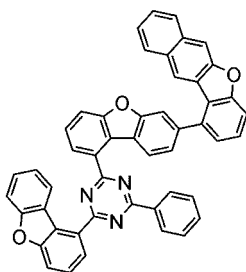


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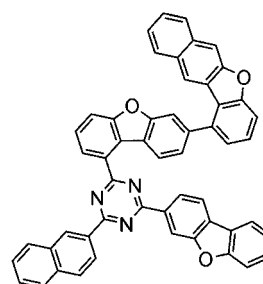
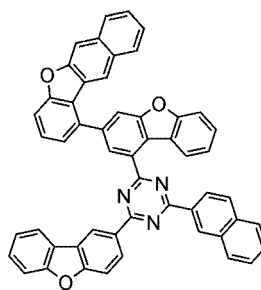
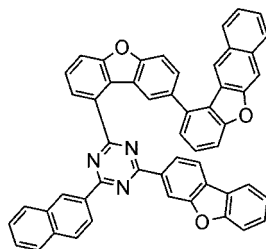
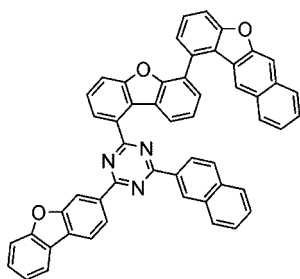
【化 6 1 0】



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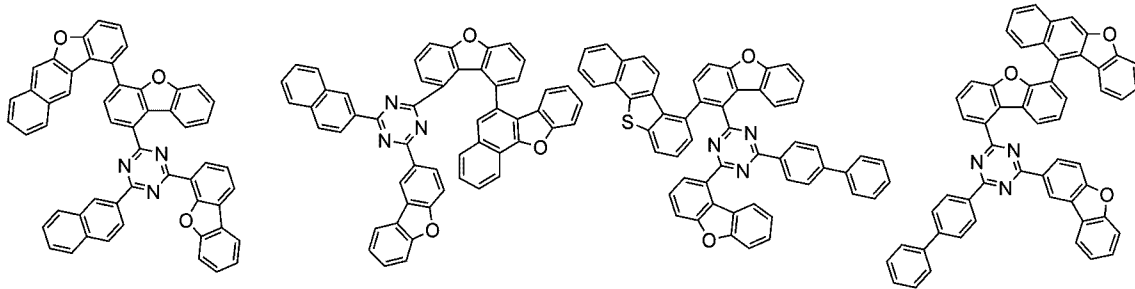


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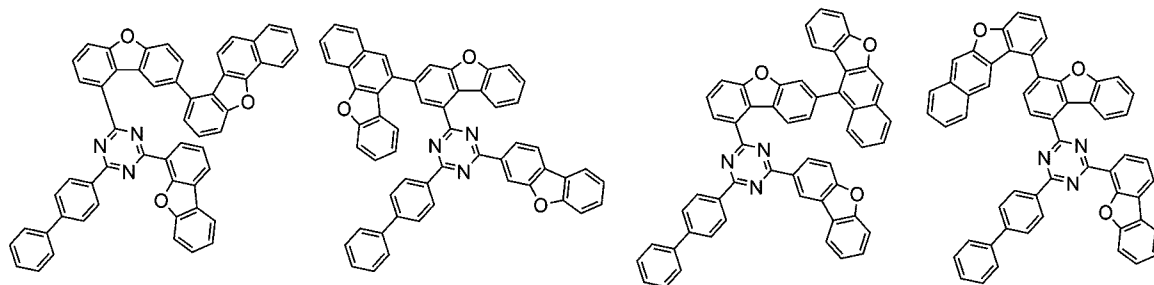
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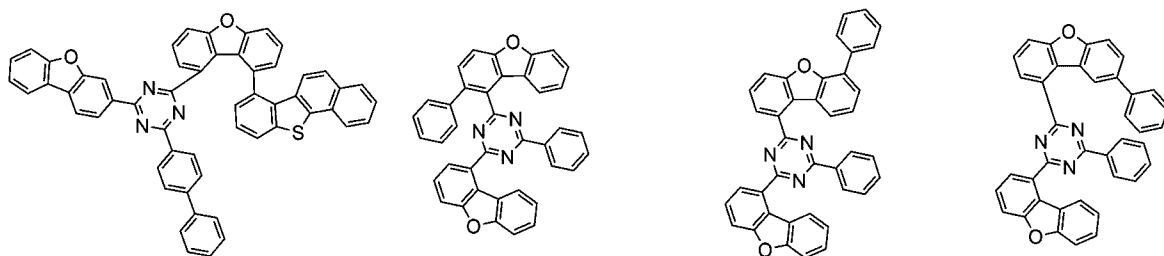
【化 8 8】



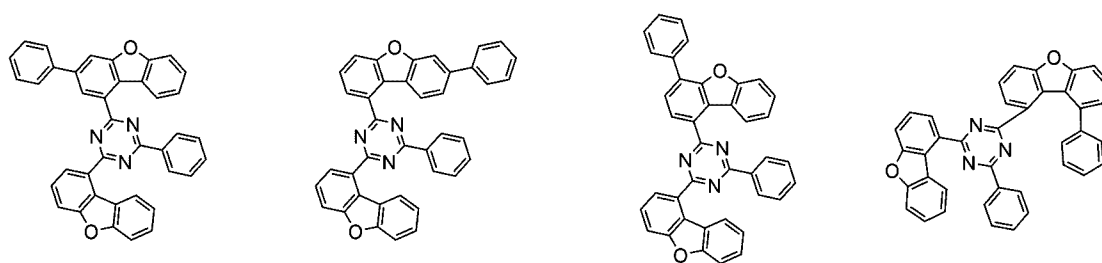
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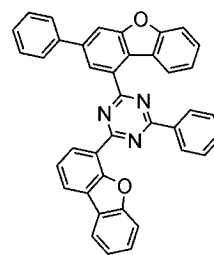
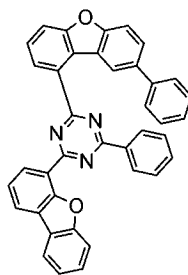
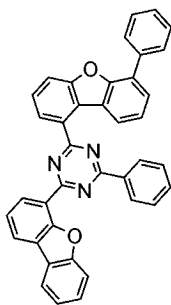
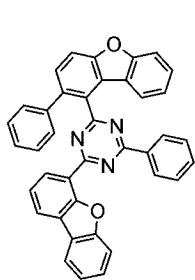
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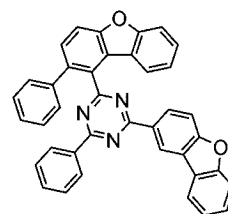
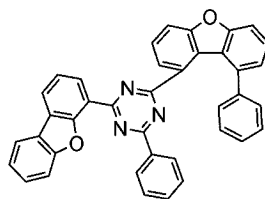
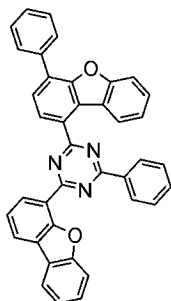
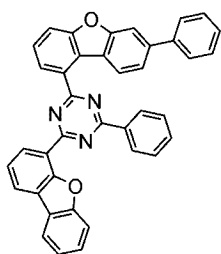
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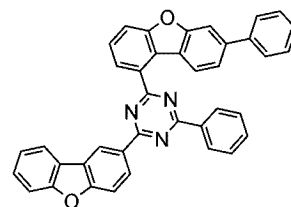
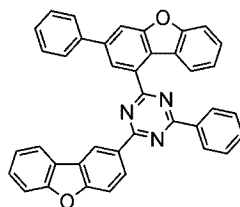
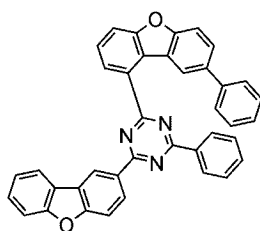
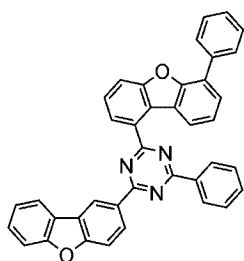
【化 8 9】



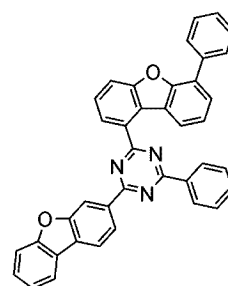
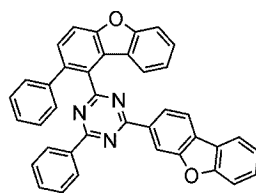
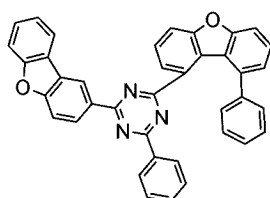
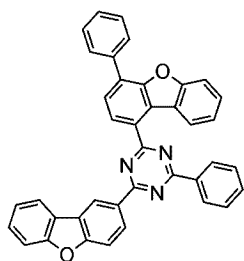
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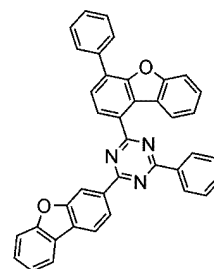
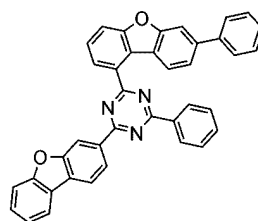
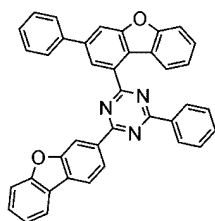
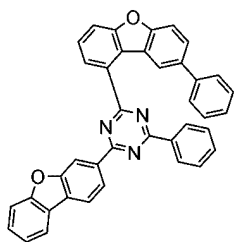
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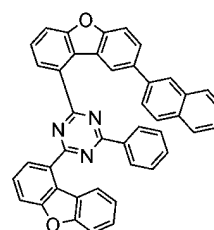
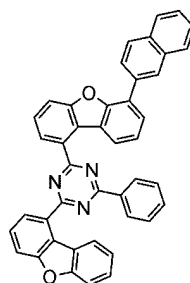
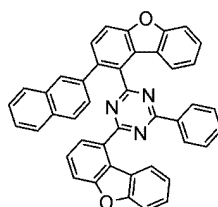
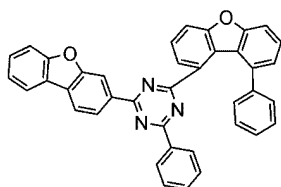
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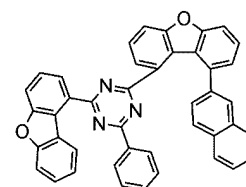
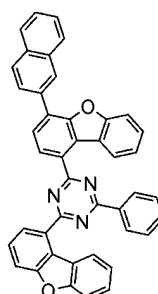
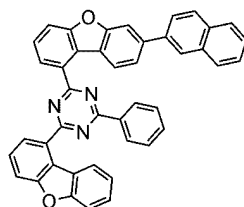
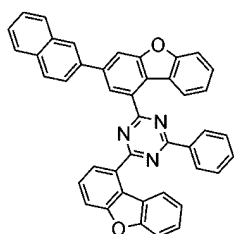
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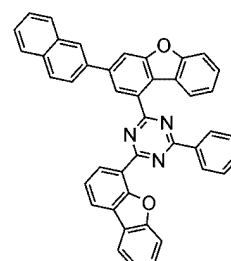
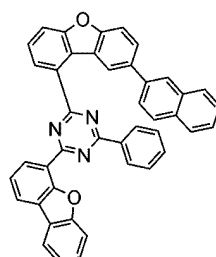
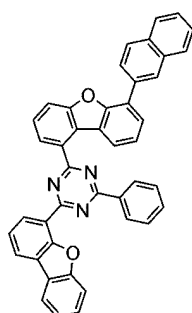
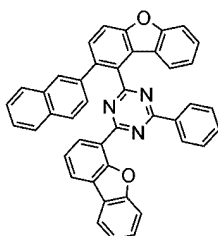
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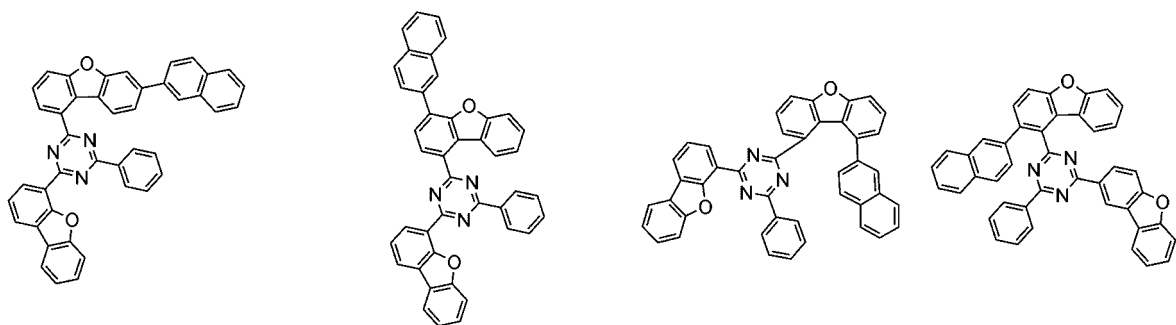
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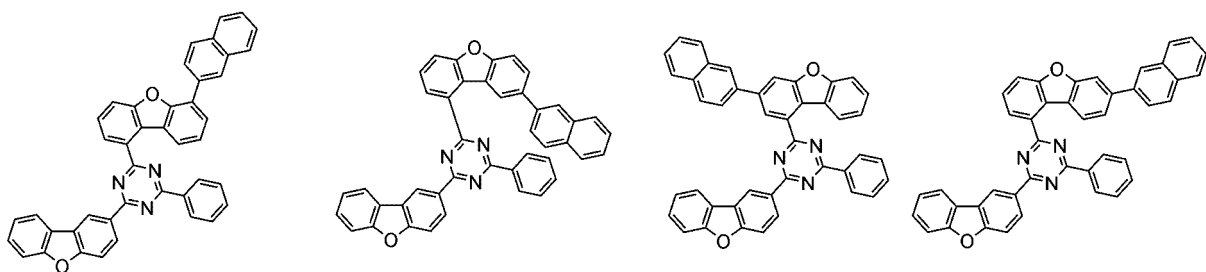
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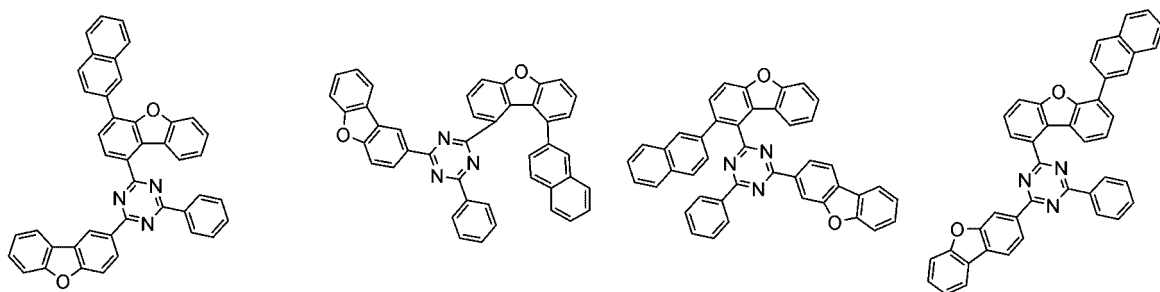
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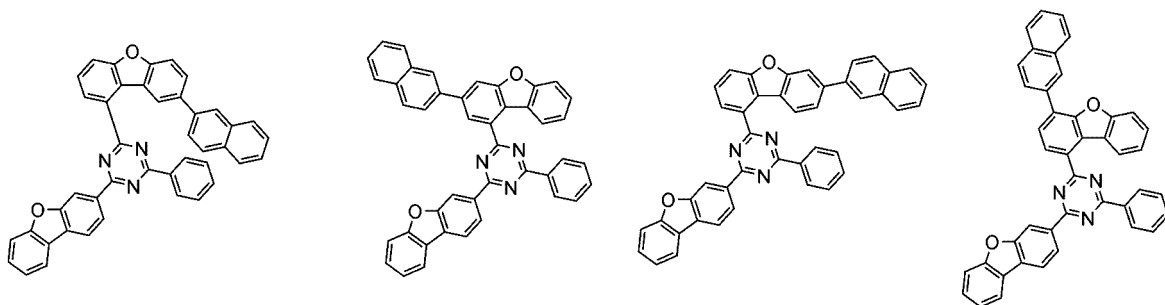
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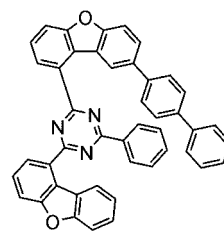
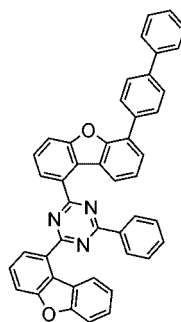
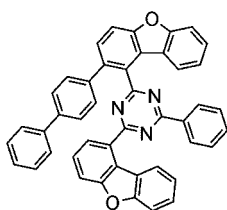
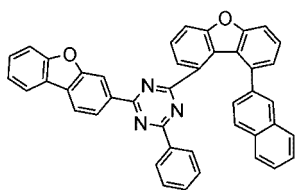
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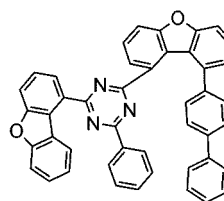
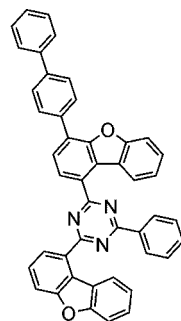
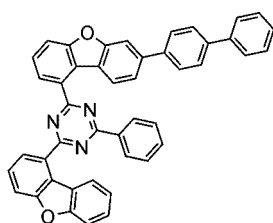
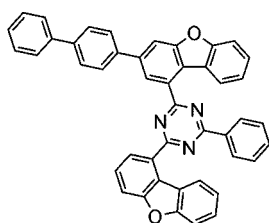
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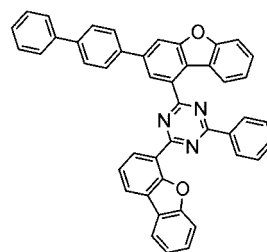
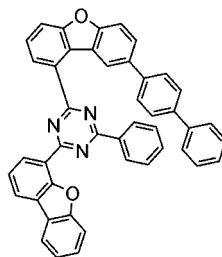
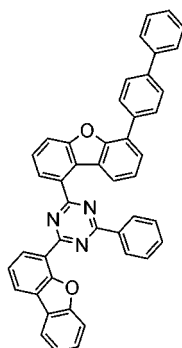
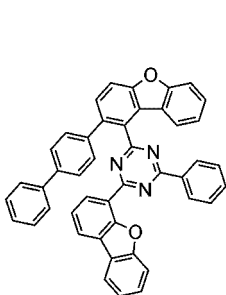
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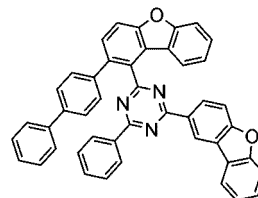
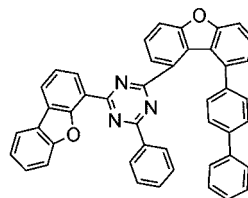
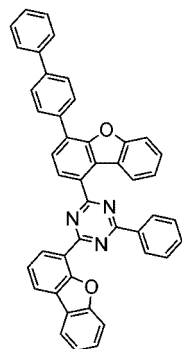
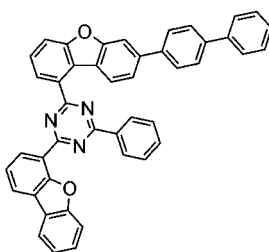
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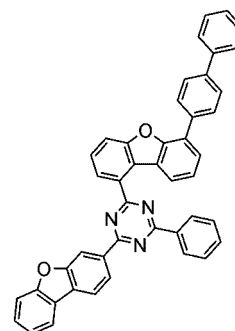
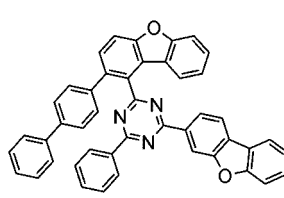
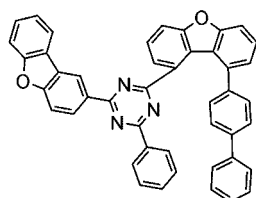
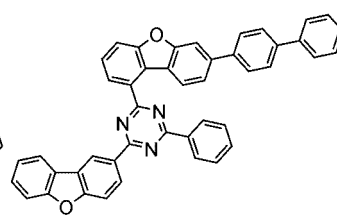
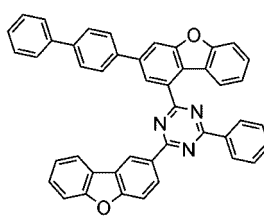
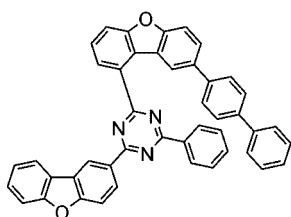


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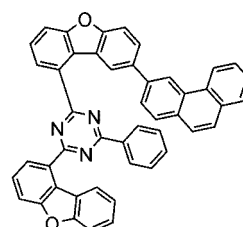
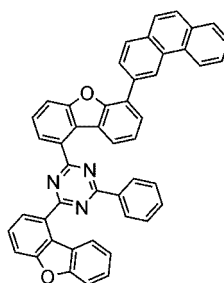
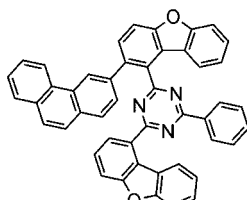
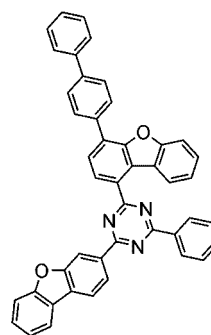
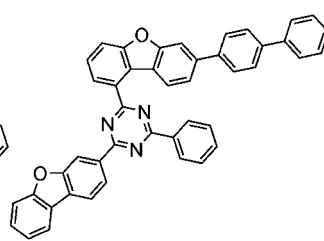
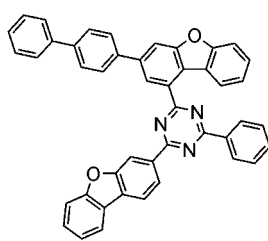


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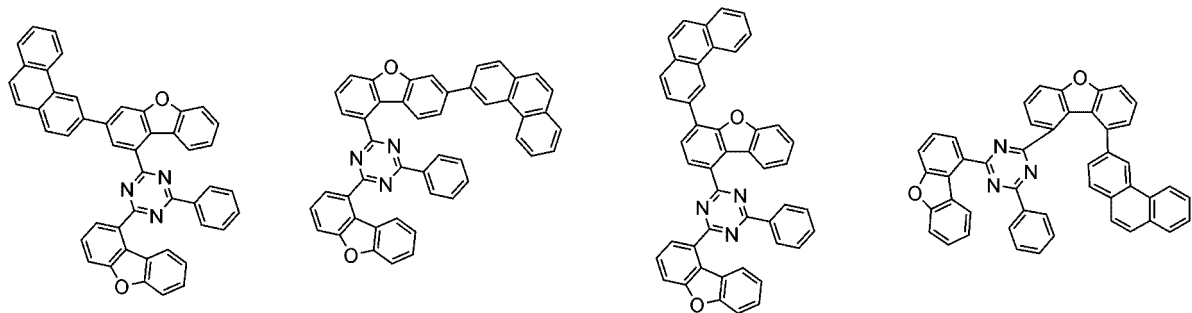


The chemical structure of compound 1 is a macrocycle. It consists of a central 1,3,5-triazine ring. At the 2 and 4 positions of the triazine ring, there are fluorenyl groups (a benzene ring fused to a five-membered furan ring). At the 6 position of the triazine ring, there are two 4-phenylphenyl groups (a benzene ring connected at its para position to another benzene ring). The fluorenyl and 4-phenylphenyl groups are linked together to form a large ring structure.

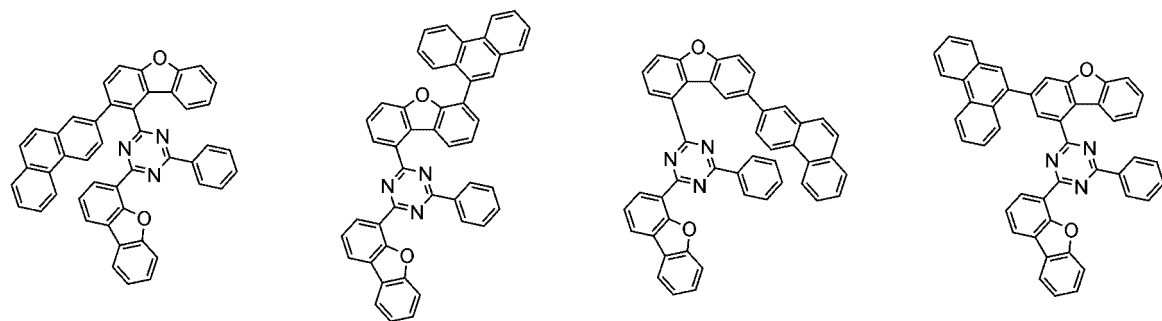


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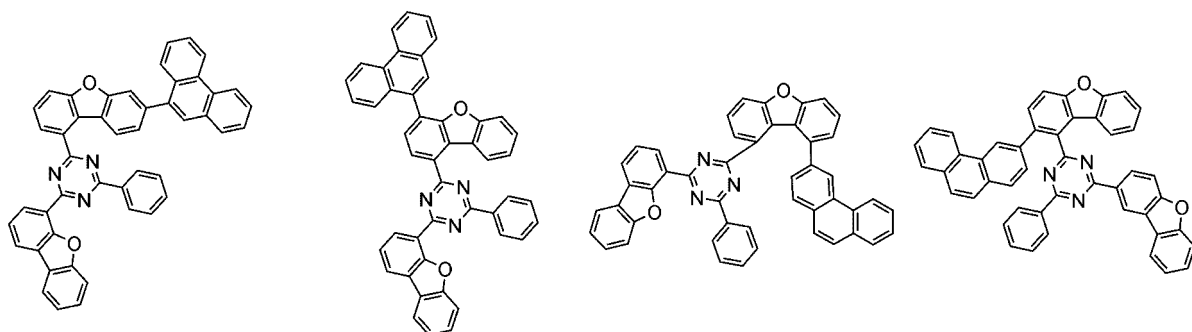
【化 9 4】



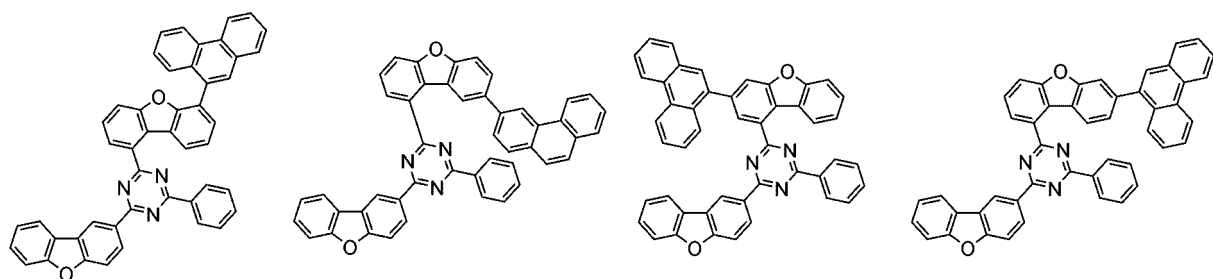
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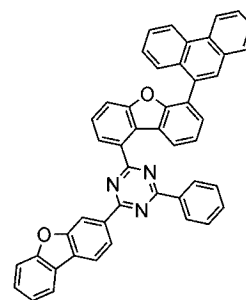
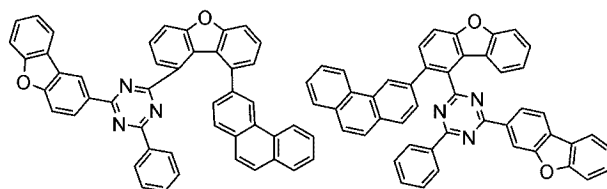
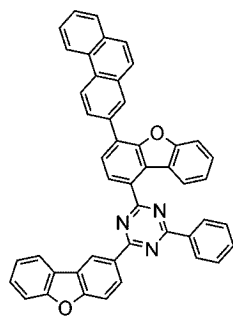
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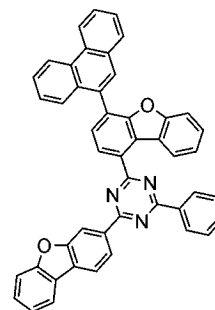
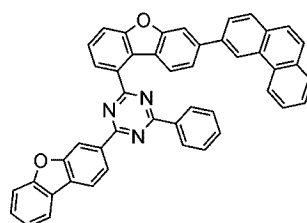
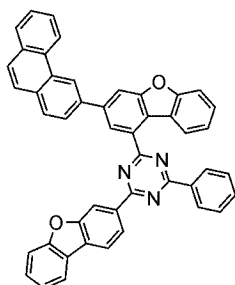
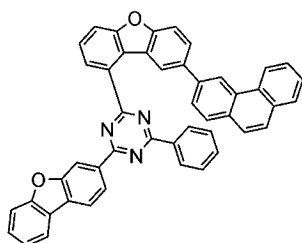
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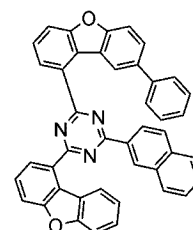
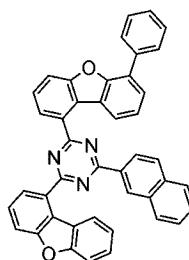
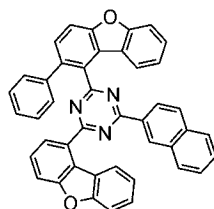
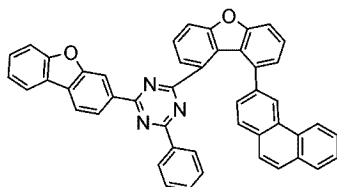
【化 9 5】



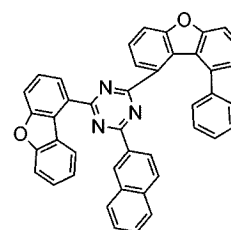
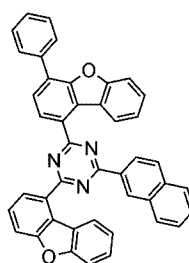
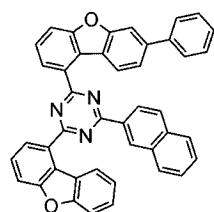
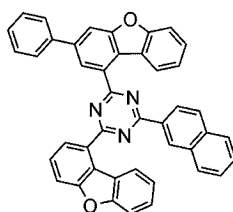
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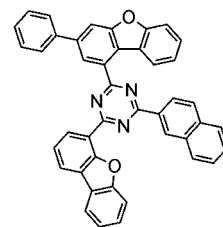
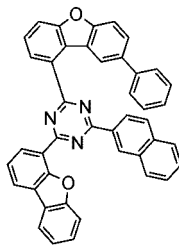
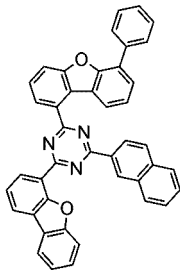
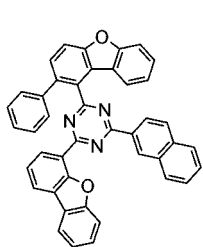
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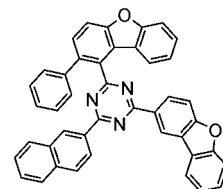
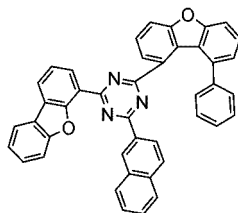
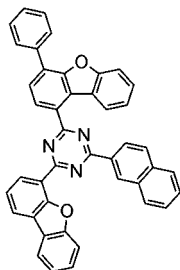
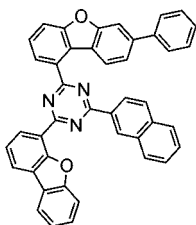
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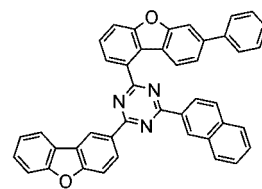
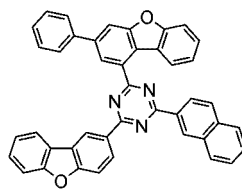
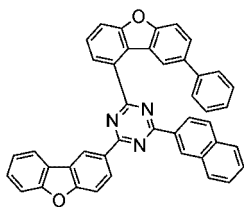
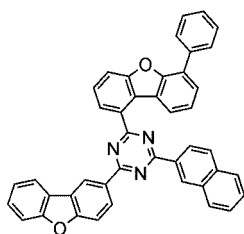
【化 6 1 4】



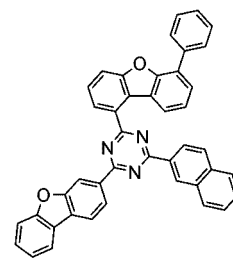
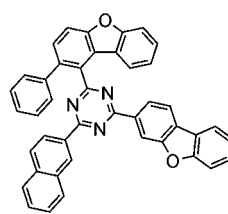
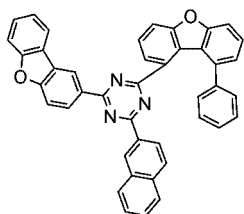
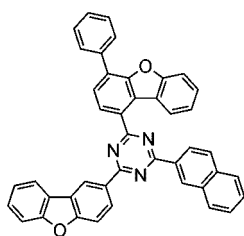
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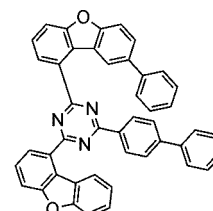
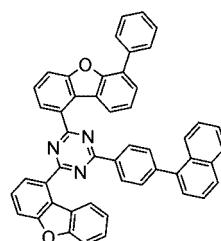
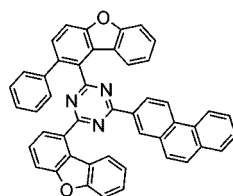
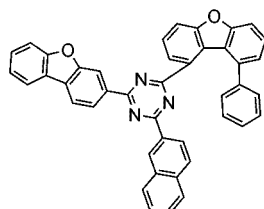
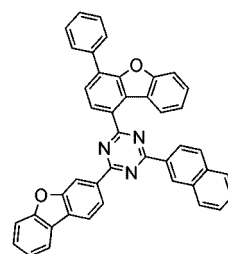
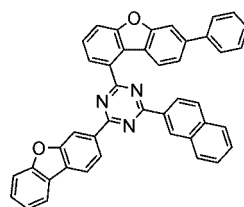
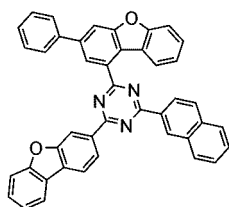
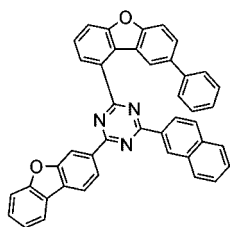
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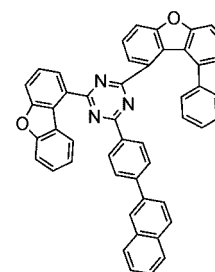
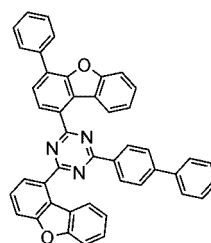
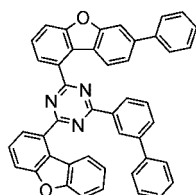
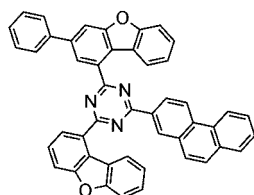
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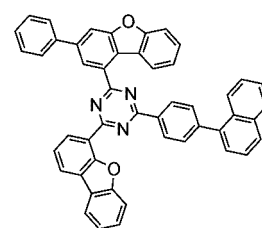
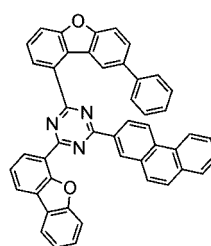
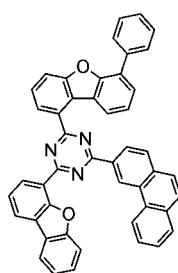
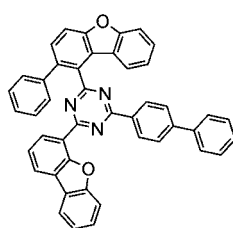
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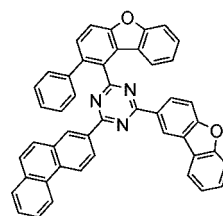
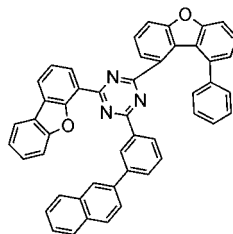
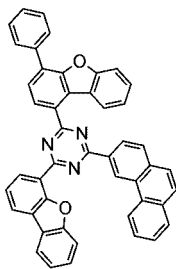
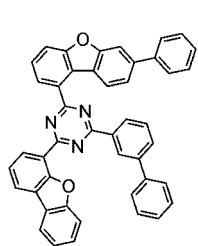


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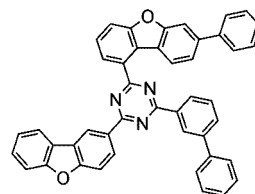
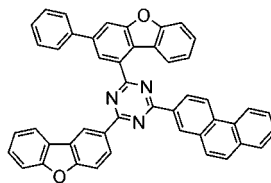
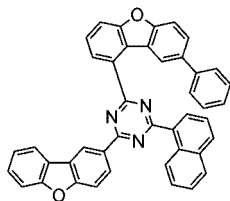
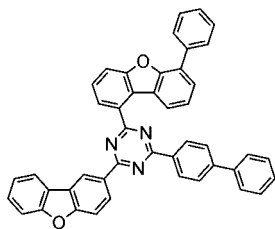
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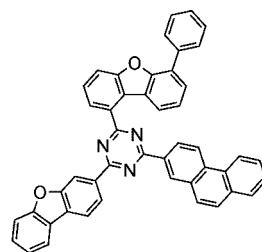
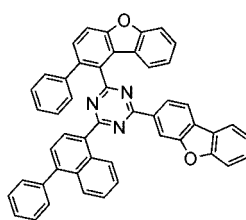
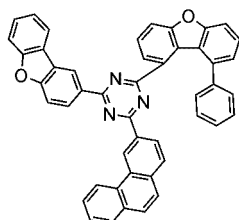
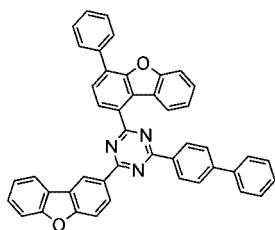
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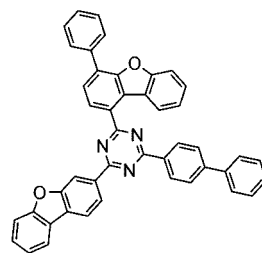
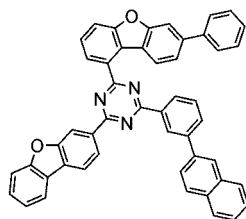
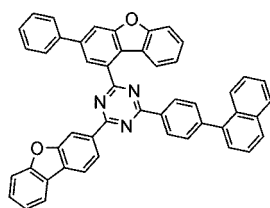
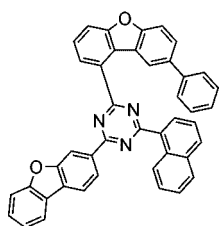
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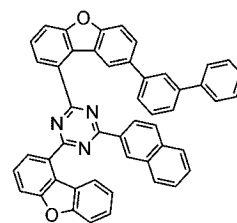
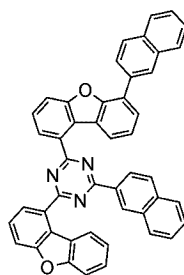
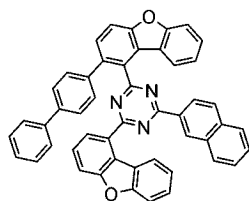
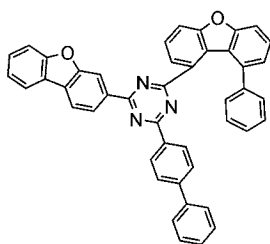
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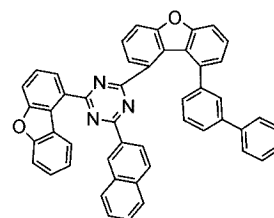
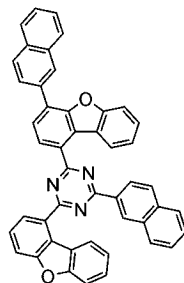
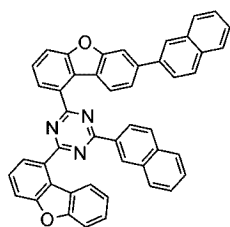
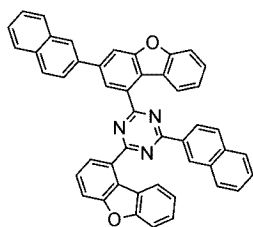
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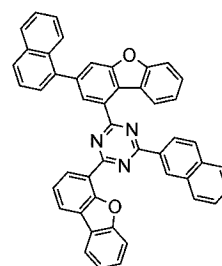
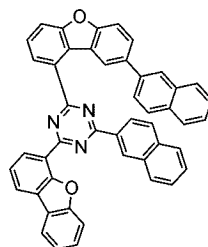
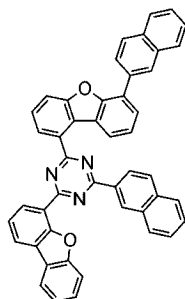
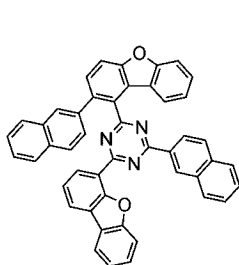
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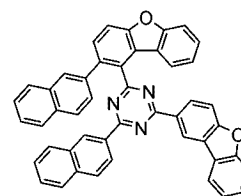
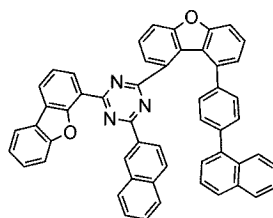
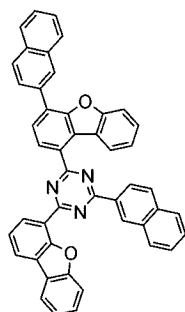
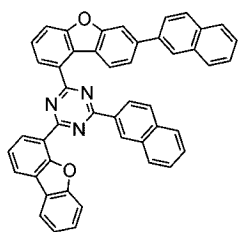
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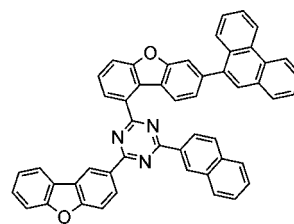
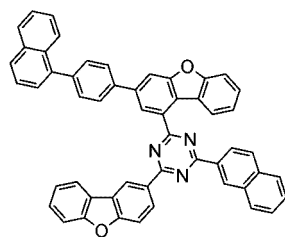
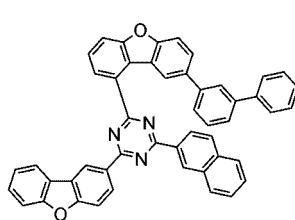
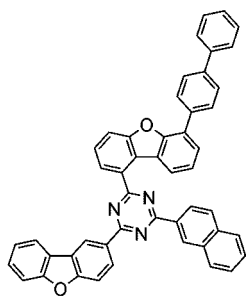
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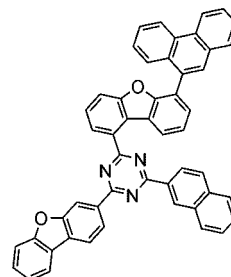
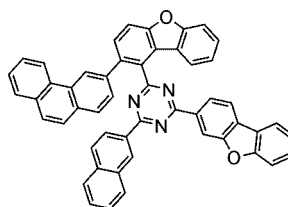
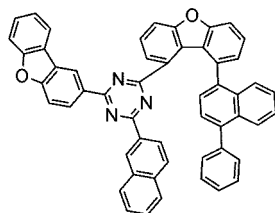
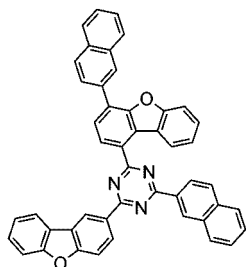
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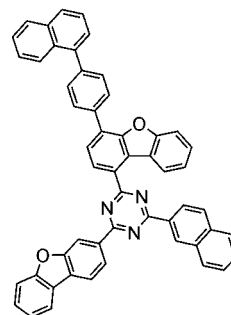
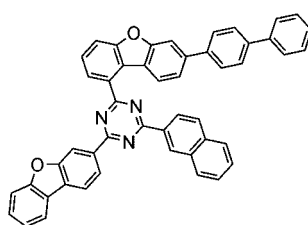
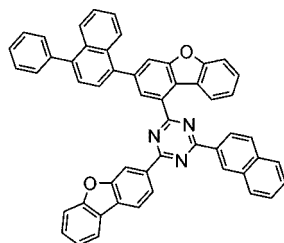
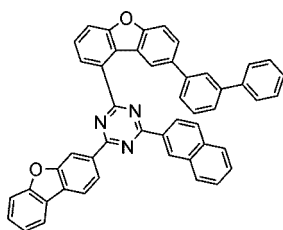
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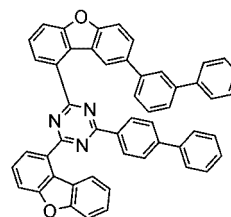
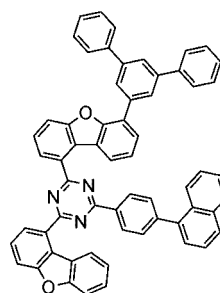
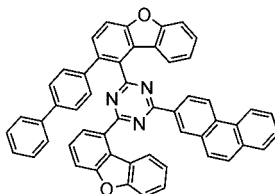
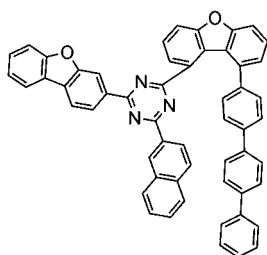
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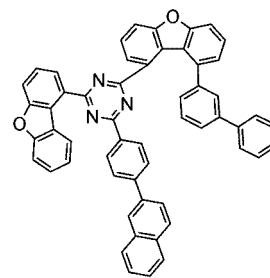
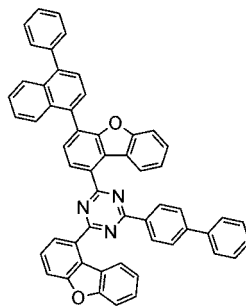
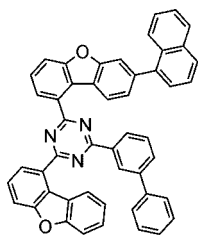
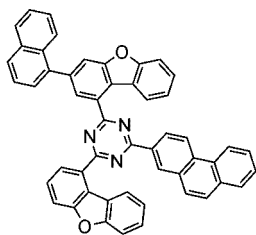
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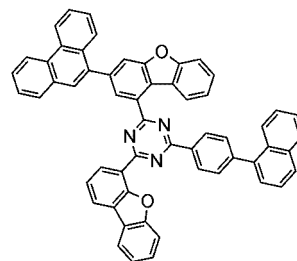
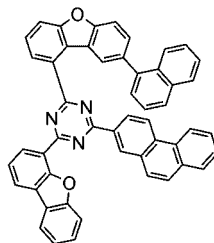
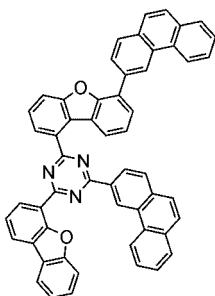
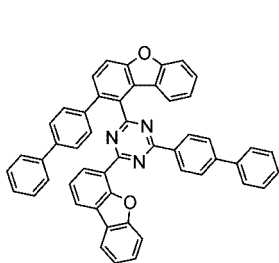
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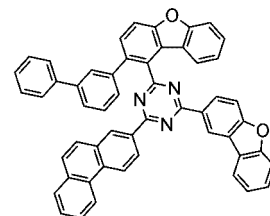
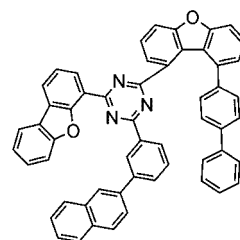
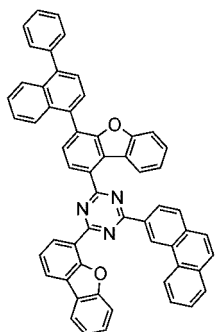
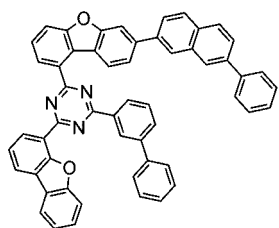
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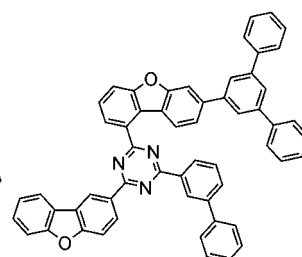
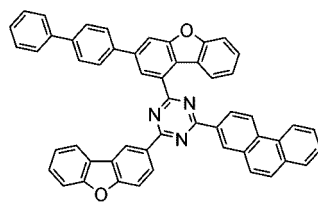
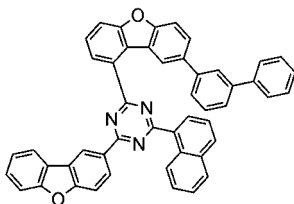
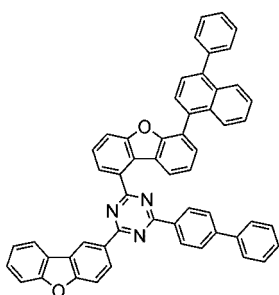
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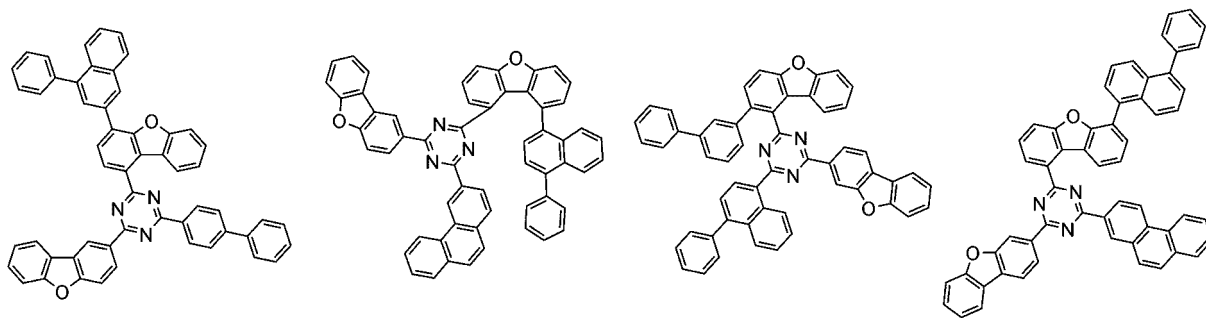
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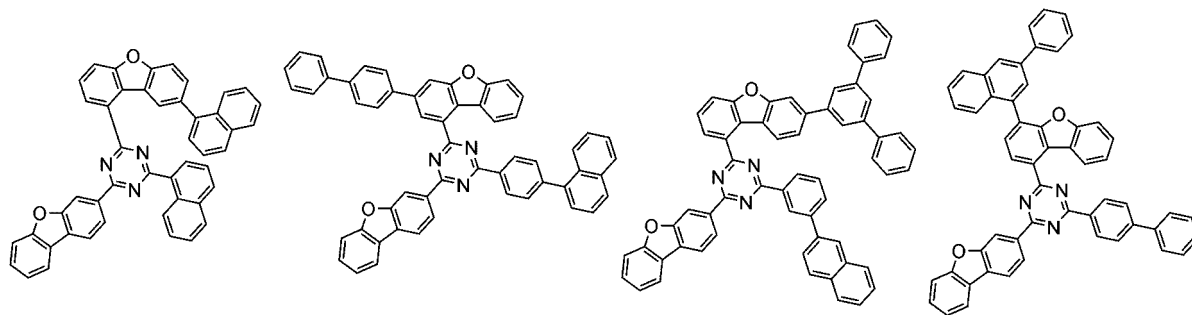
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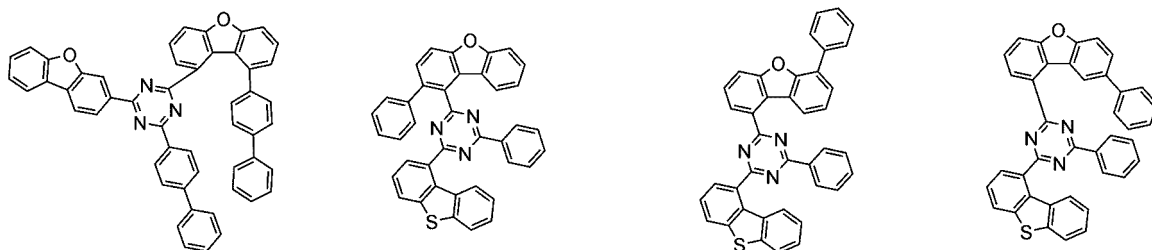
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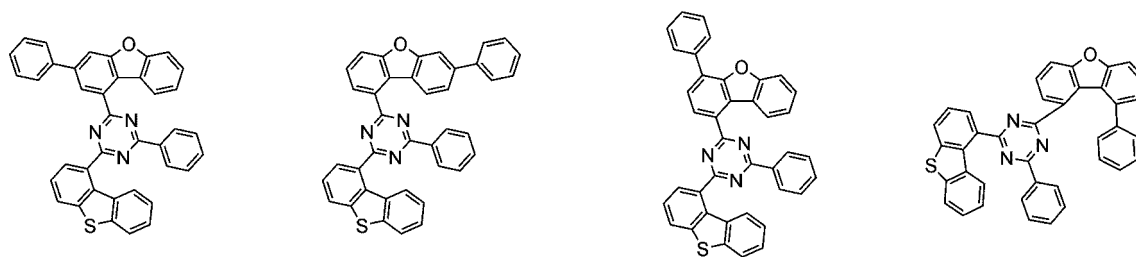
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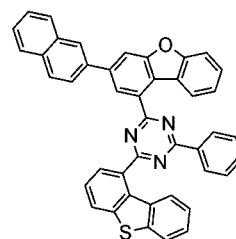
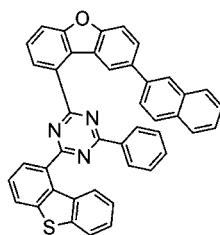
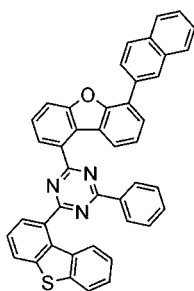
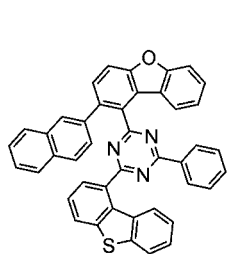
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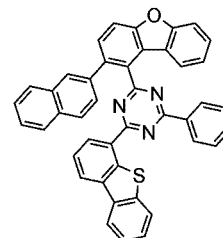
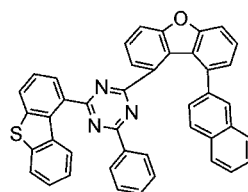
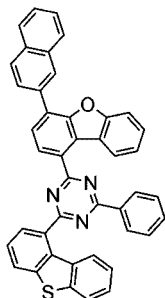
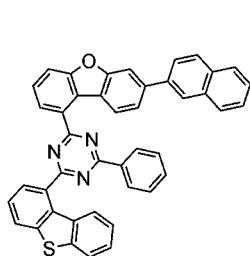
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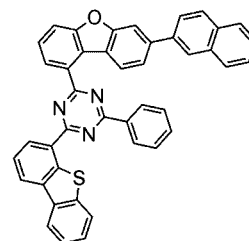
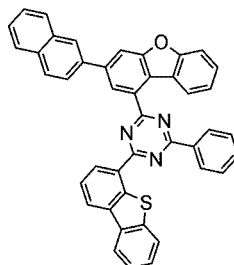
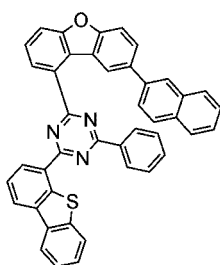
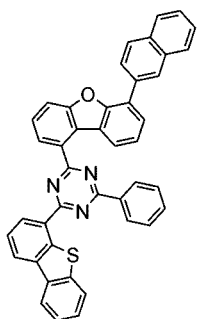
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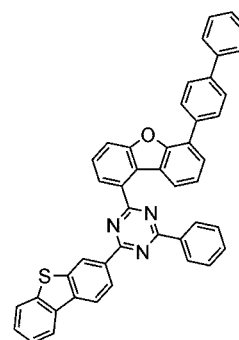
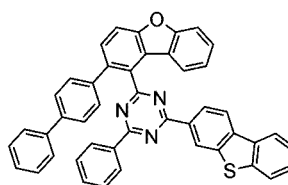
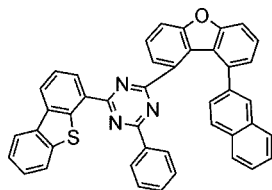
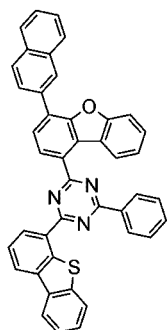
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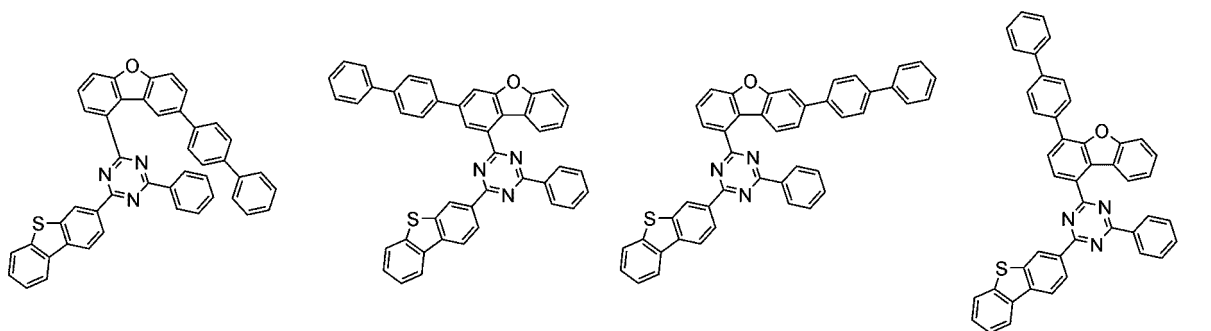
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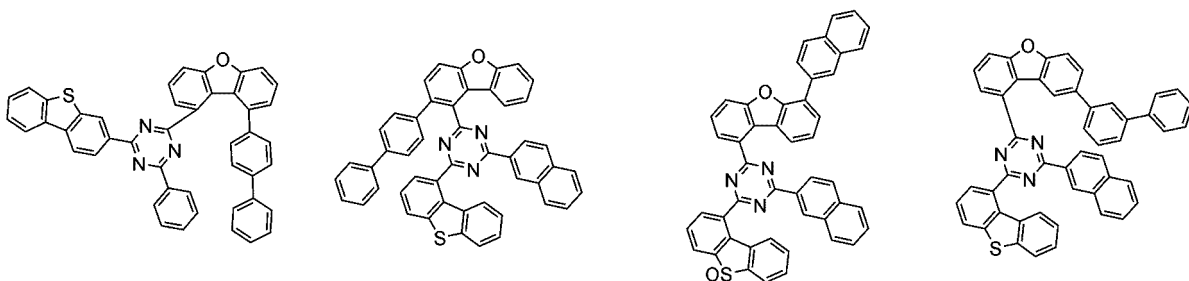
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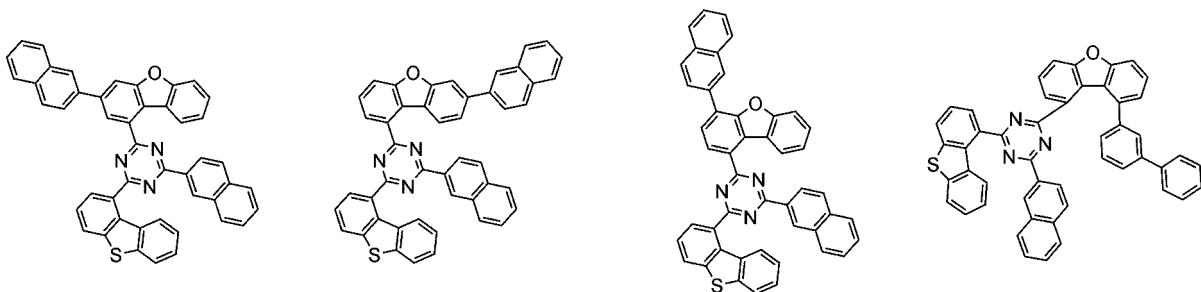
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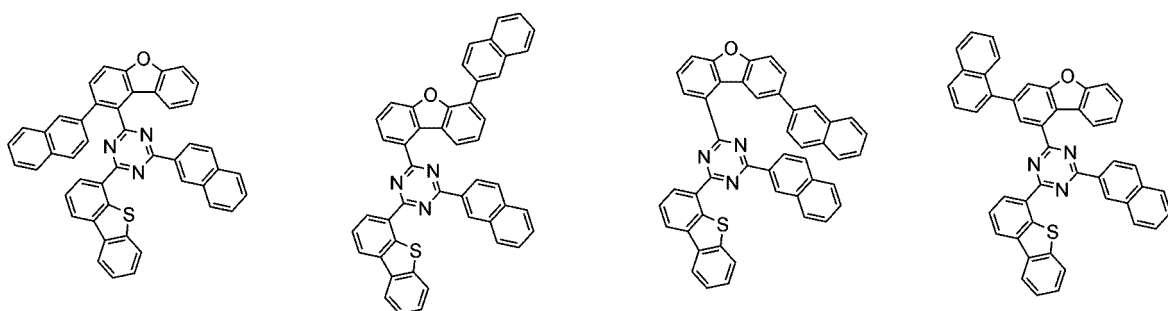
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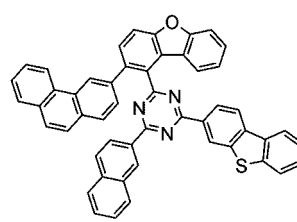
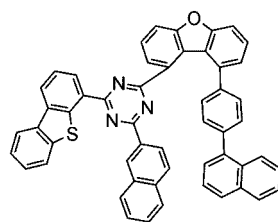
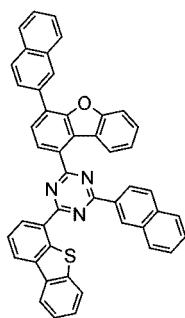
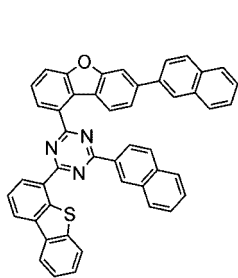
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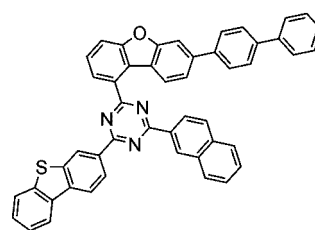
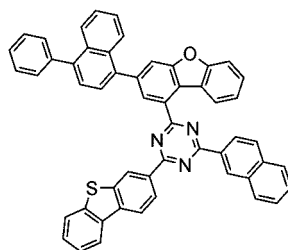
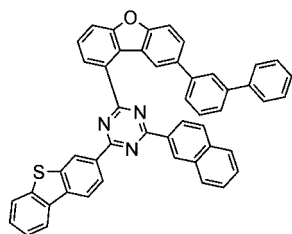
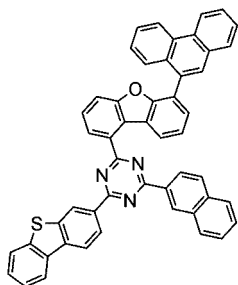
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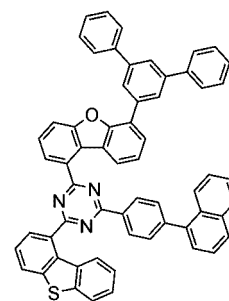
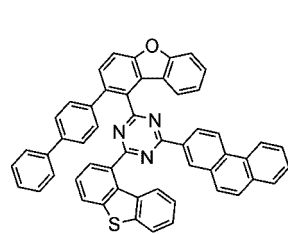
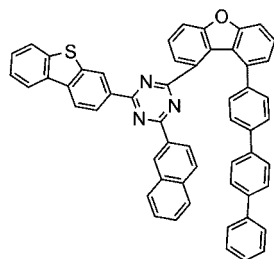
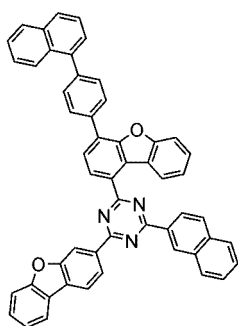
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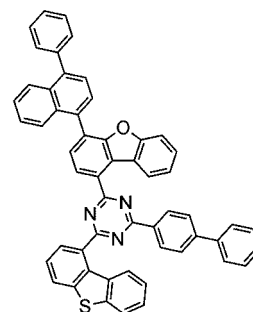
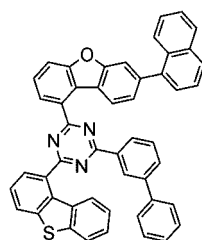
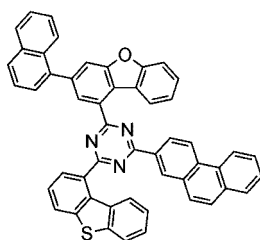
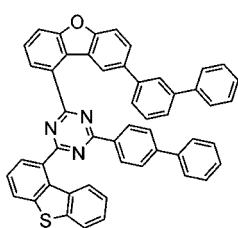
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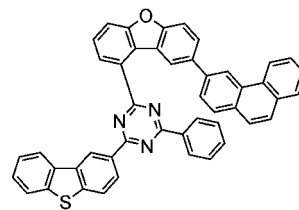
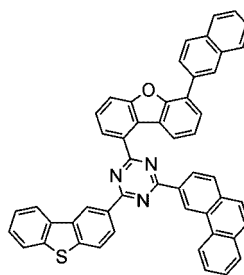
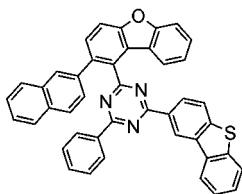
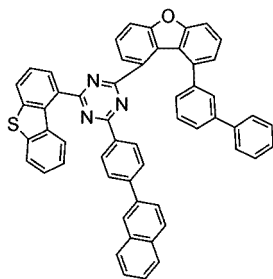
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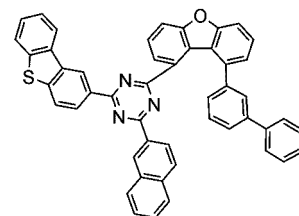
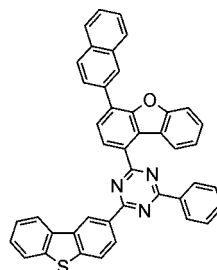
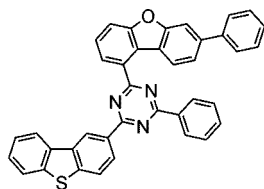
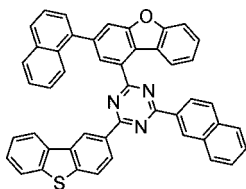
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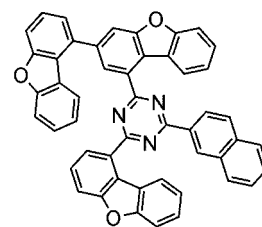
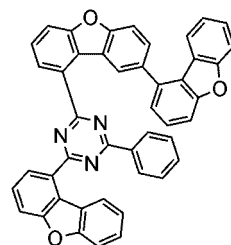
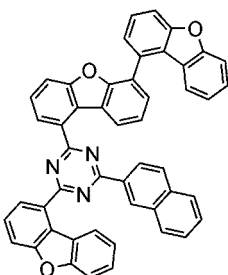
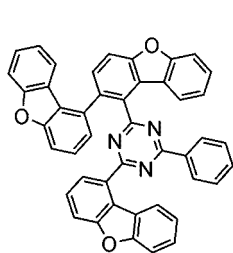
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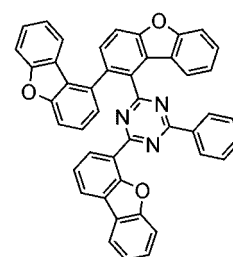
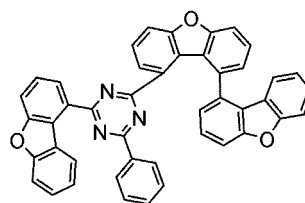
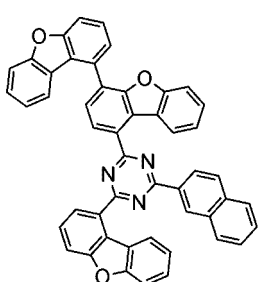
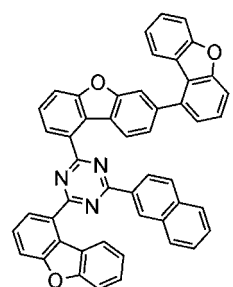
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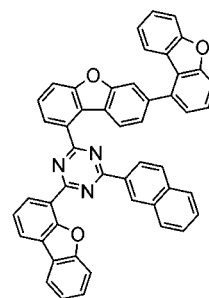
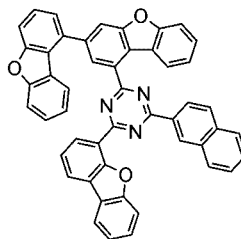
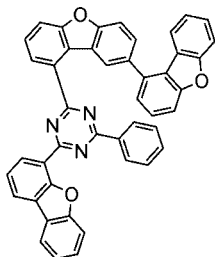
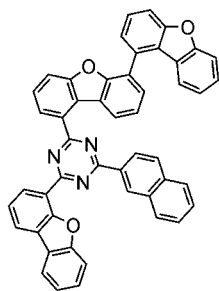


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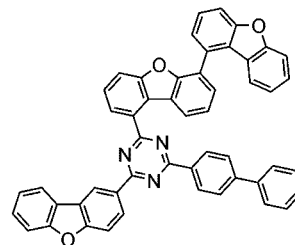
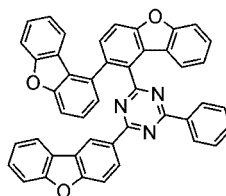
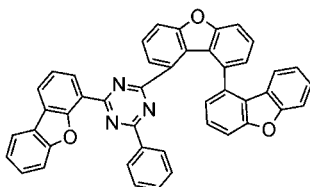
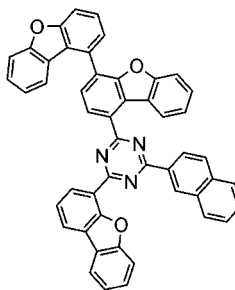
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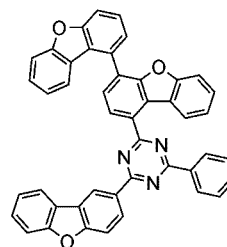
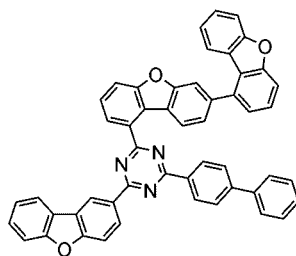
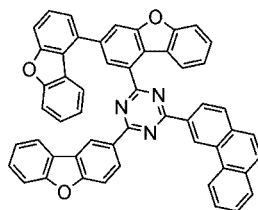
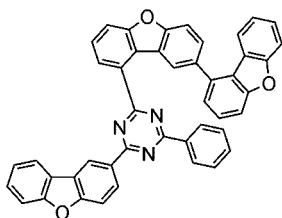
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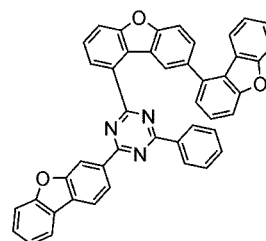
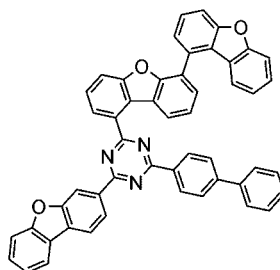
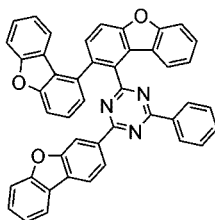
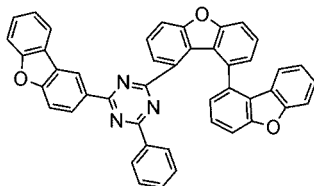
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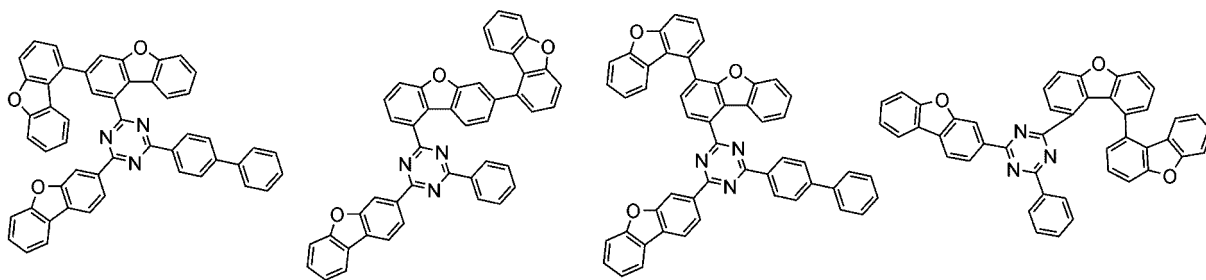
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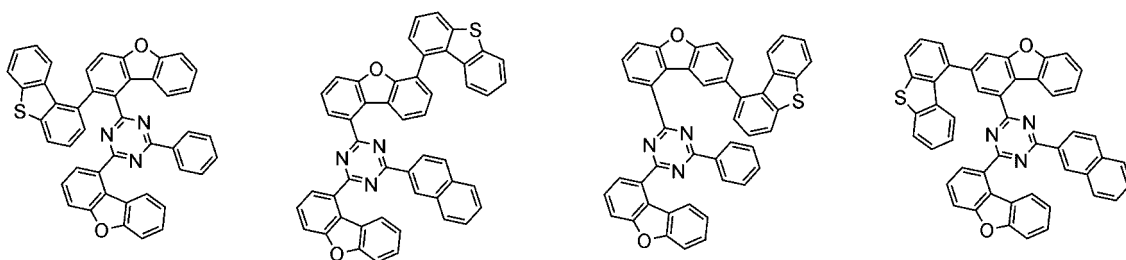
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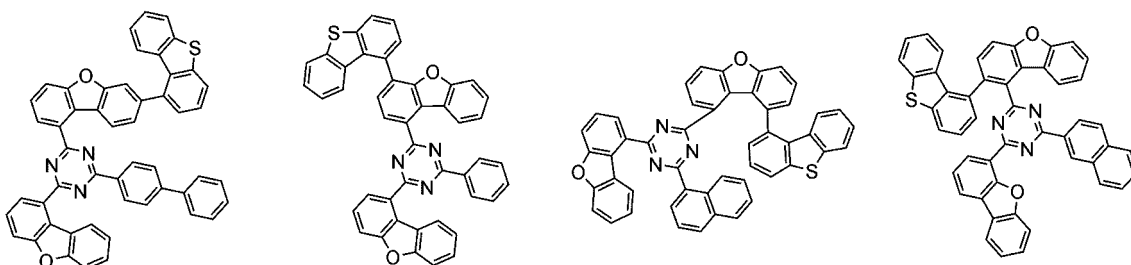
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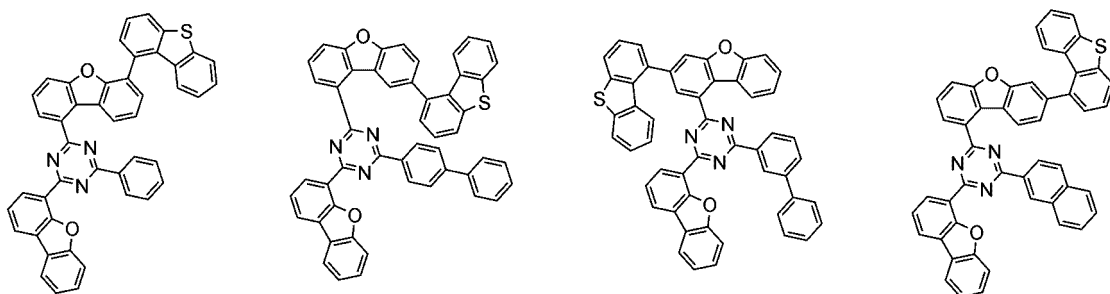
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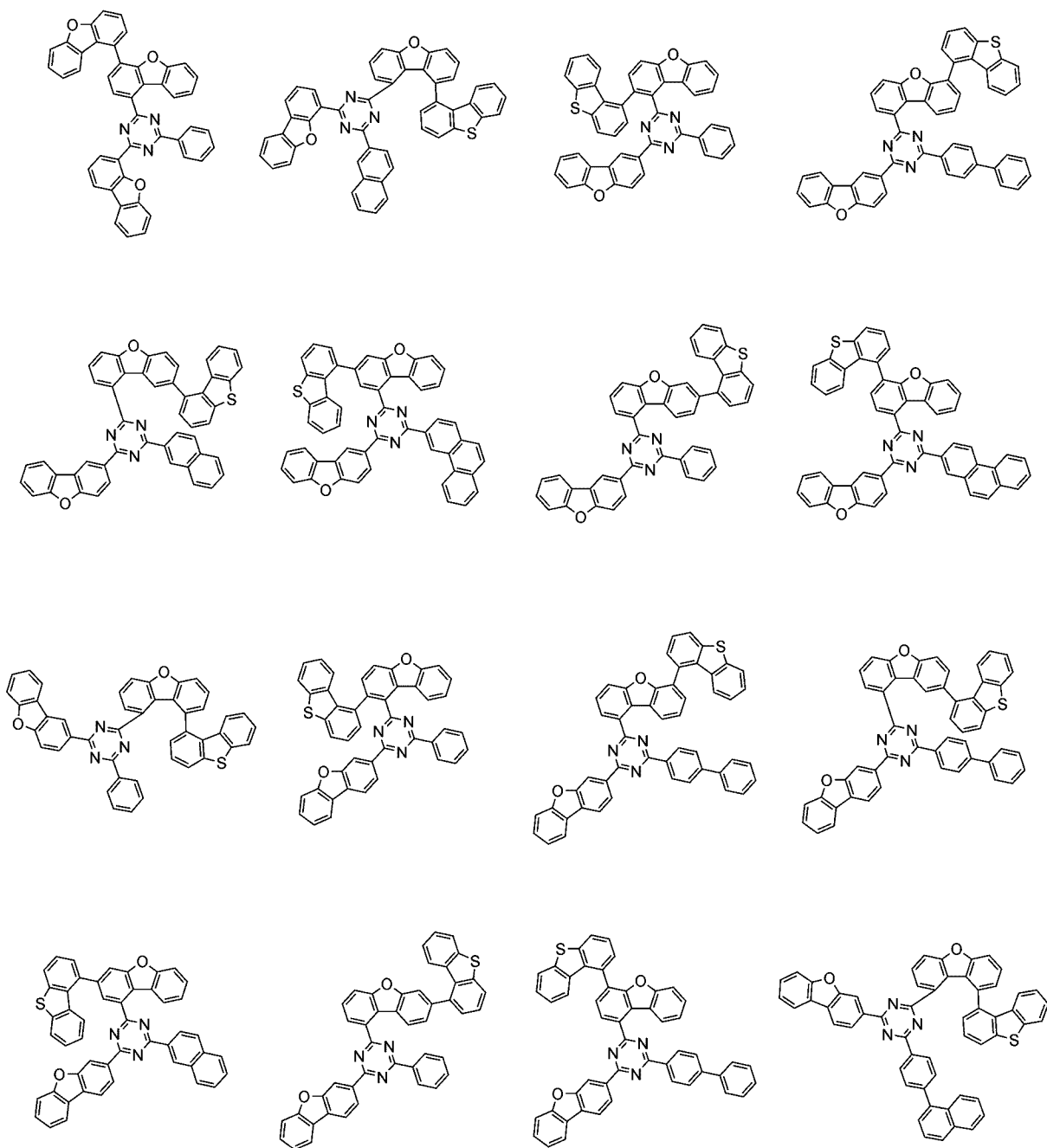
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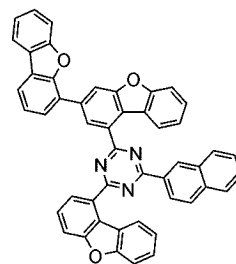
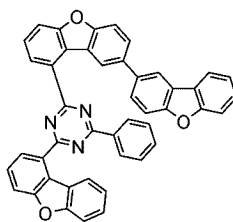
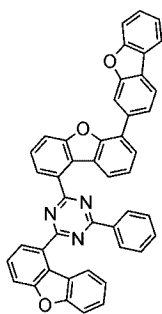
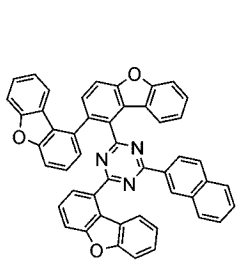
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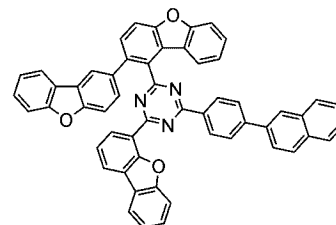
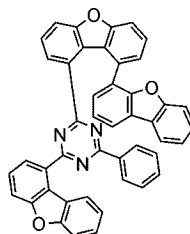
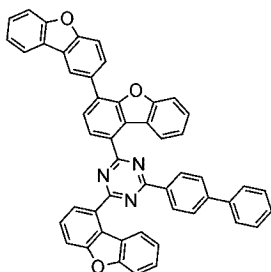
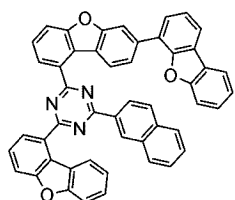
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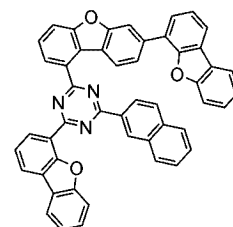
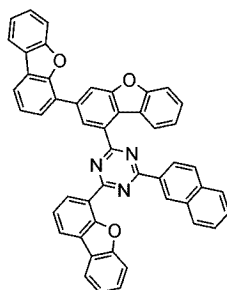
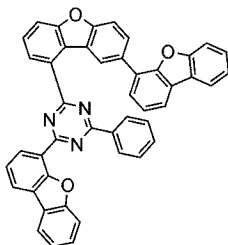
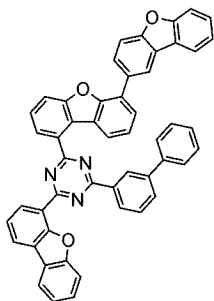
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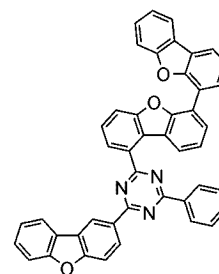
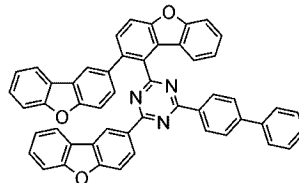
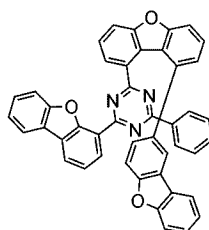
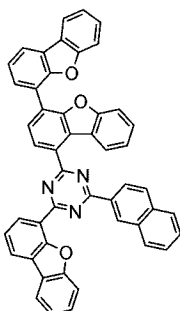
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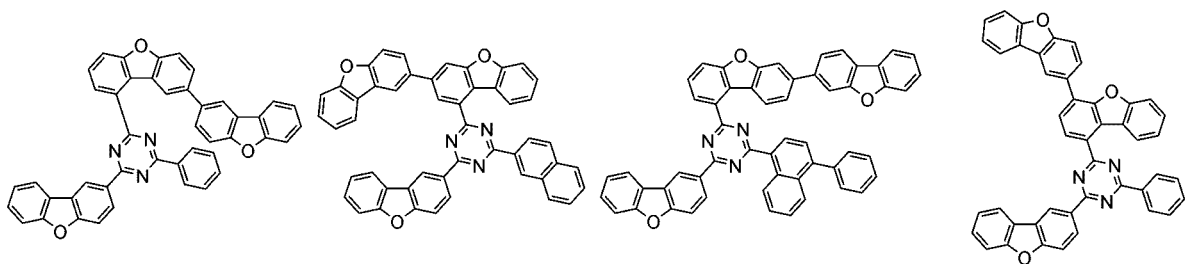
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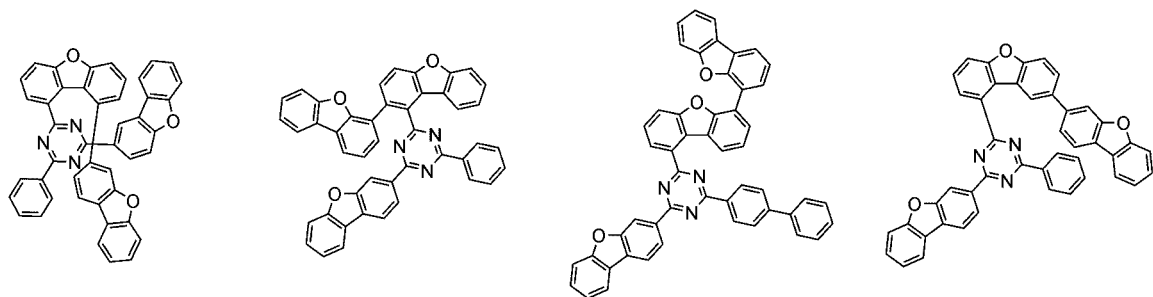
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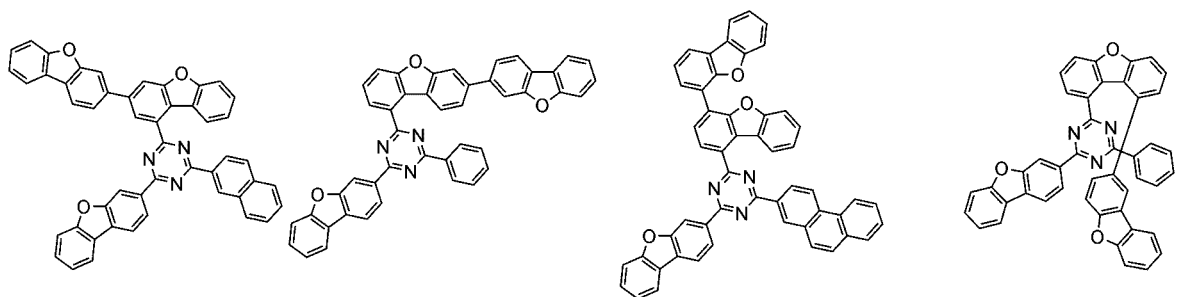
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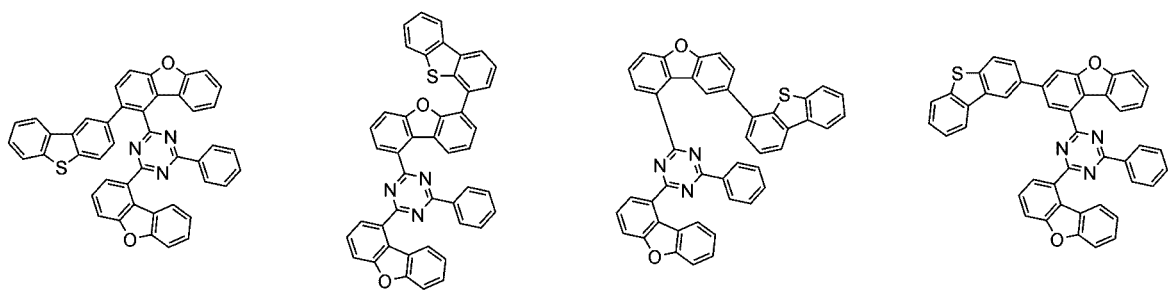
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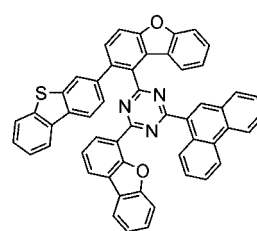
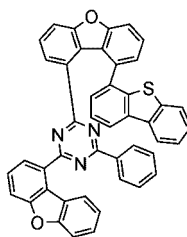
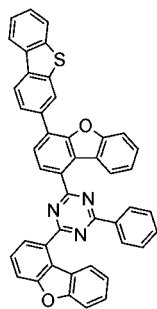
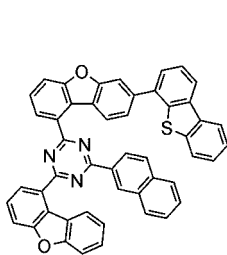
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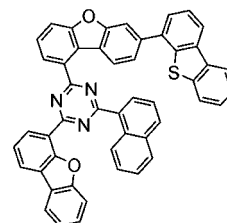
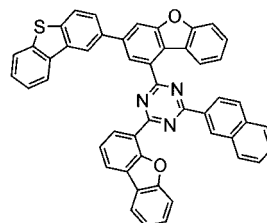
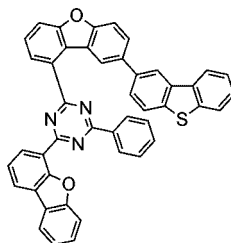
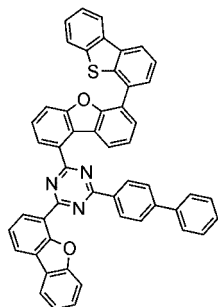
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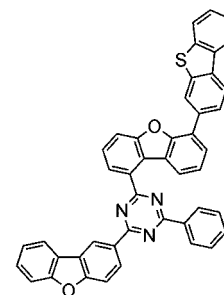
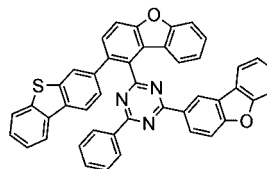
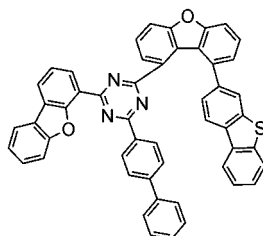
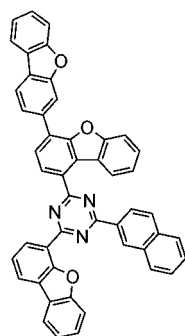
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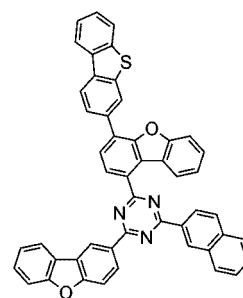
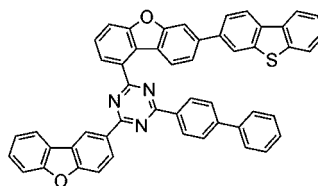
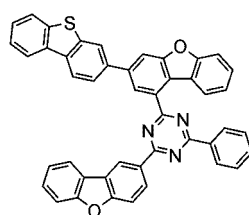
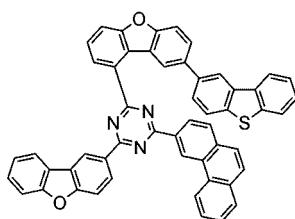
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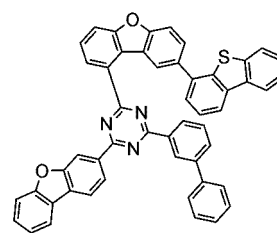
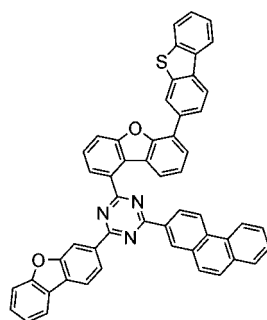
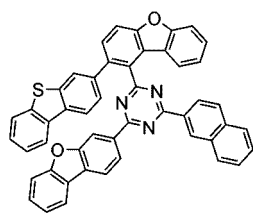
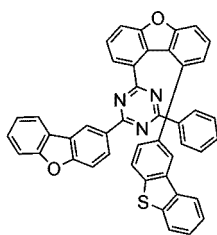
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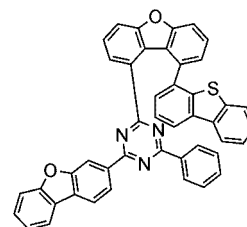
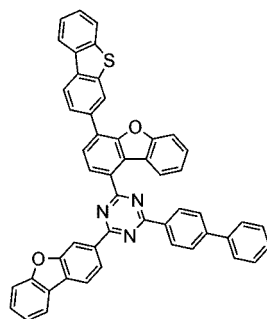
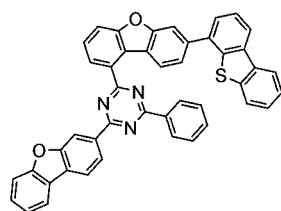
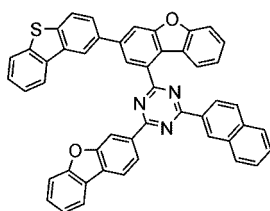
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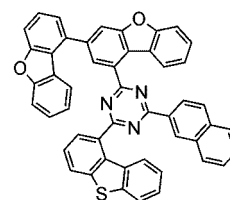
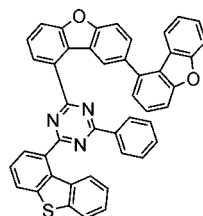
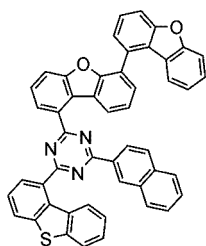
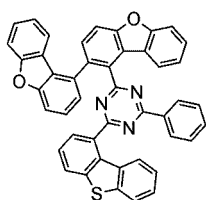
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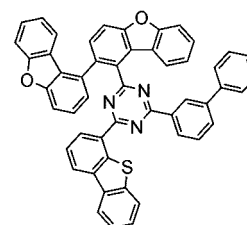
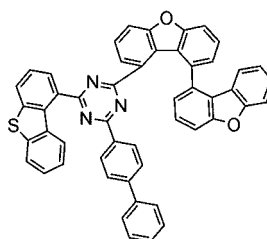
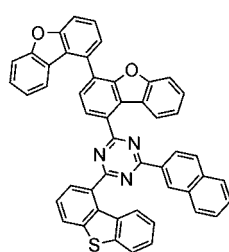
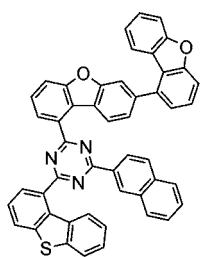
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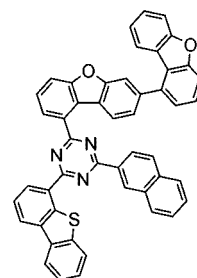
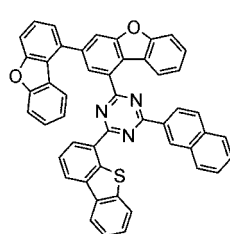
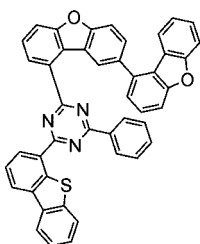
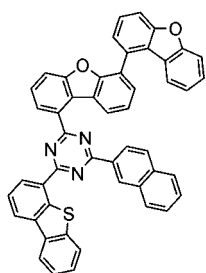
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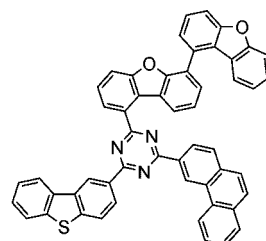
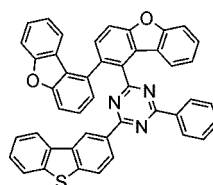
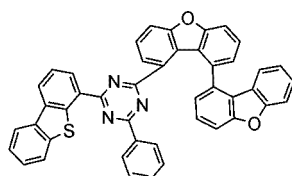
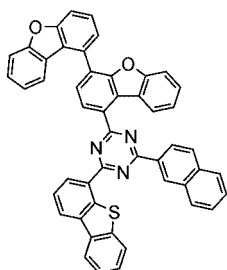
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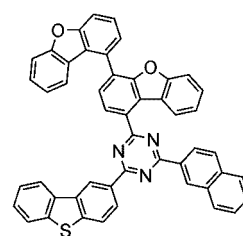
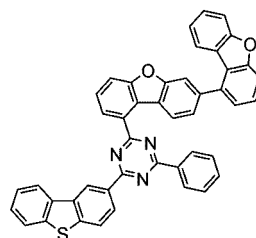
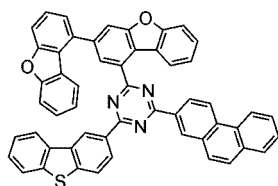
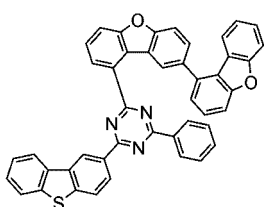
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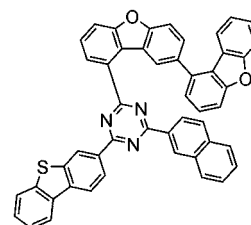
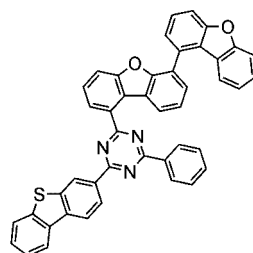
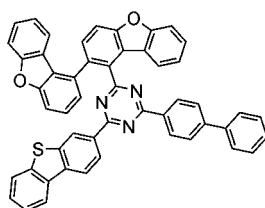
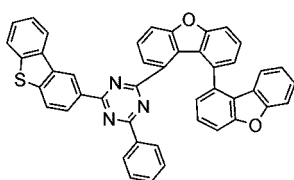
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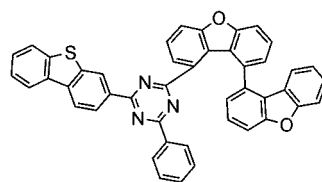
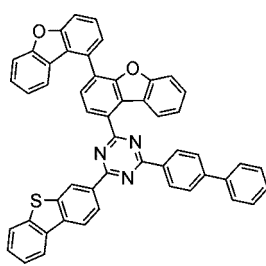
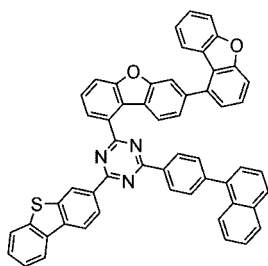
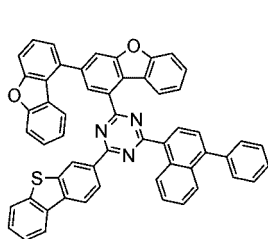
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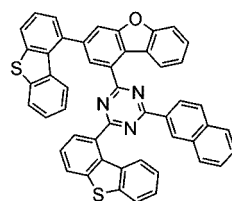
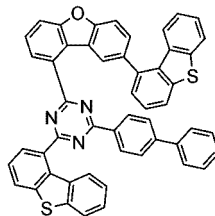
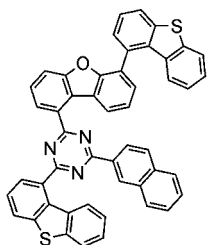
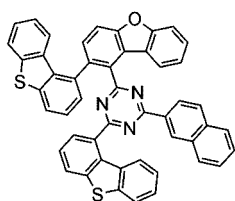
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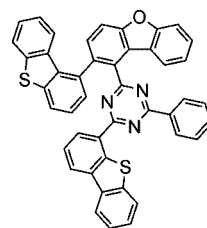
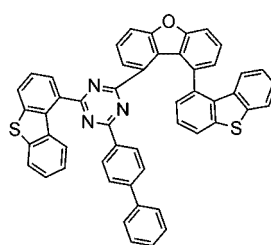
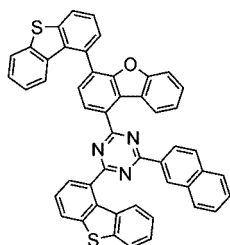
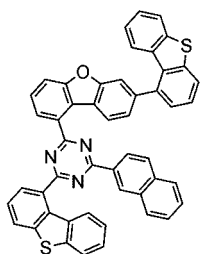
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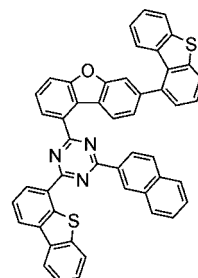
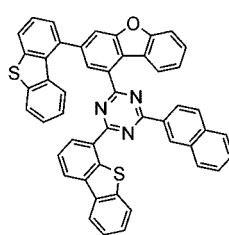
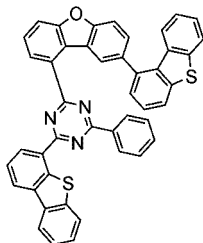
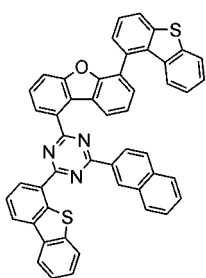
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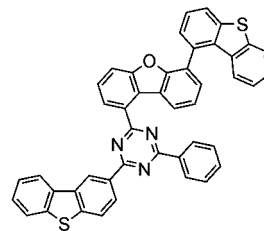
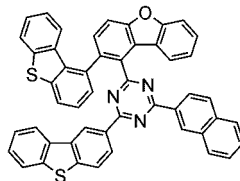
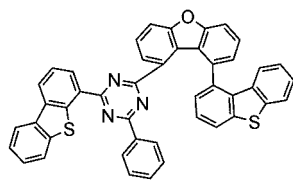
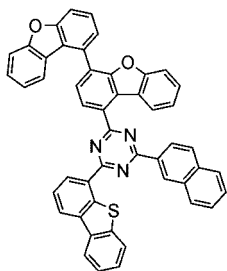
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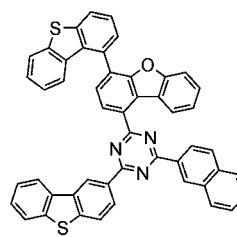
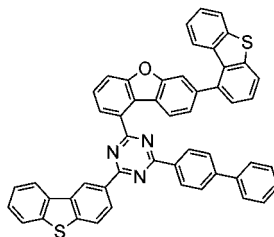
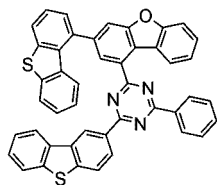
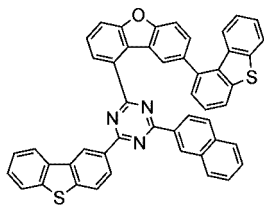
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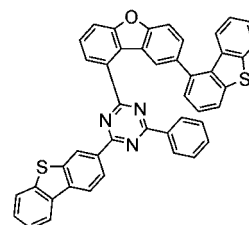
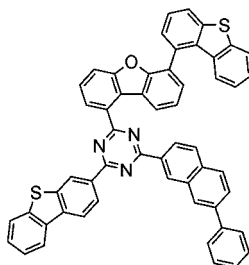
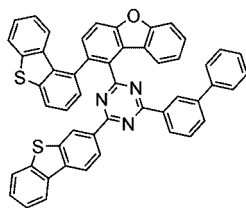
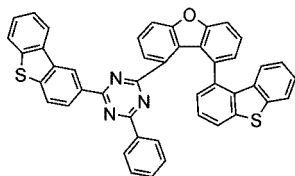
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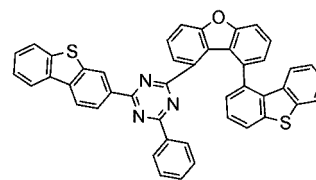
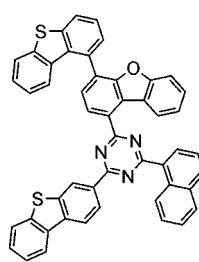
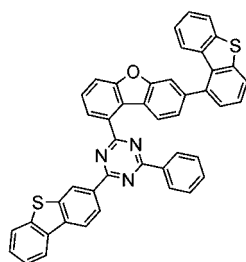
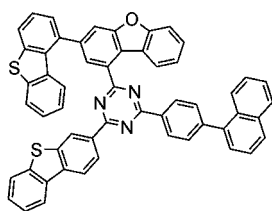
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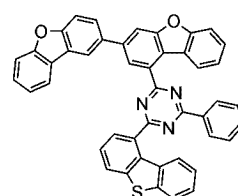
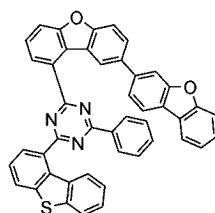
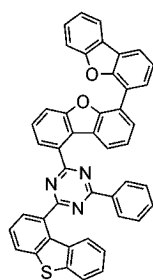
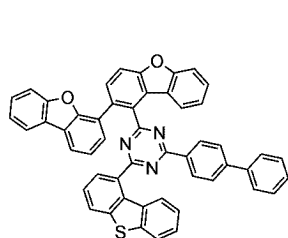
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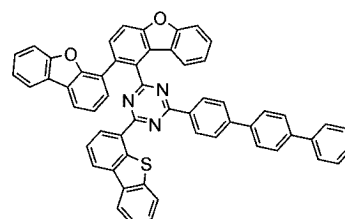
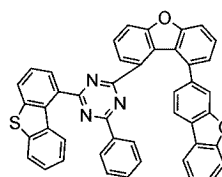
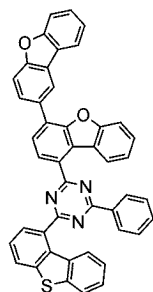
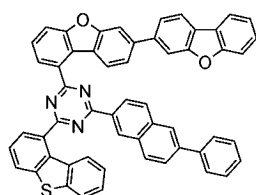
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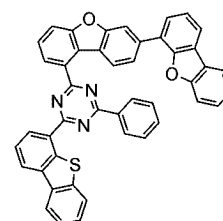
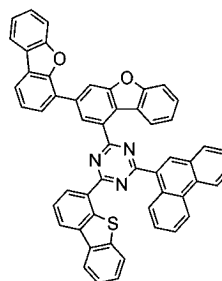
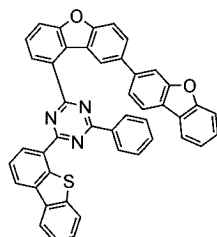
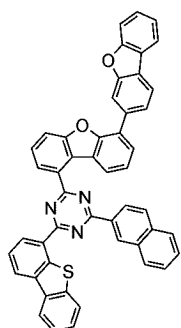
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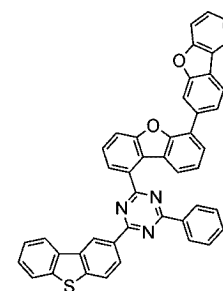
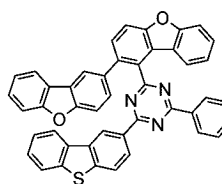
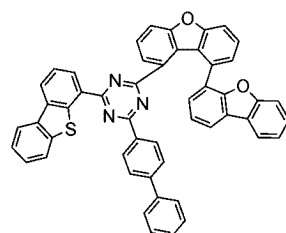
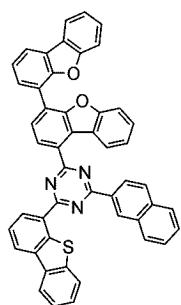
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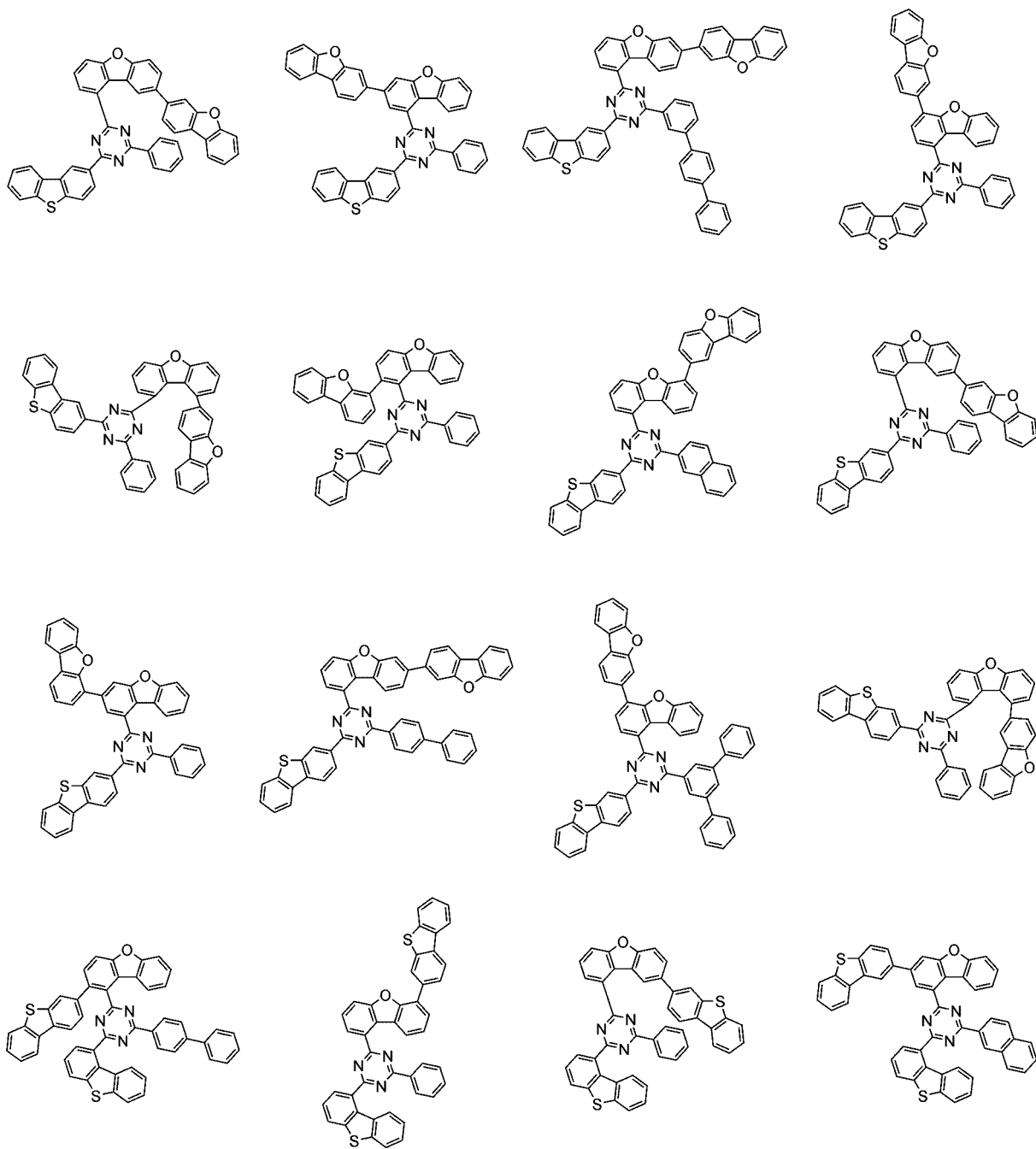
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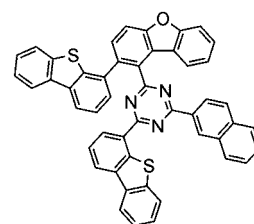
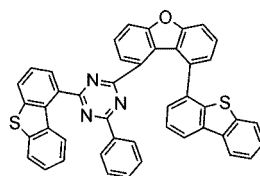
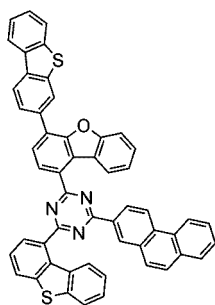
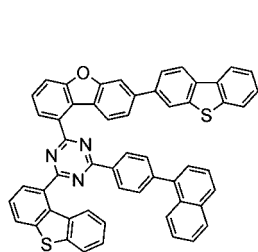
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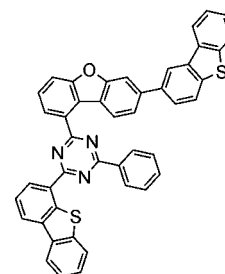
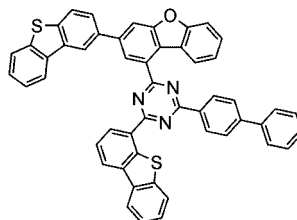
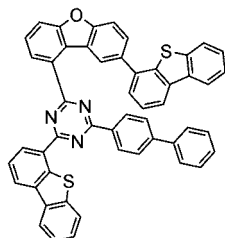
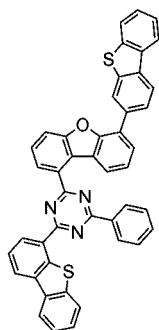
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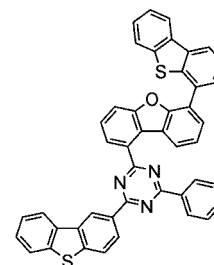
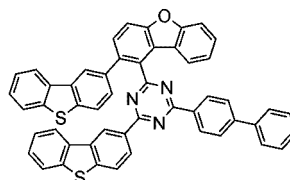
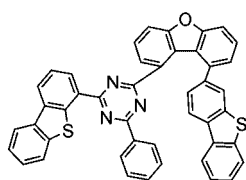
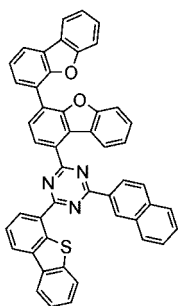
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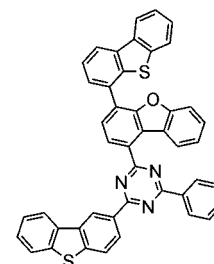
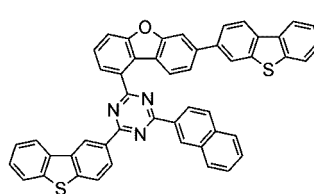
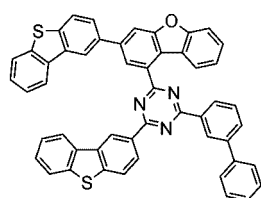
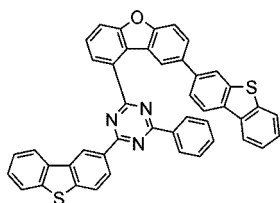
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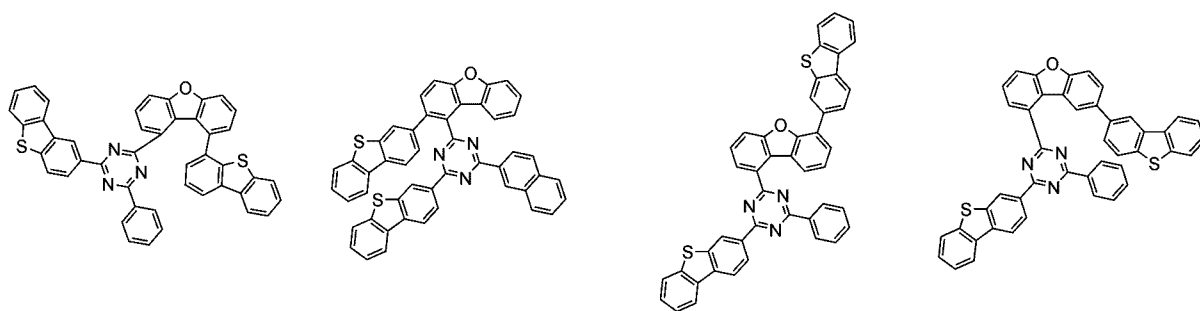
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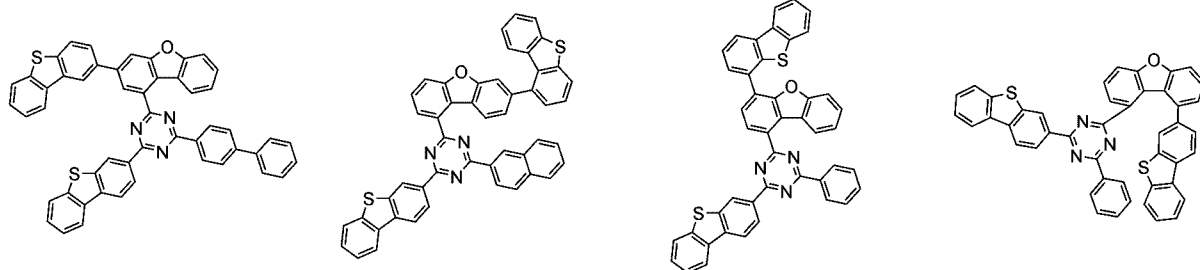
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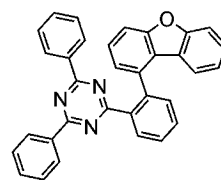
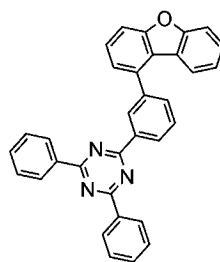
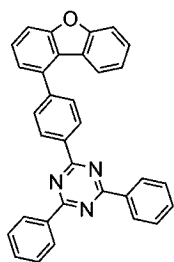
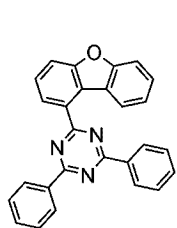
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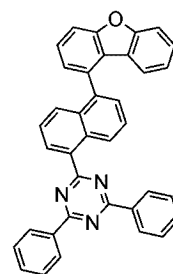
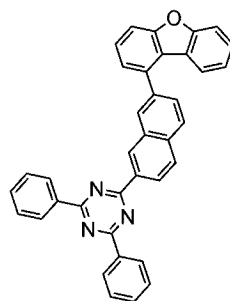
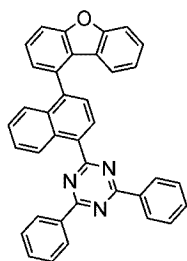
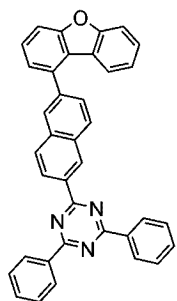
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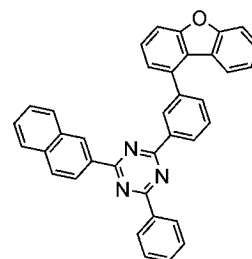
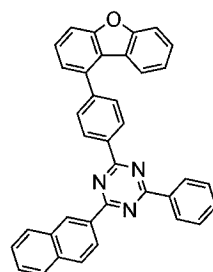
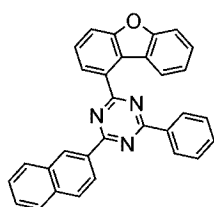
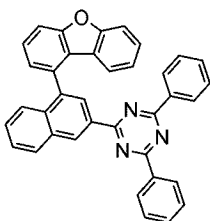
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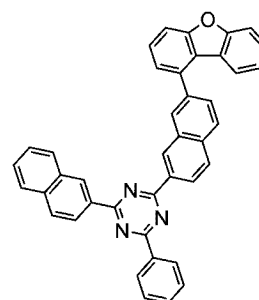
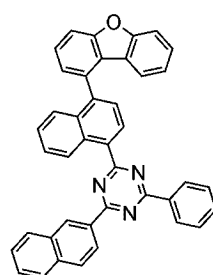
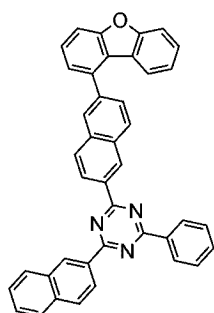
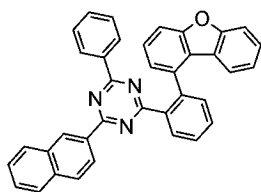
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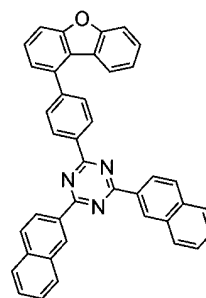
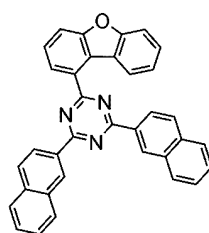
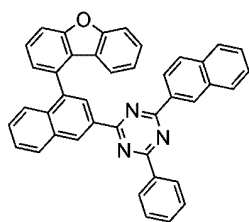
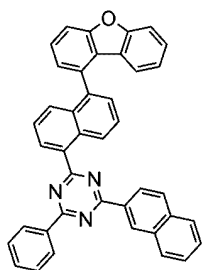
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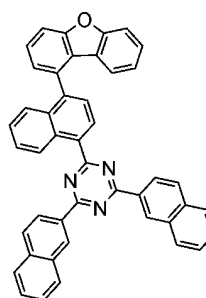
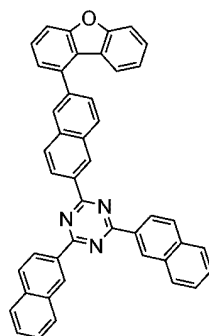
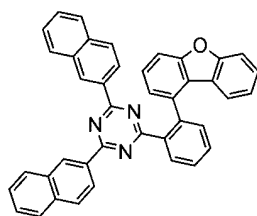
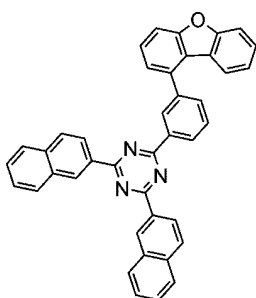
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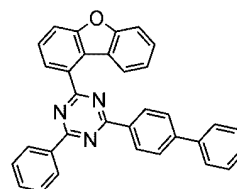
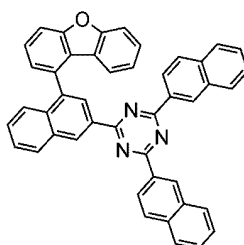
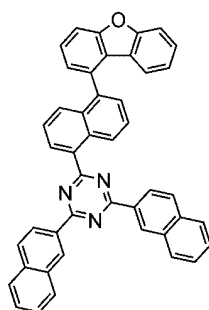
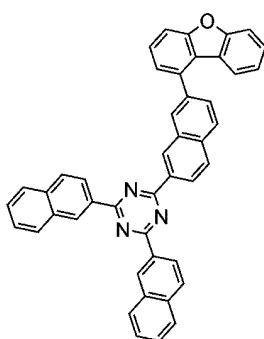
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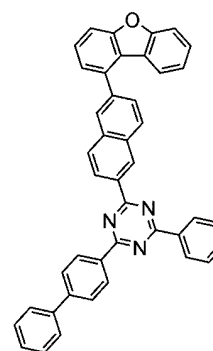
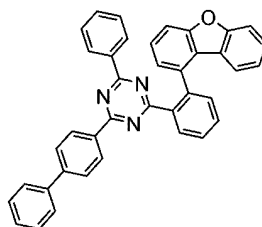
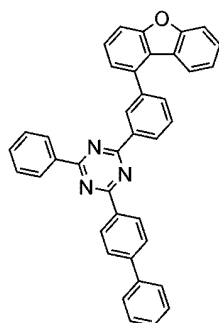
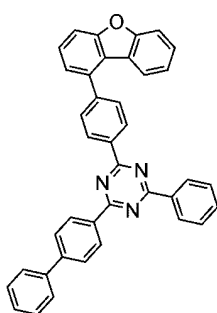
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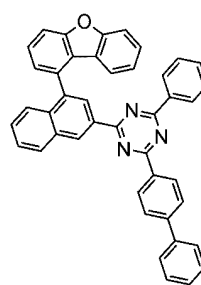
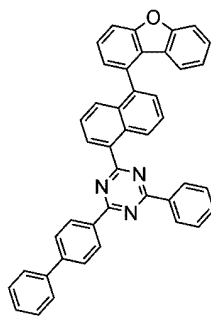
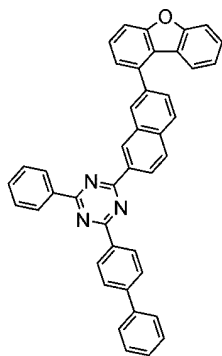
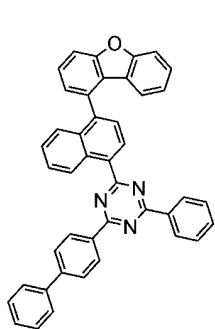
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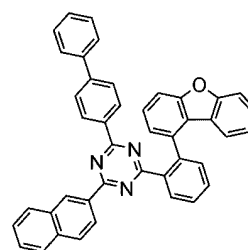
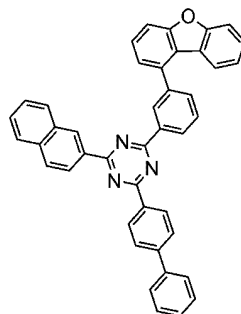
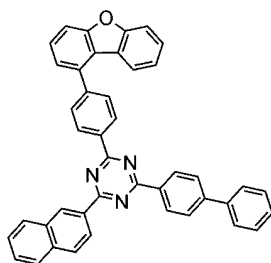
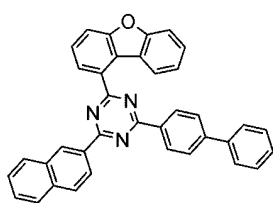
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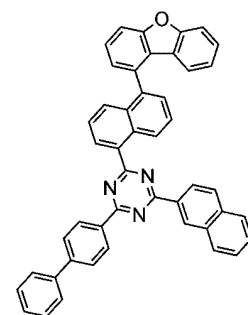
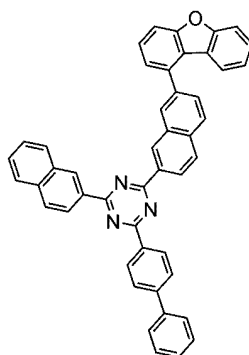
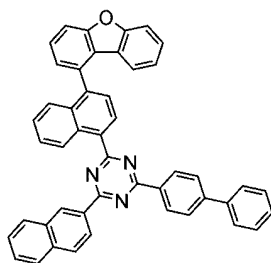
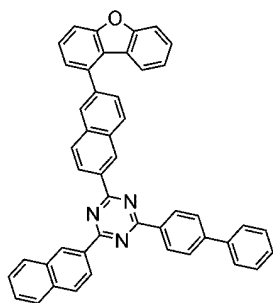
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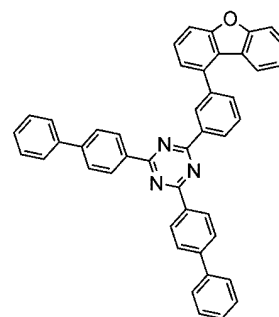
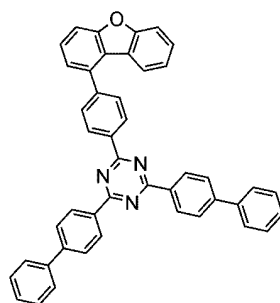
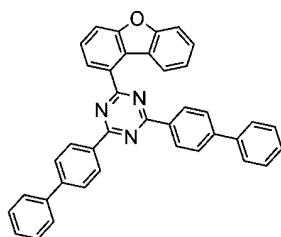
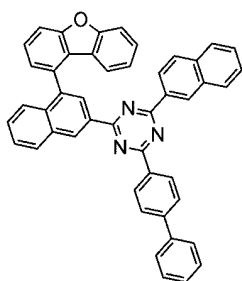
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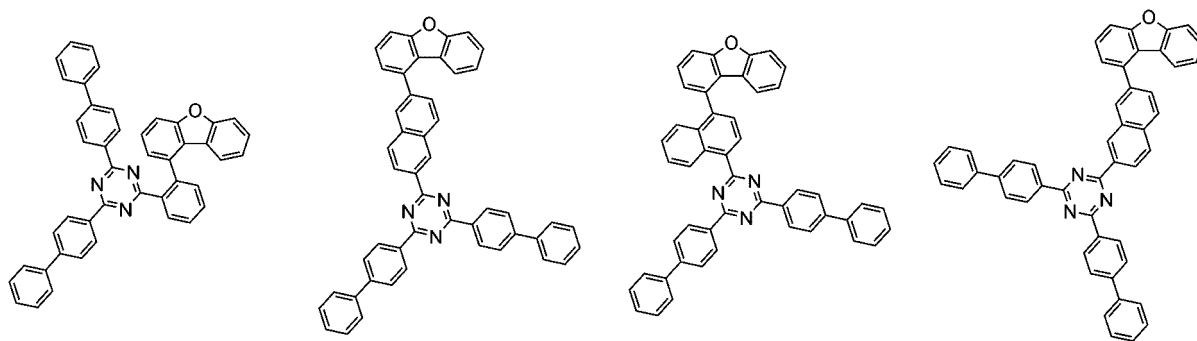
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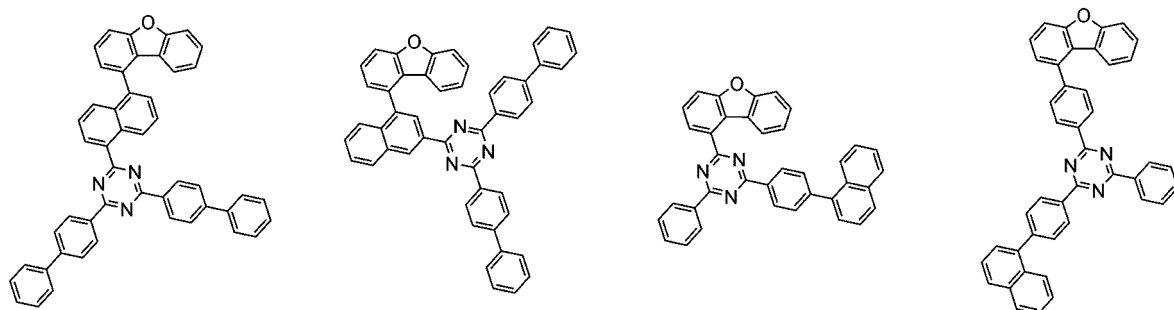
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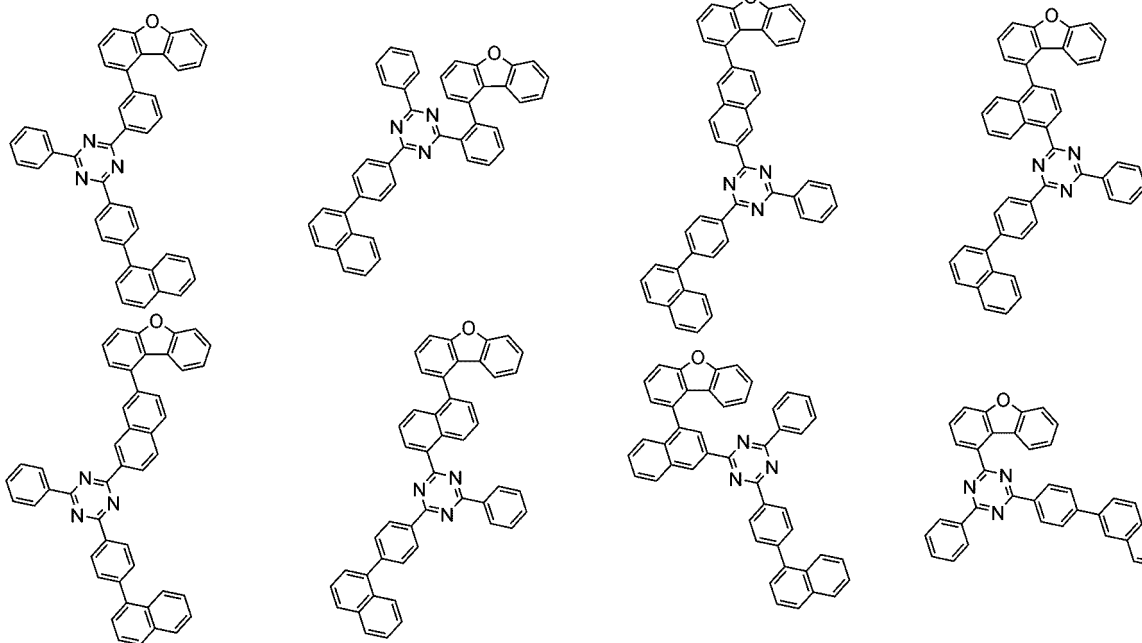
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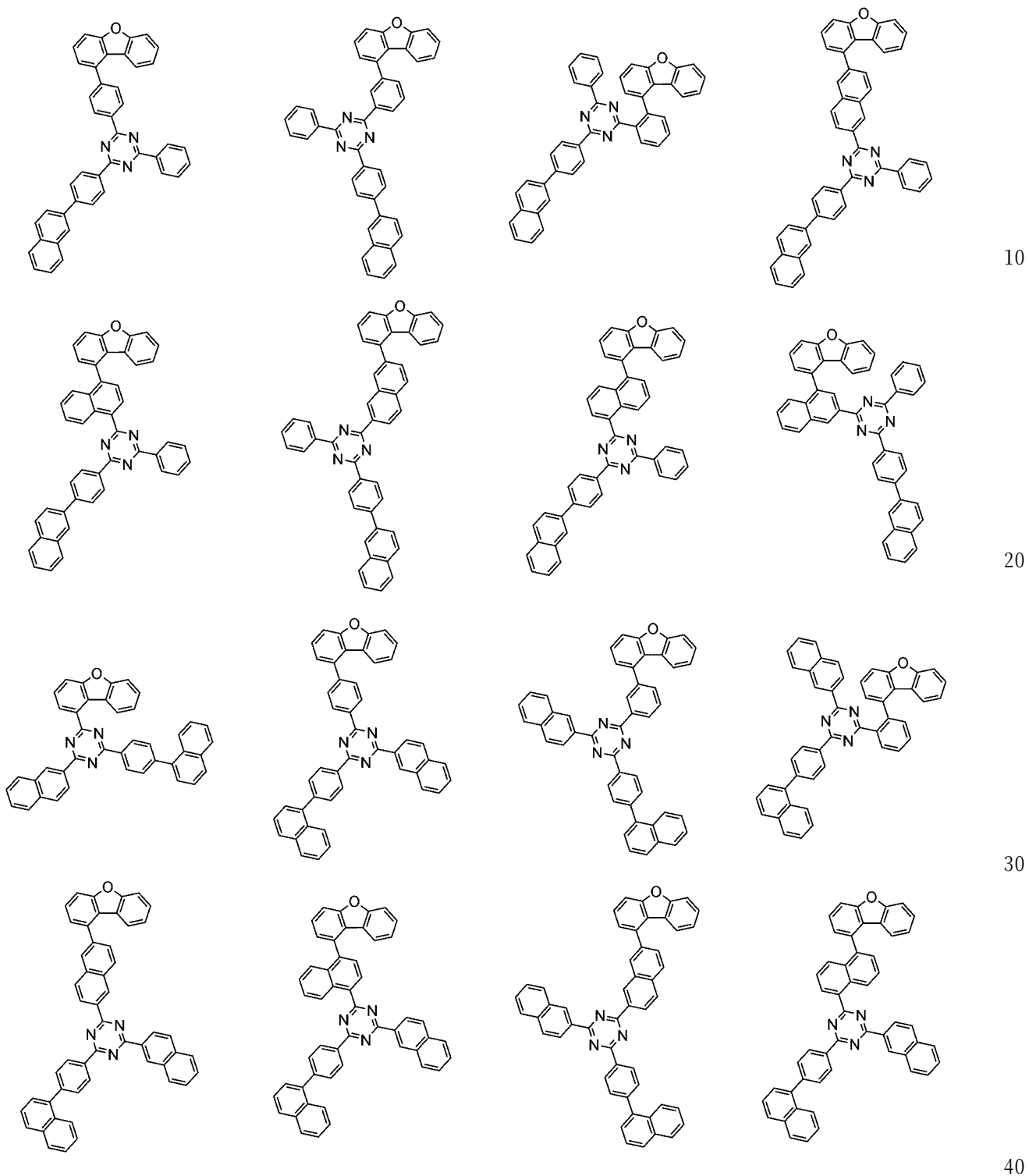


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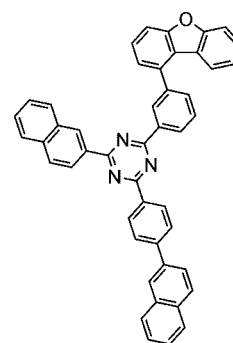
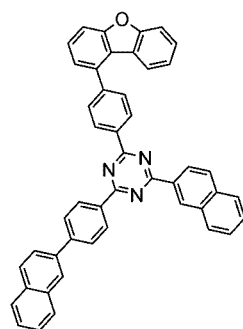
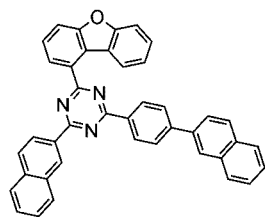
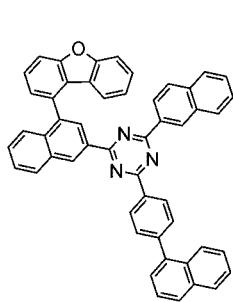
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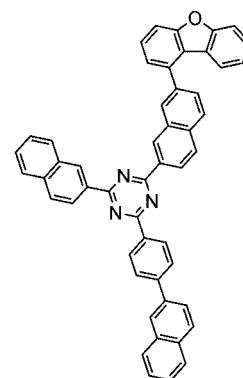
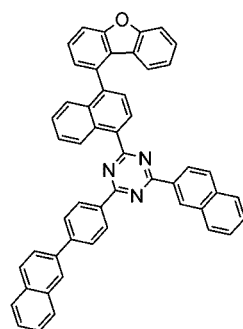
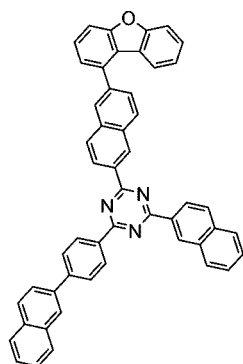
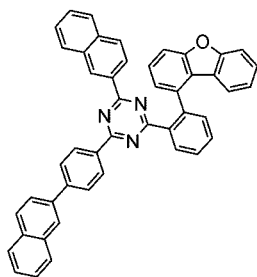
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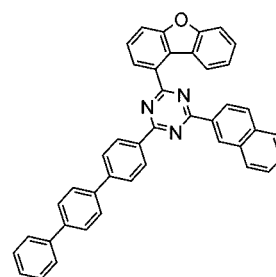
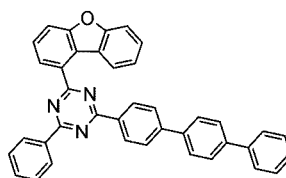
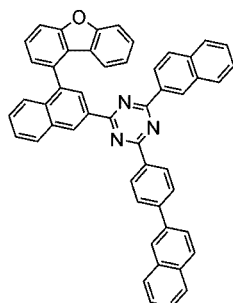
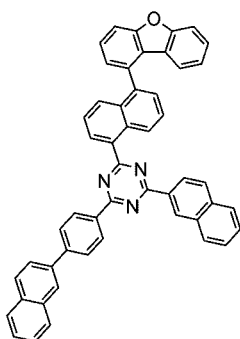
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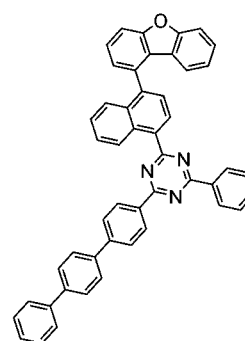
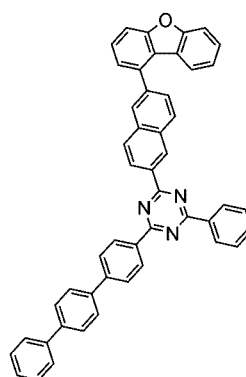
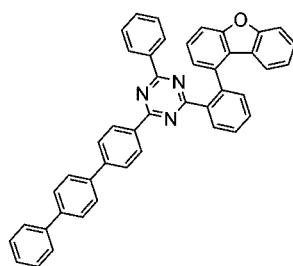
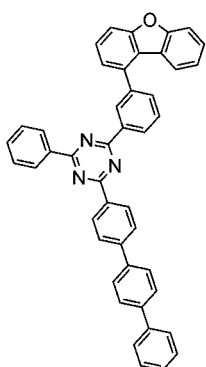
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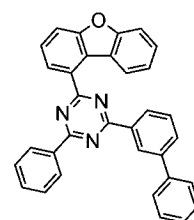
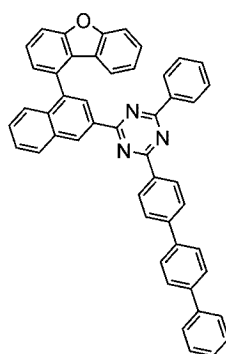
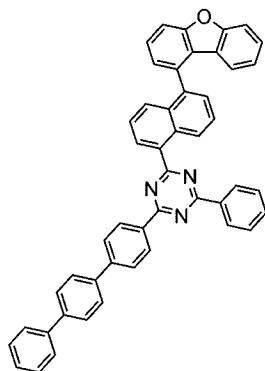
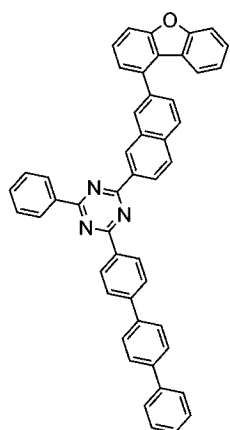
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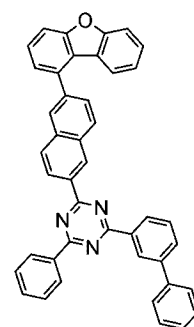
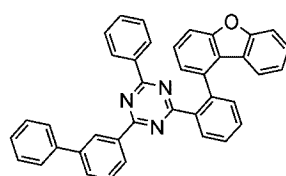
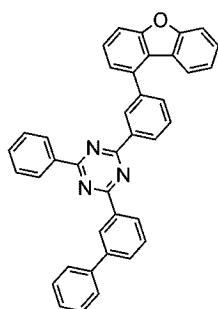
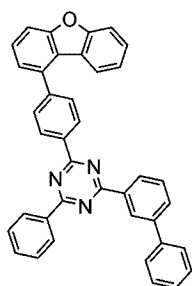
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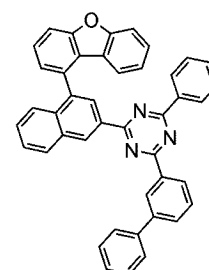
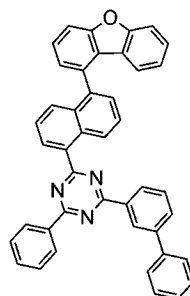
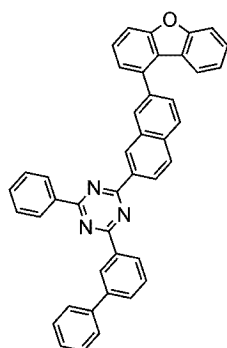
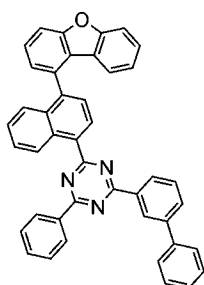
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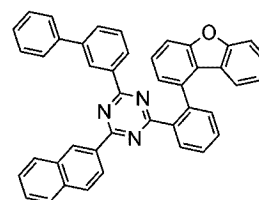
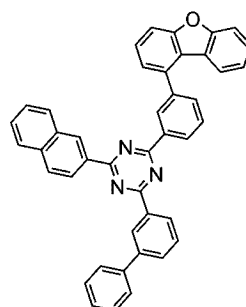
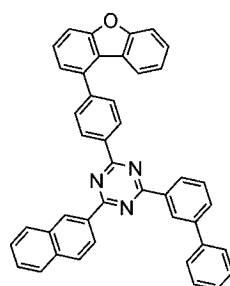
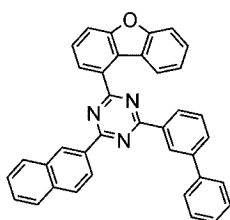
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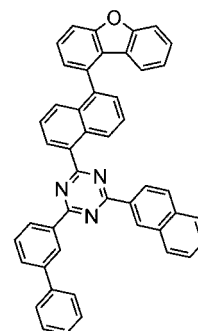
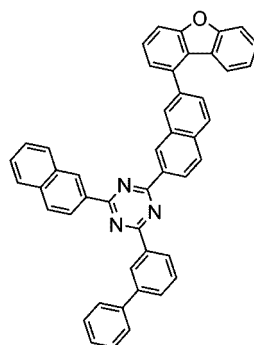
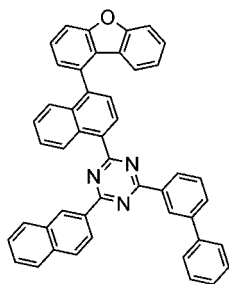
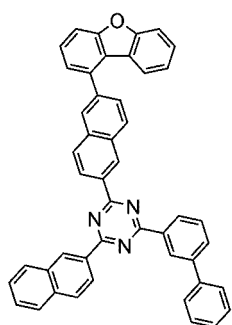
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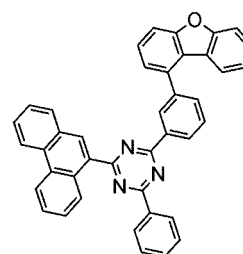
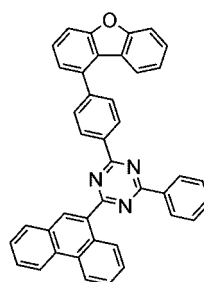
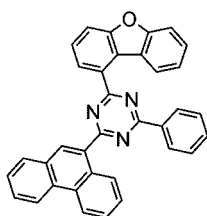
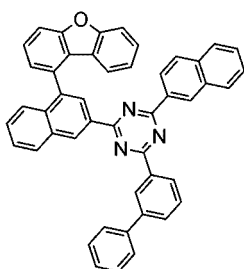
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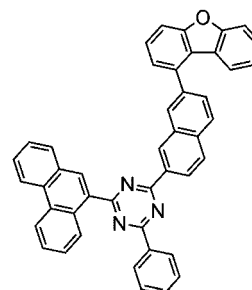
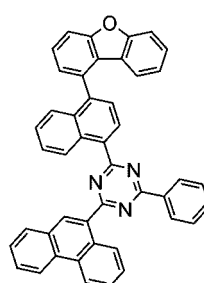
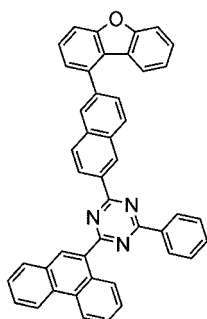
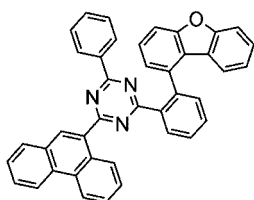
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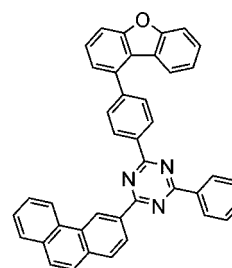
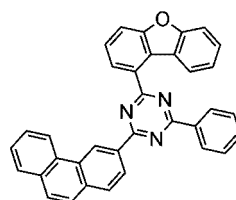
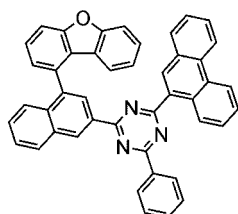
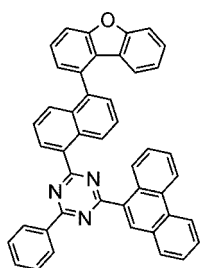
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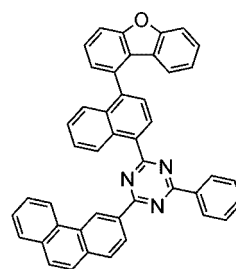
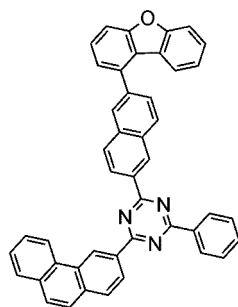
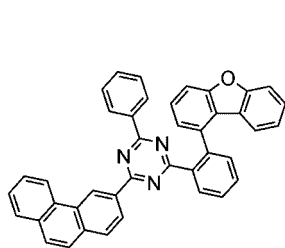
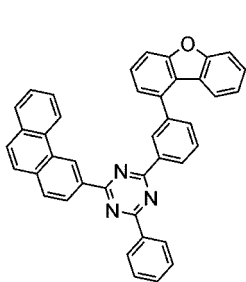
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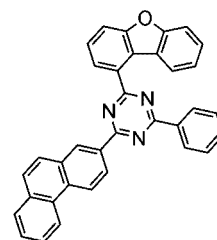
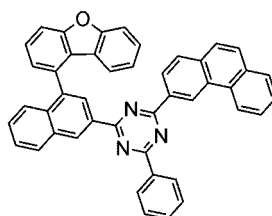
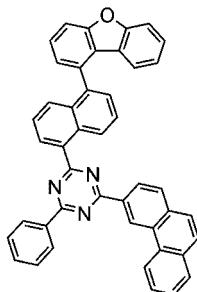
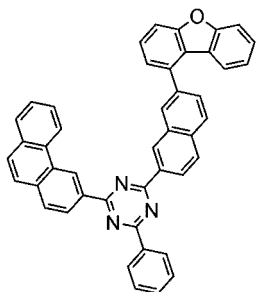
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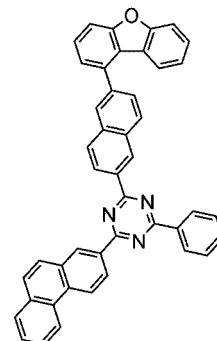
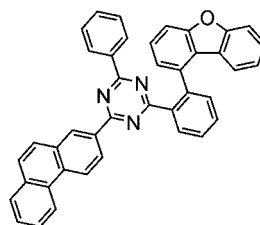
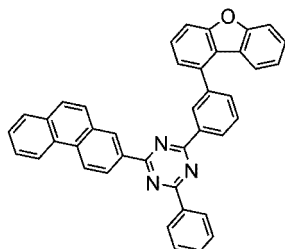
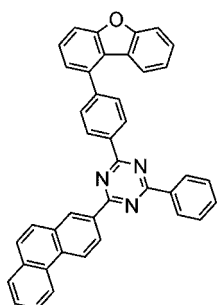
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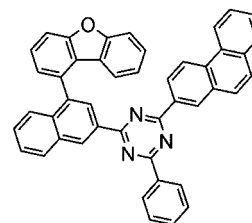
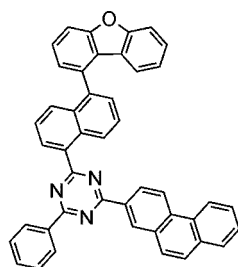
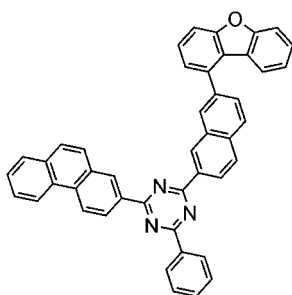
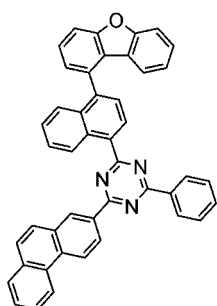
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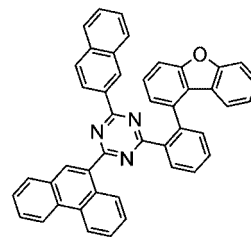
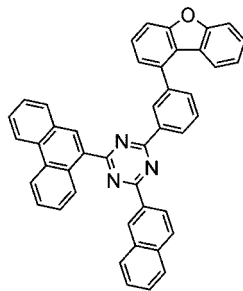
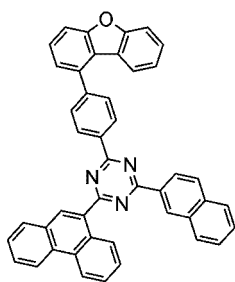
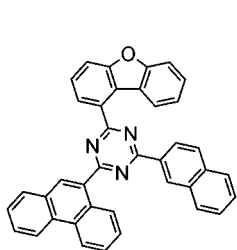
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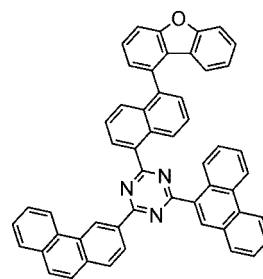
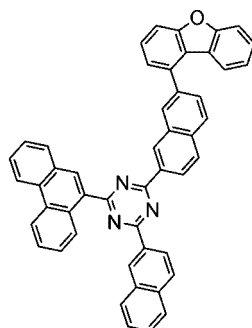
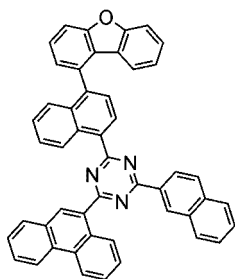
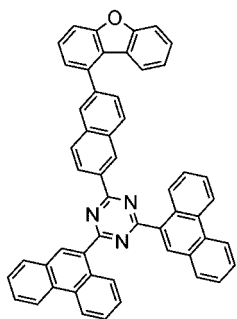
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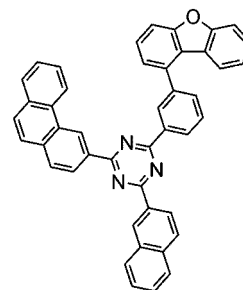
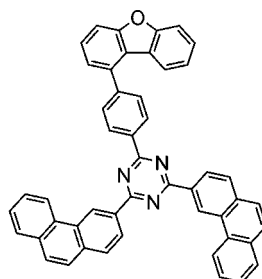
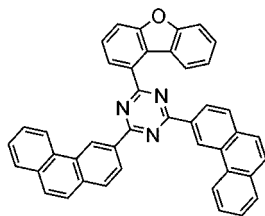
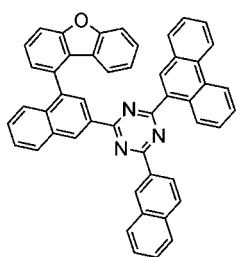
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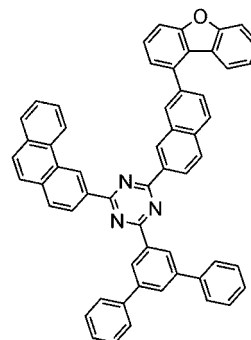
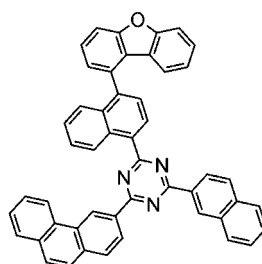
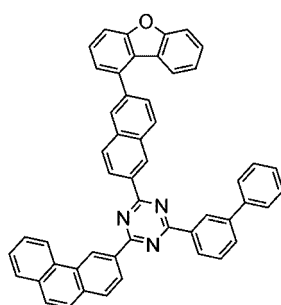
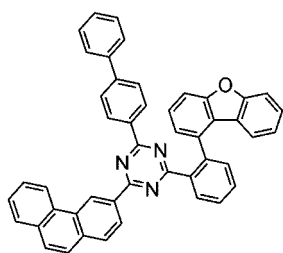
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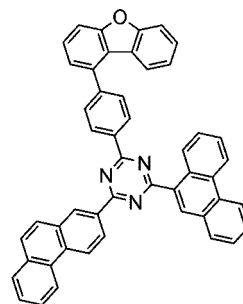
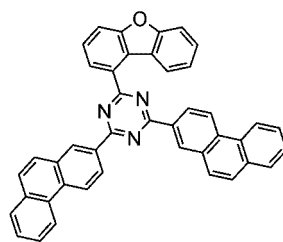
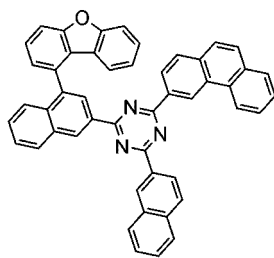
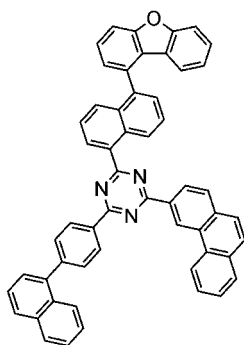
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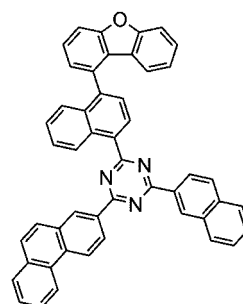
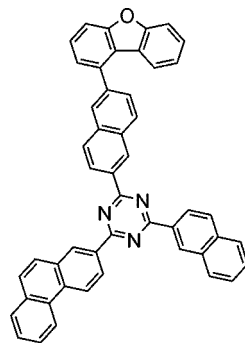
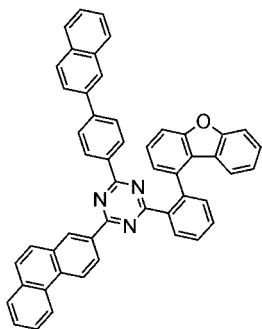
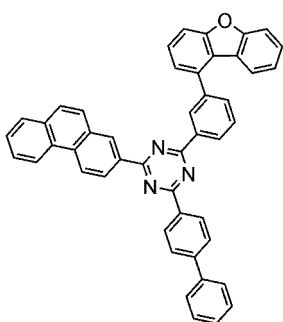
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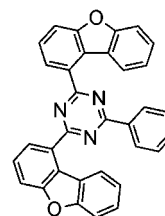
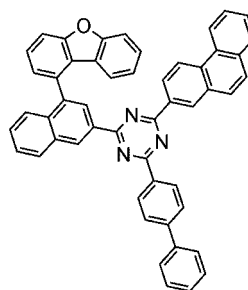
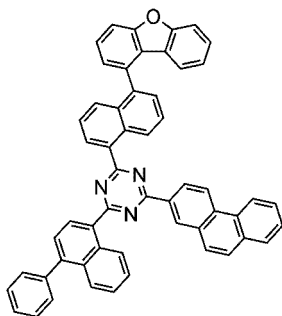
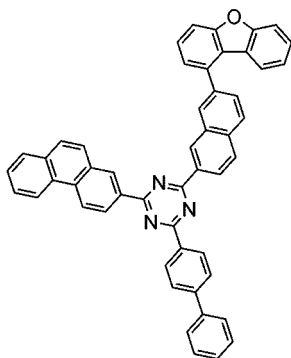
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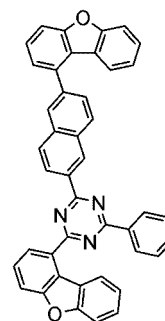
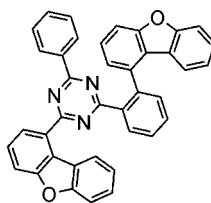
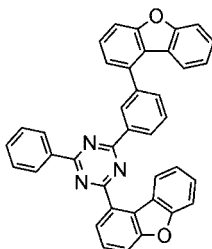
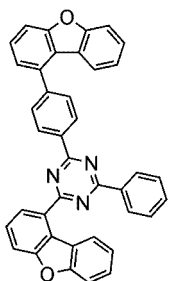
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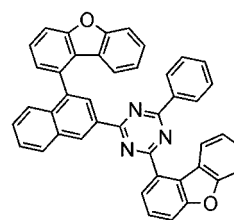
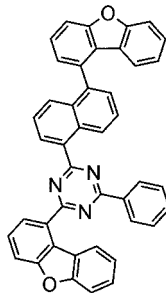
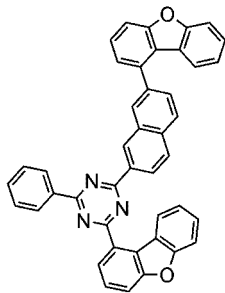
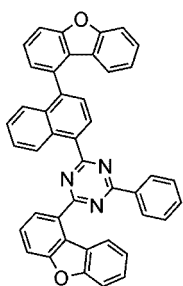
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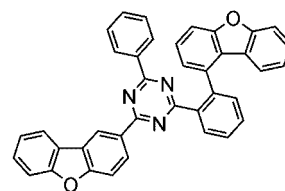
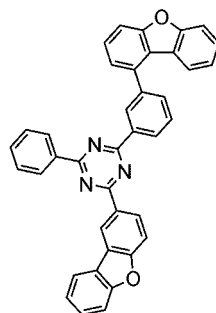
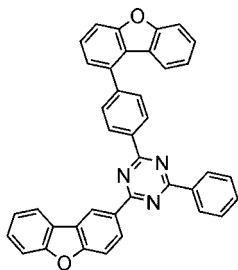
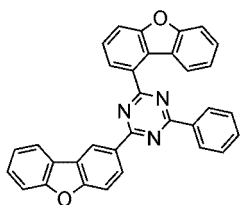
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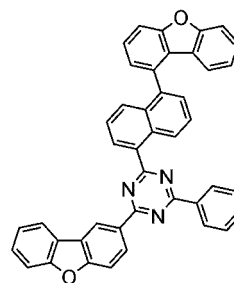
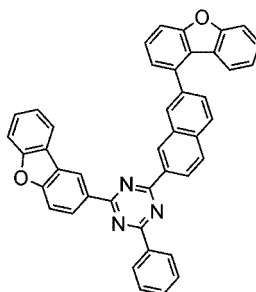
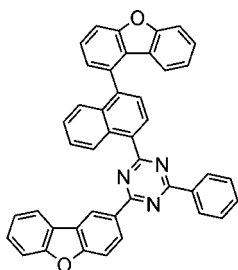
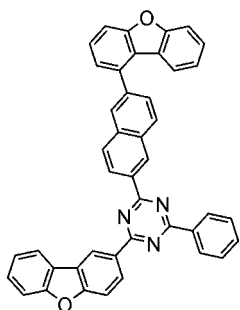
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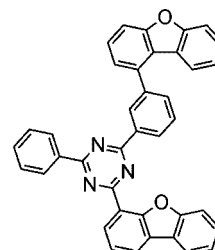
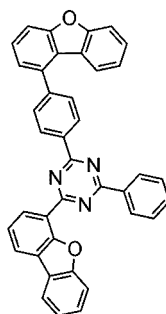
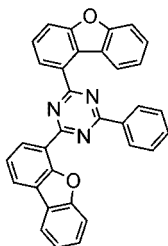
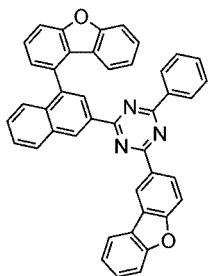
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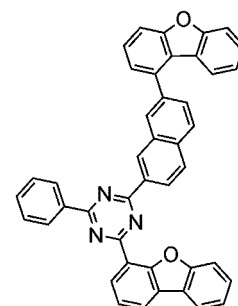
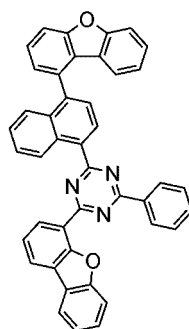
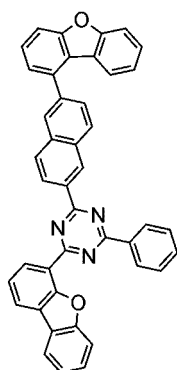
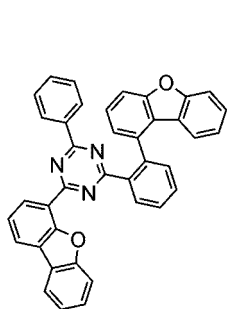
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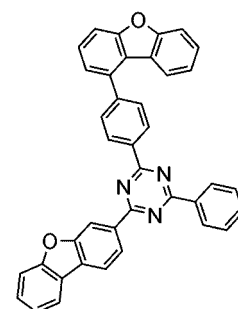
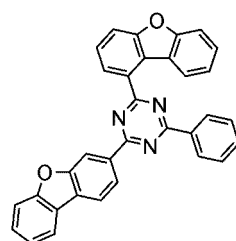
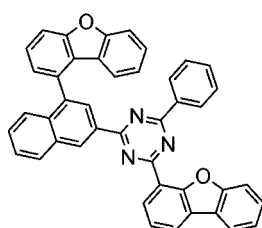
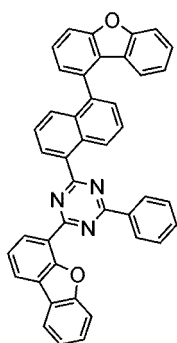
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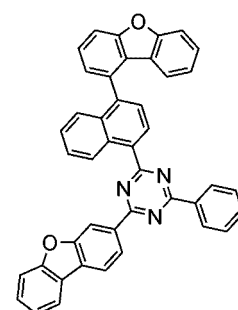
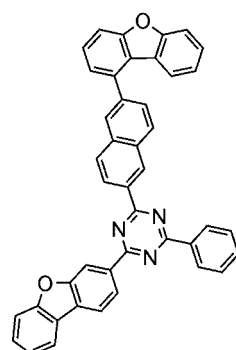
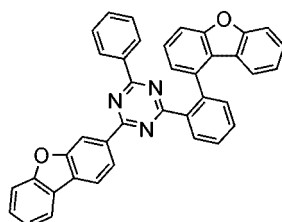
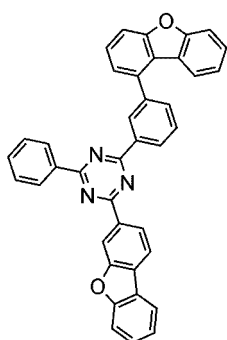
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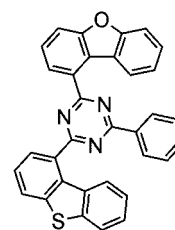
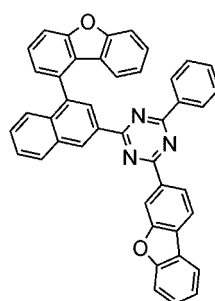
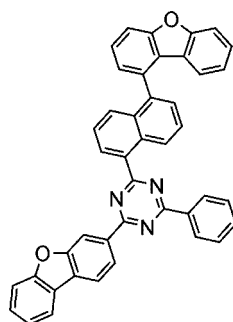
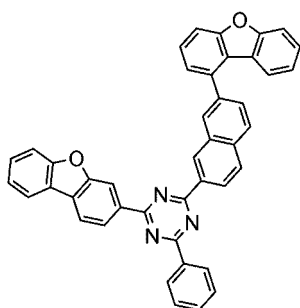
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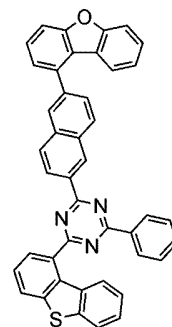
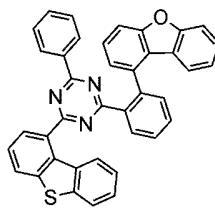
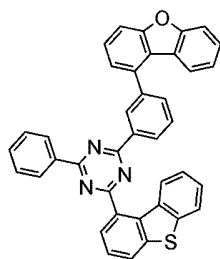
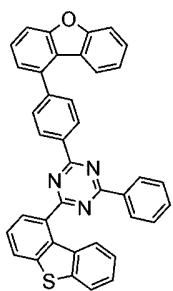
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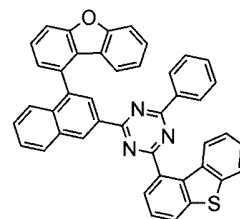
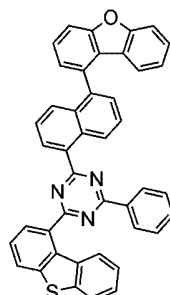
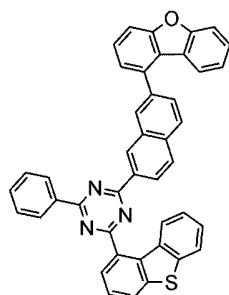
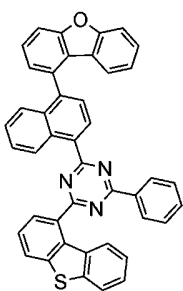
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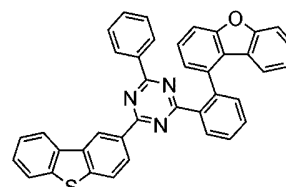
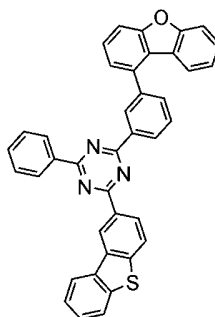
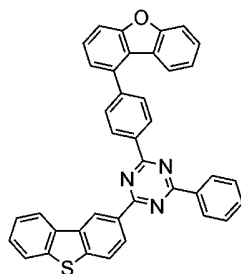
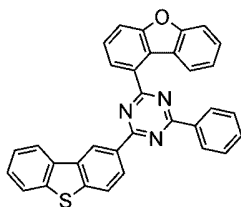
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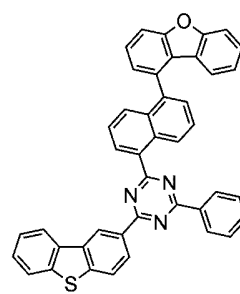
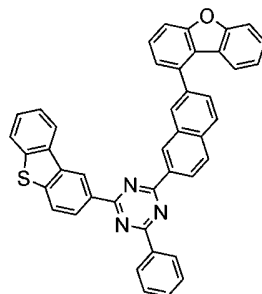
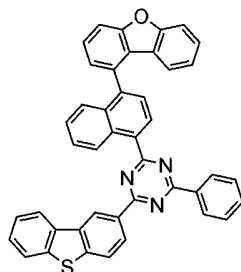
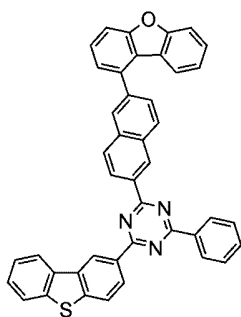
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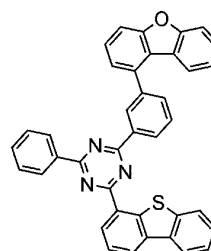
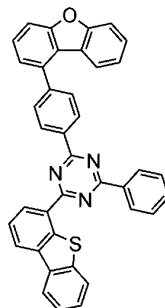
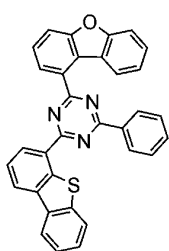
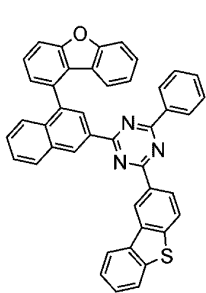
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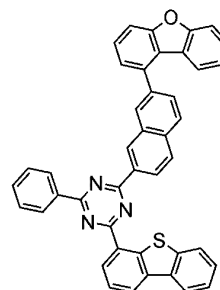
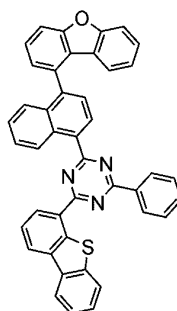
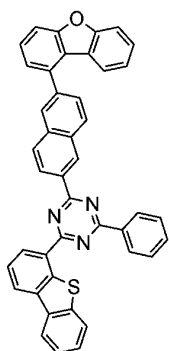
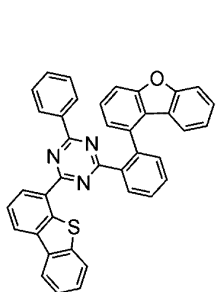
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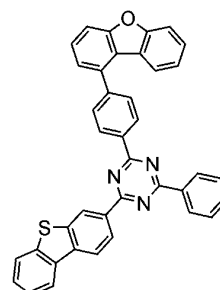
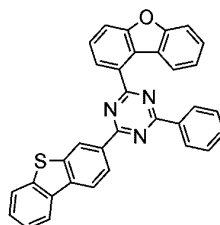
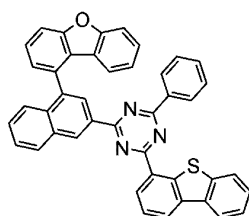
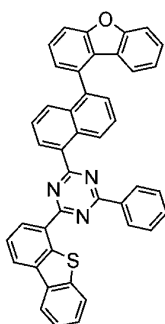
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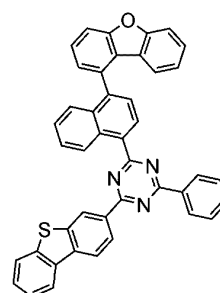
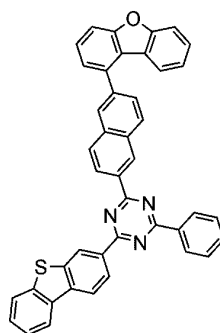
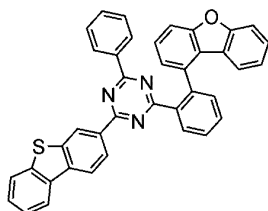
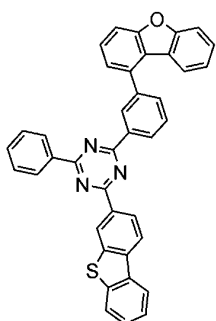
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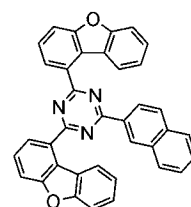
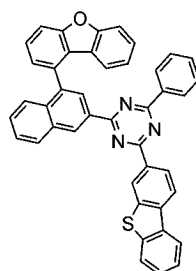
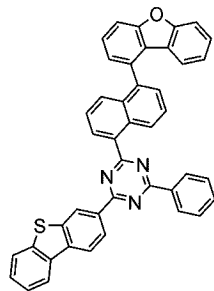
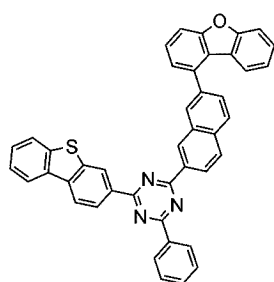
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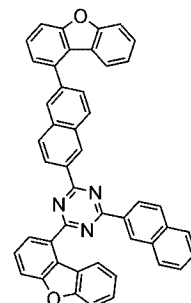
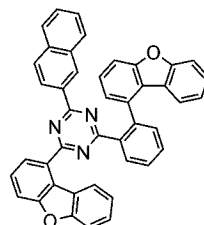
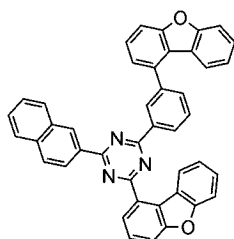
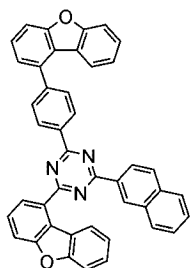
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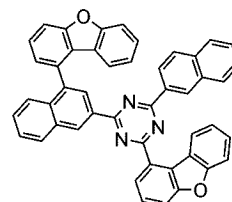
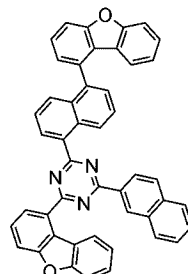
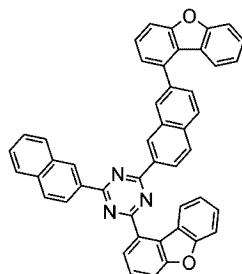
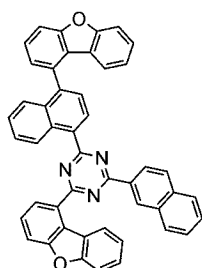
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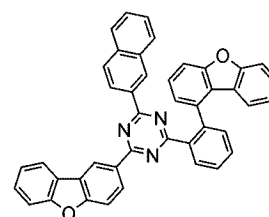
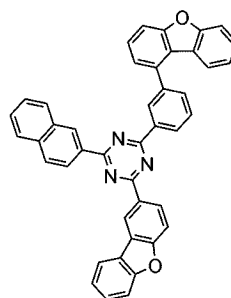
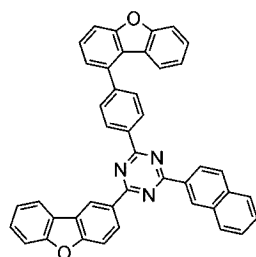
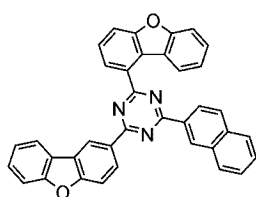
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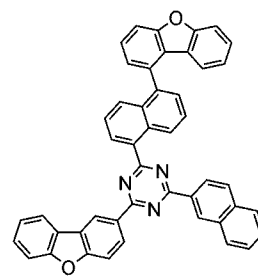
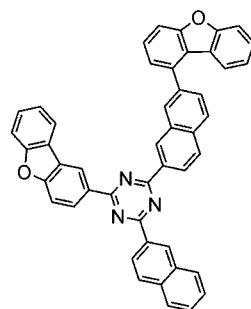
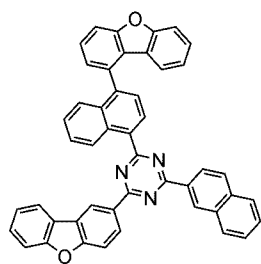
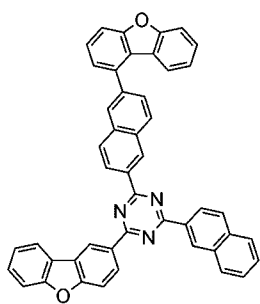
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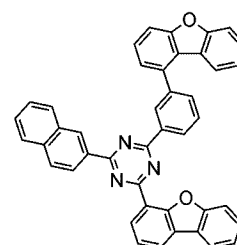
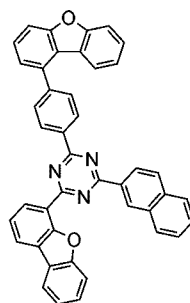
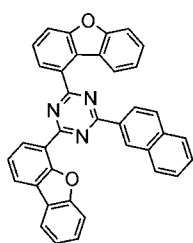
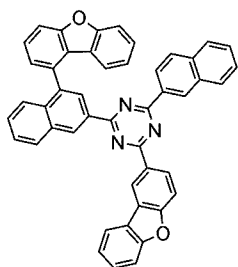
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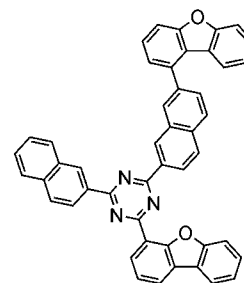
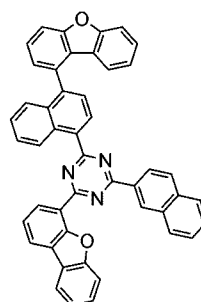
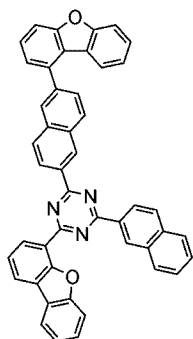
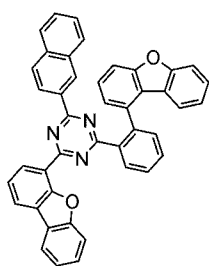
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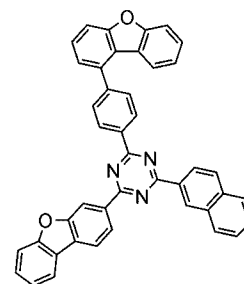
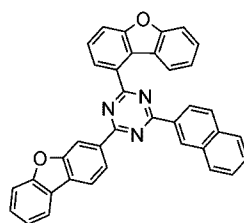
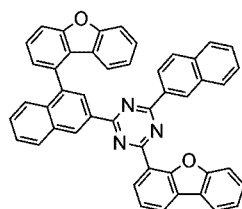
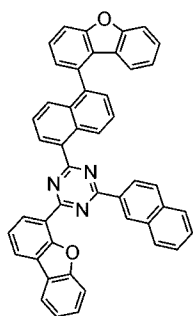
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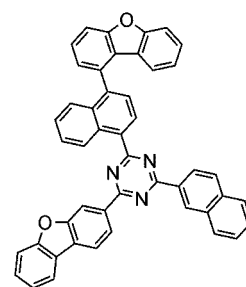
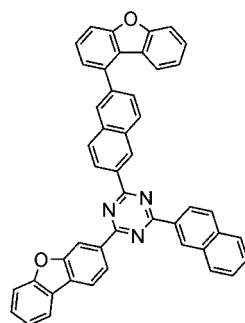
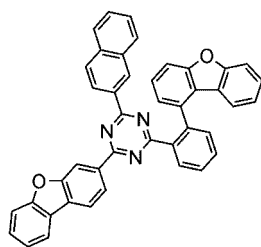
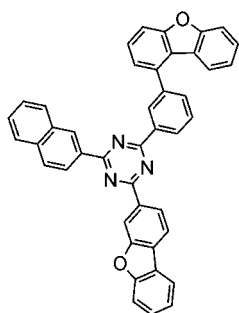
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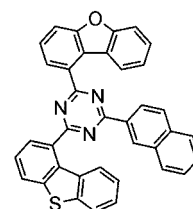
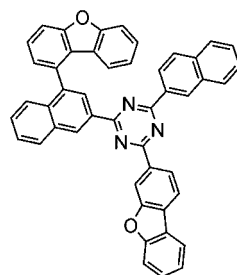
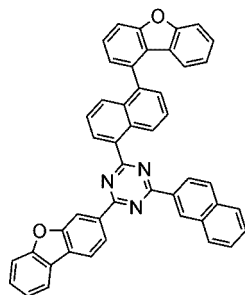
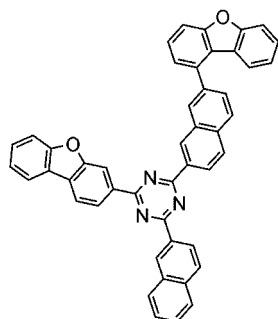
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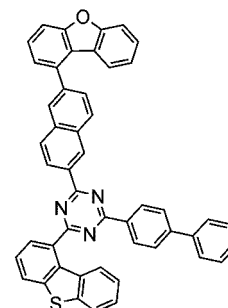
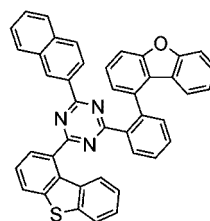
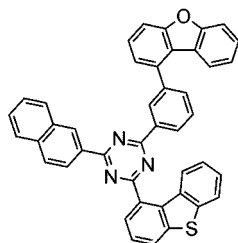
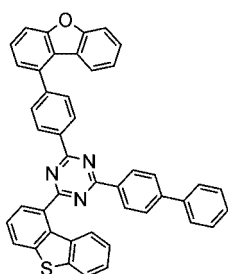
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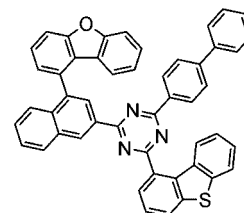
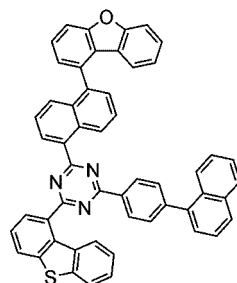
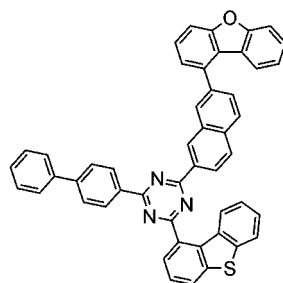
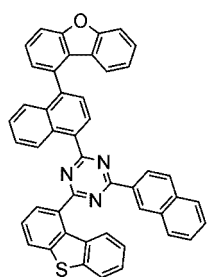
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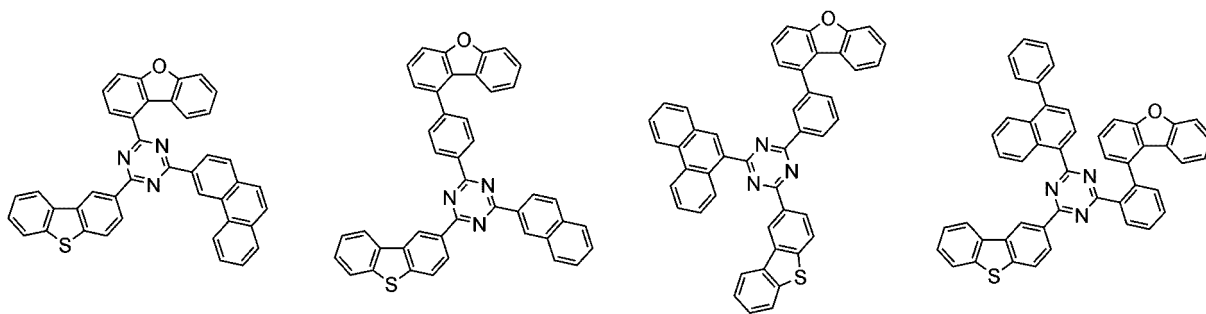
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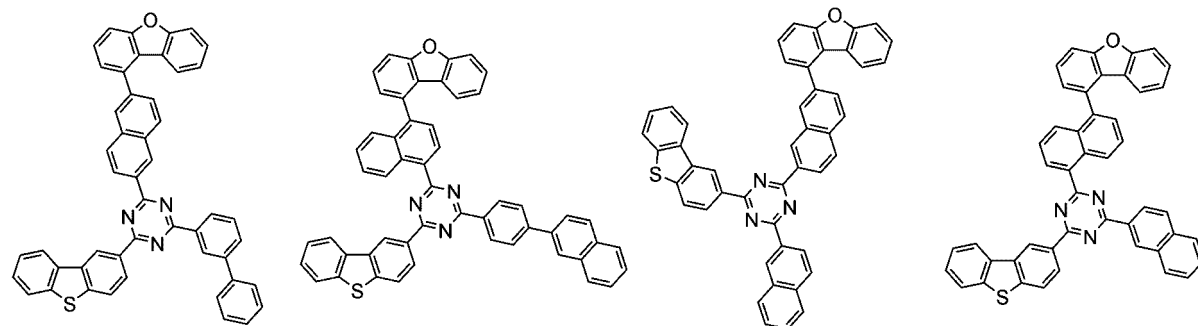
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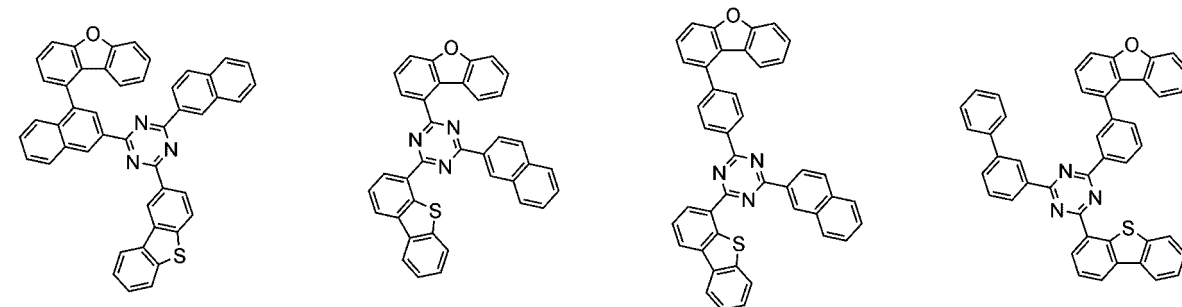
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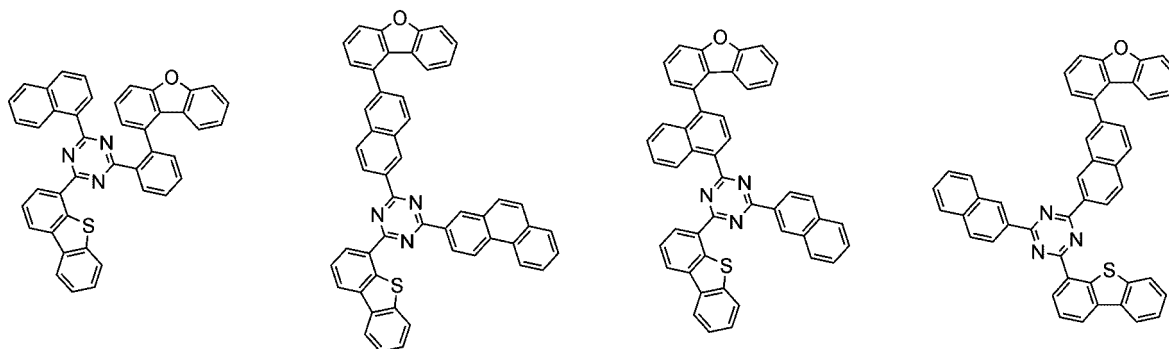
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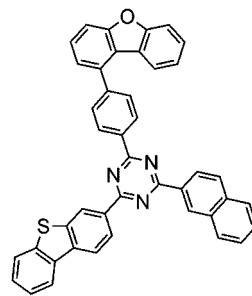
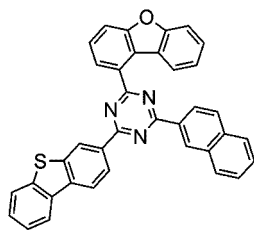
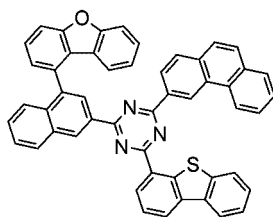
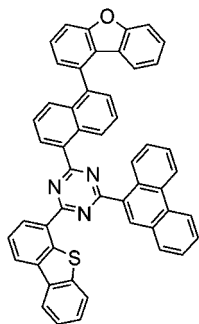
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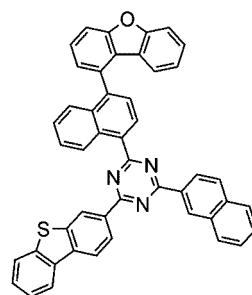
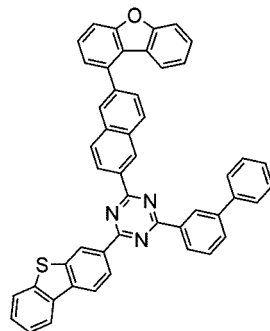
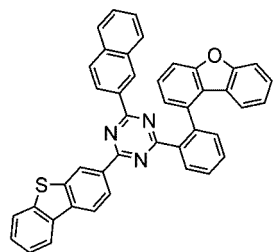
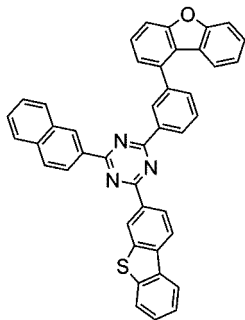
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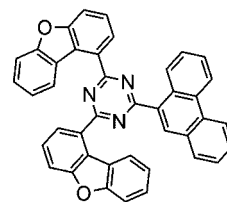
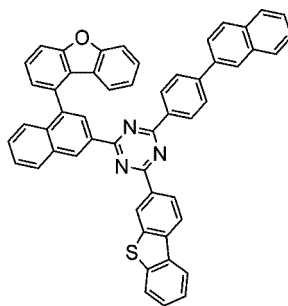
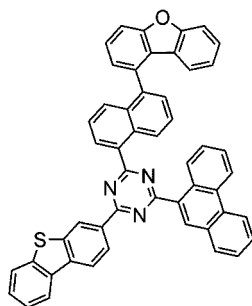
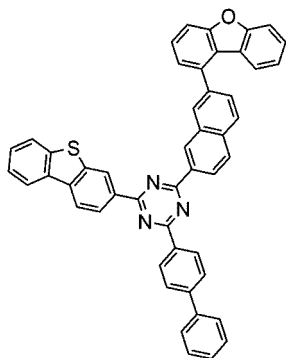
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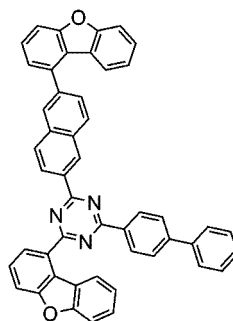
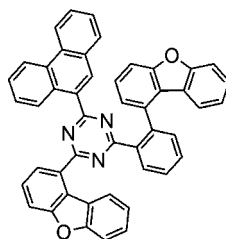
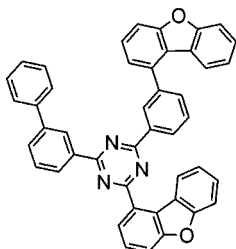
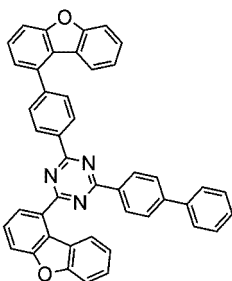
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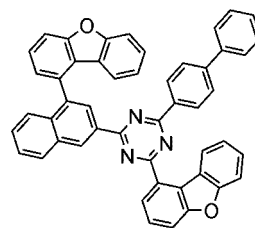
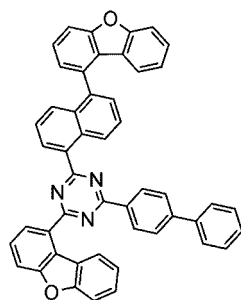
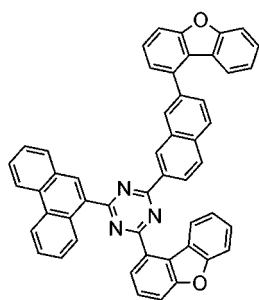
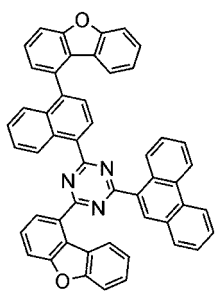
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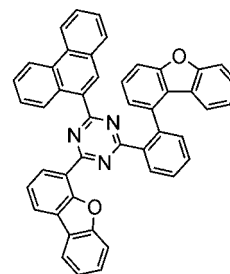
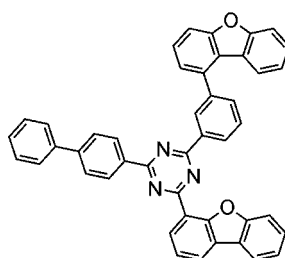
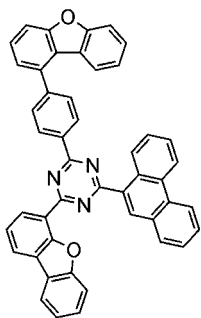
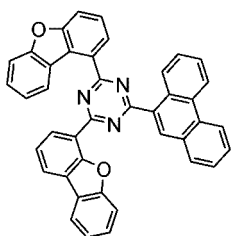
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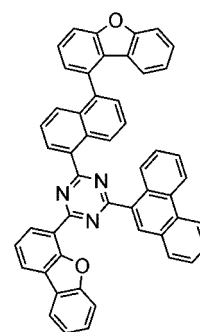
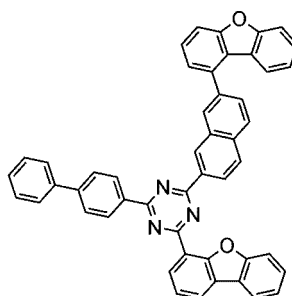
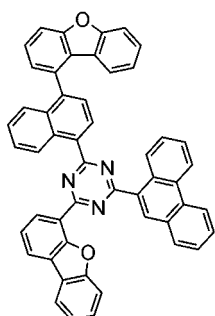
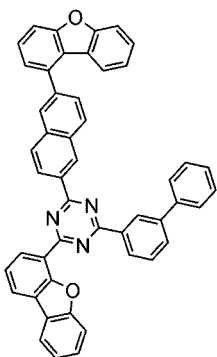
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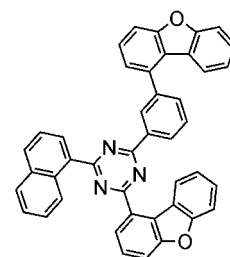
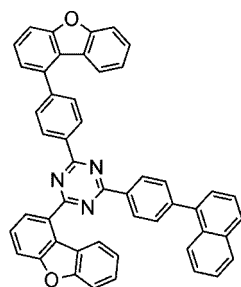
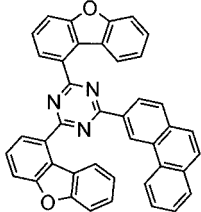
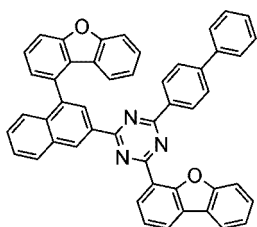
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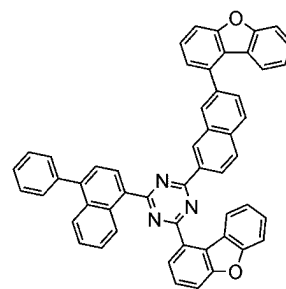
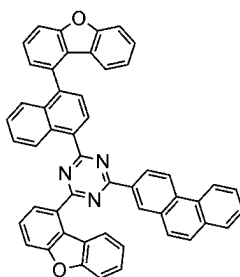
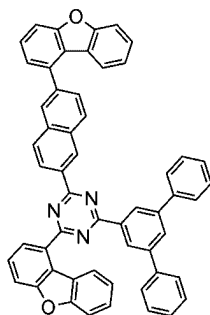
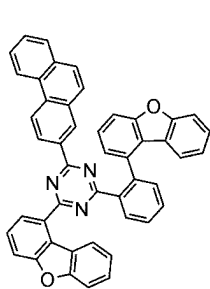
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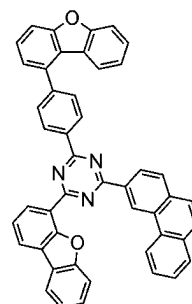
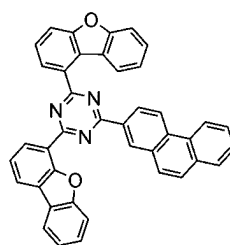
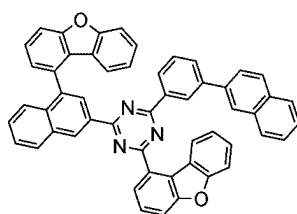
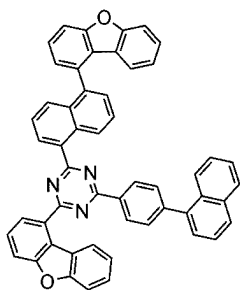
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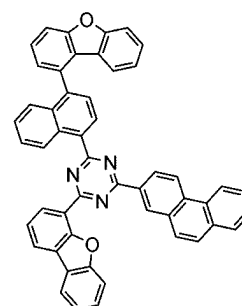
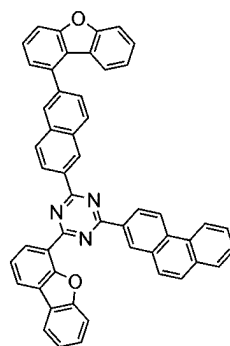
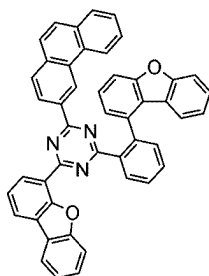
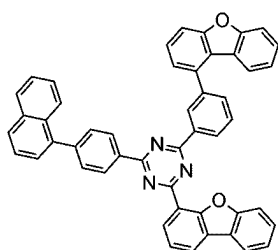
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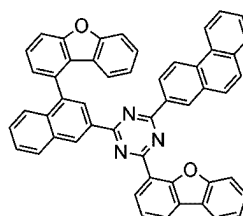
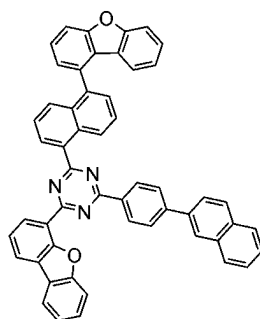
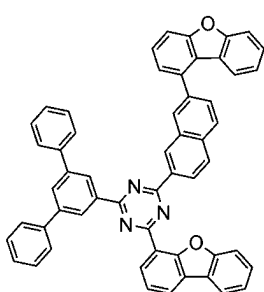
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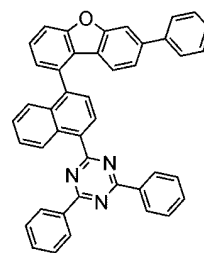
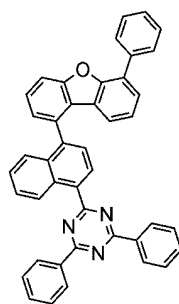
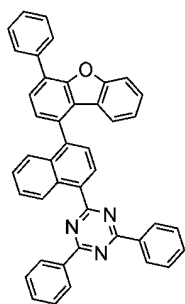
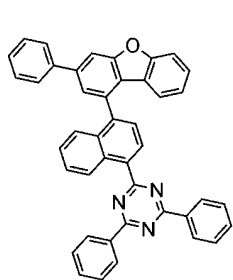
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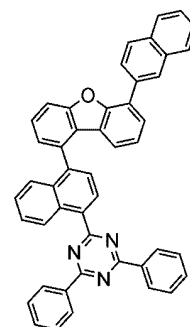
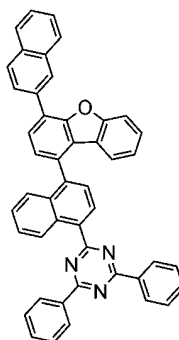
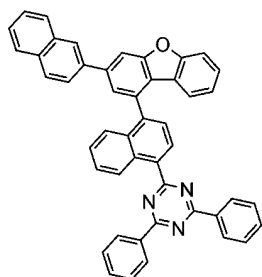
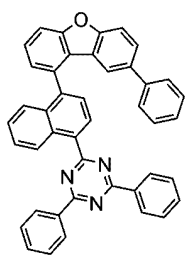
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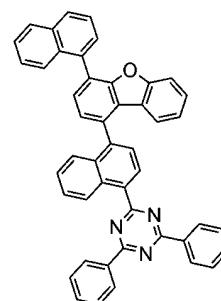
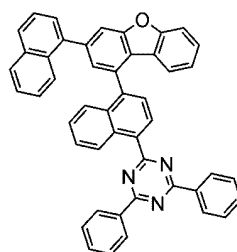
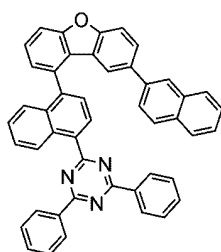
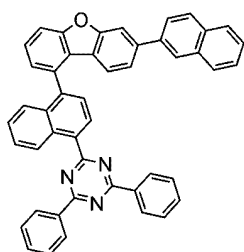
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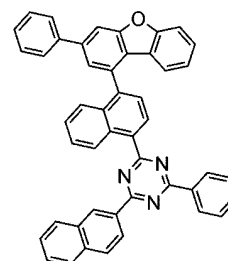
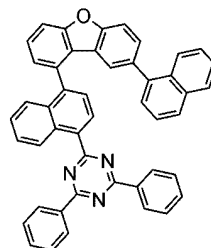
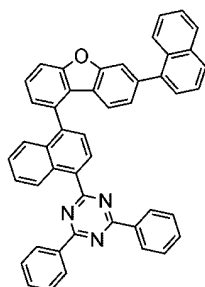
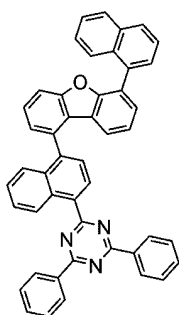
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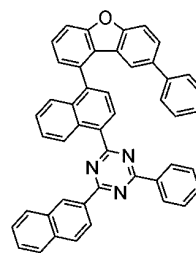
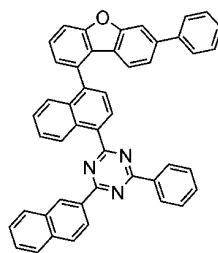
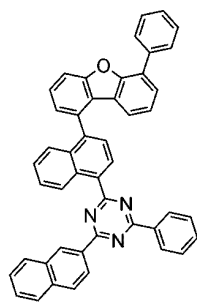
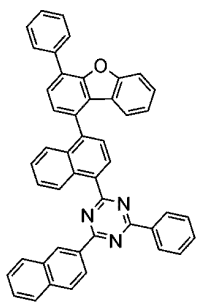
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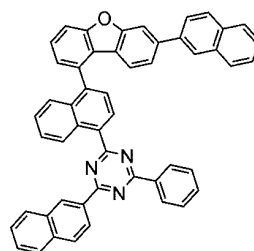
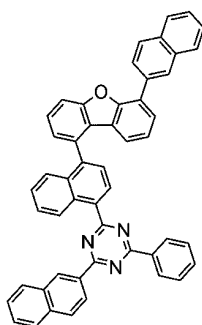
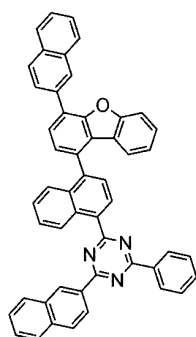
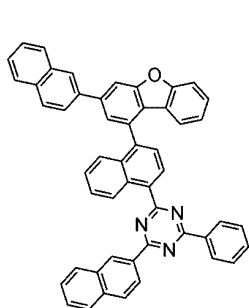
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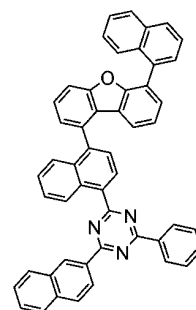
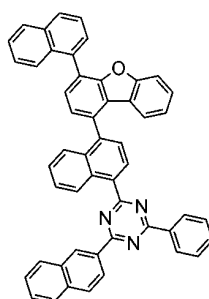
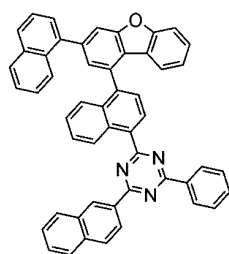
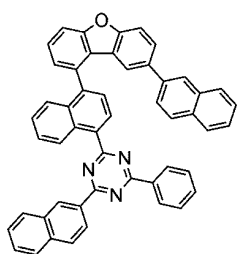
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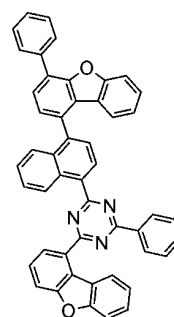
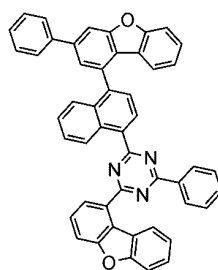
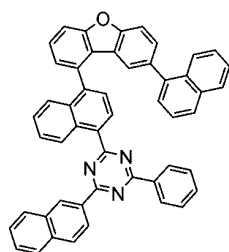
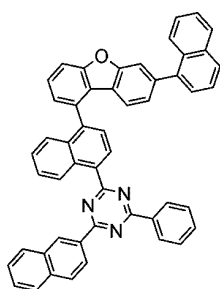
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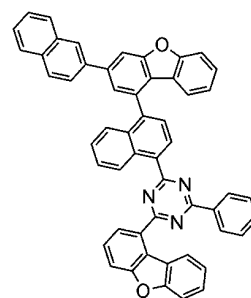
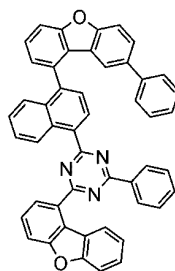
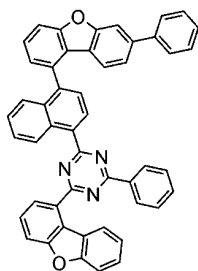
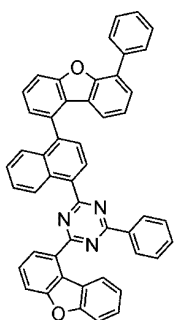
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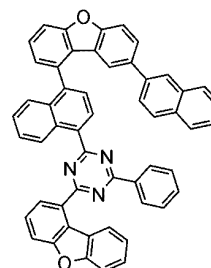
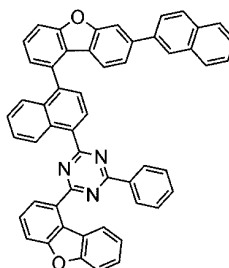
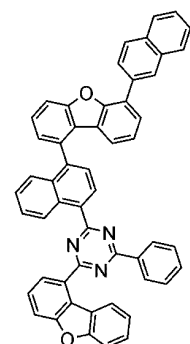
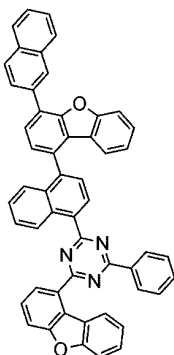
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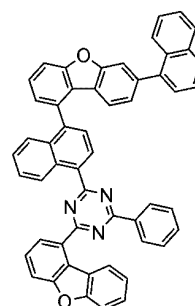
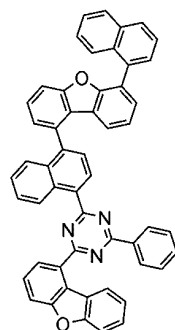
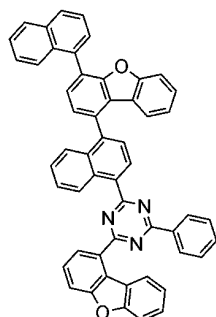
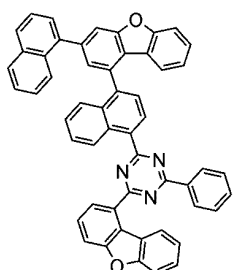
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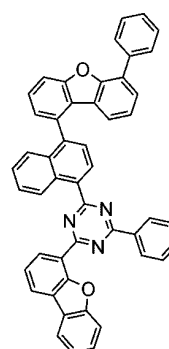
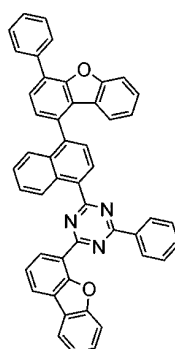
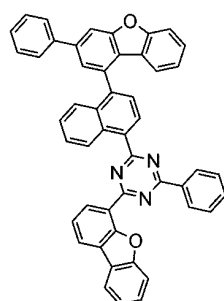
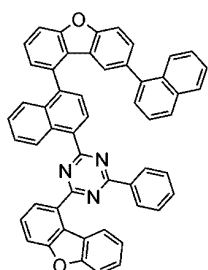
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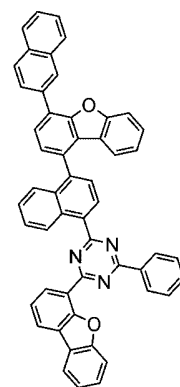
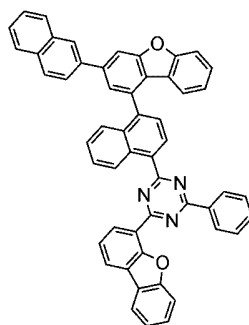
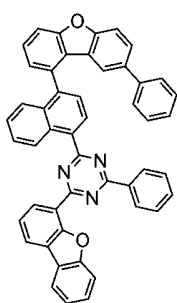
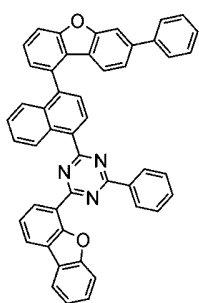


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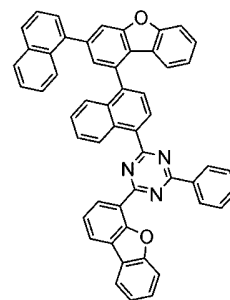
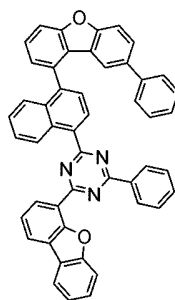
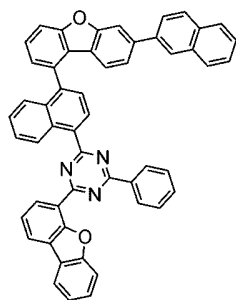
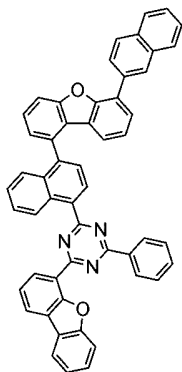


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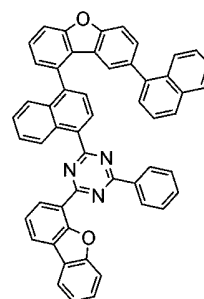
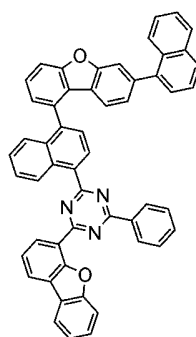
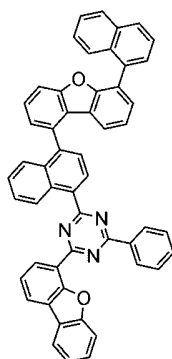
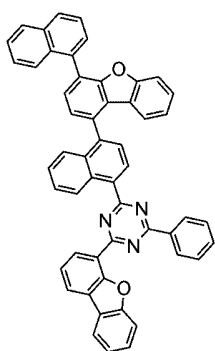
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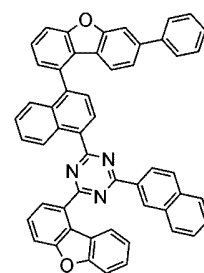
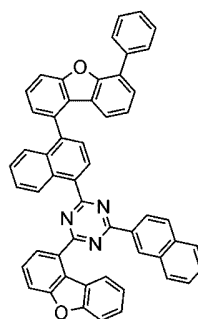
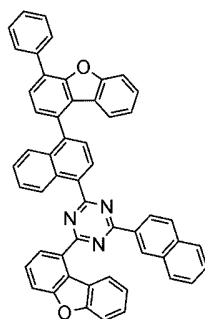
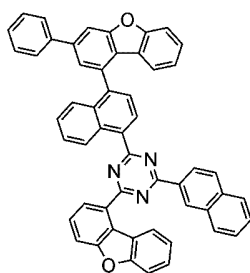
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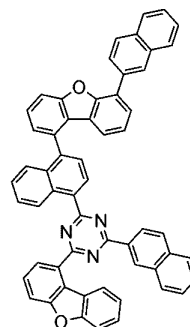
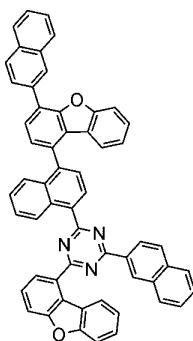
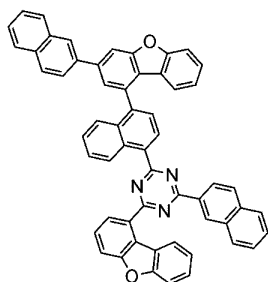
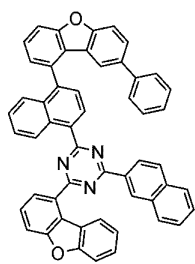
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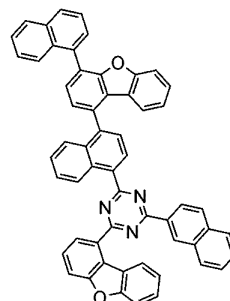
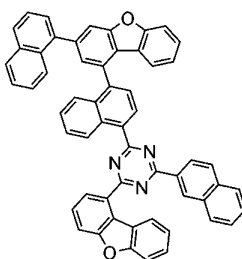
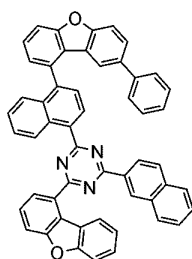
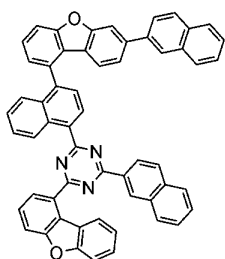
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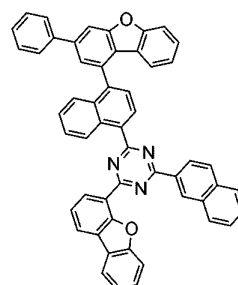
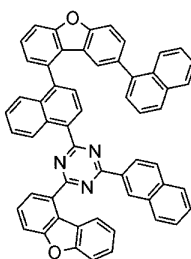
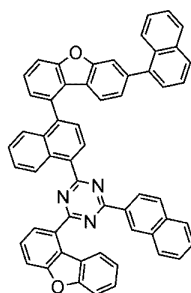
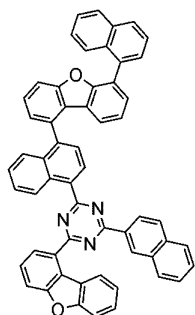
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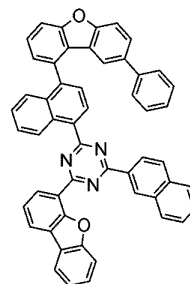
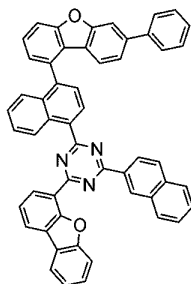
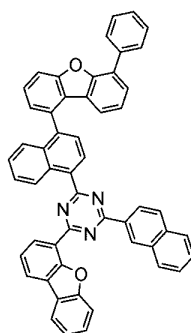
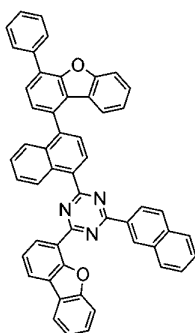
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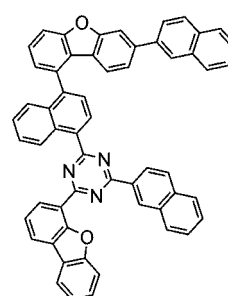
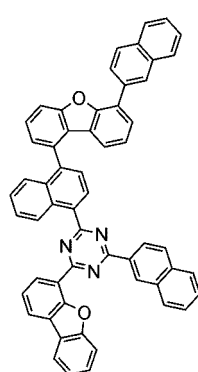
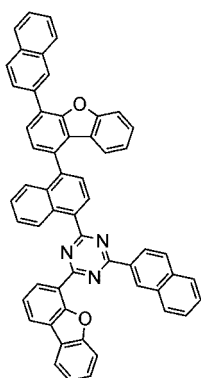
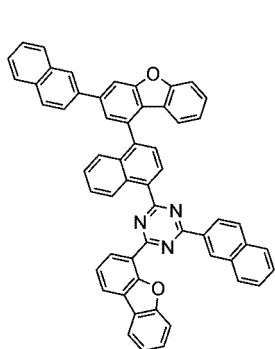
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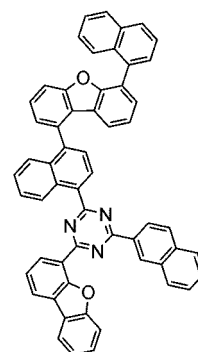
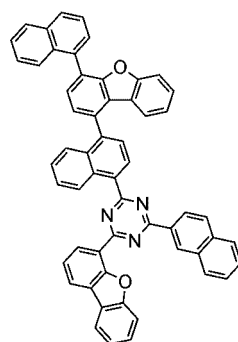
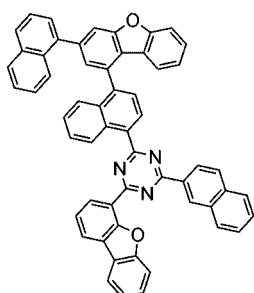
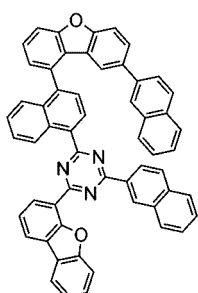
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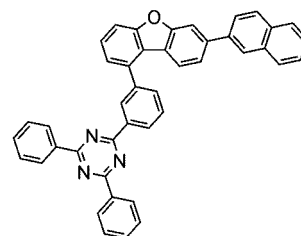
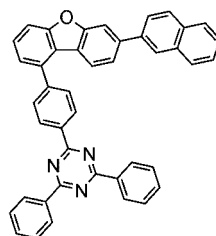
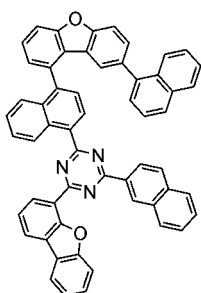
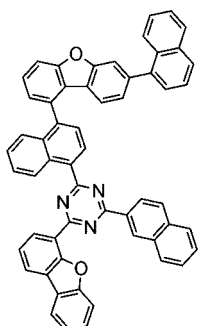
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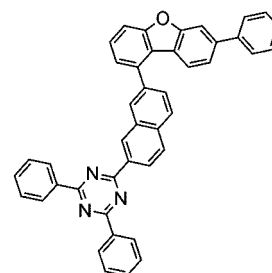
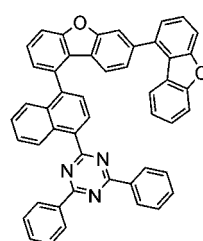
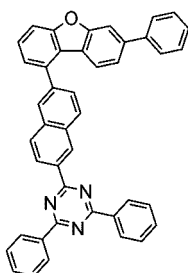
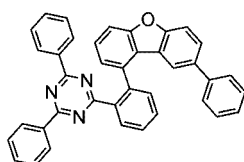
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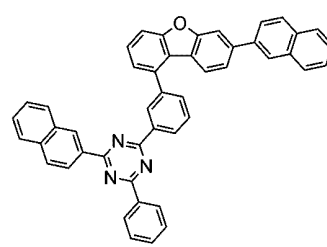
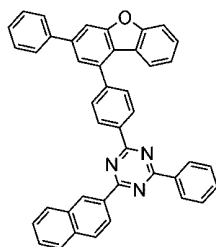
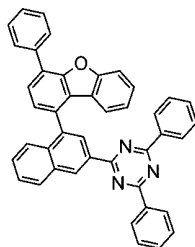
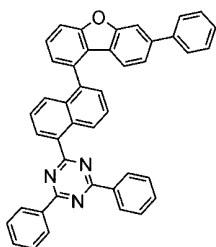
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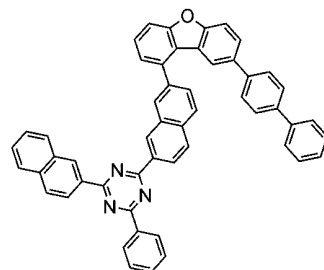
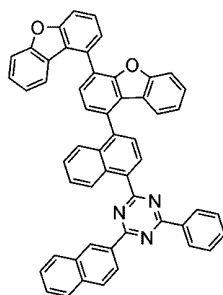
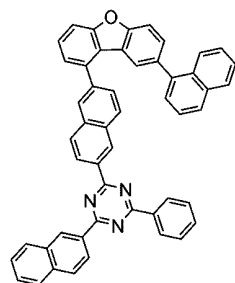
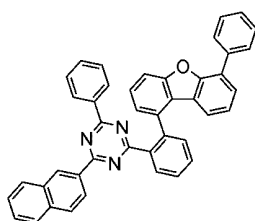
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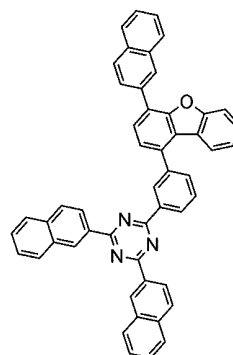
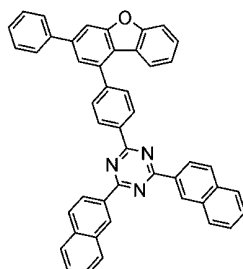
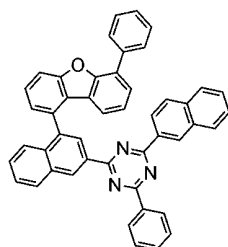
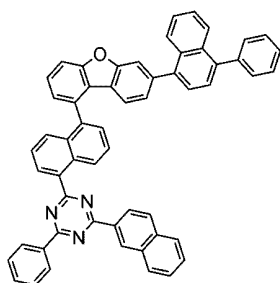
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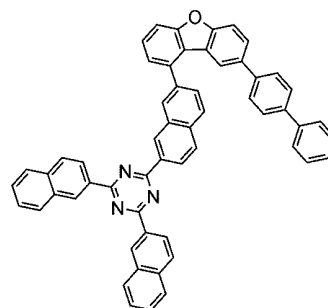
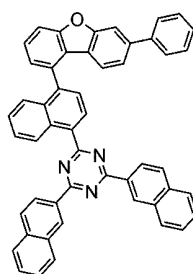
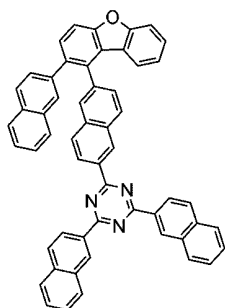
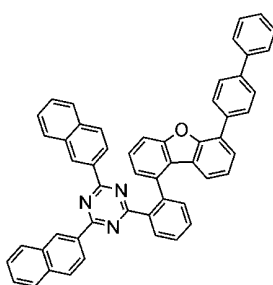
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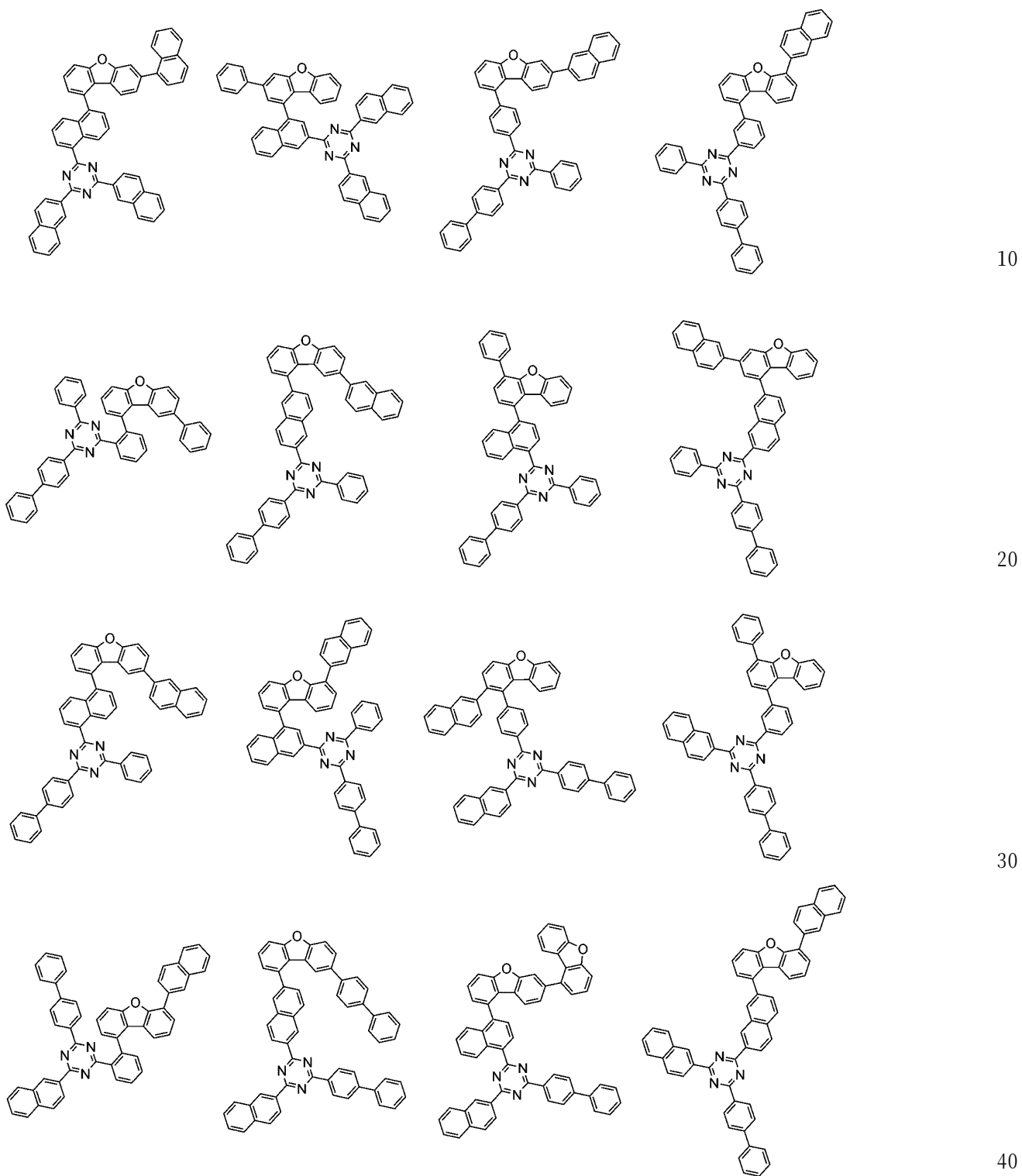
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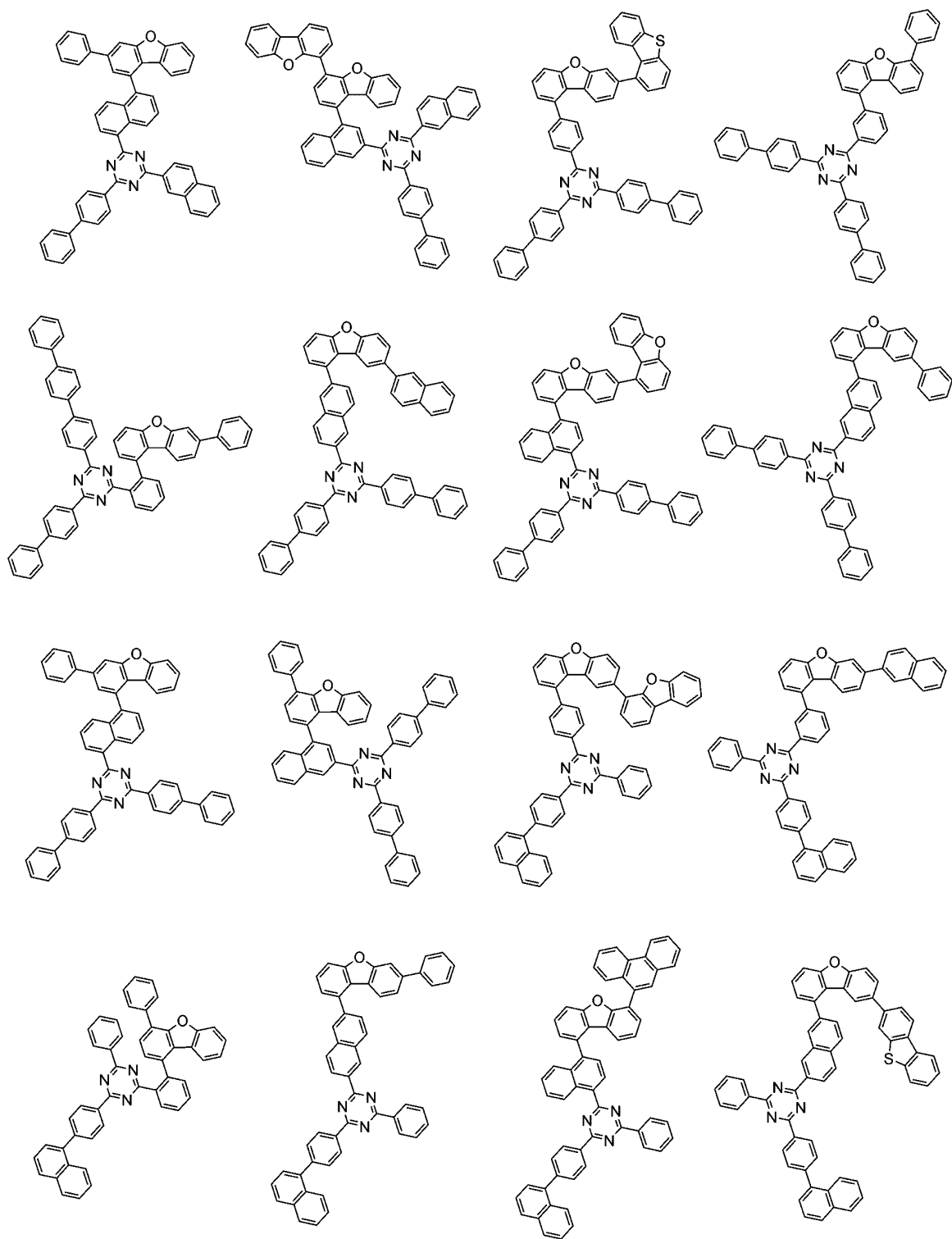
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【化 1 5 2】



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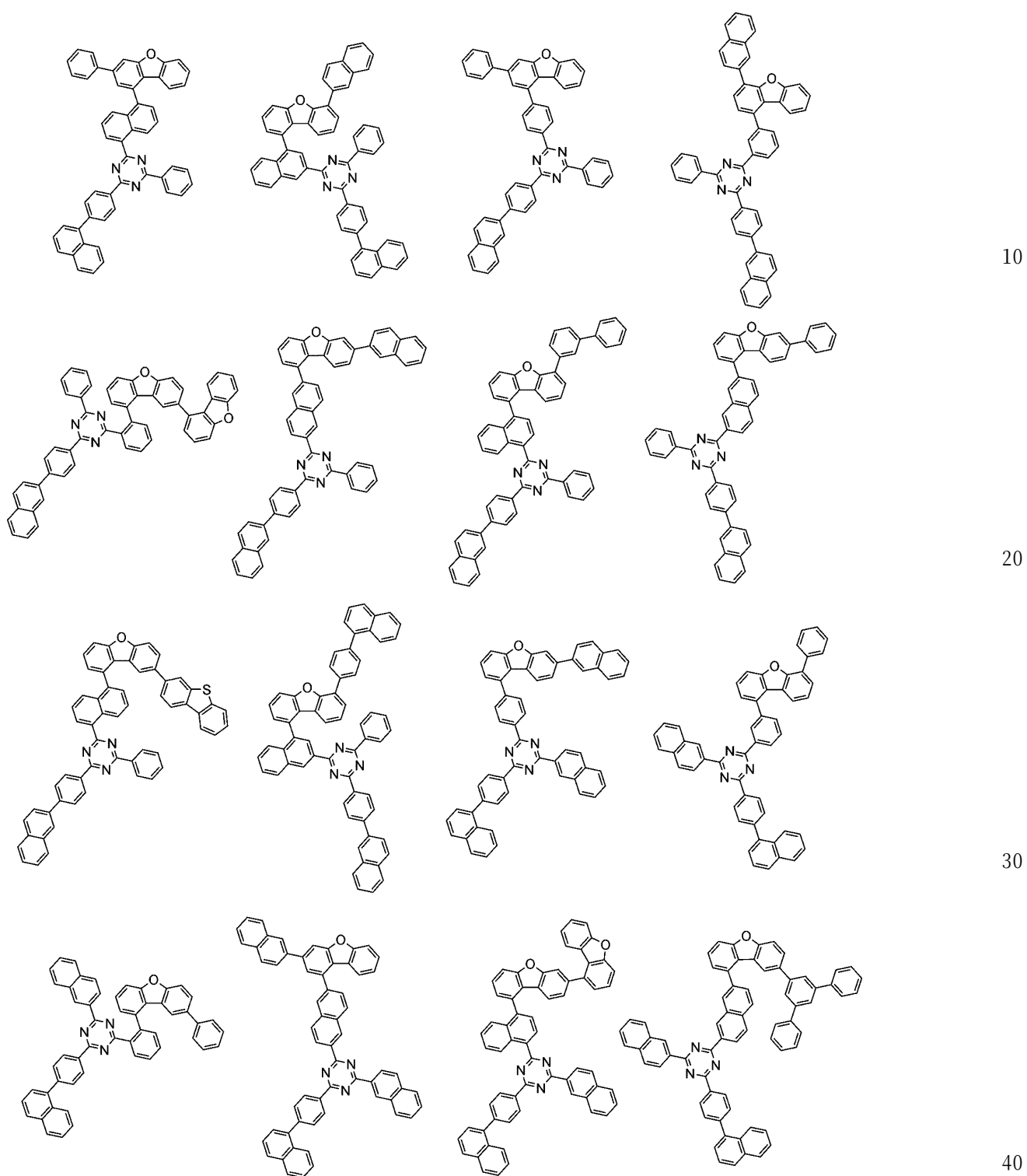
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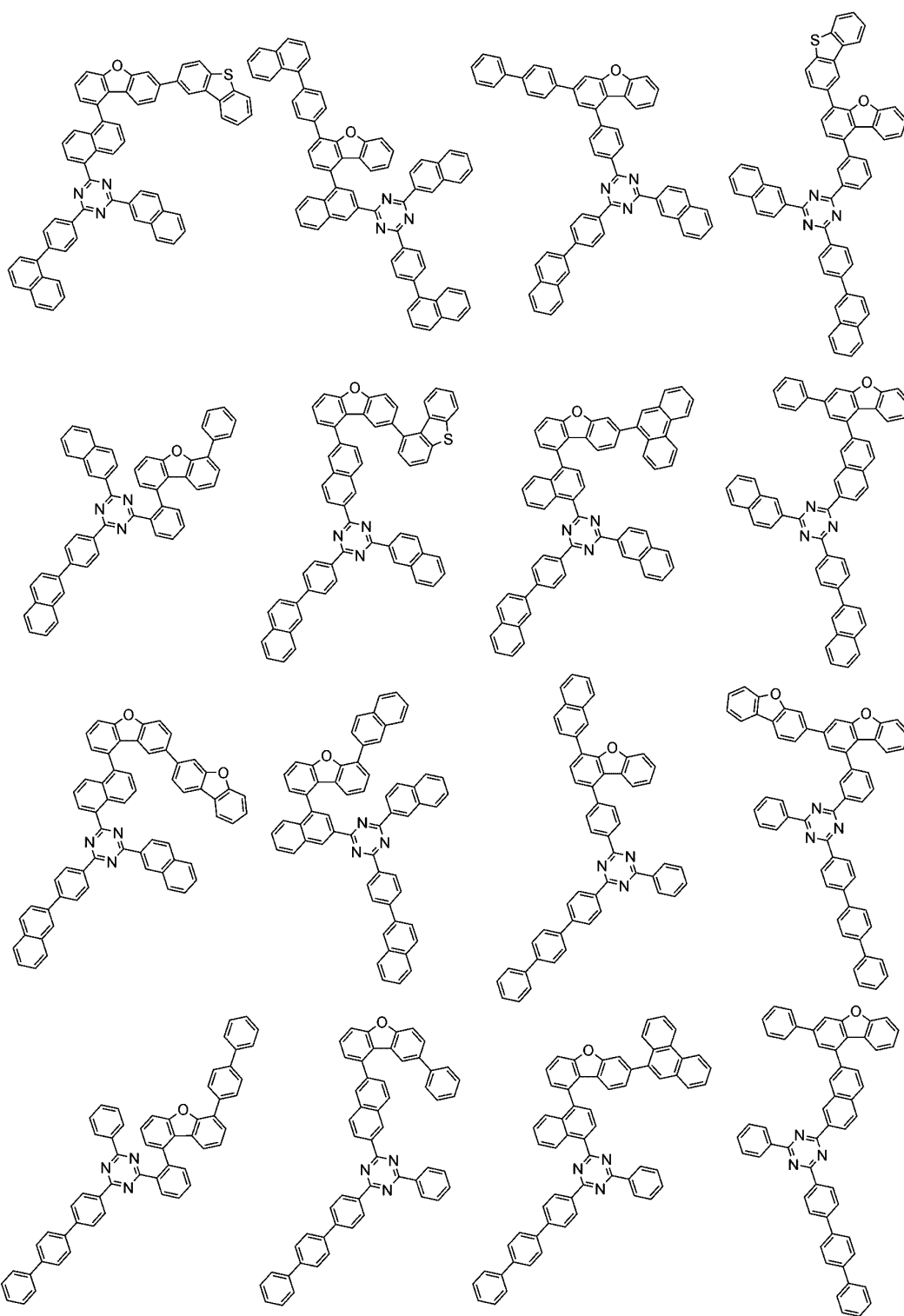
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【化 1 5 3】



【化 1 5 4】



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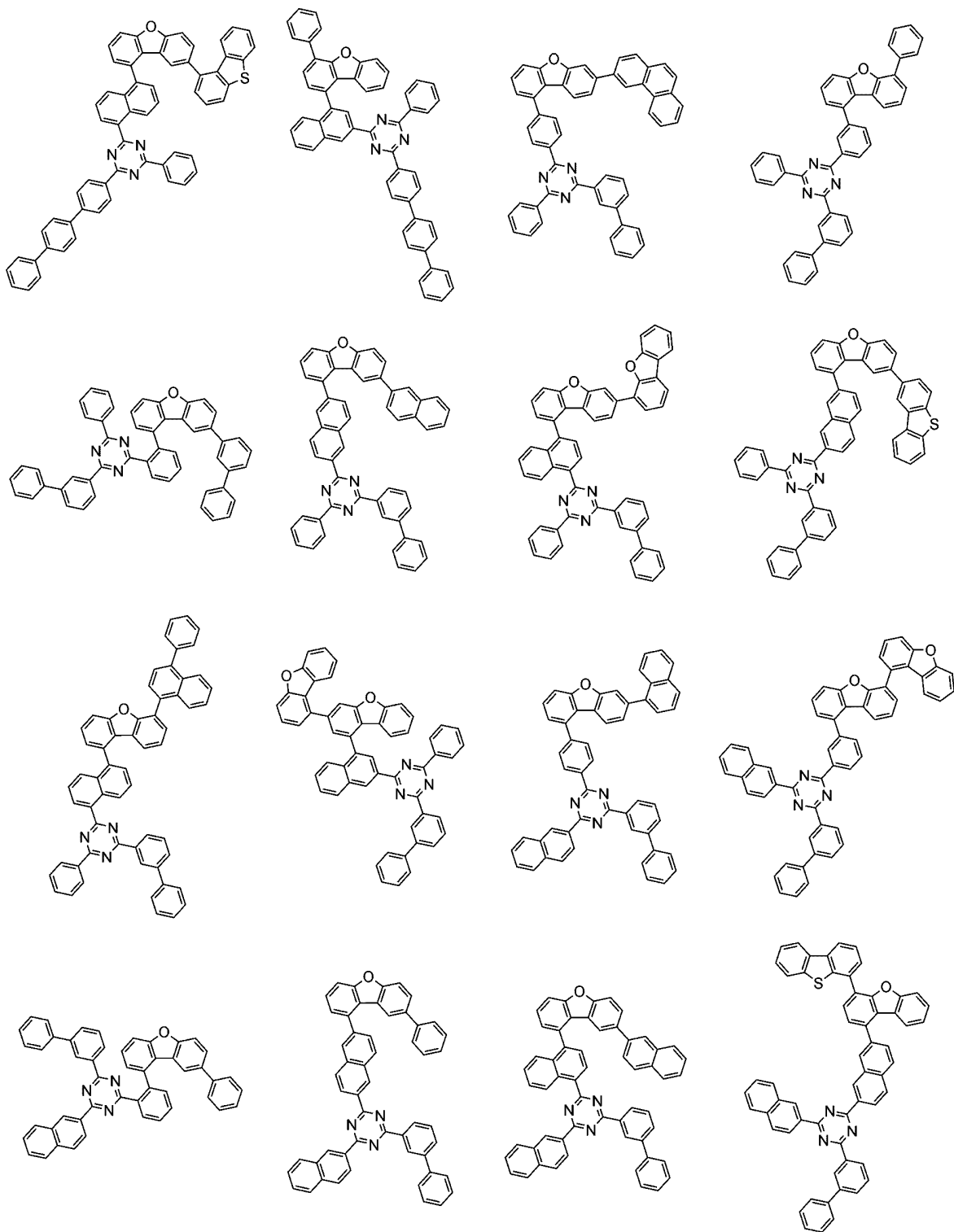
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【化 1 5 5】



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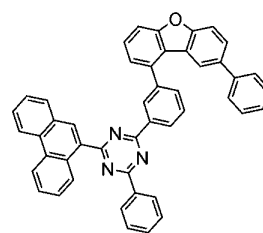
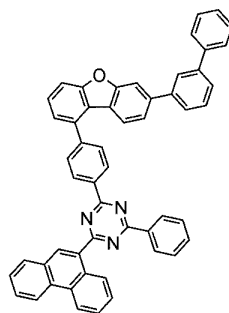
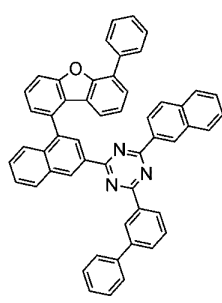
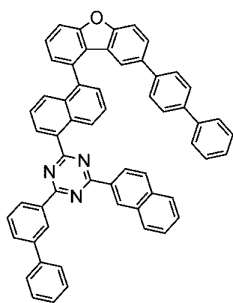
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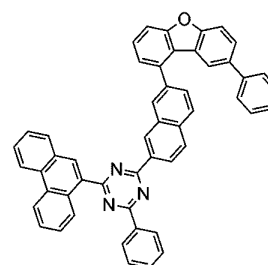
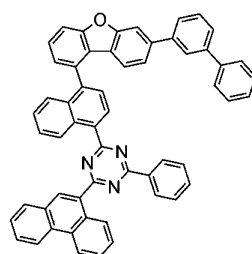
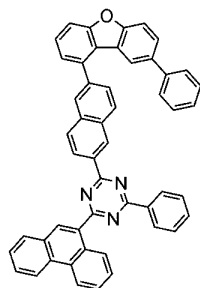
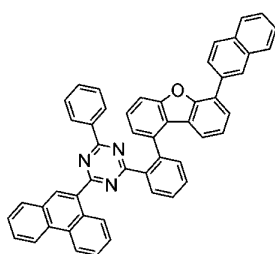
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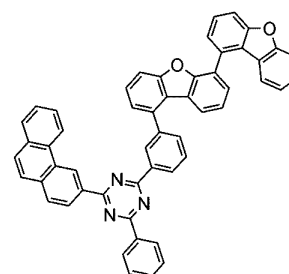
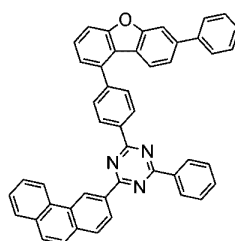
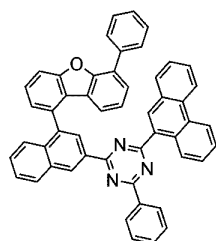
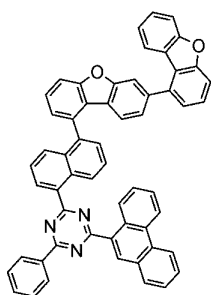
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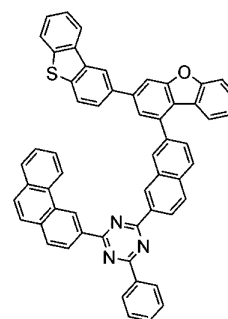
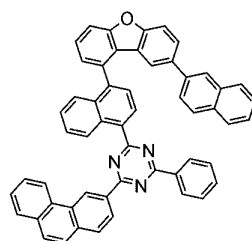
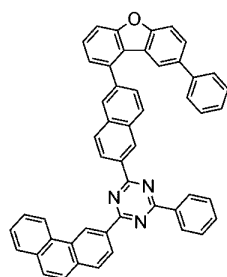
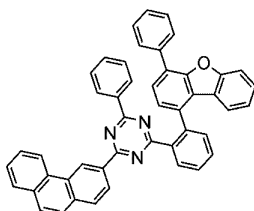
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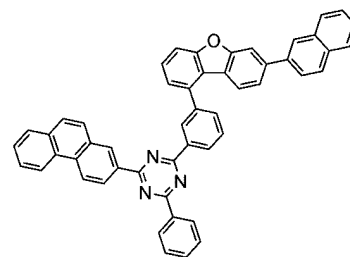
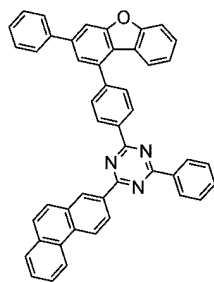
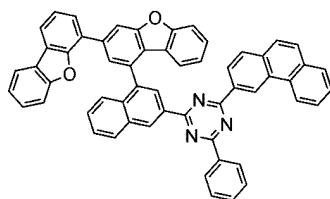
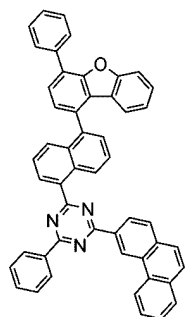
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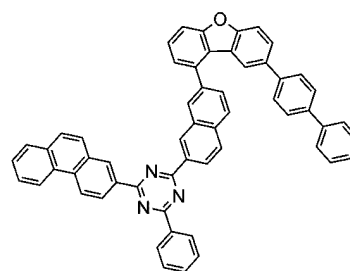
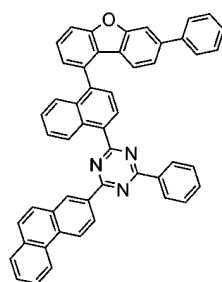
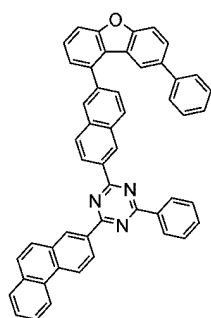
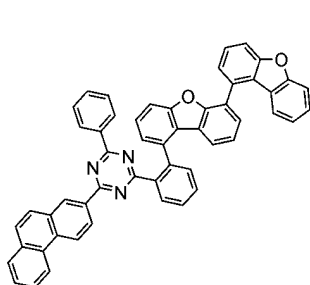
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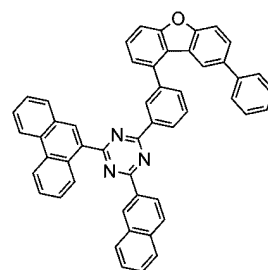
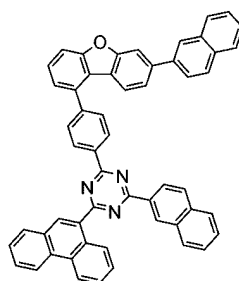
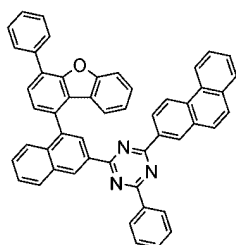
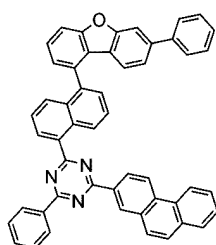
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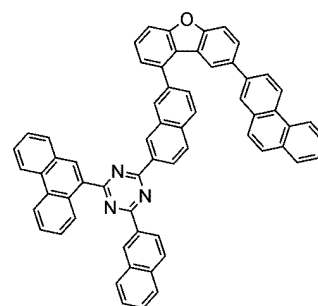
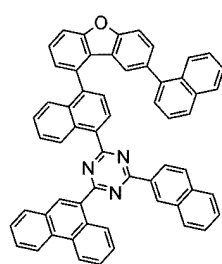
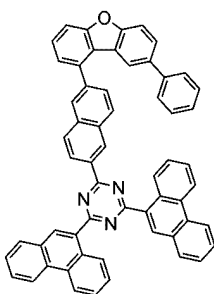
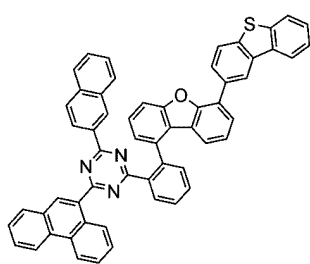
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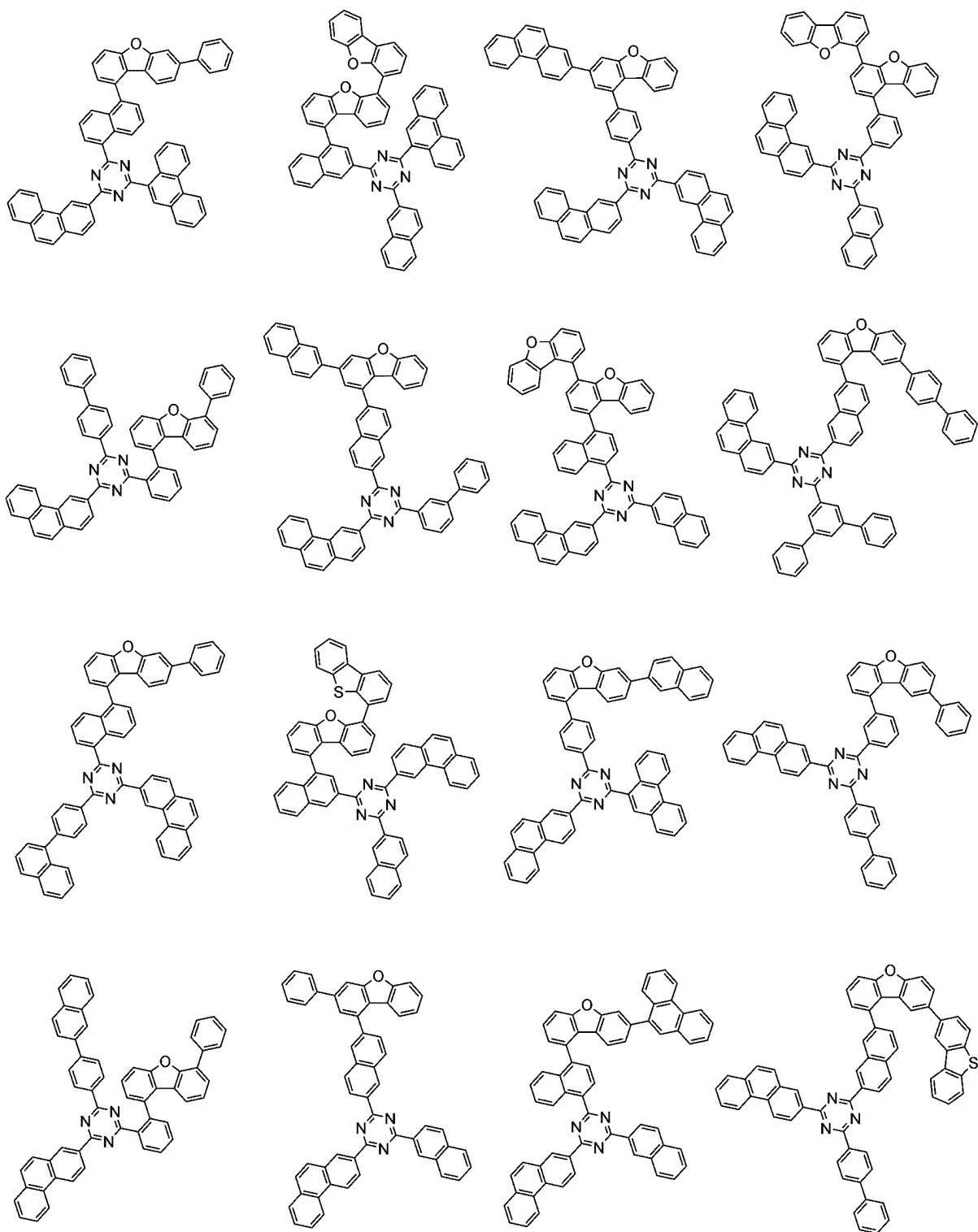
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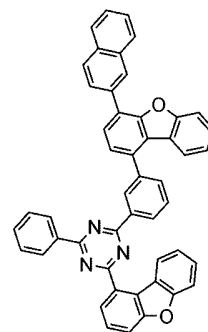
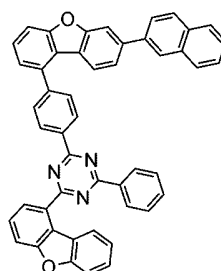
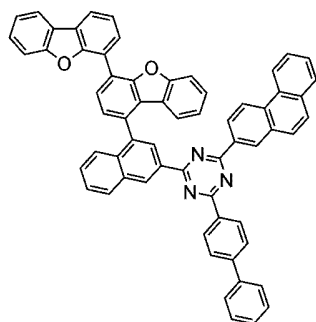
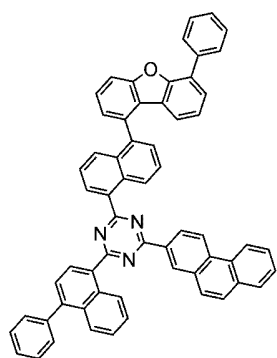
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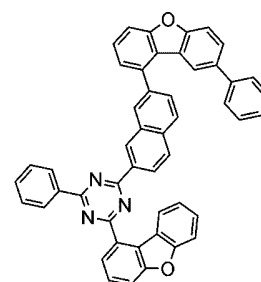
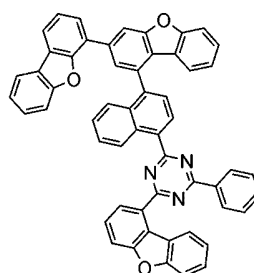
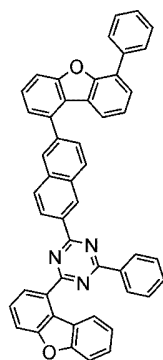
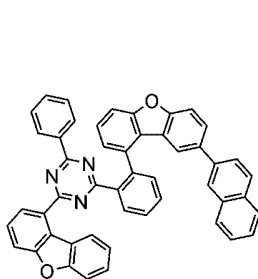
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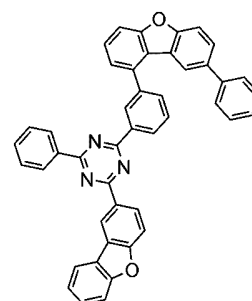
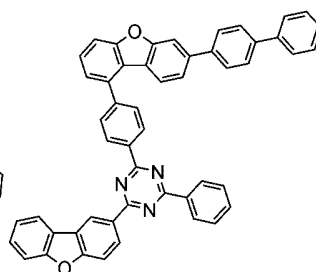
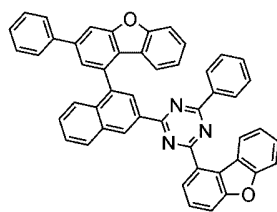
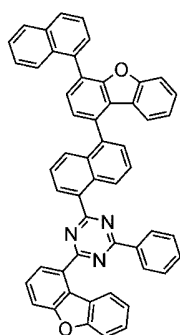
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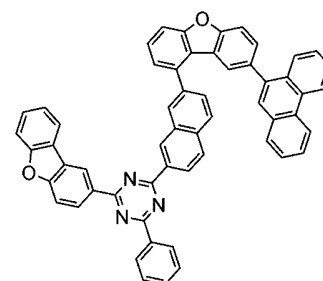
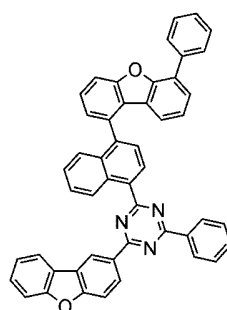
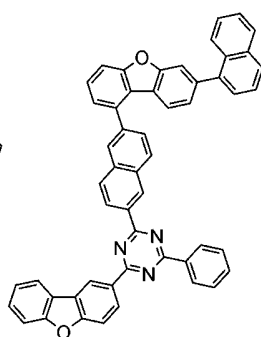
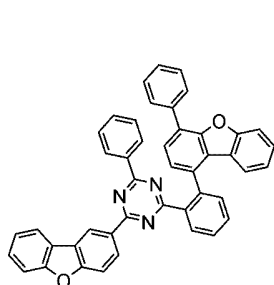
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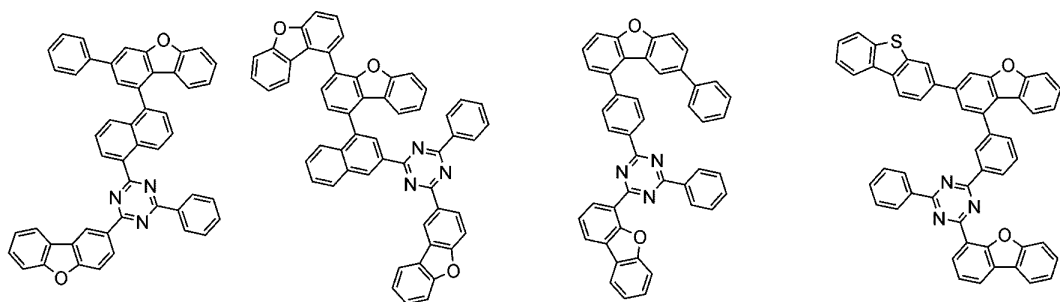
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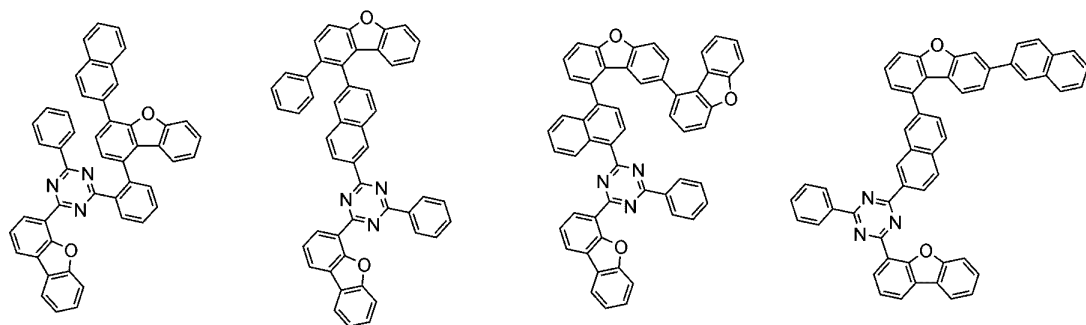
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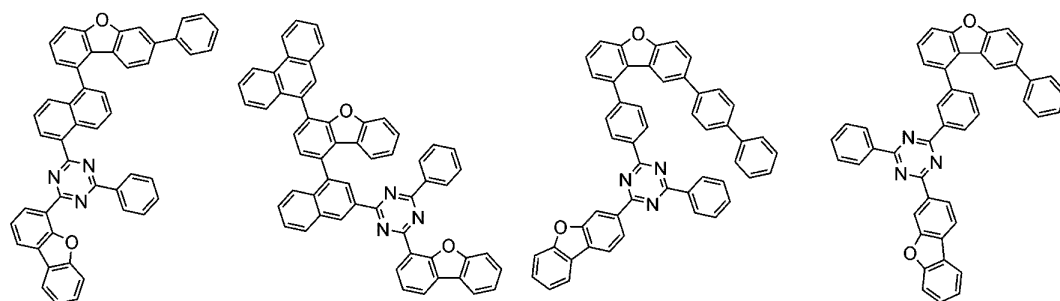
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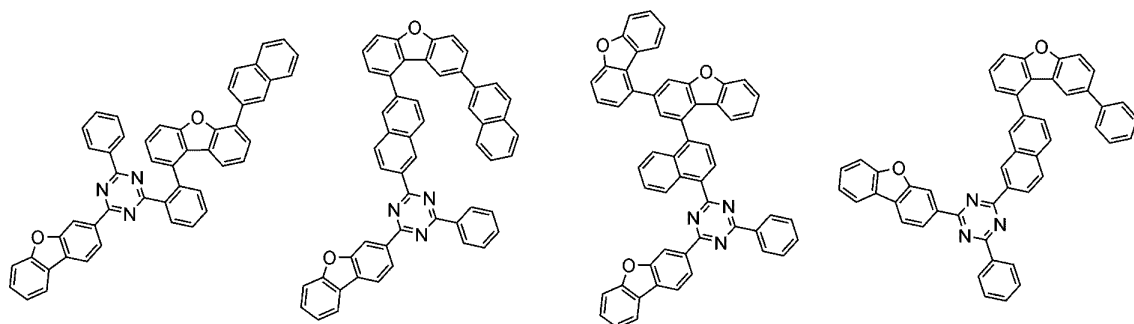
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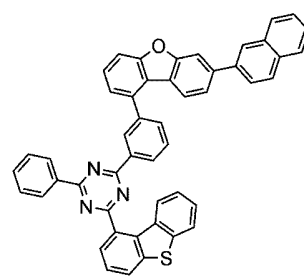
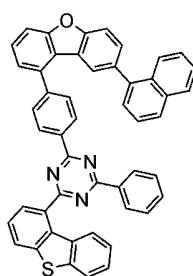
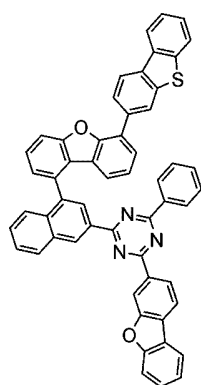
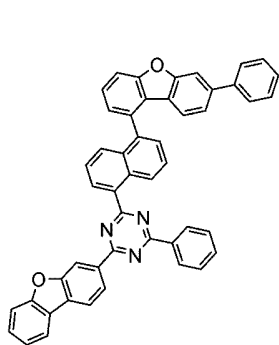
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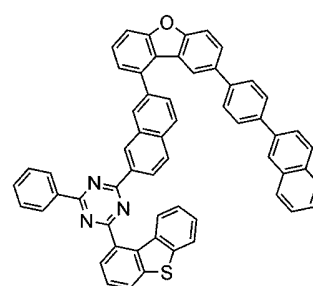
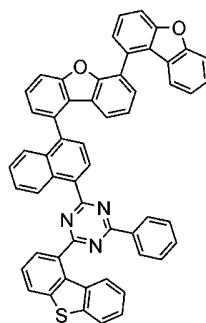
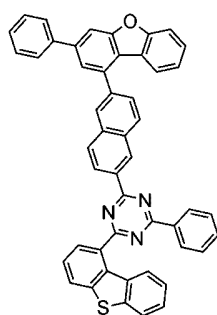
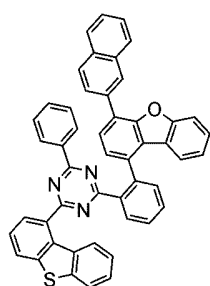
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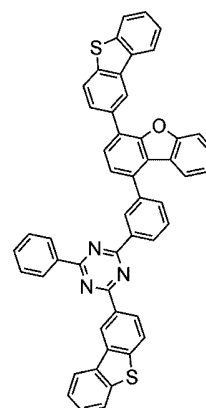
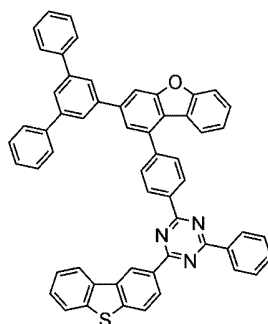
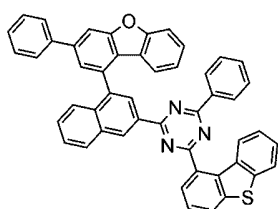
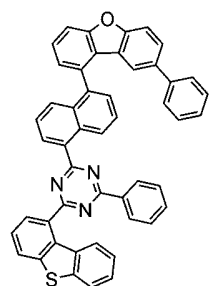
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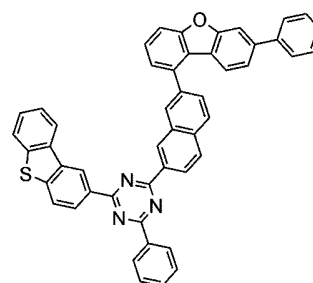
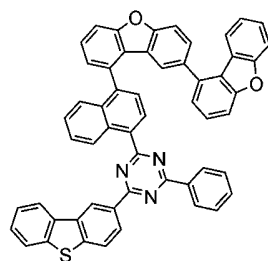
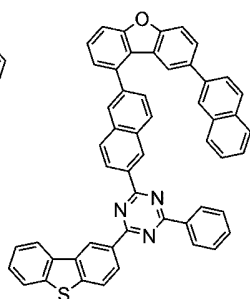
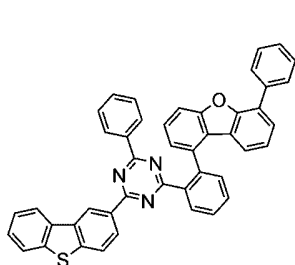
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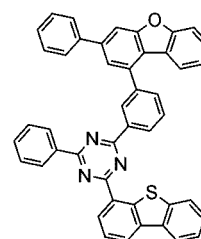
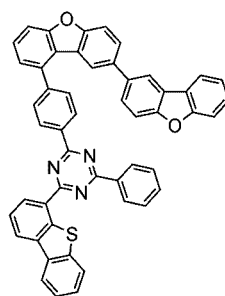
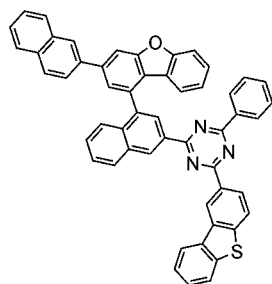
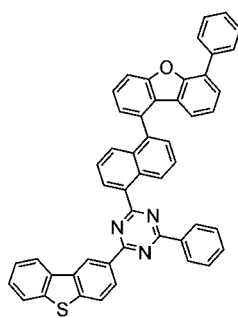
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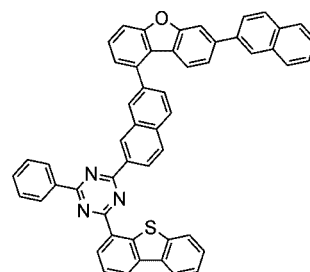
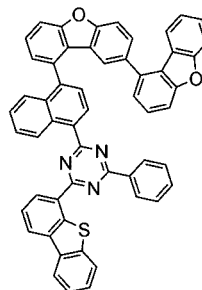
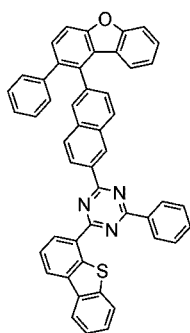
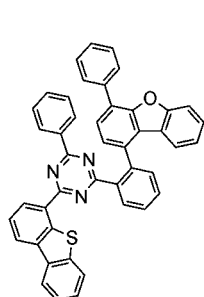
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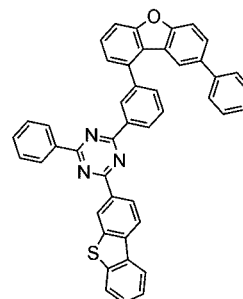
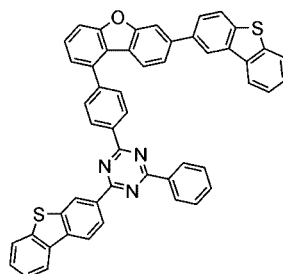
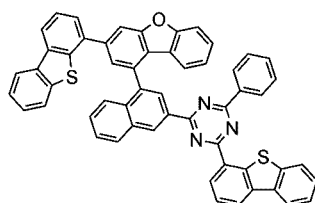
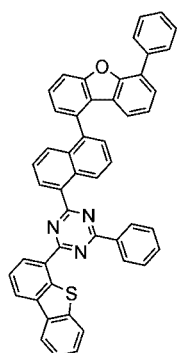
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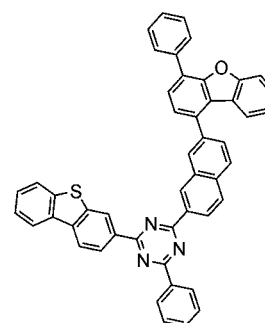
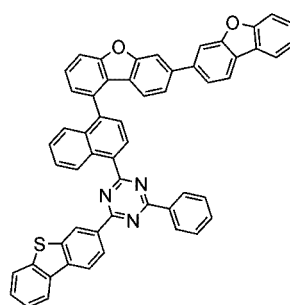
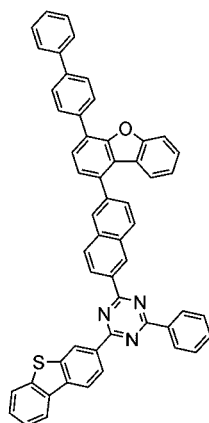
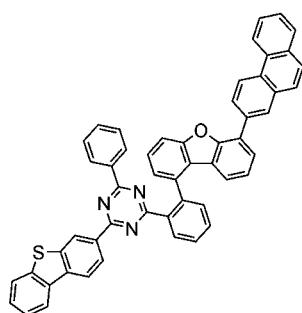
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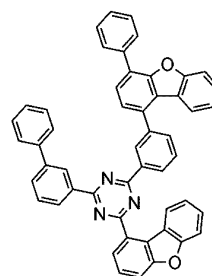
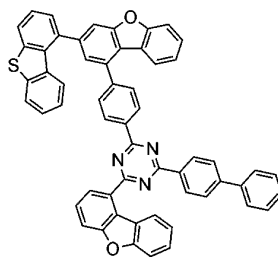
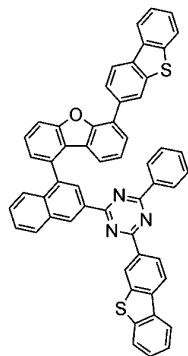
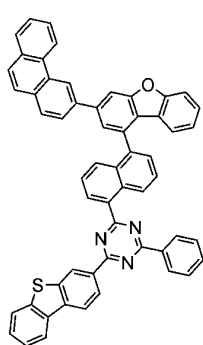
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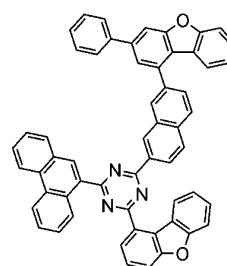
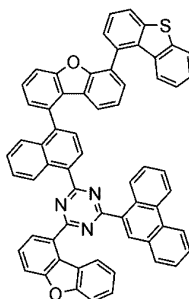
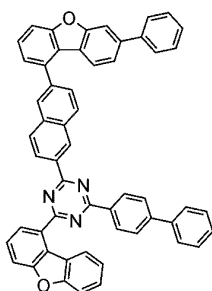
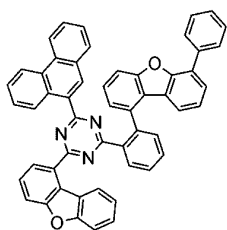
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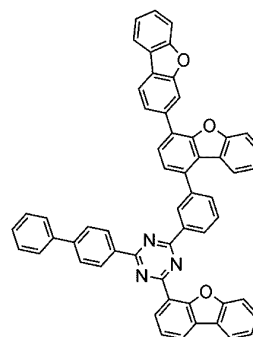
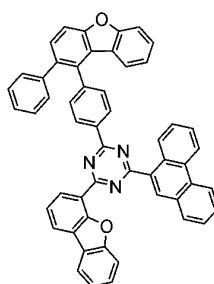
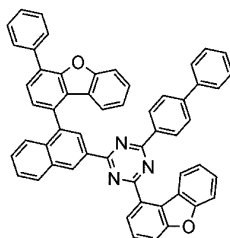
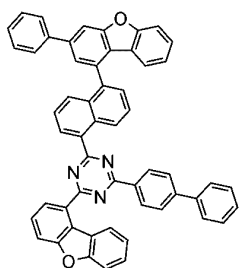
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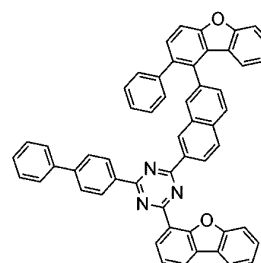
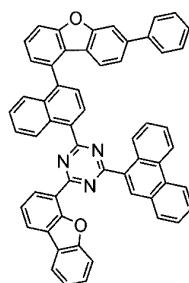
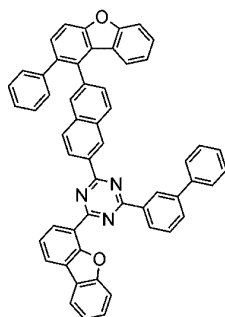
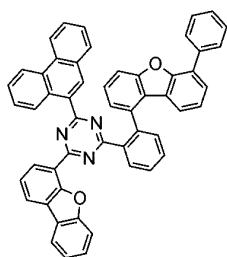
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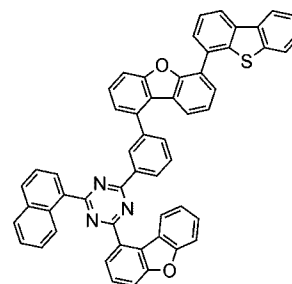
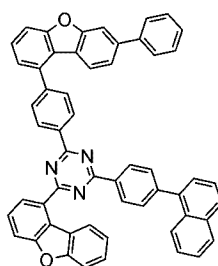
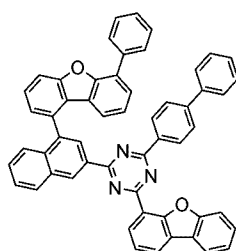
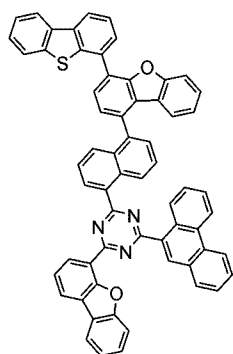
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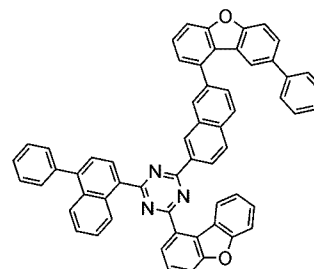
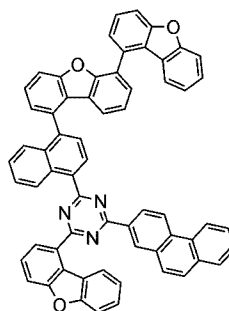
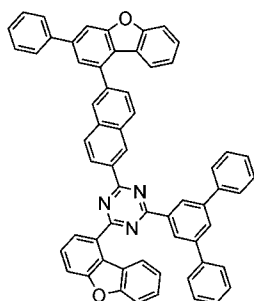
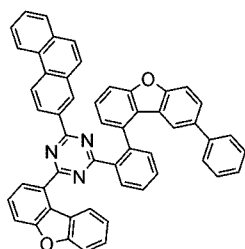
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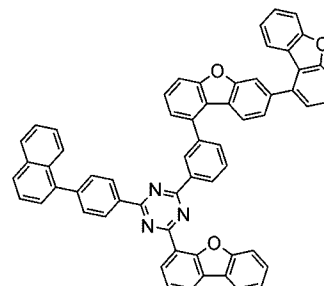
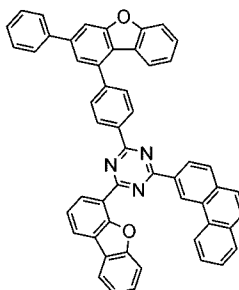
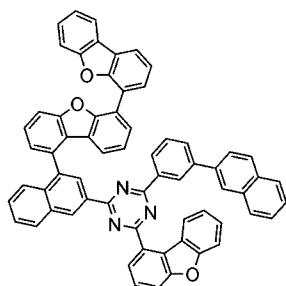
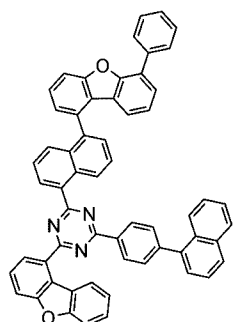
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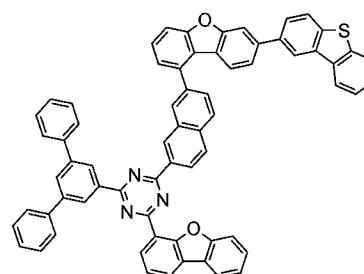
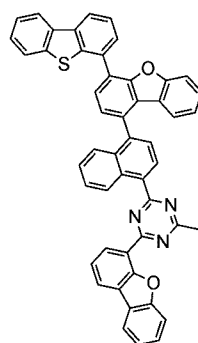
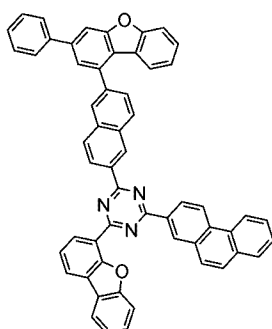
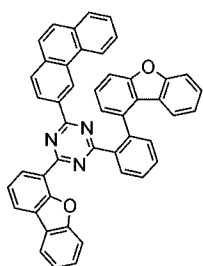
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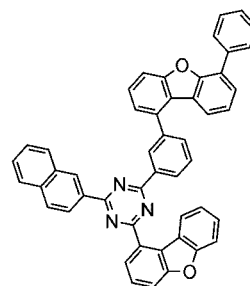
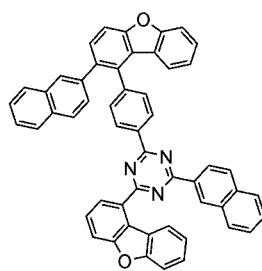
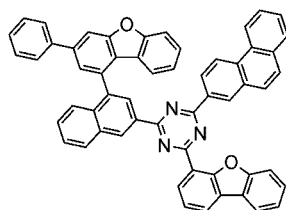
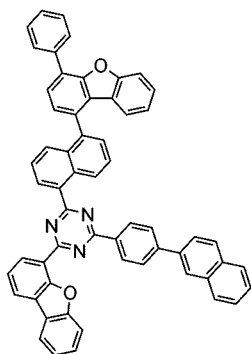
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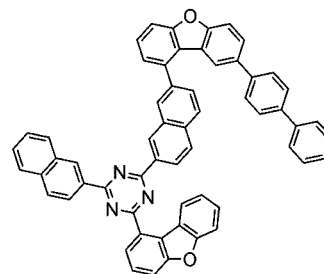
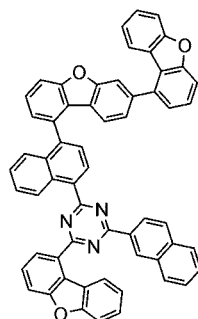
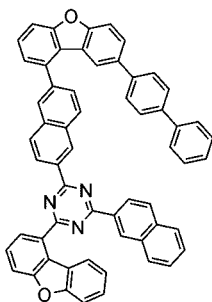
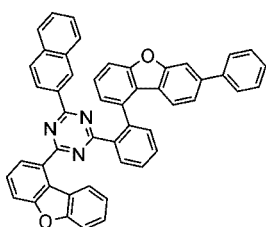
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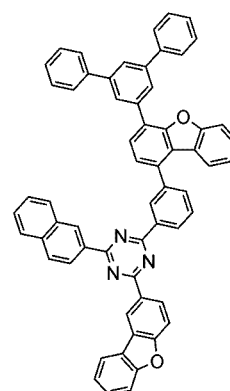
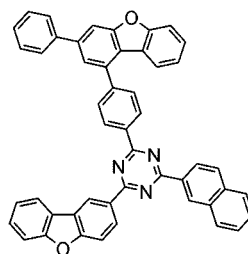
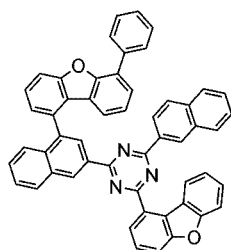
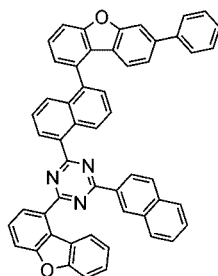
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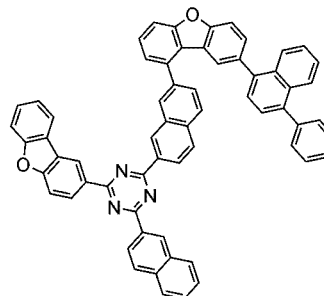
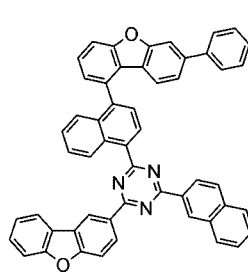
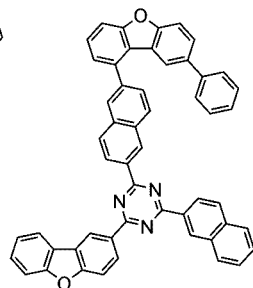
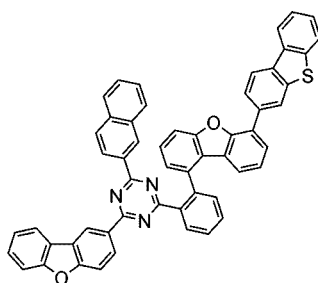
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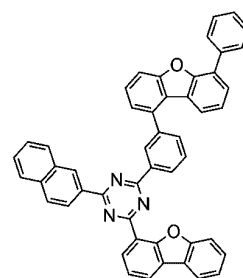
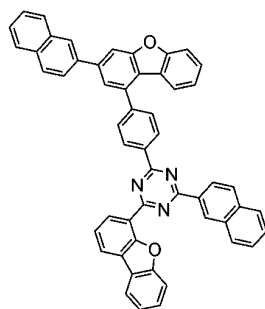
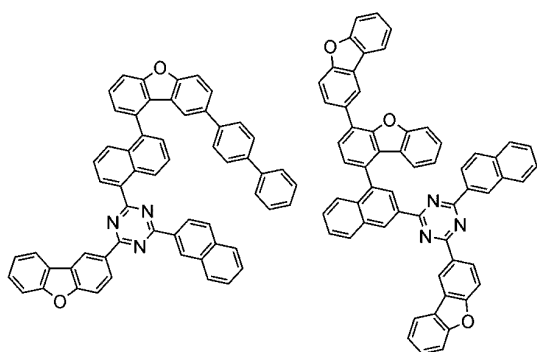
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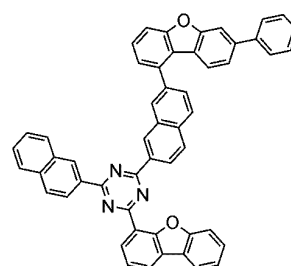
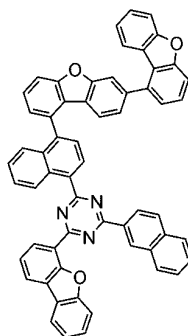
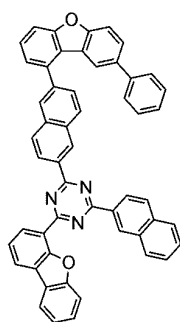
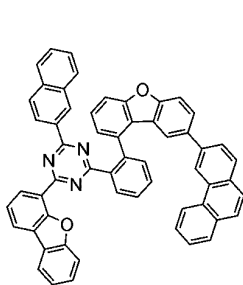
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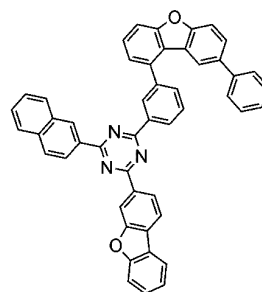
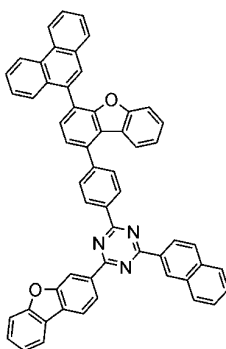
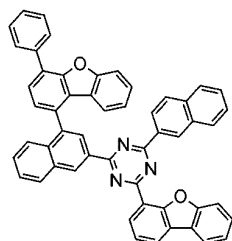
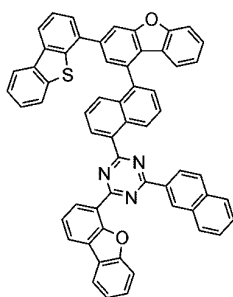
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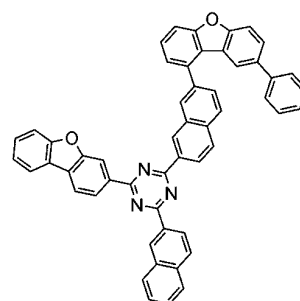
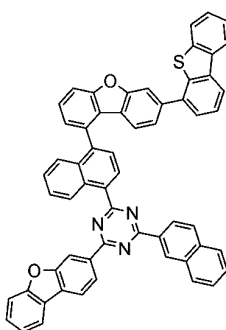
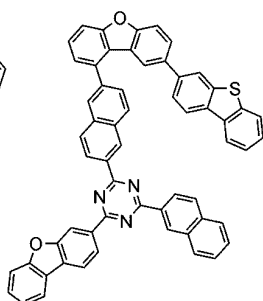
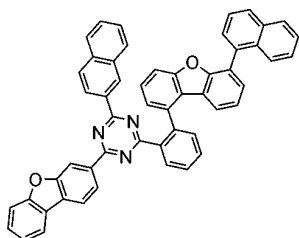
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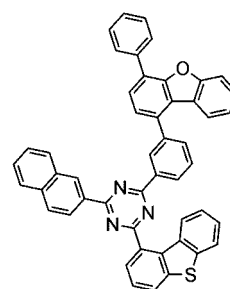
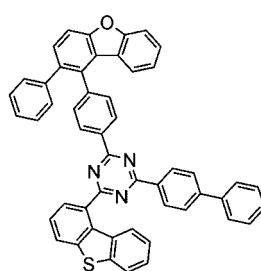
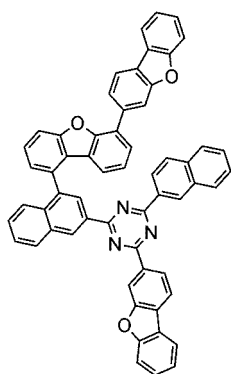
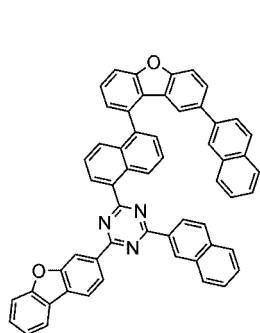
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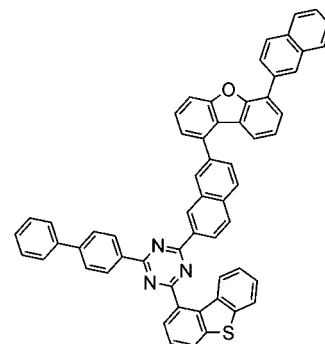
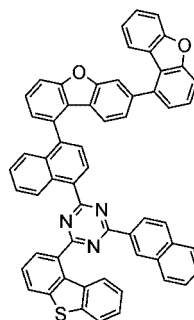
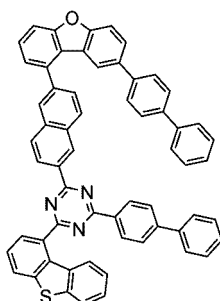
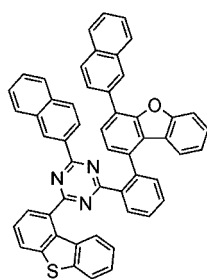
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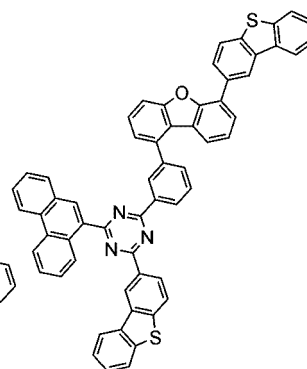
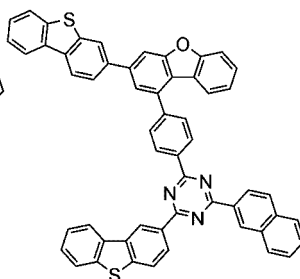
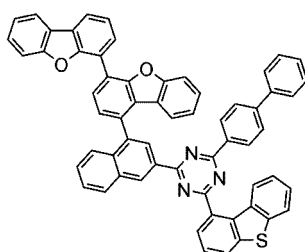
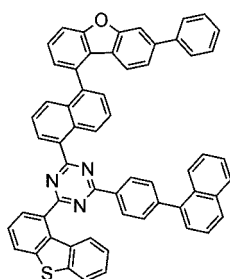
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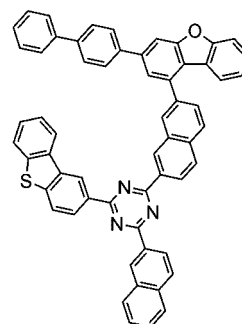
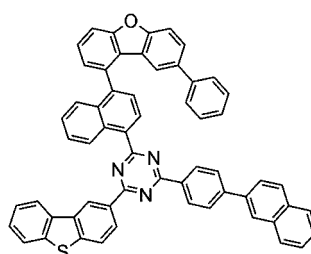
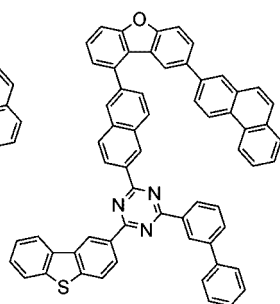
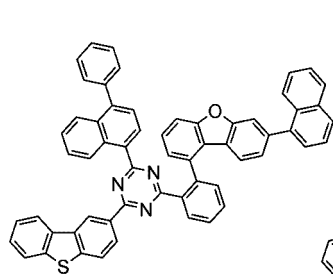
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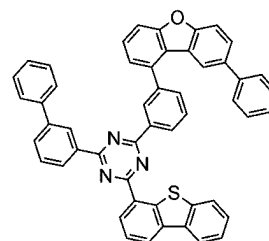
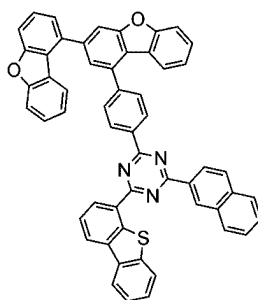
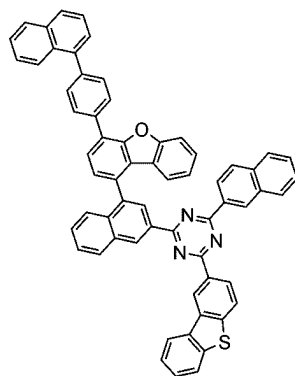
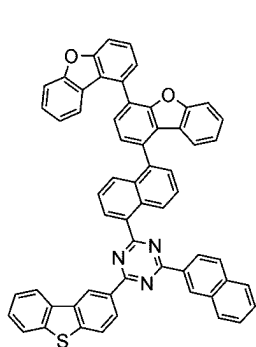
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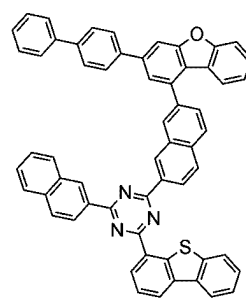
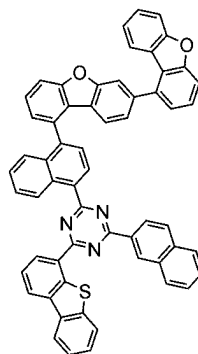
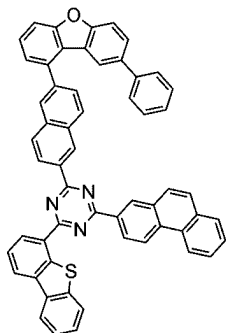
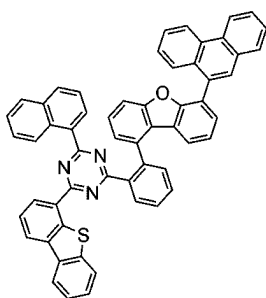
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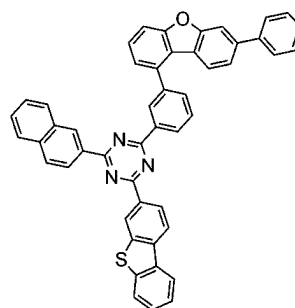
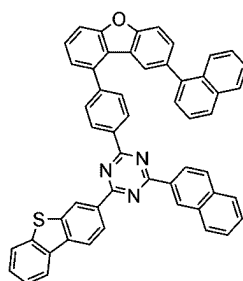
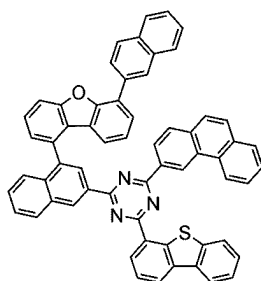
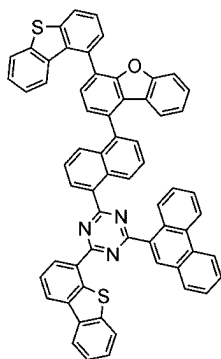
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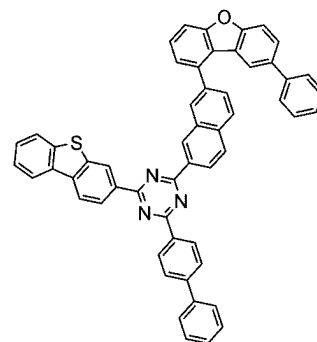
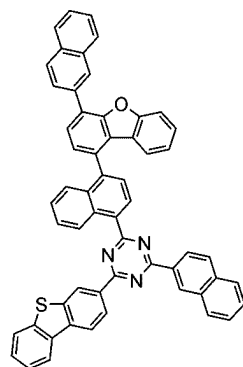
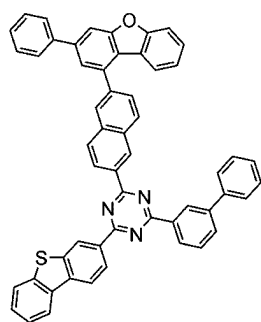
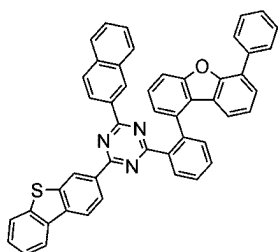
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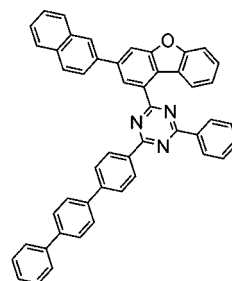
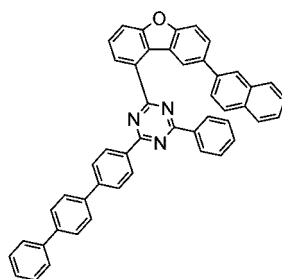
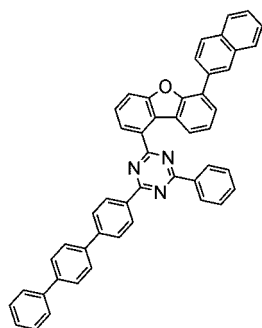
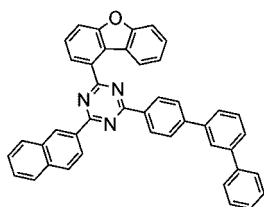
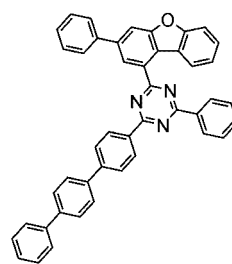
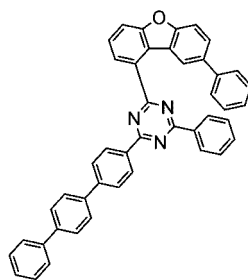
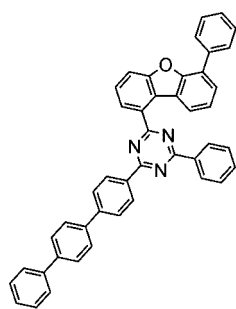
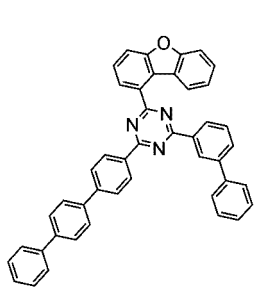
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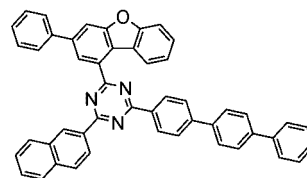
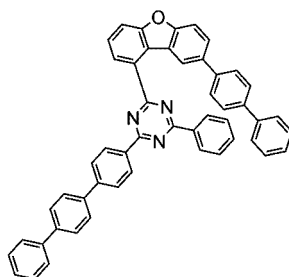
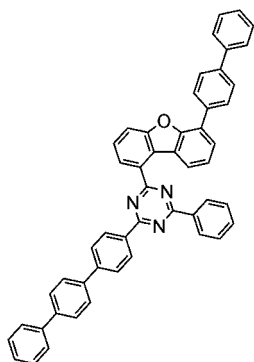
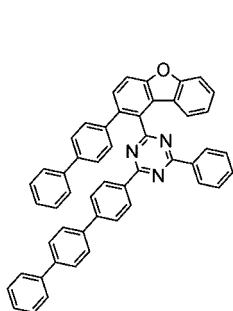
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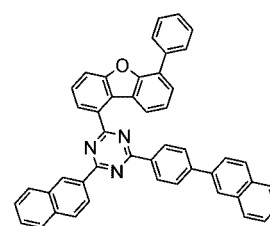
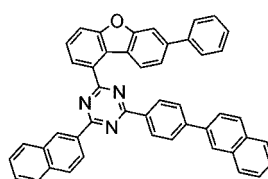
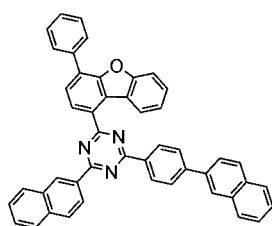
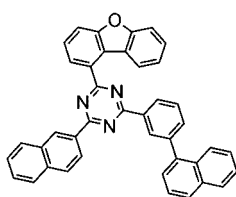
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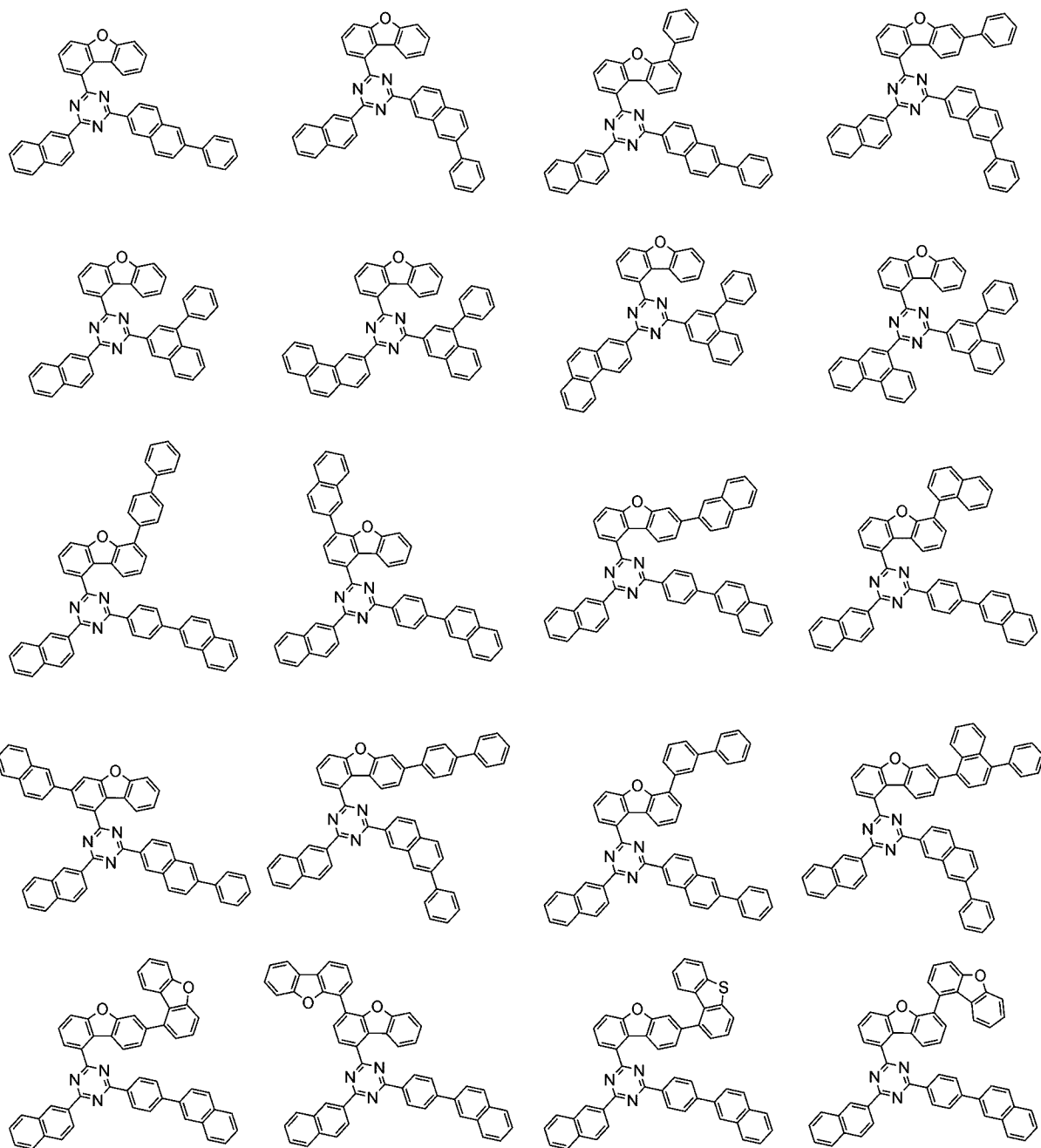


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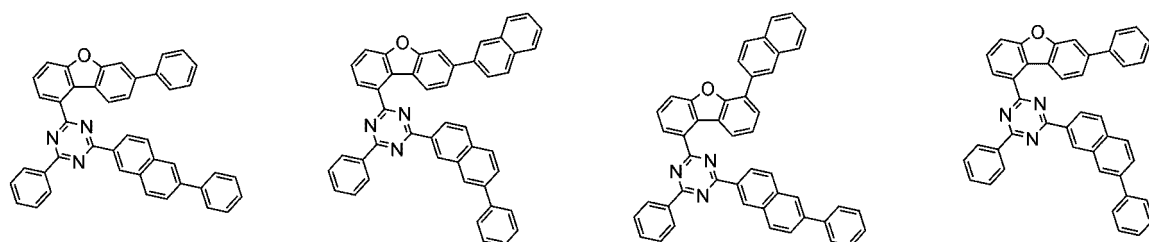
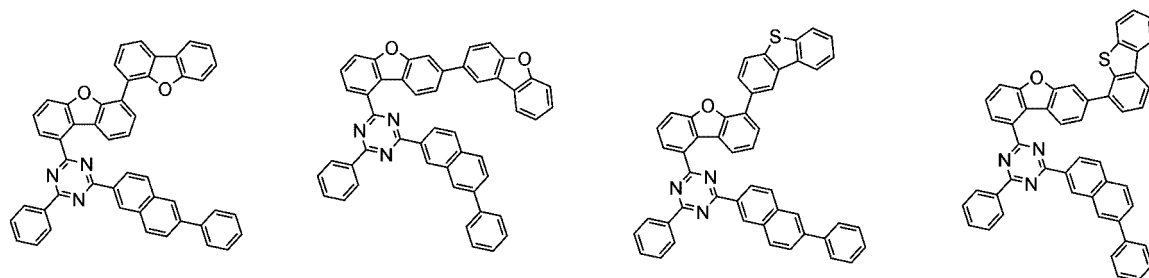
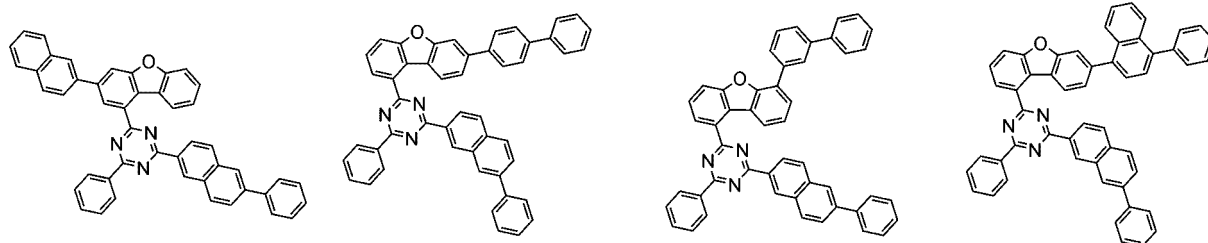
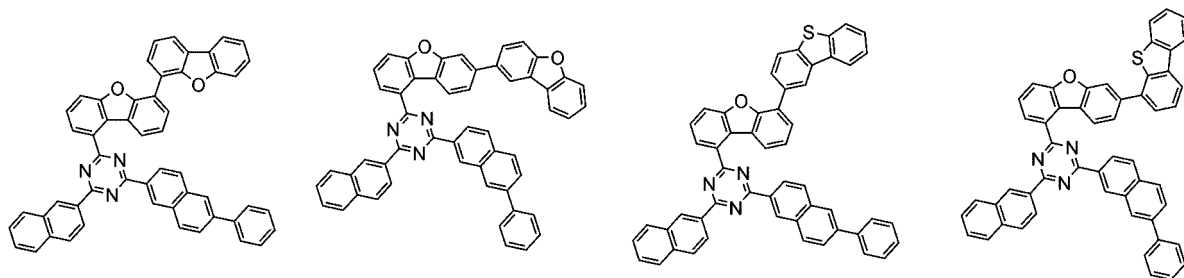
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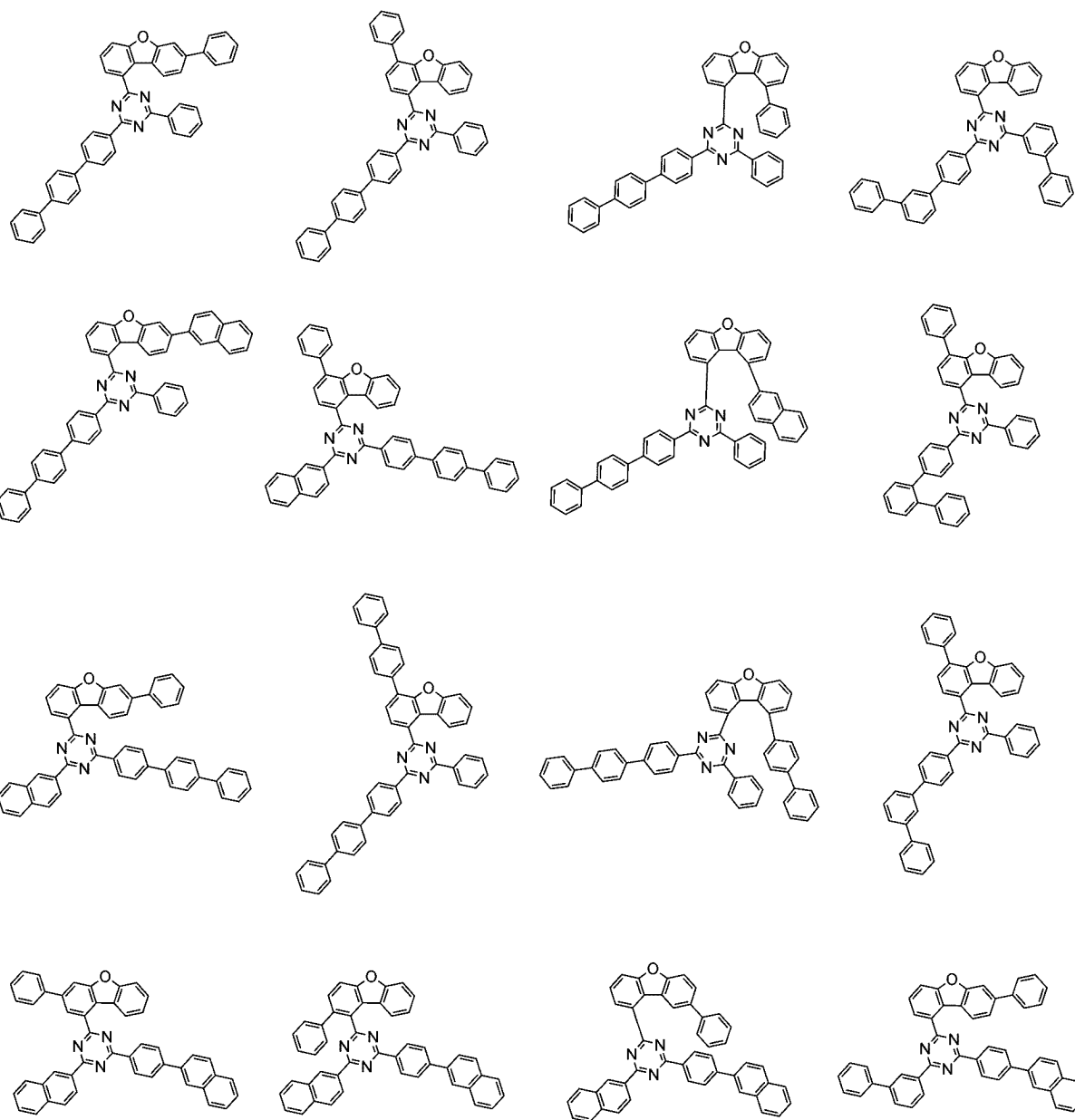
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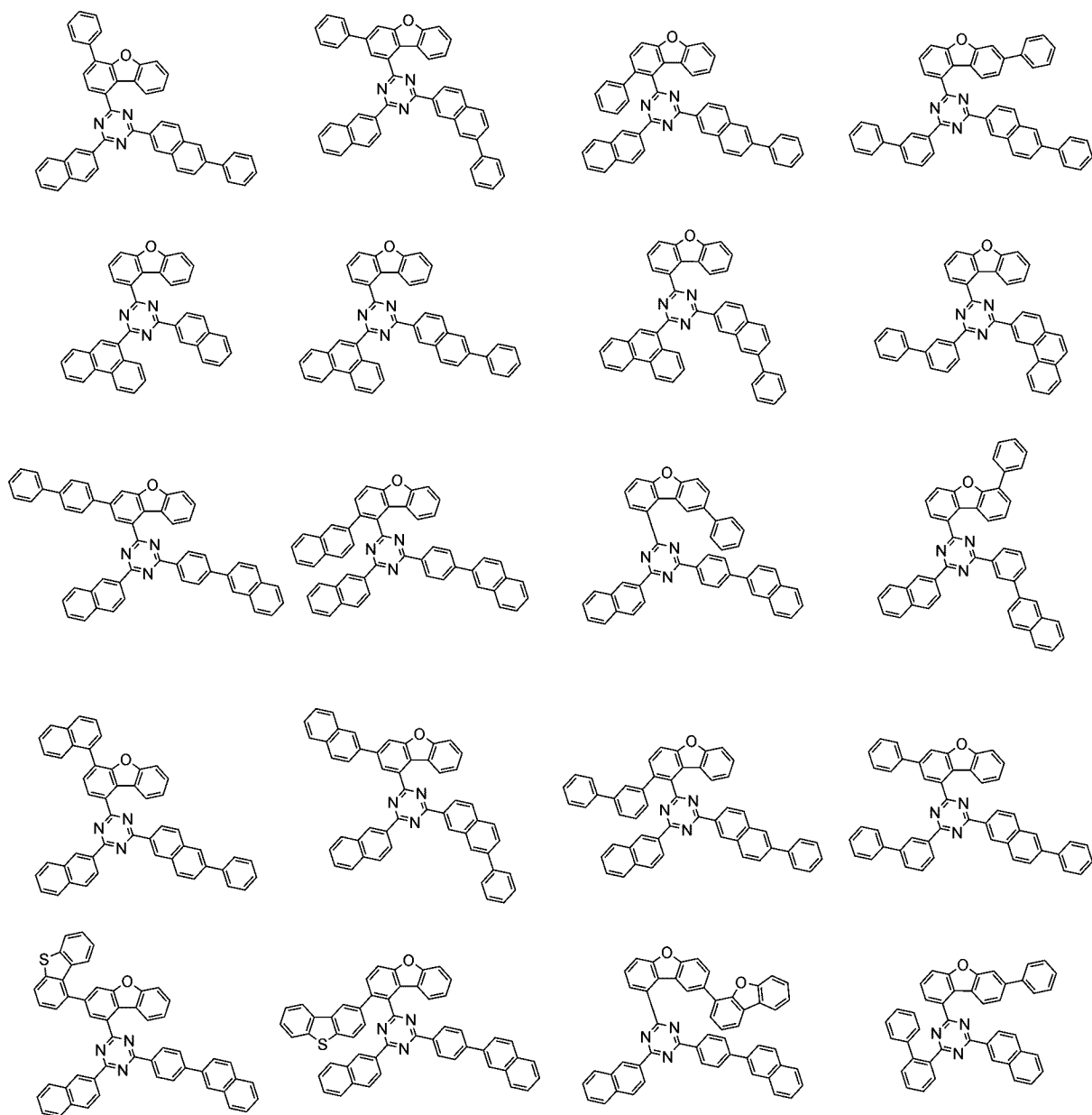
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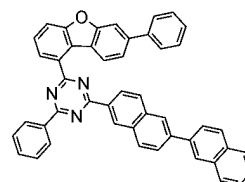
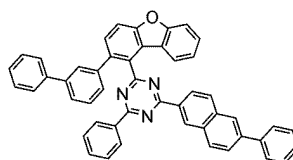
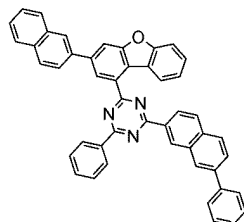
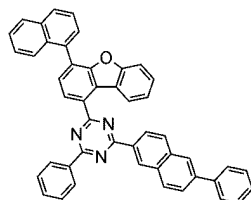
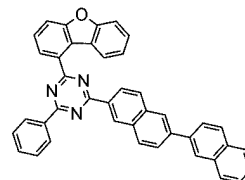
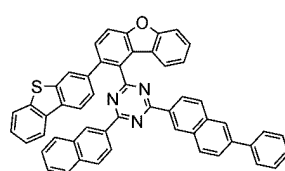
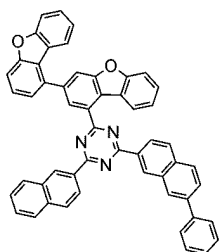
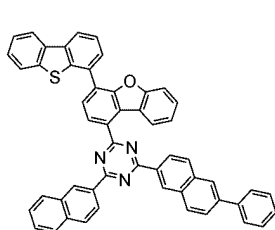
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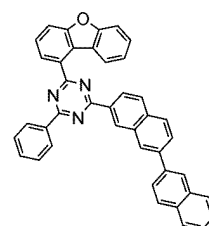
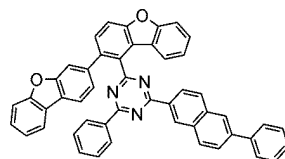
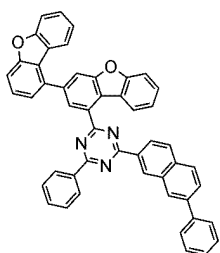
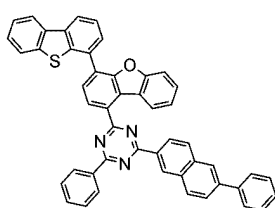
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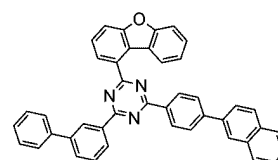
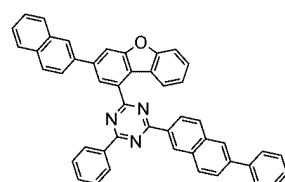
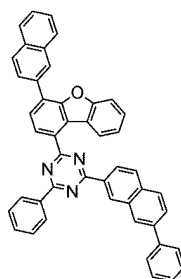
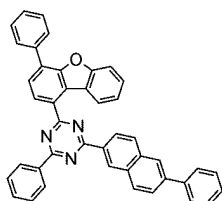
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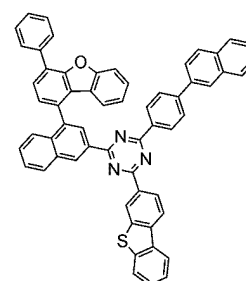
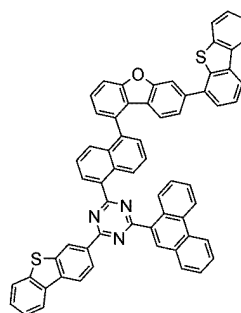
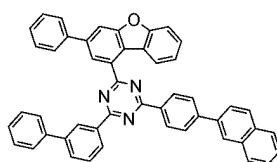
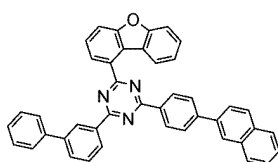
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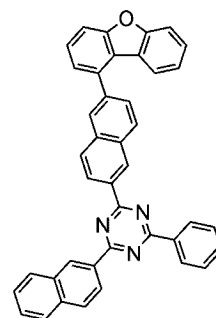
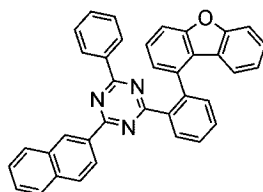
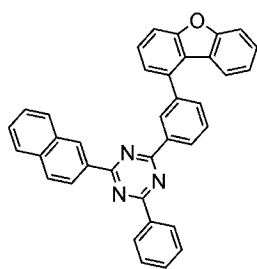
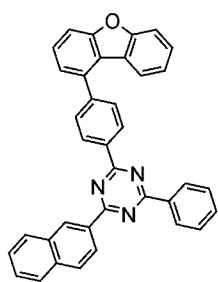
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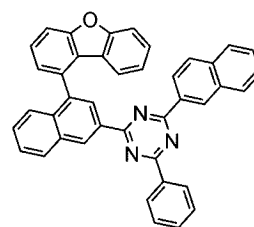
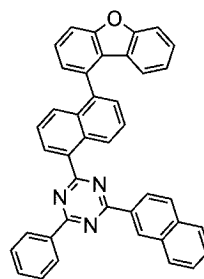
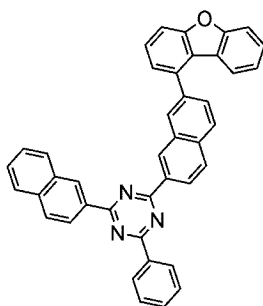
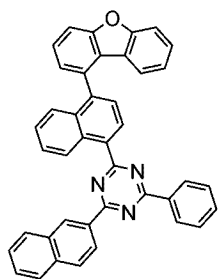
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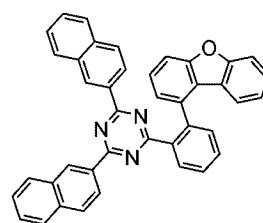
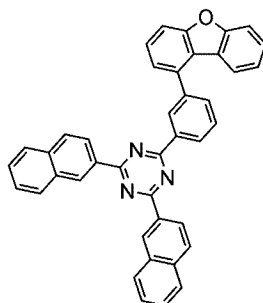
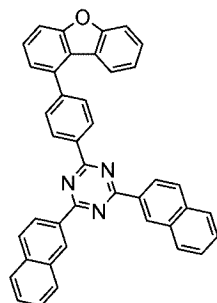
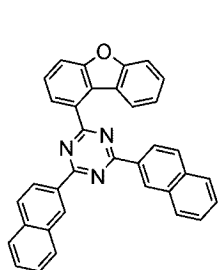
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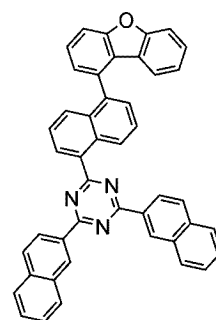
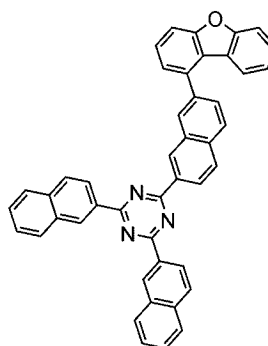
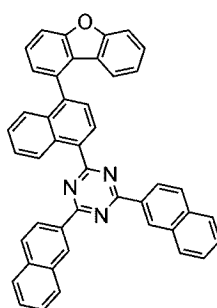
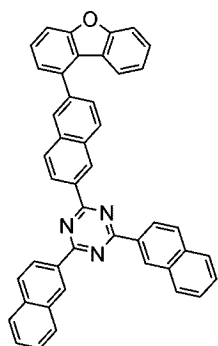
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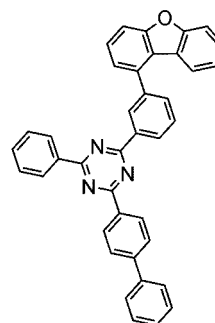
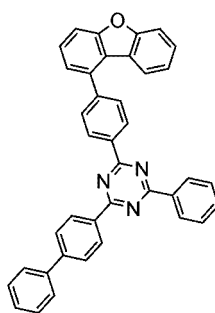
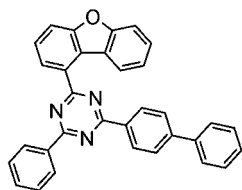
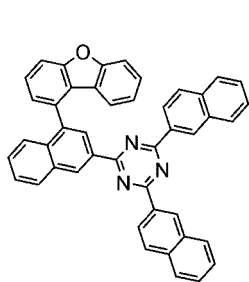
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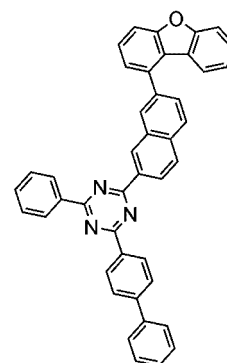
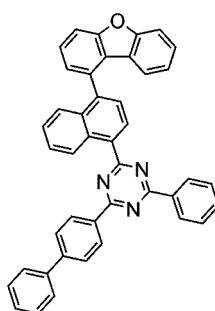
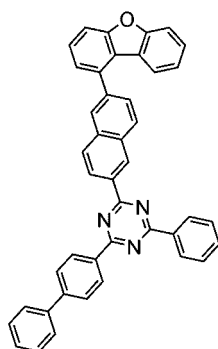
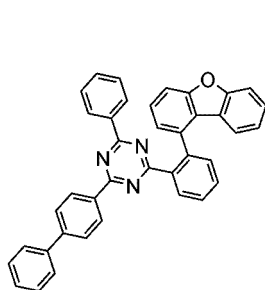
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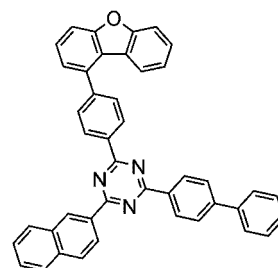
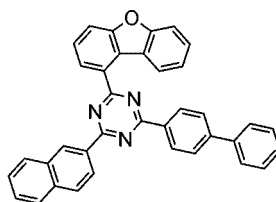
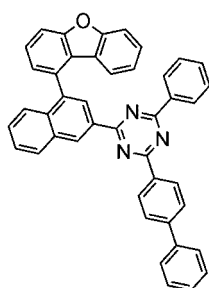
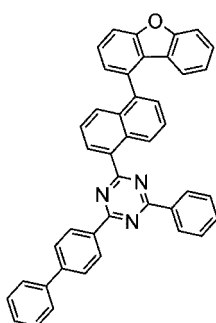
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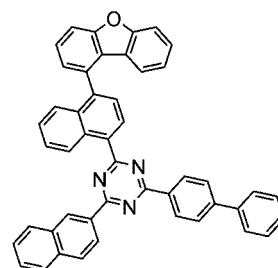
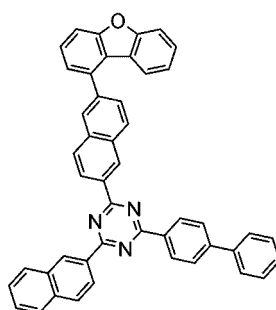
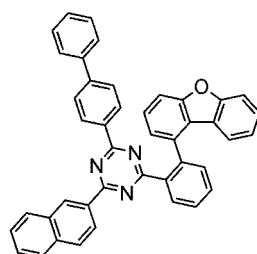
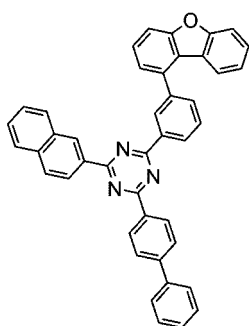
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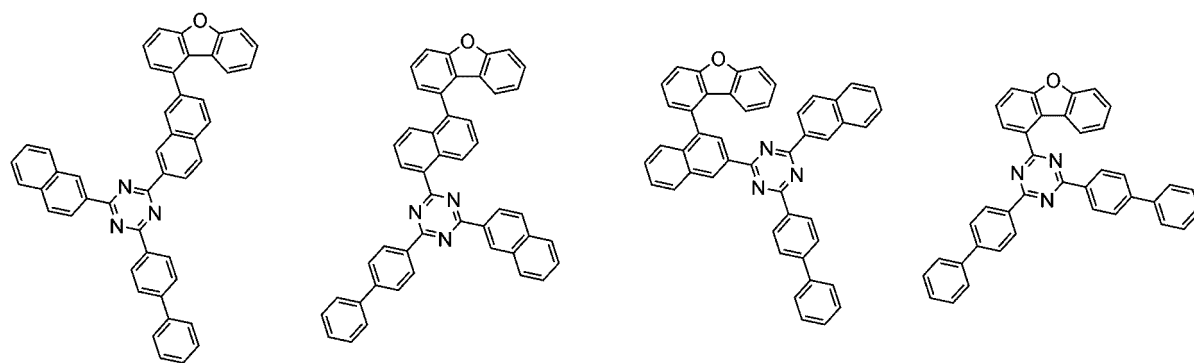
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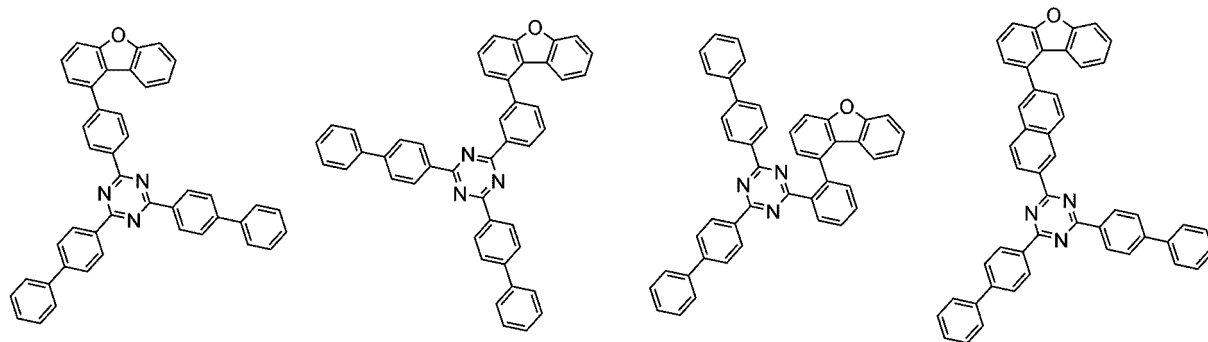
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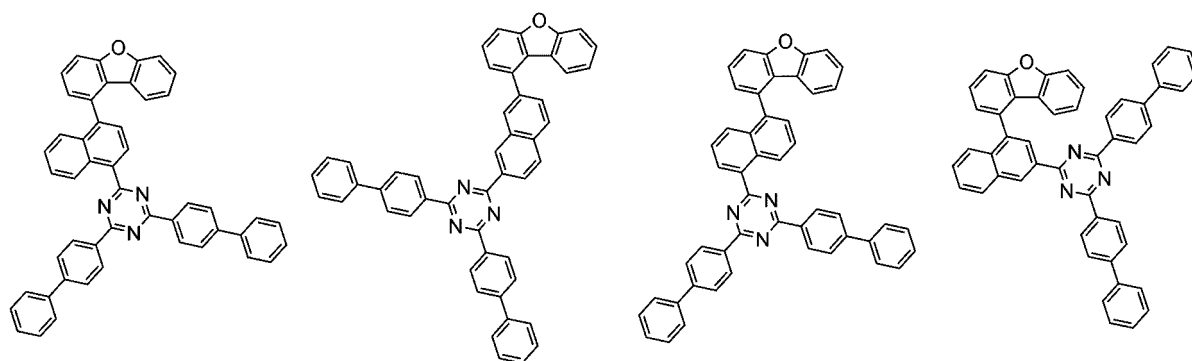
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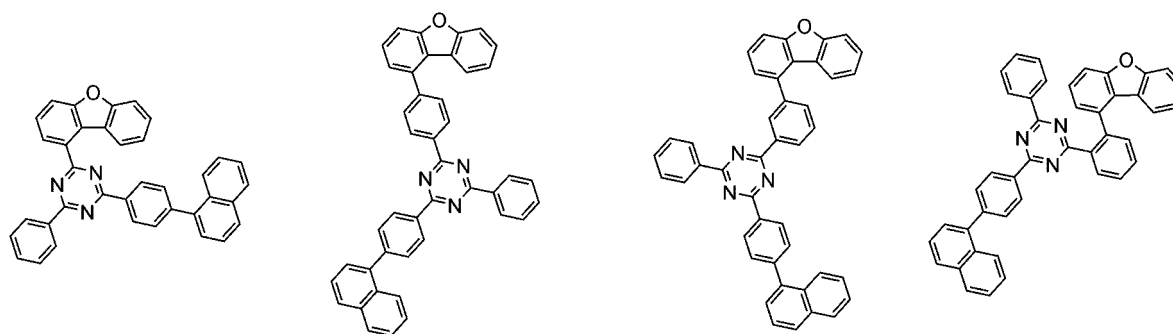
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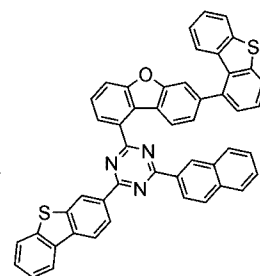
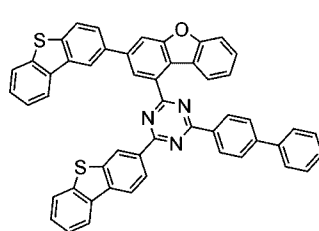
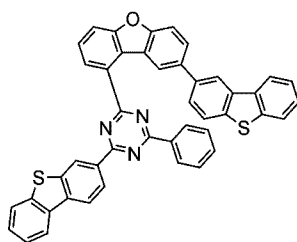
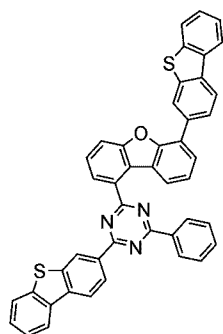
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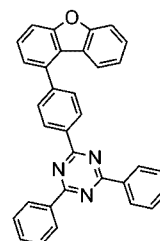
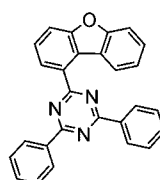
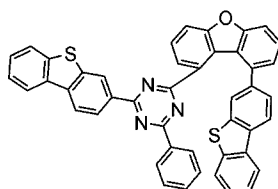
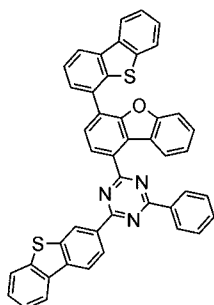
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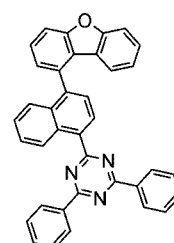
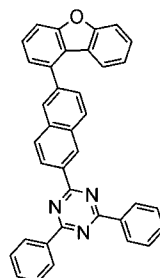
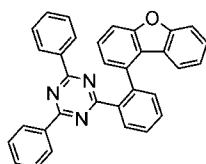
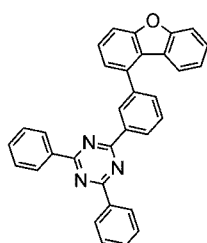
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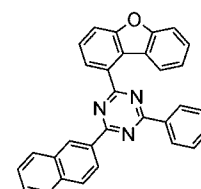
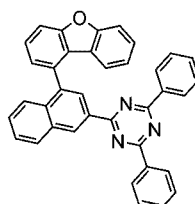
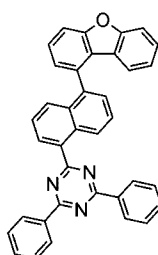
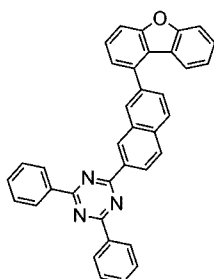
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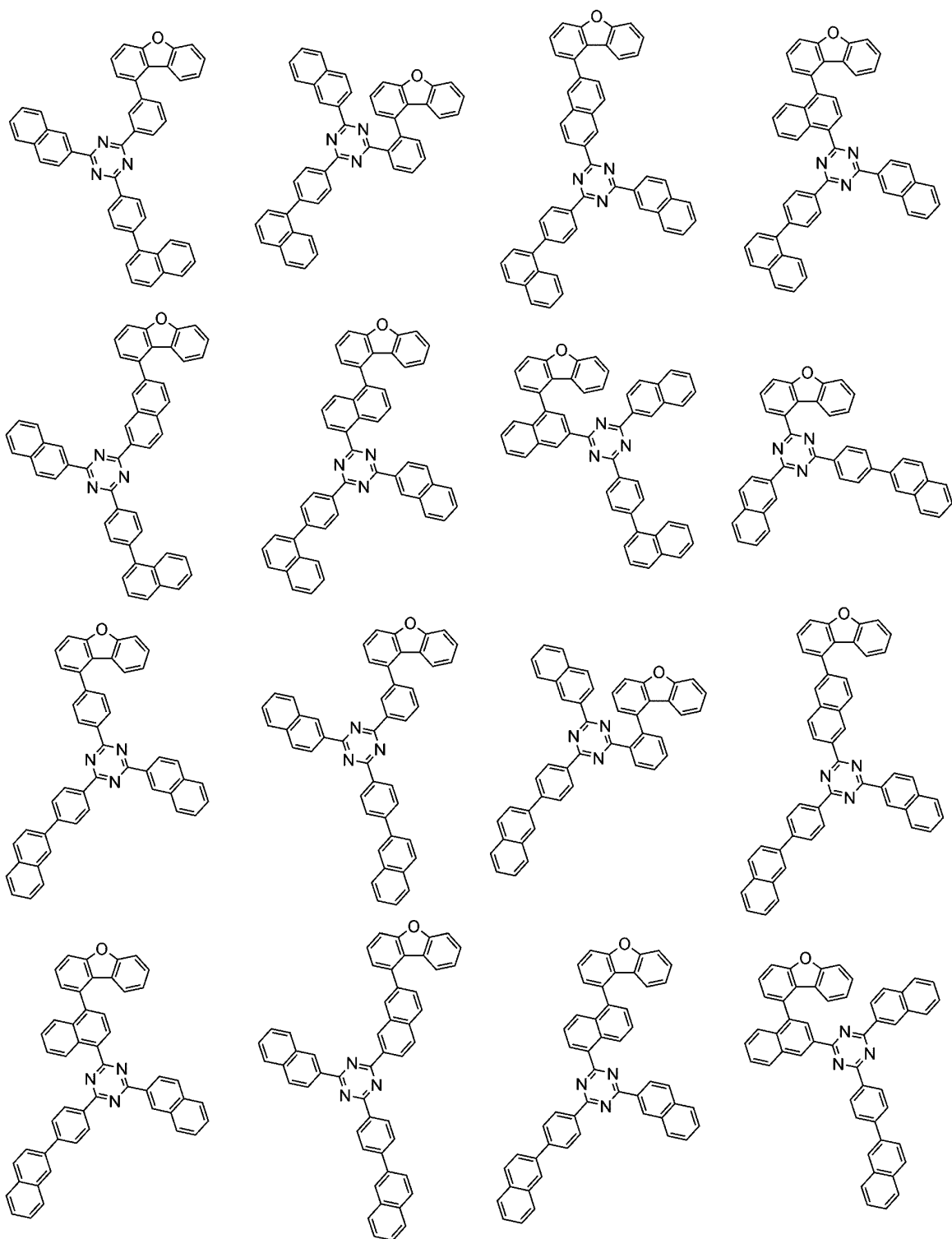
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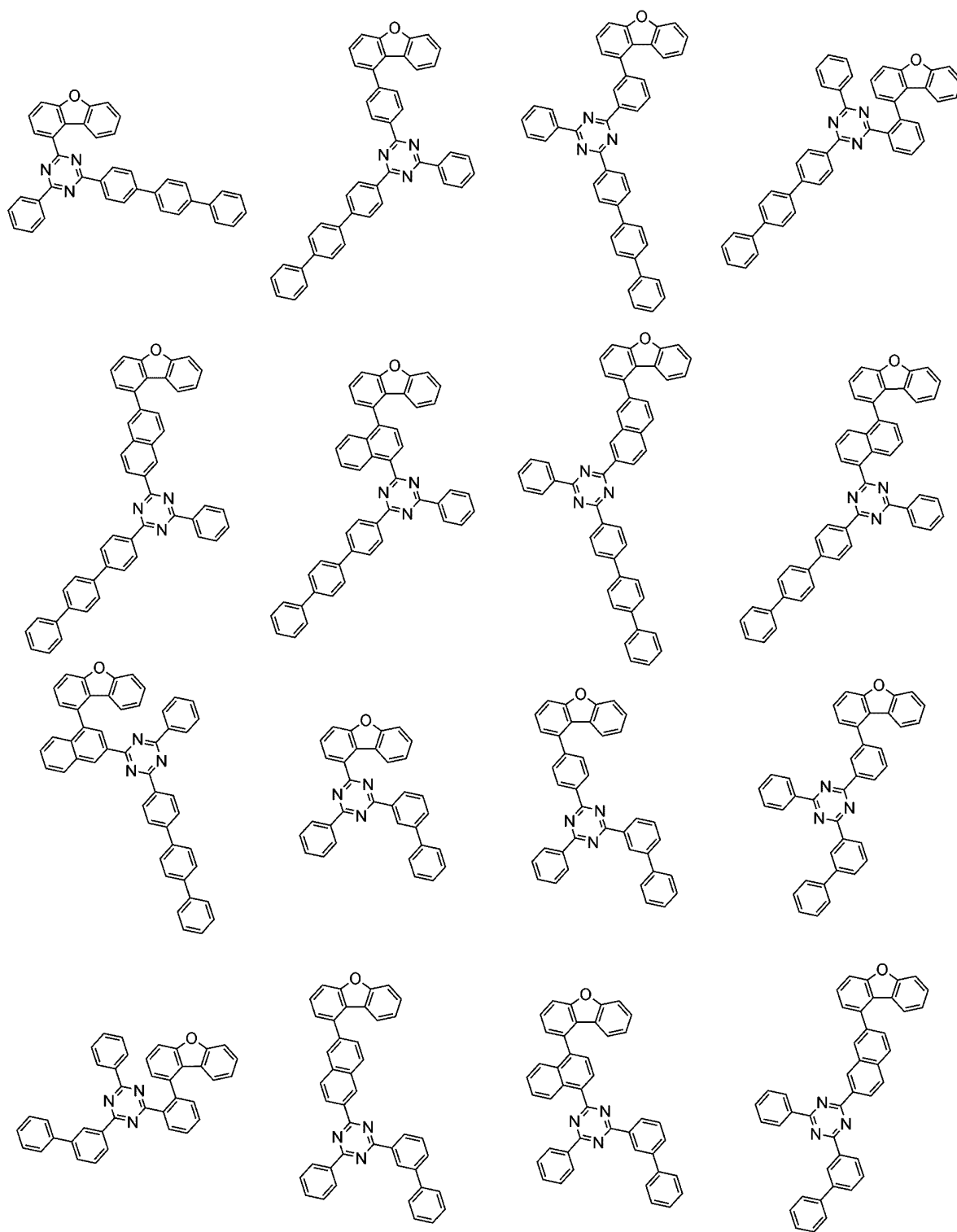
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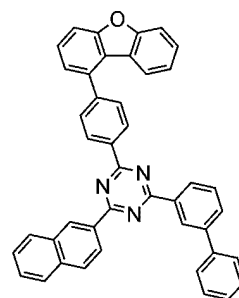
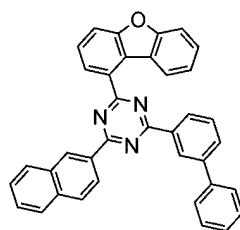
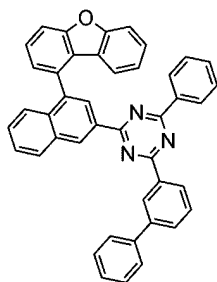
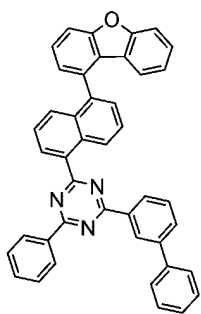
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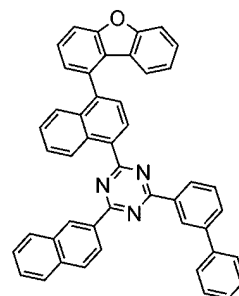
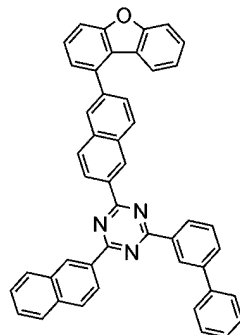
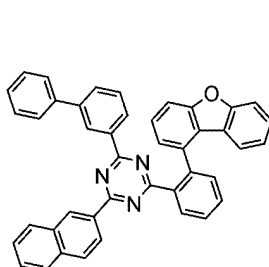
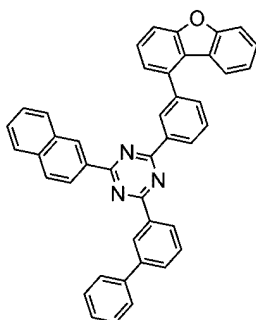
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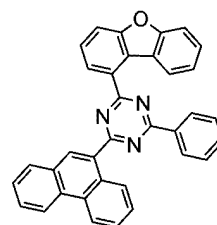
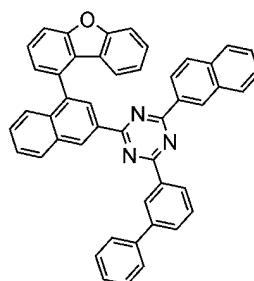
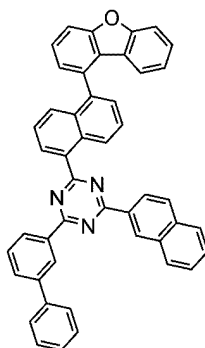
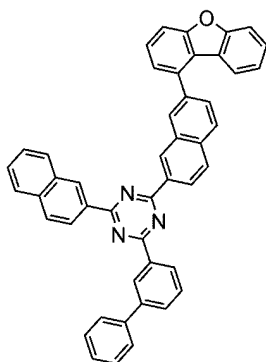
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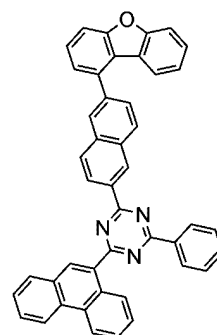
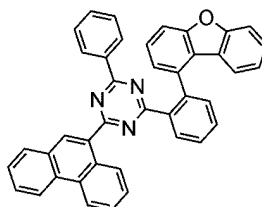
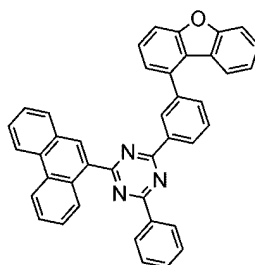
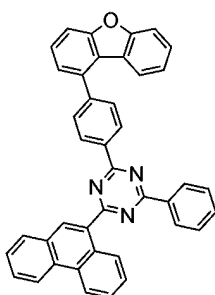
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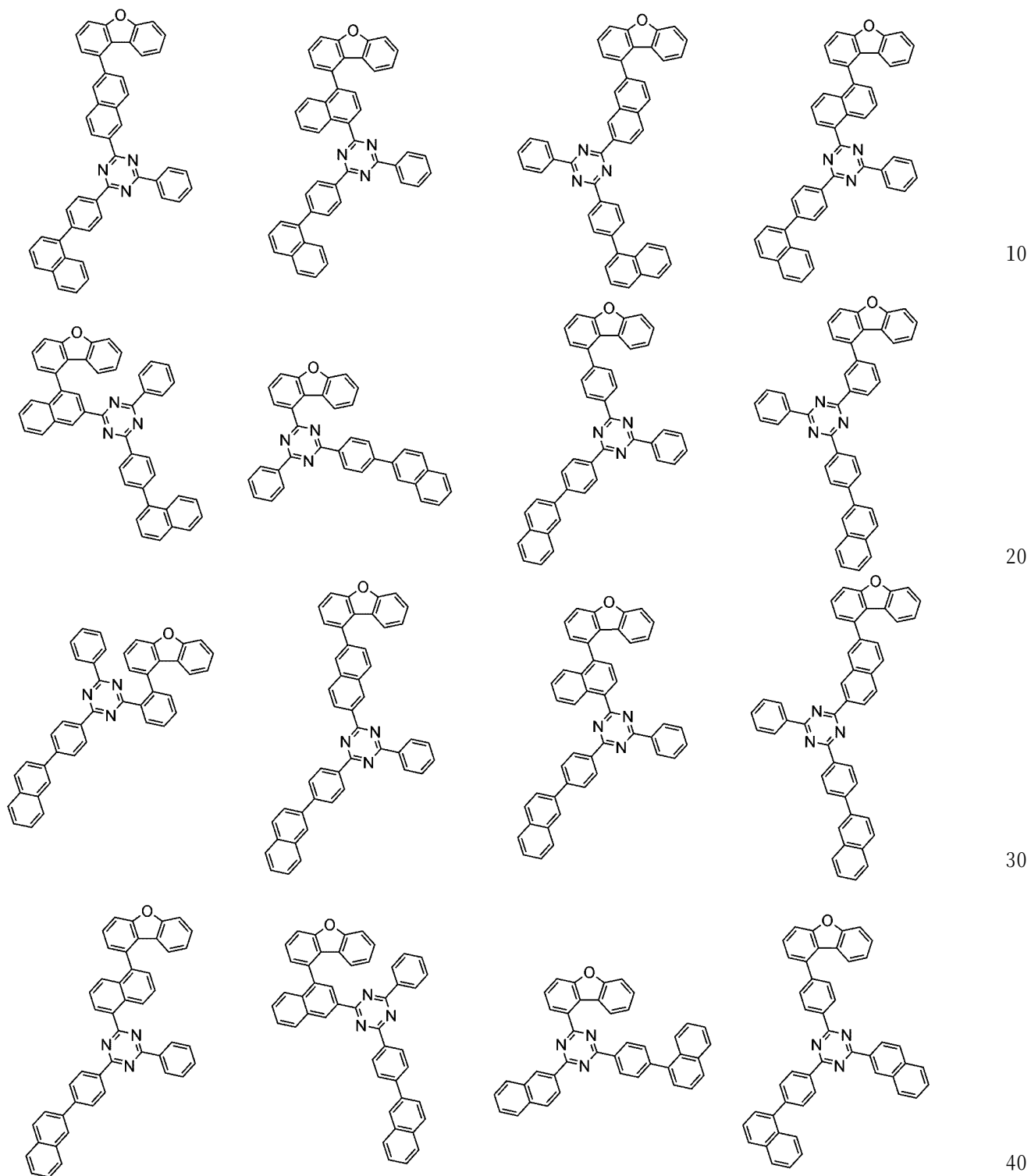
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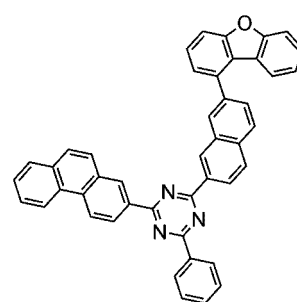
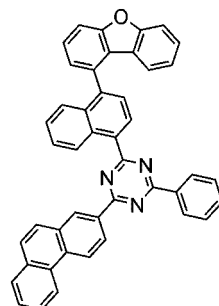
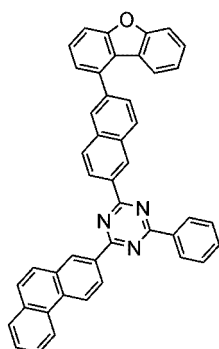
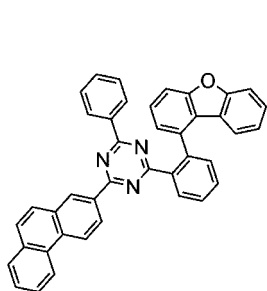
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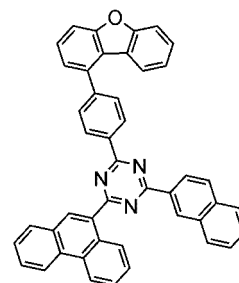
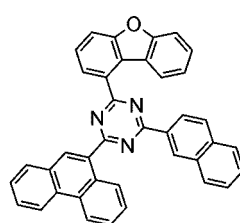
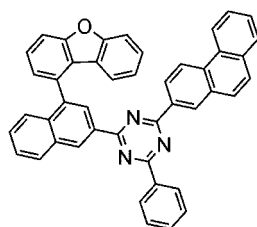
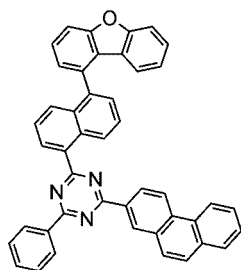
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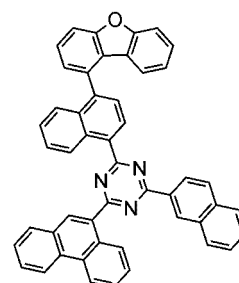
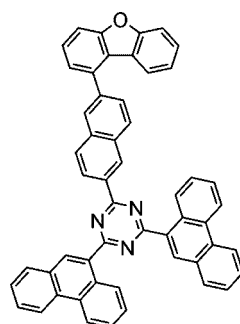
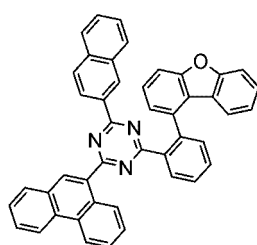
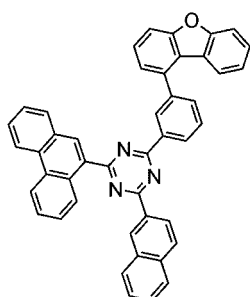
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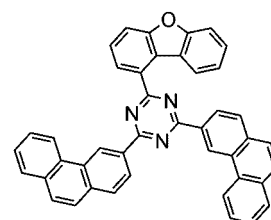
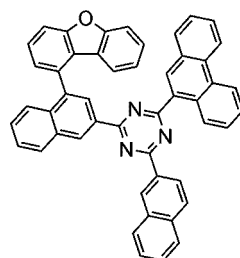
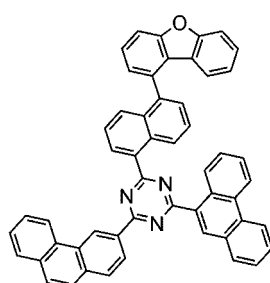
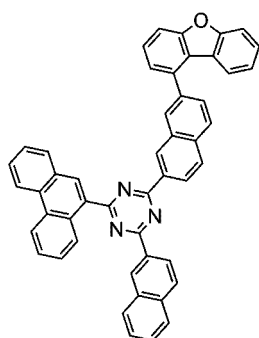
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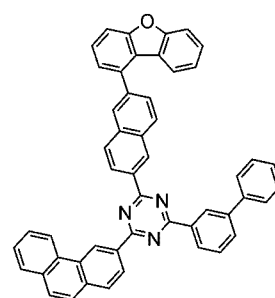
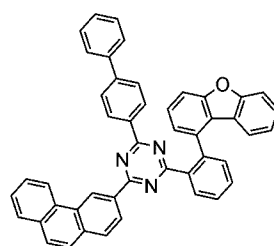
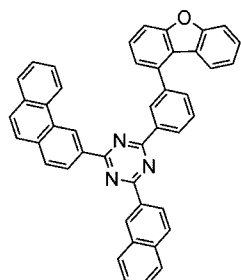
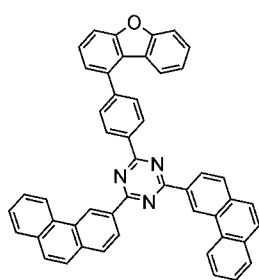
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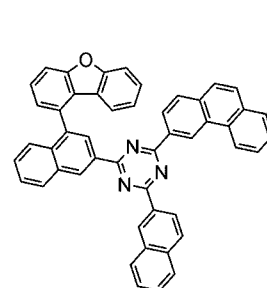
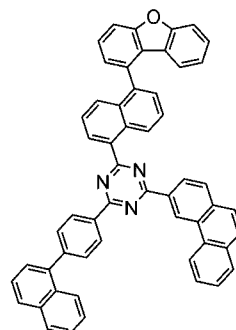
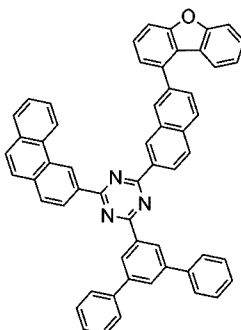
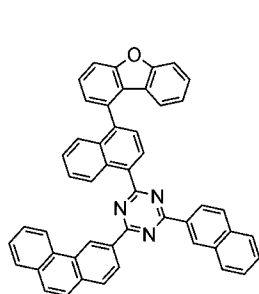
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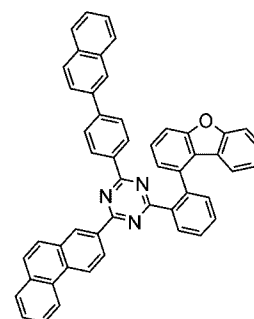
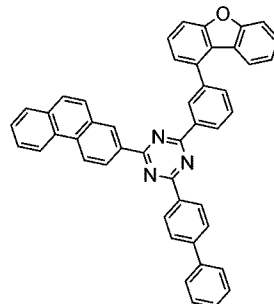
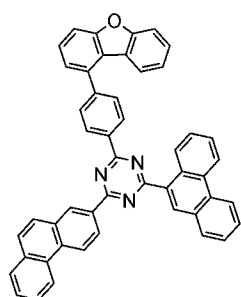
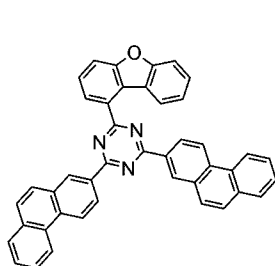
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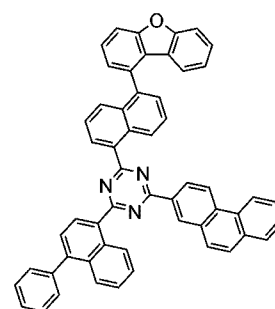
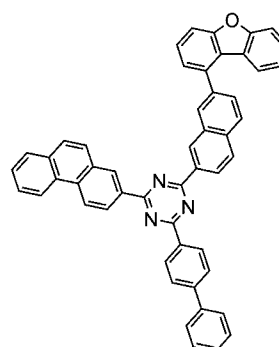
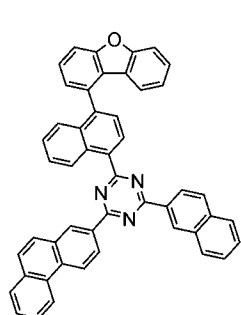
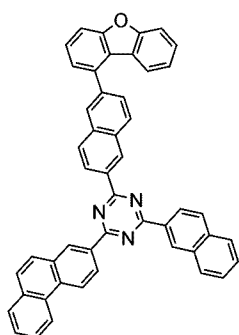
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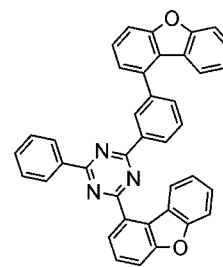
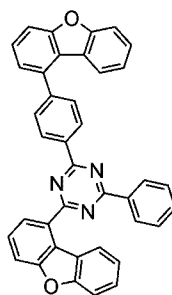
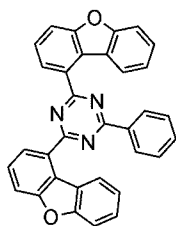
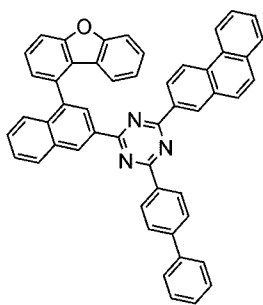
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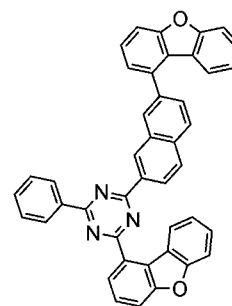
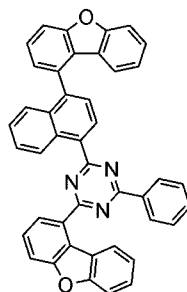
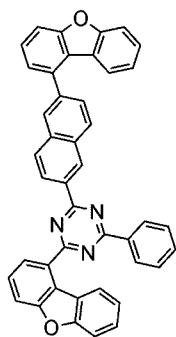
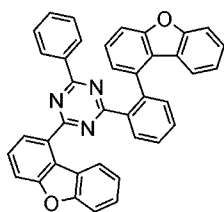
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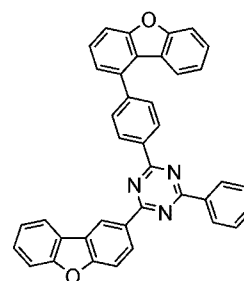
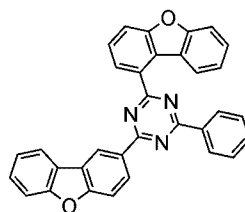
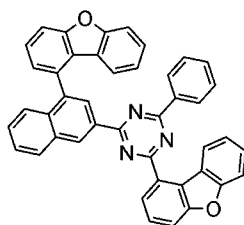
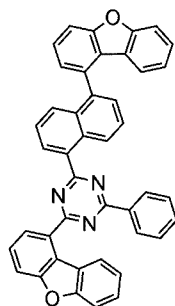
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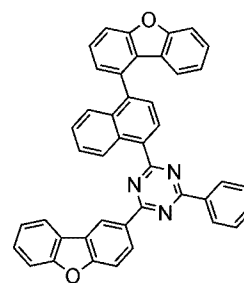
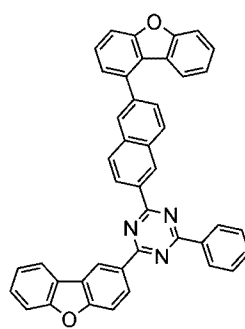
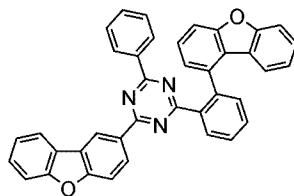
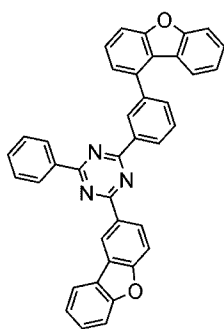
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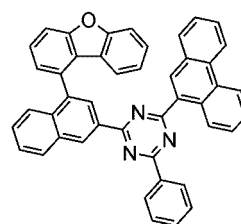
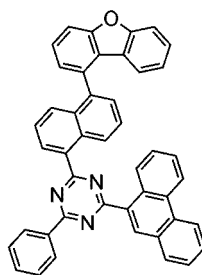
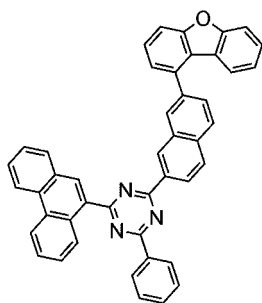
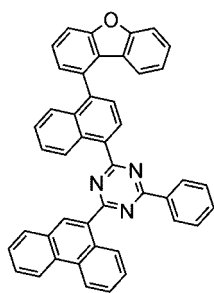
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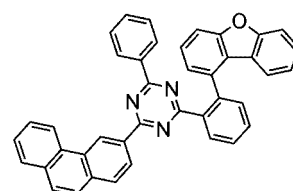
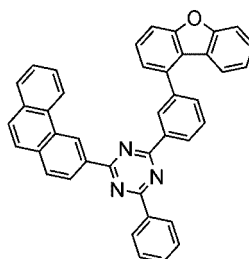
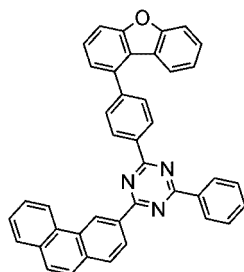
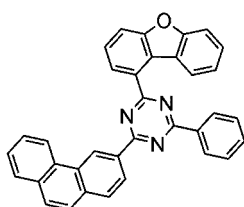
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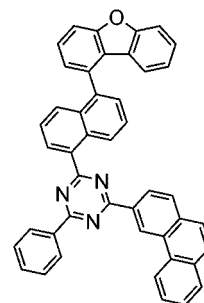
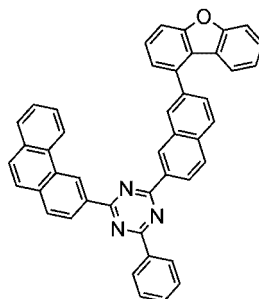
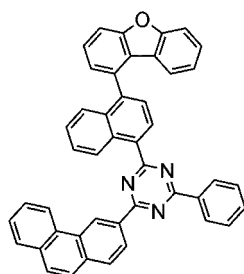
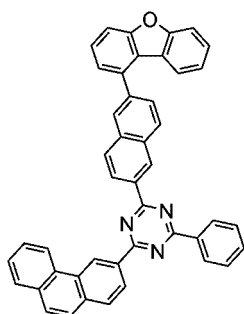
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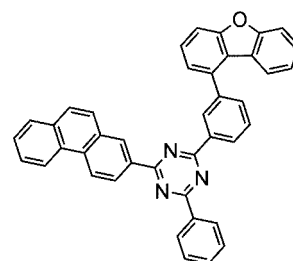
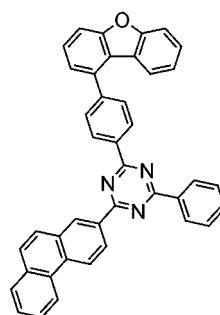
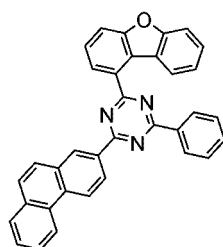
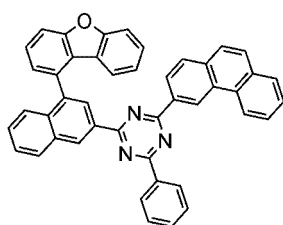
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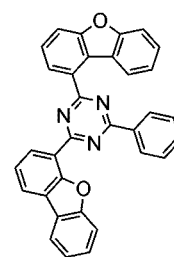
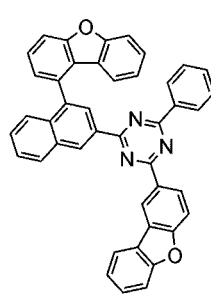
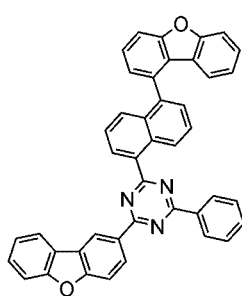
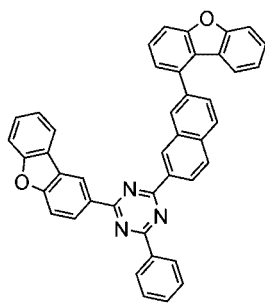
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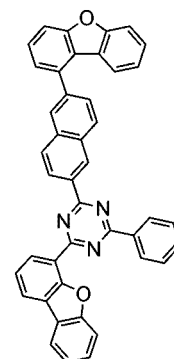
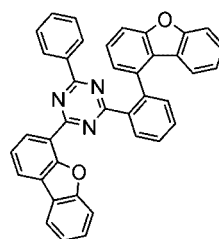
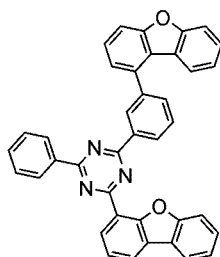
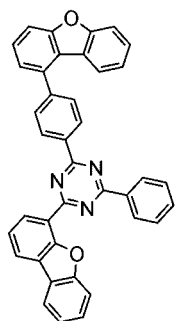
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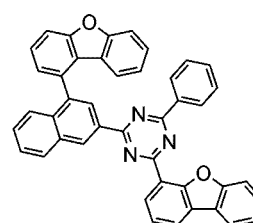
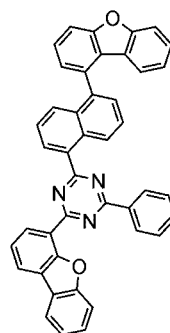
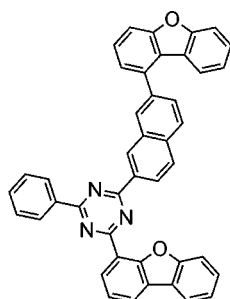
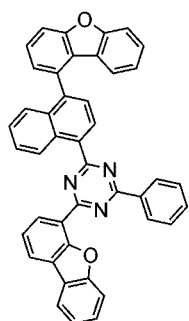
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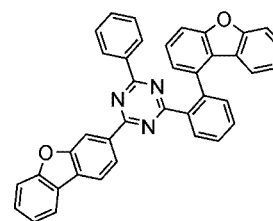
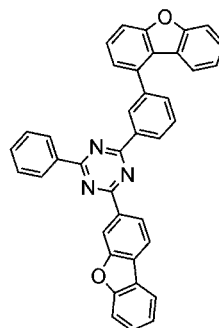
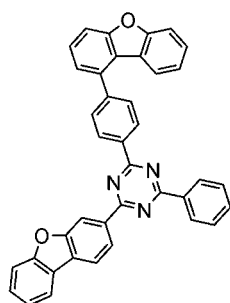
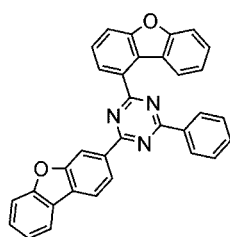
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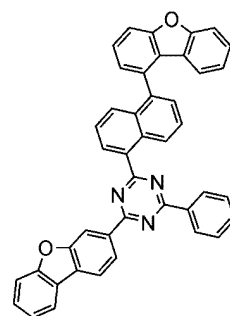
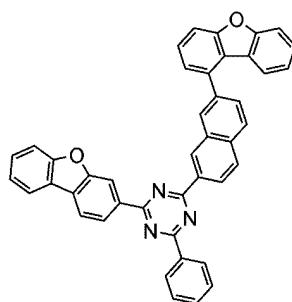
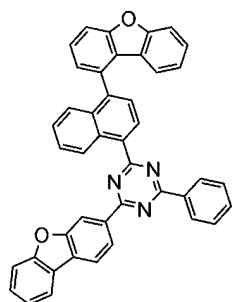
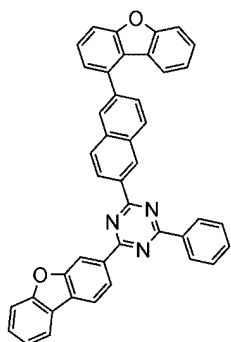
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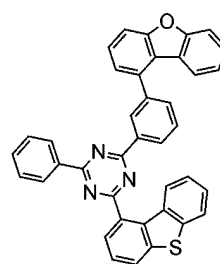
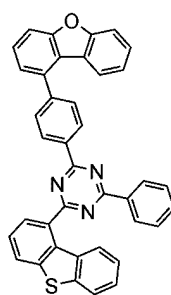
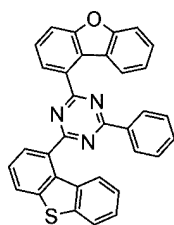
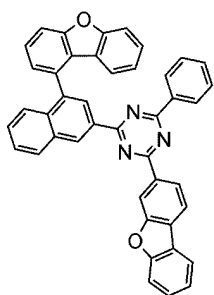
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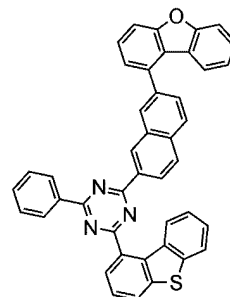
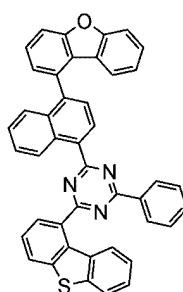
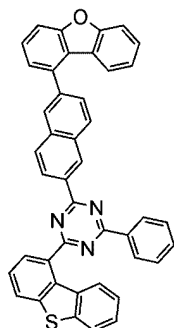
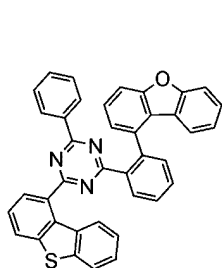
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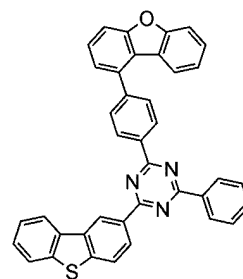
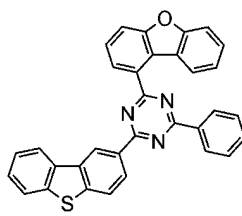
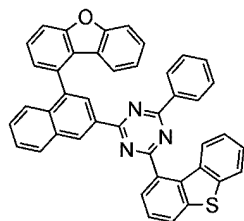
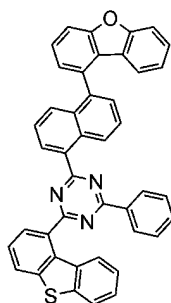
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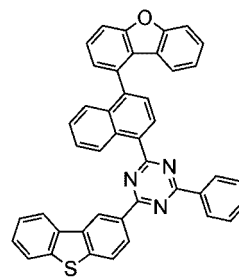
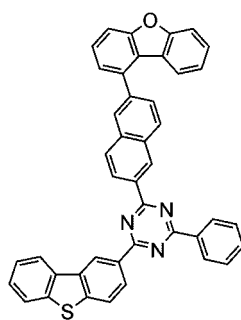
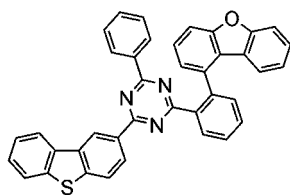
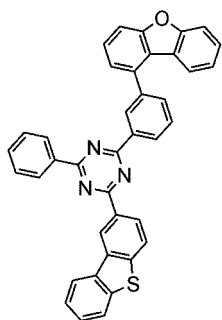
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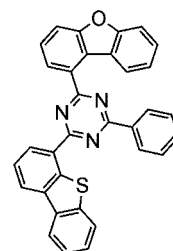
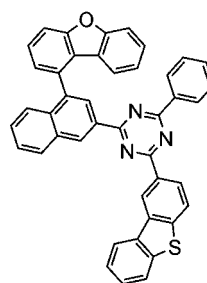
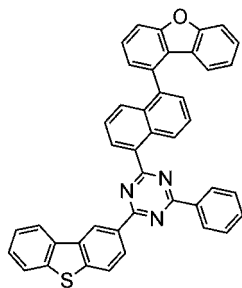
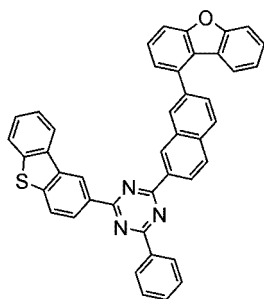
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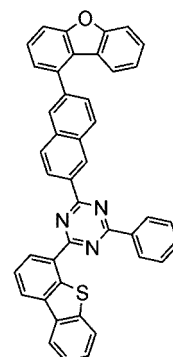
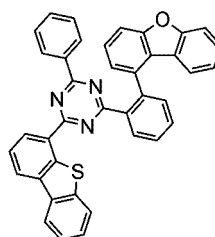
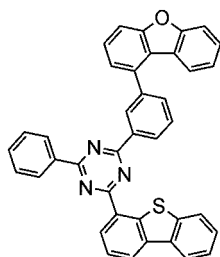
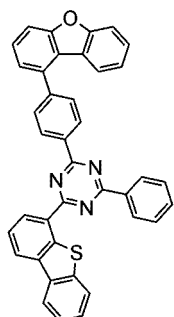
【化 189】



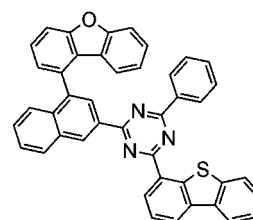
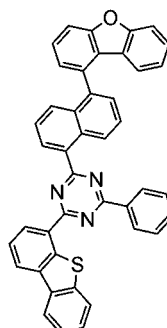
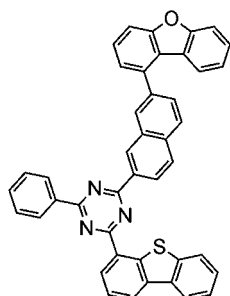
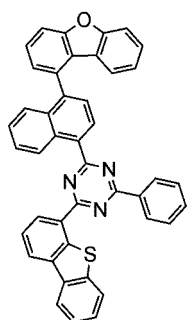
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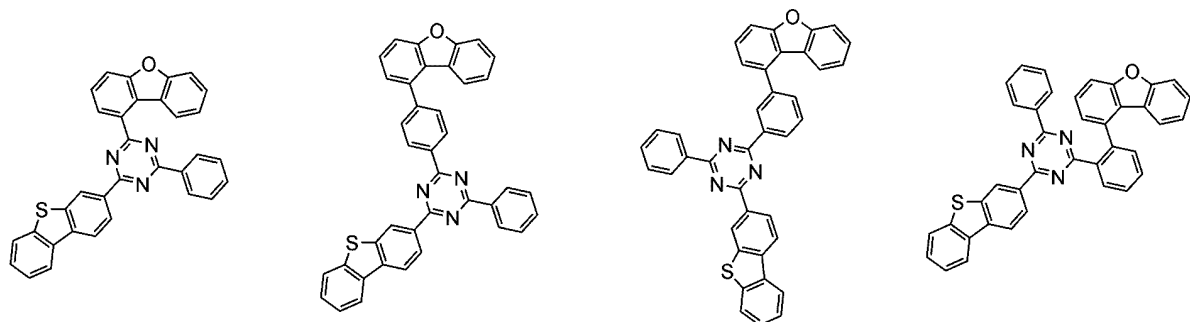
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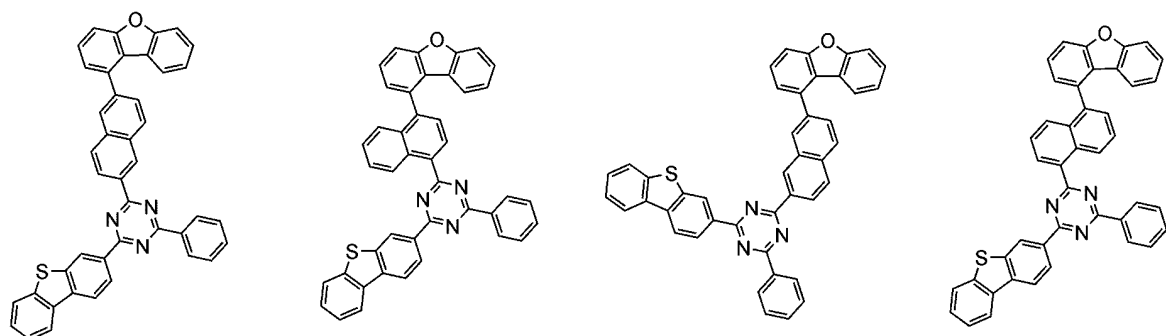
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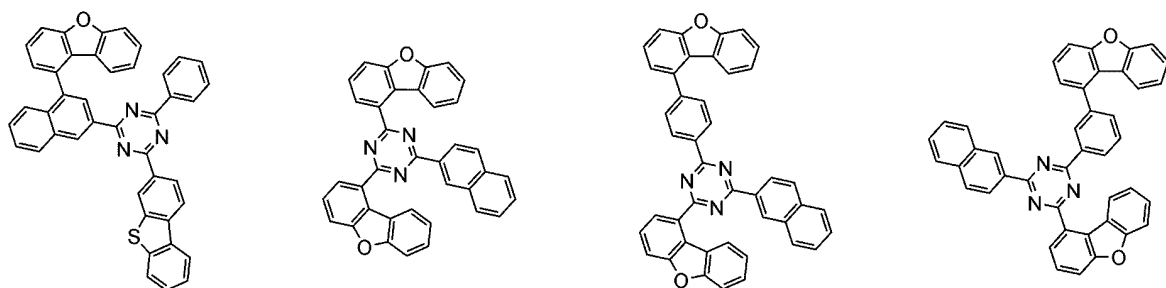
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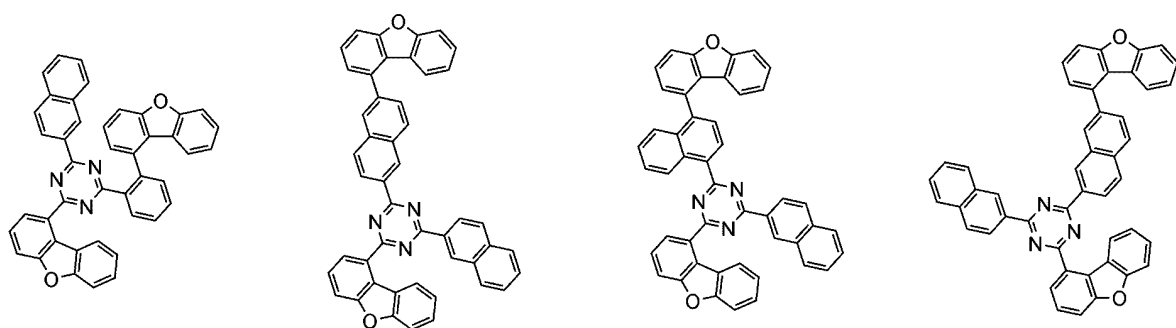
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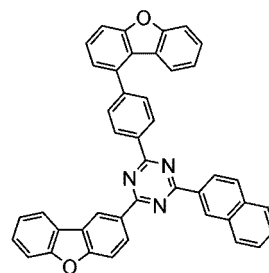
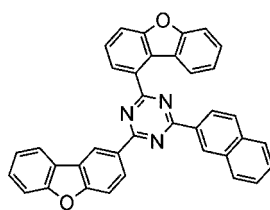
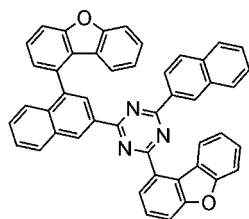
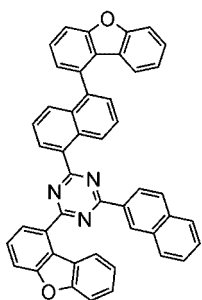
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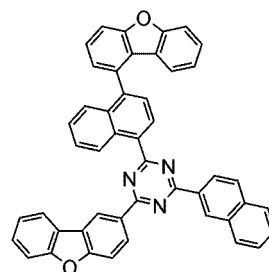
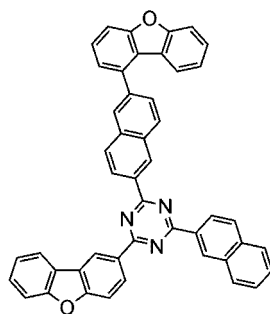
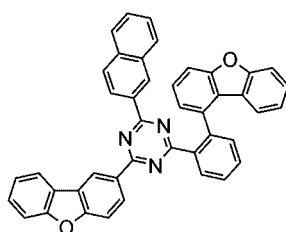
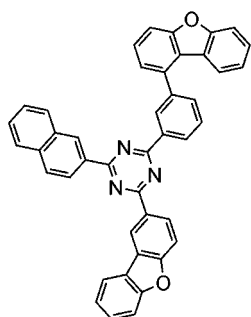
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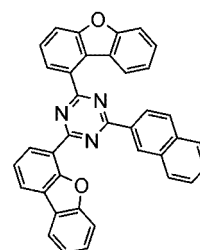
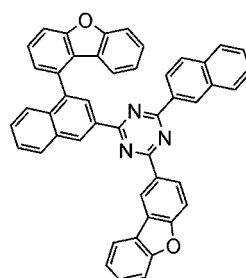
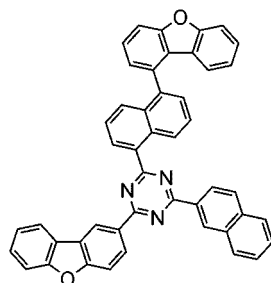
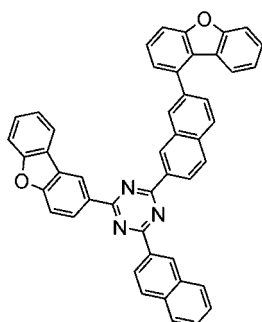
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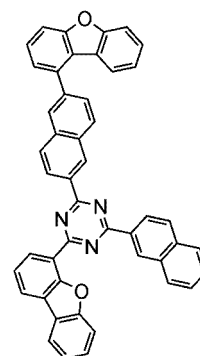
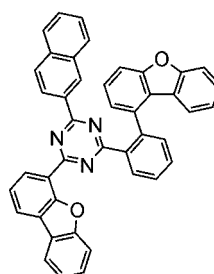
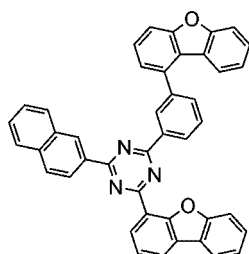
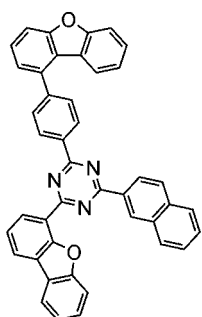
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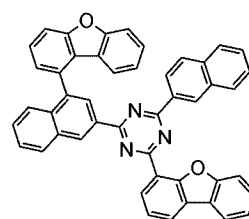
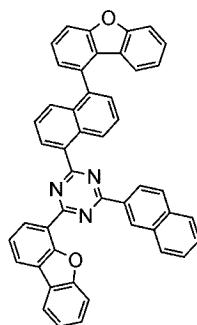
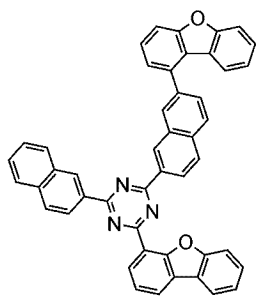
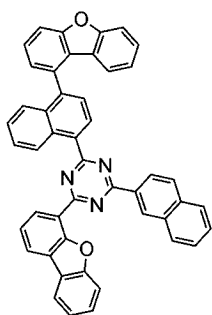
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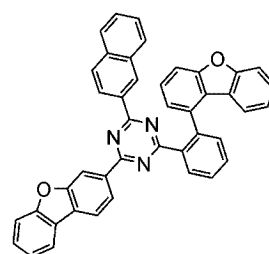
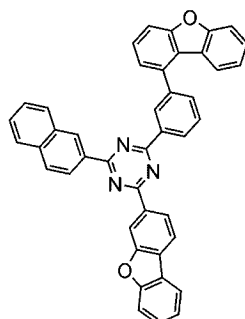
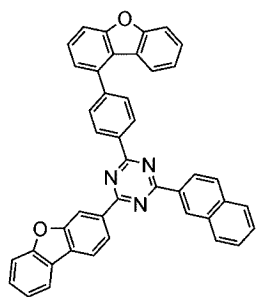
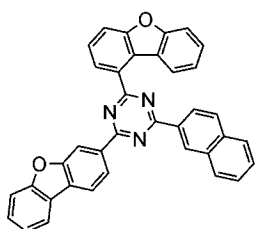
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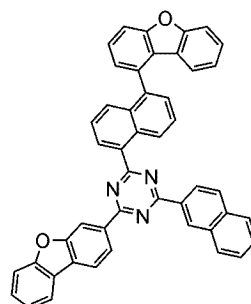
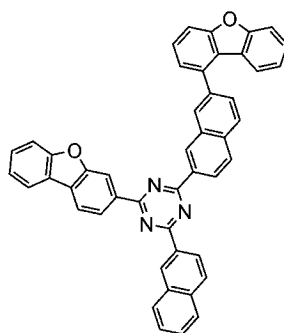
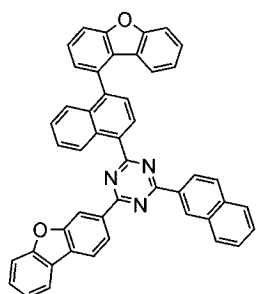
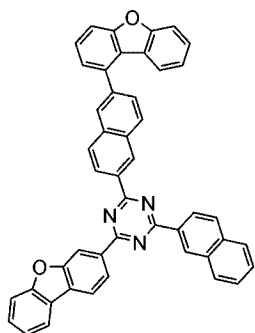
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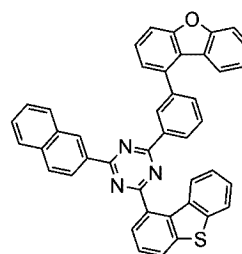
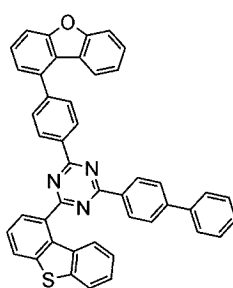
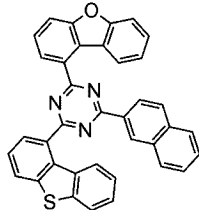
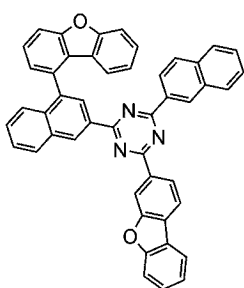
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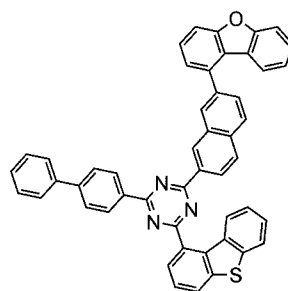
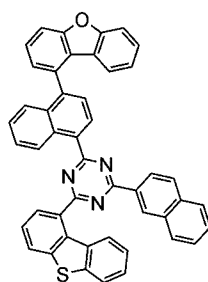
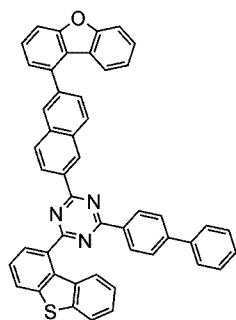
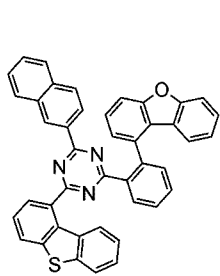
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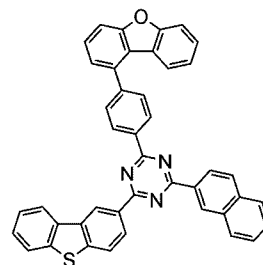
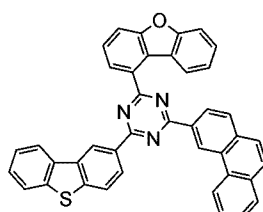
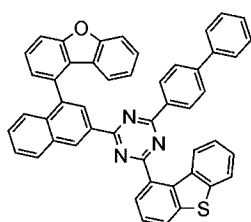
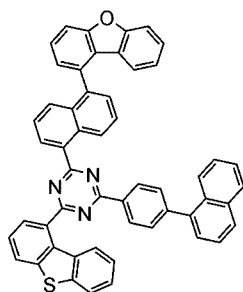
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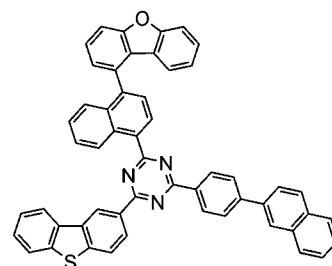
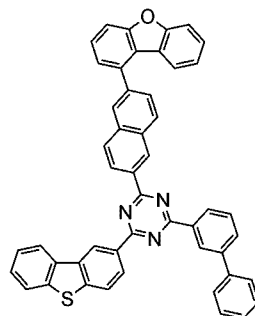
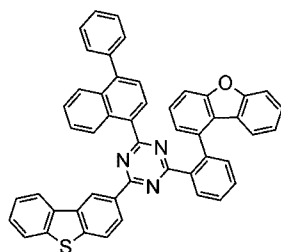
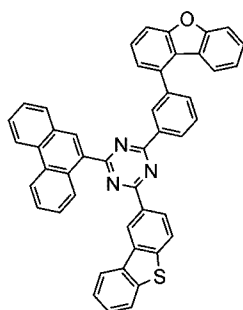
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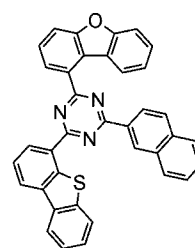
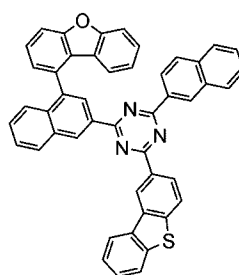
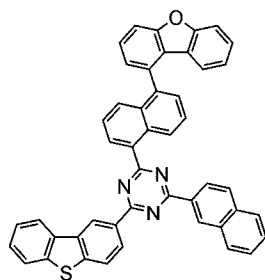
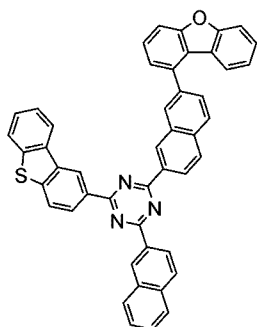
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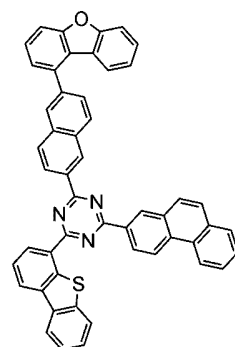
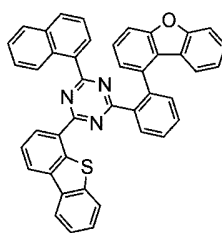
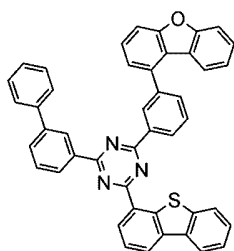
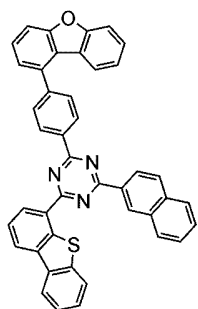
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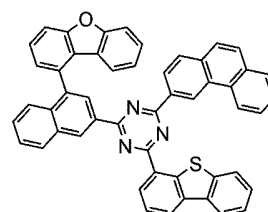
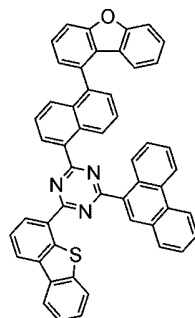
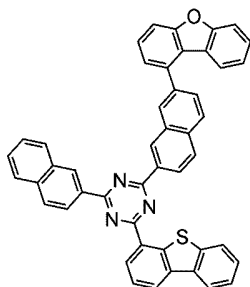
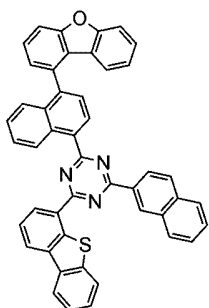
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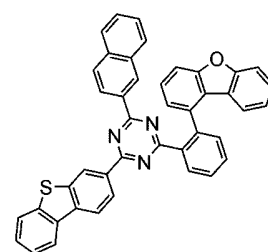
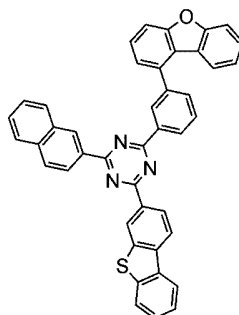
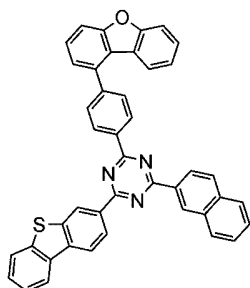
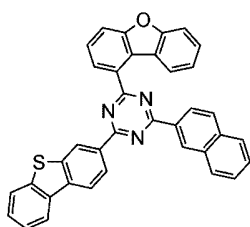
【化 1 9 4】



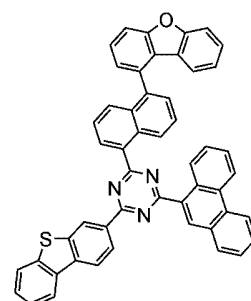
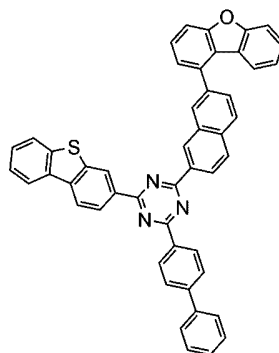
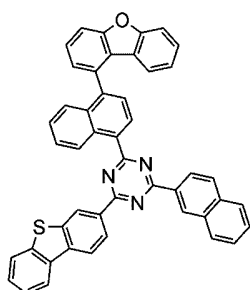
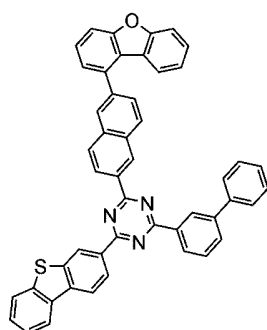
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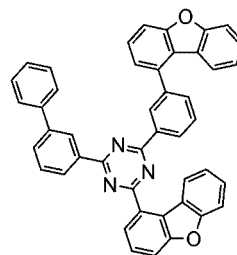
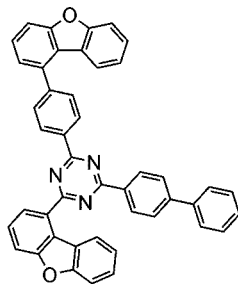
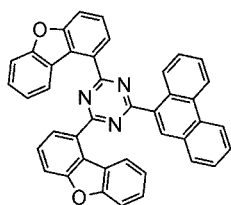
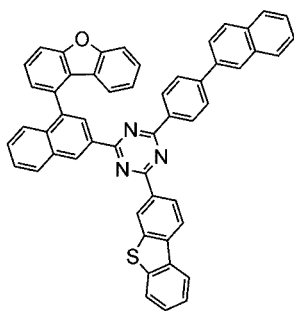
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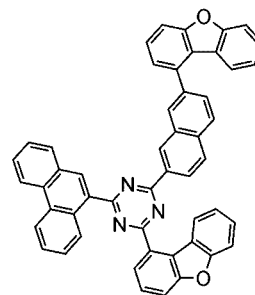
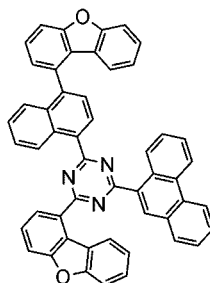
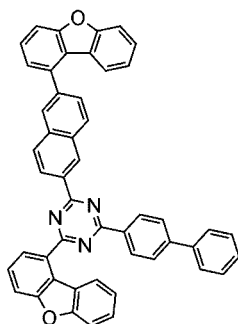
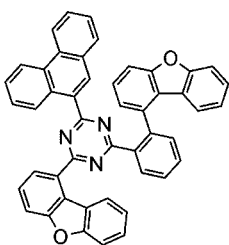
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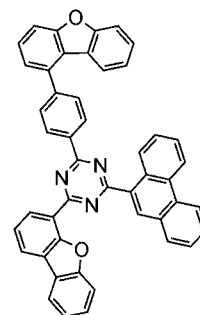
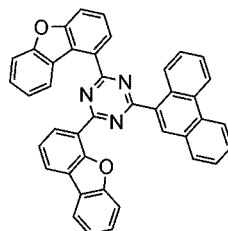
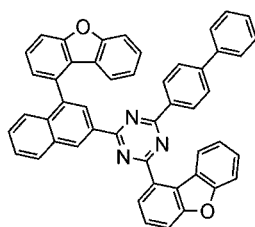
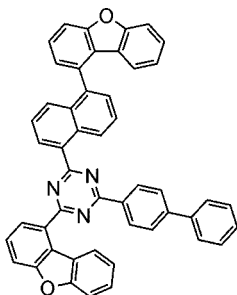
【化 195】



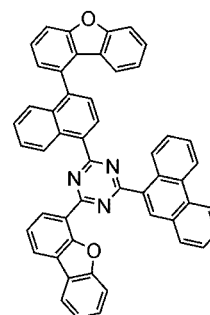
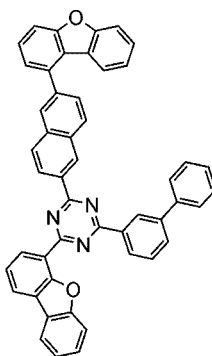
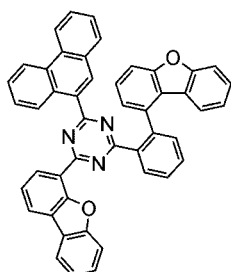
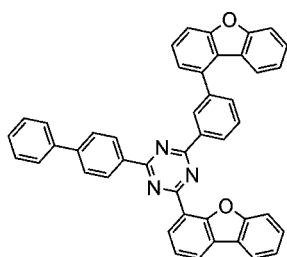
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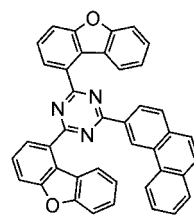
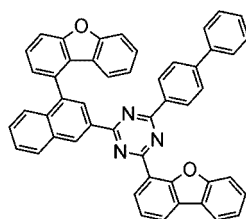
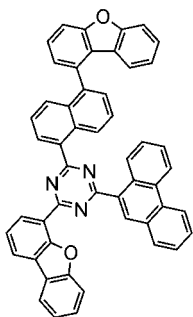
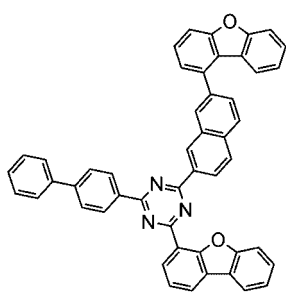
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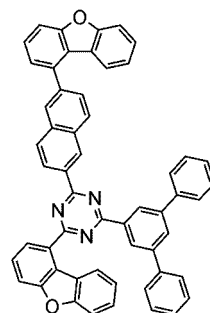
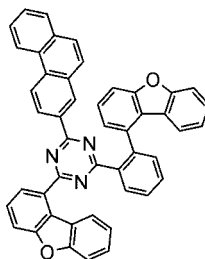
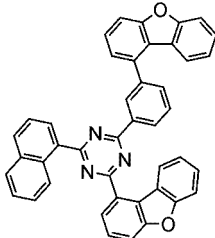
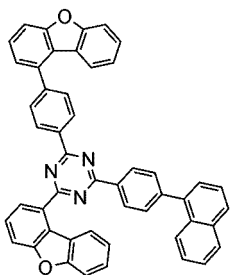
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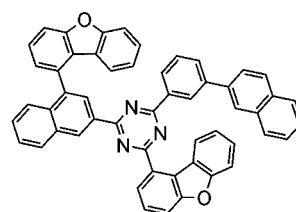
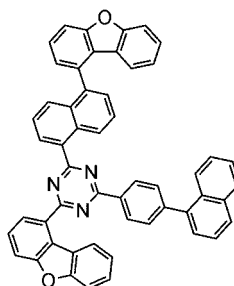
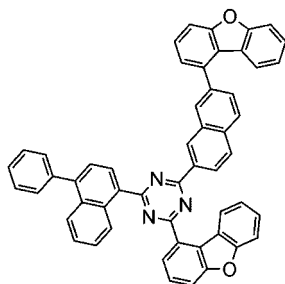
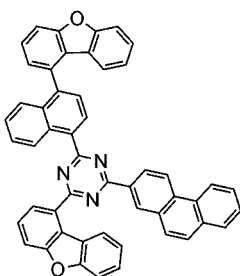
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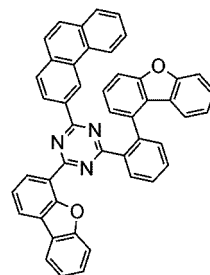
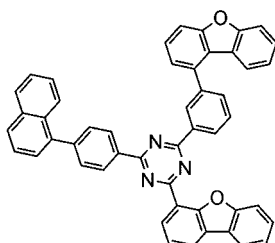
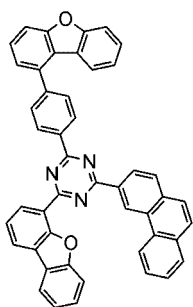
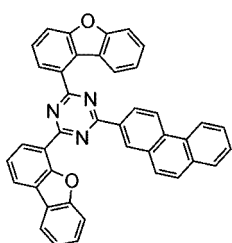
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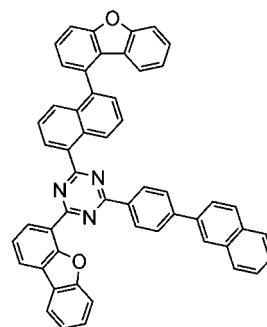
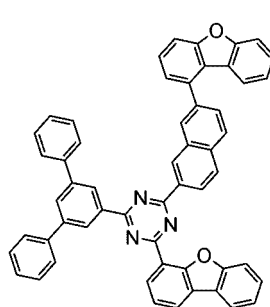
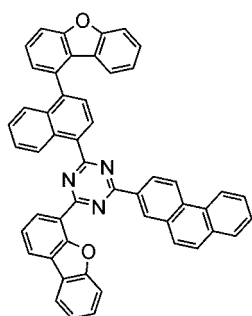


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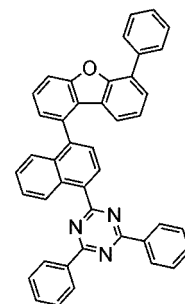
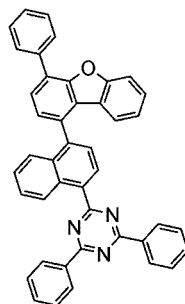
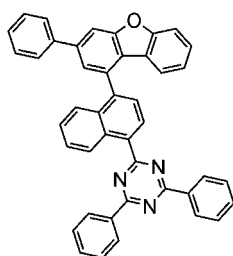
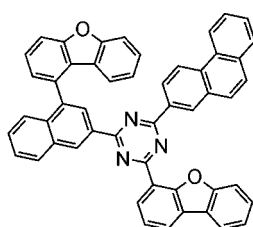


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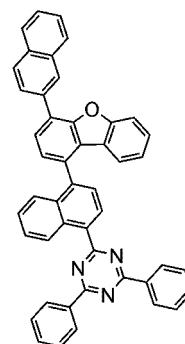
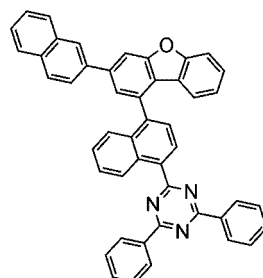
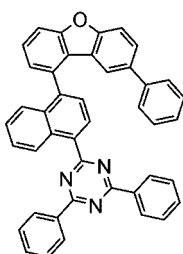
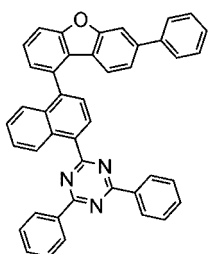
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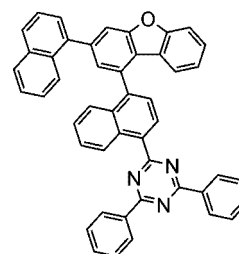
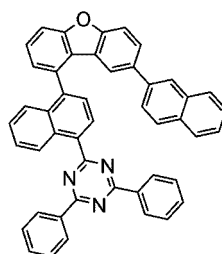
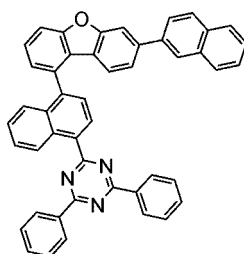
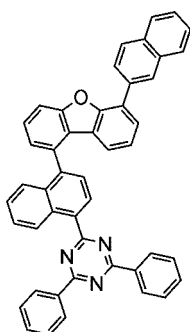
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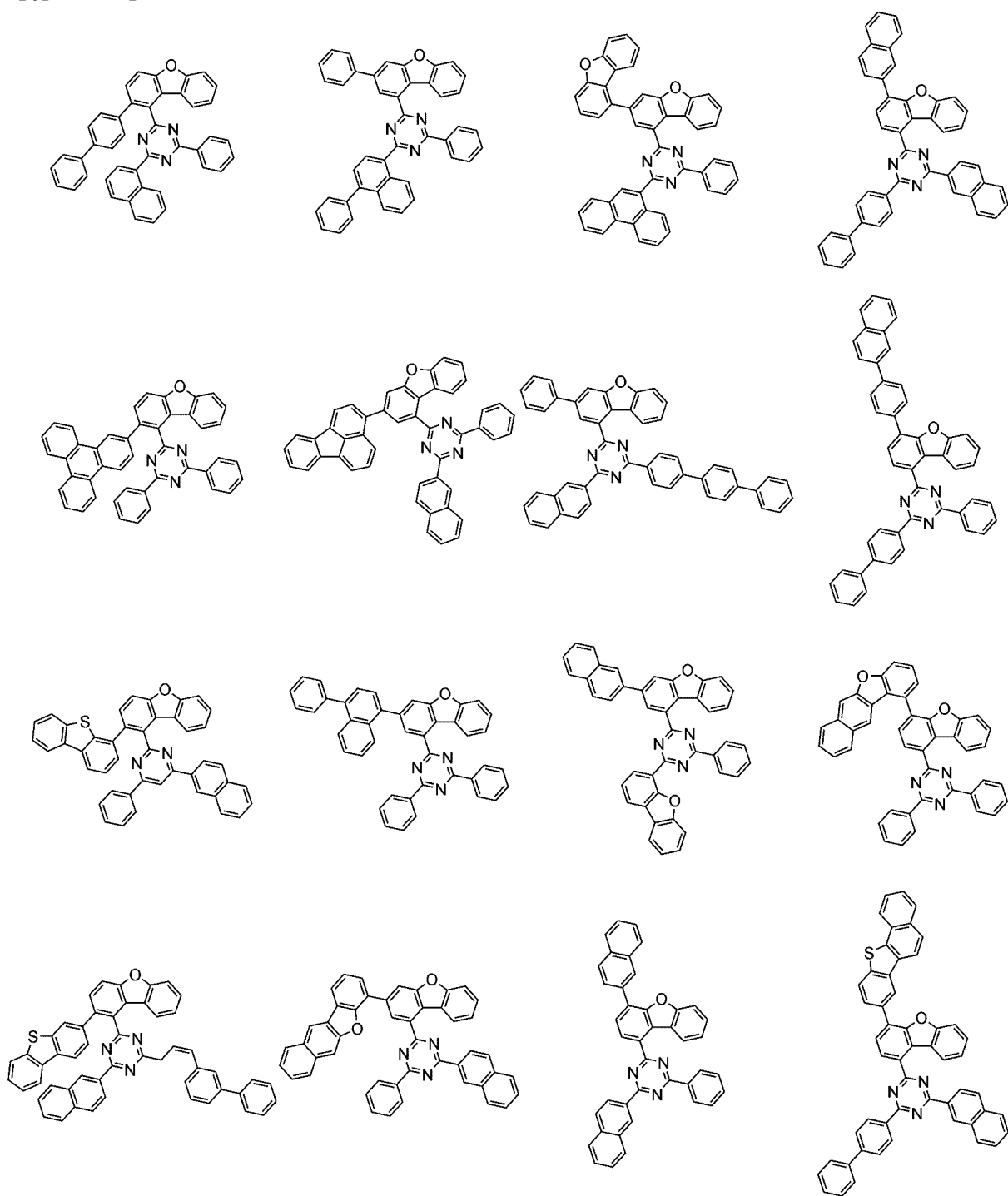


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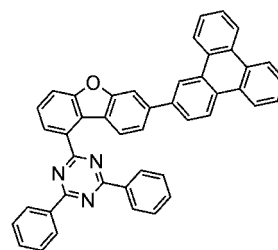
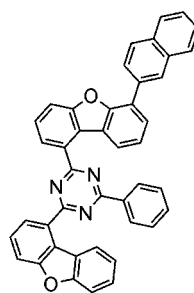
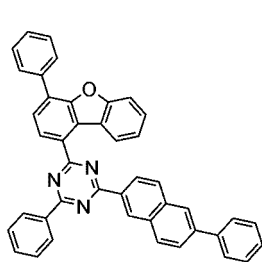
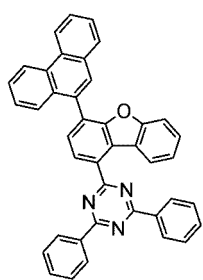
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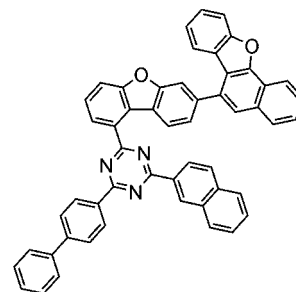
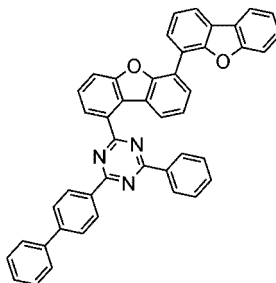
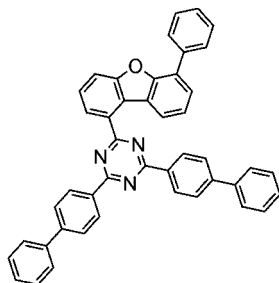
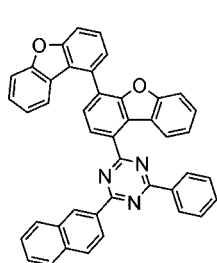
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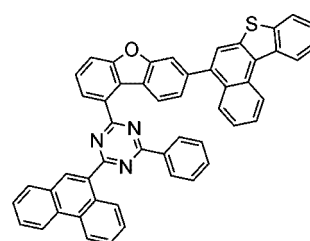
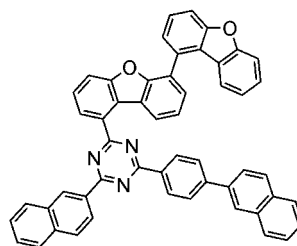
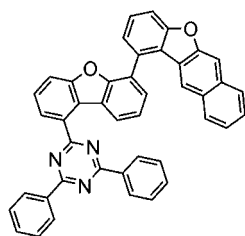
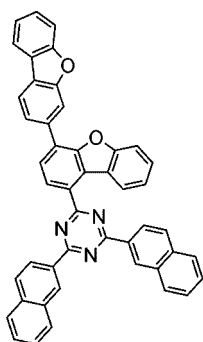
【化 199】



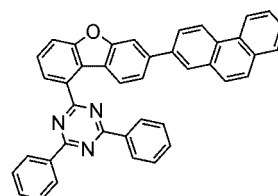
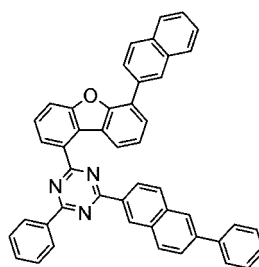
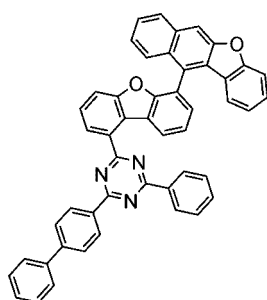
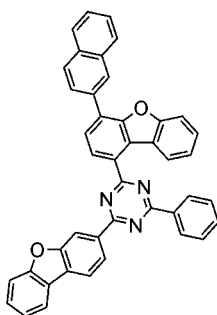
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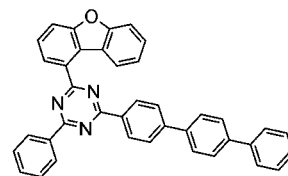
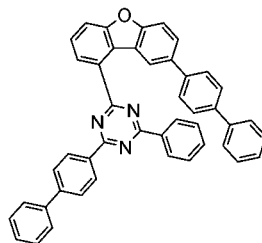
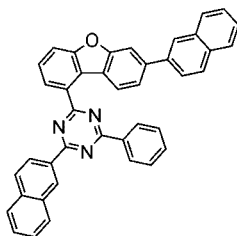
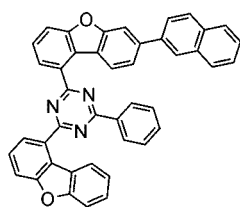
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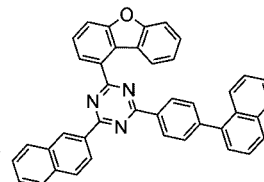
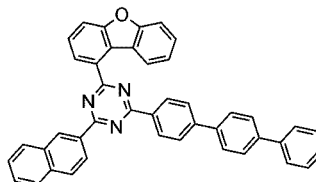
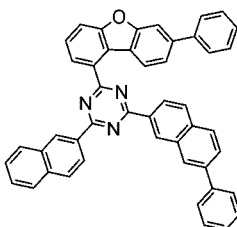
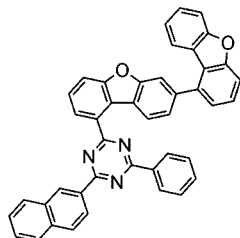
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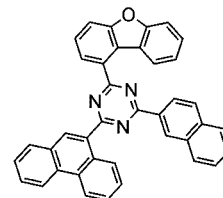
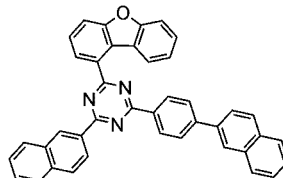
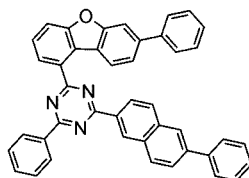
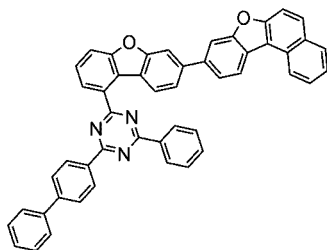
【化 2 0 0】



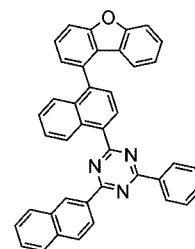
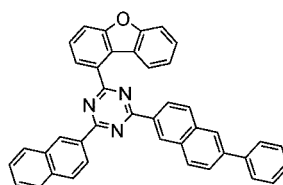
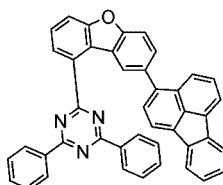
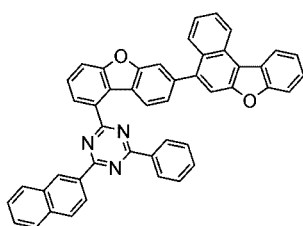
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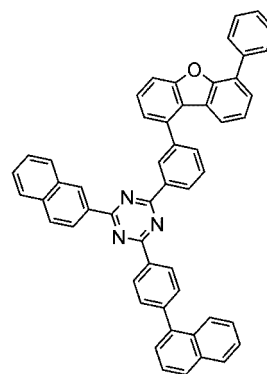
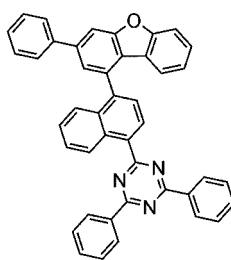
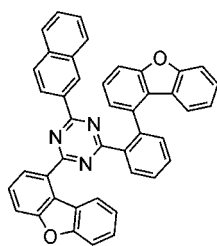
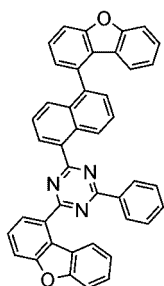
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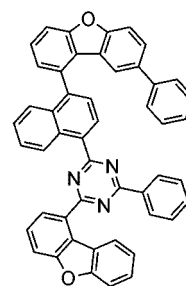
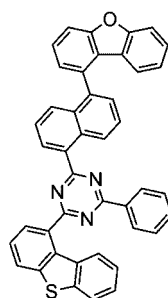
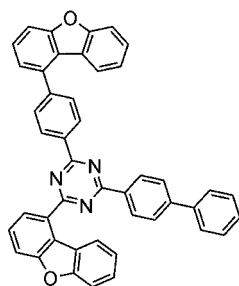
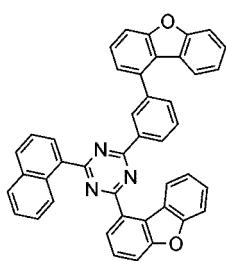
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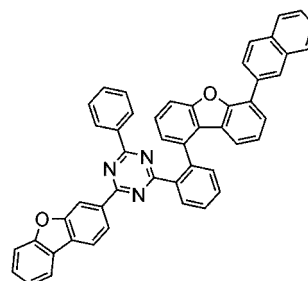
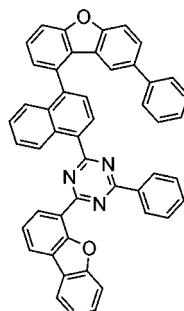
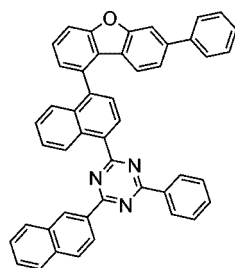
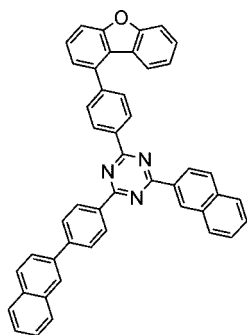
【化 6 3 8】



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【請求項 8】

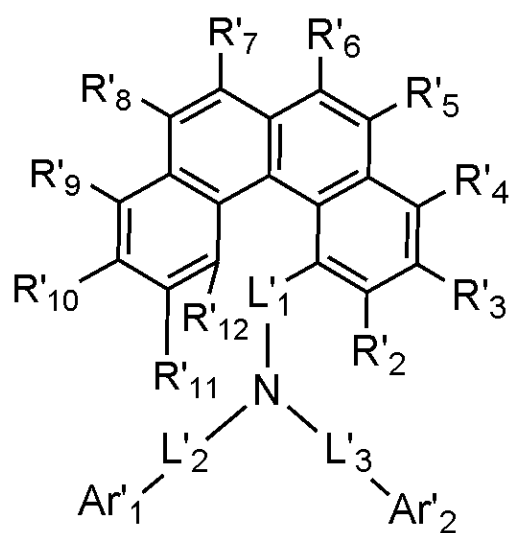
化学式 2 で表される化合物は、下記化学式 2-1 ～ 化学式 2-6 のうちいずれか 1 つで表される、請求項 1 から 7 のいずれか一項に記載の有機発光素子：

〔化学式 2-1〕

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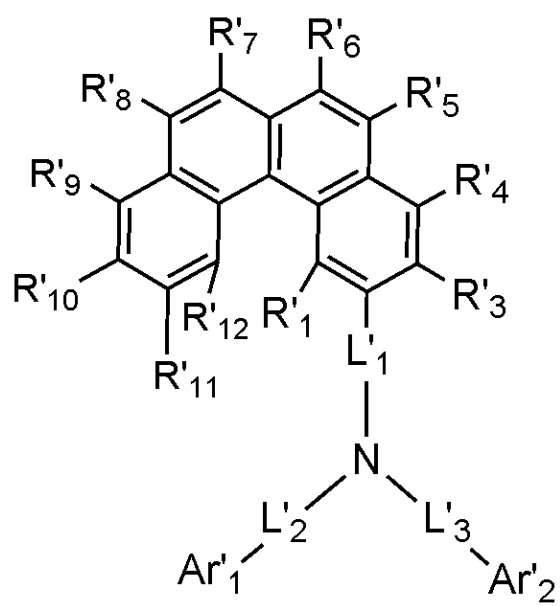
【化 6 3 9】



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【化学式 2 - 2】

【化 6 4 0】



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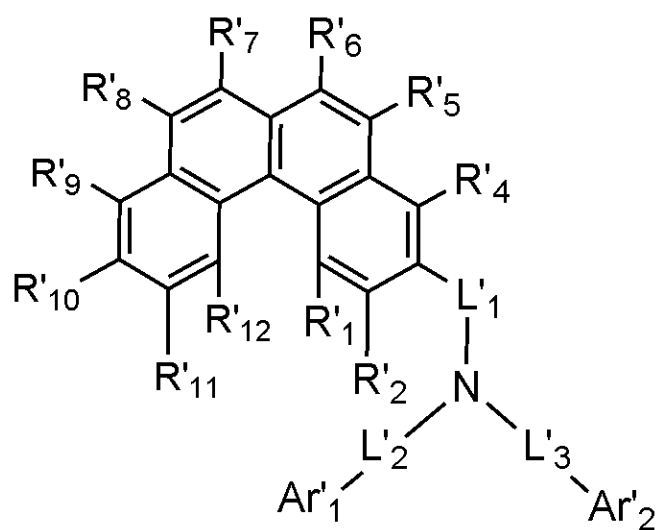
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【化学式 2 - 3】

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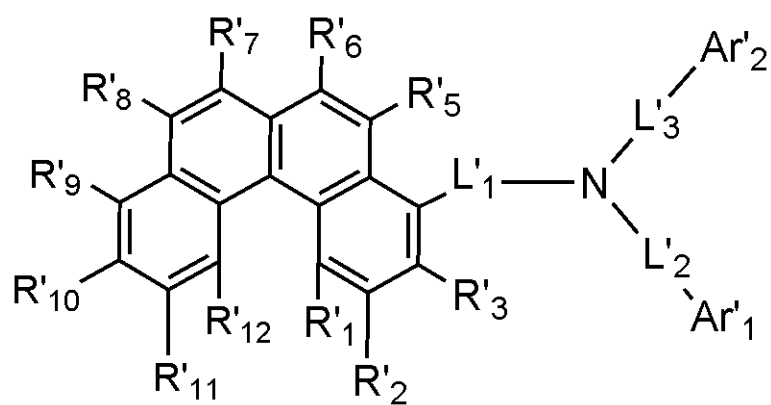
【化 6 4 1】



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〔化学式 2 - 4〕

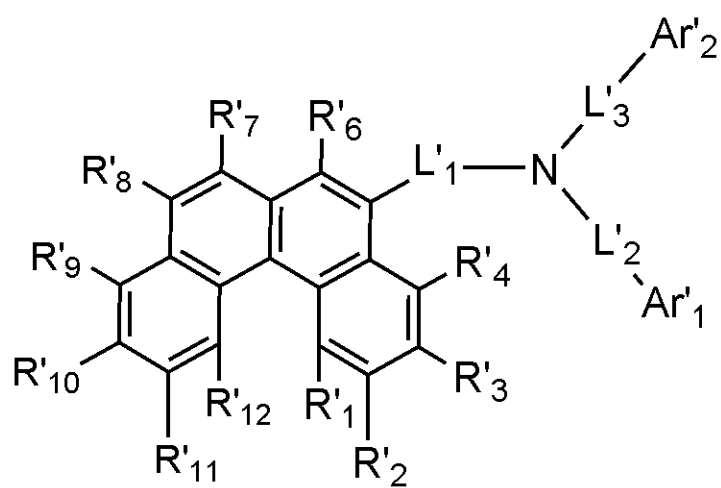
【化 6 4 2】



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〔化学式 2 - 5〕

【化 6 4 3】

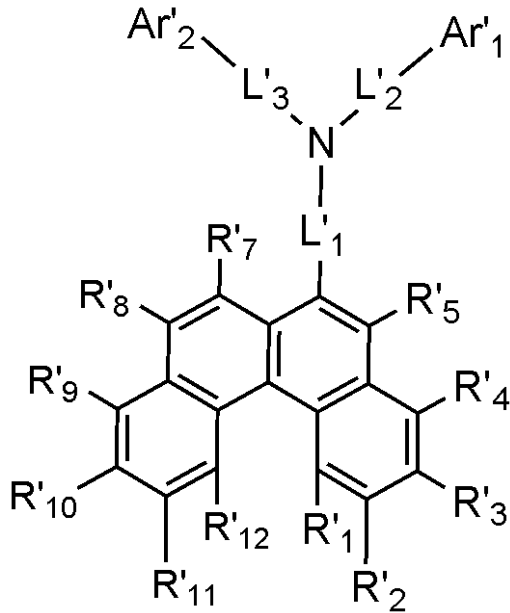


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〔化学式 2 - 6〕

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【化 2 0 8】



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前記化学式 2 - 1 ~ 化学式 2 - 6 中、

R'1 ~ R'12、L'1 ~ L'3、Ar'1 および Ar'2 は、請求項 1 で定義した通りである

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【請求項 9】

L'2 および L'3 はそれぞれ独立して、単結合、フェニレン、1 個のフェニルで置換されたフェニレン、ビフェニルジイル、またはナフタレンジイルである、請求項 1 から 8 のいずれか一項に記載の有機発光素子。

【請求項 10】

Ar'1 および Ar'2 はそれぞれ独立して、フェニル、ビフェニリル、ターフェニリル、ナフチル、フェナントレニル、ジベンゾフラニル、ジベンゾチオフェニル、フェニルカルバゾール、ジメチルフルオレニル、ベンゾナフトフラニル、またはベンゾナフトチオフェニルである、請求項 1 から 9 のいずれか一項に記載の有機発光素子。

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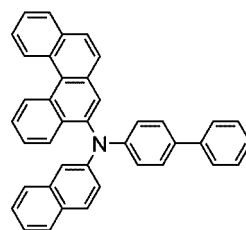
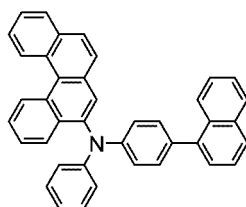
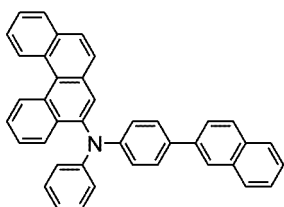
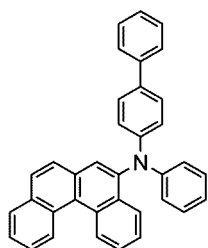
【請求項 11】

前記化学式 2 で表される化合物は、下記で構成される群より選択されるいずれか 1 つである、請求項 1 に記載の有機発光素子：

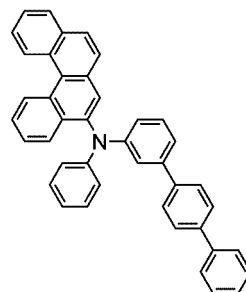
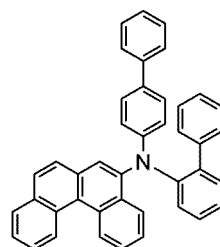
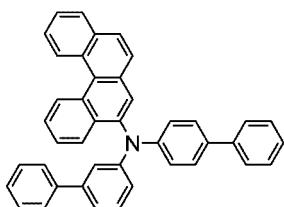
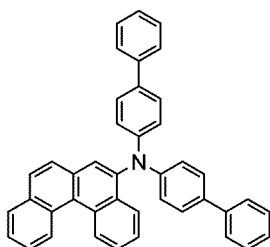
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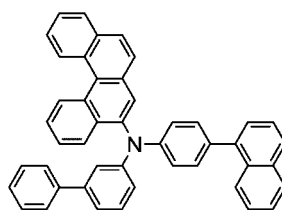
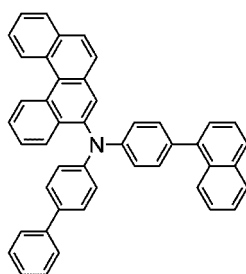
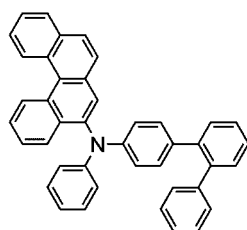
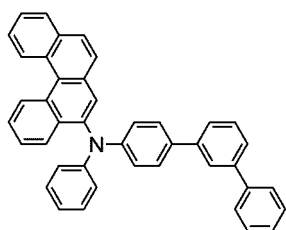
【化 2 1 4】



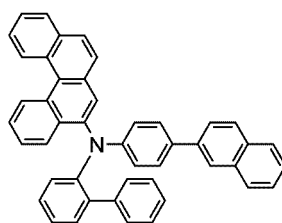
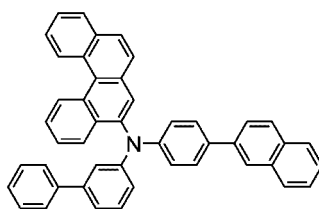
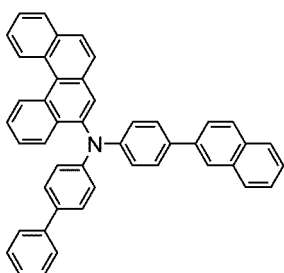
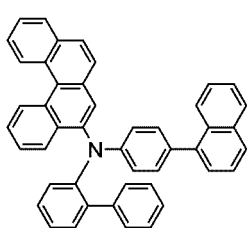
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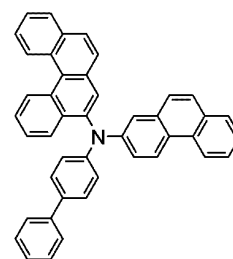
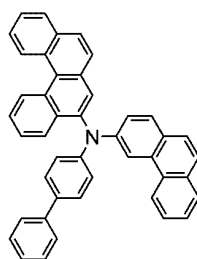
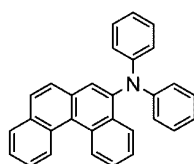
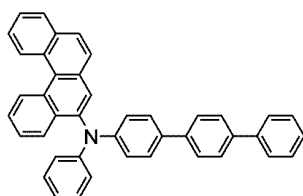
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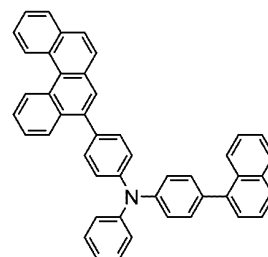
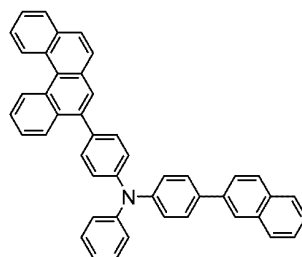
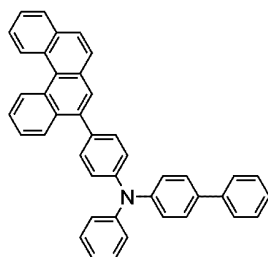
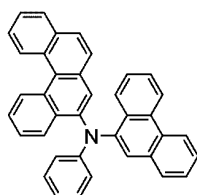
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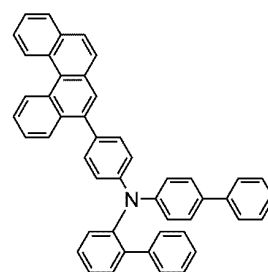
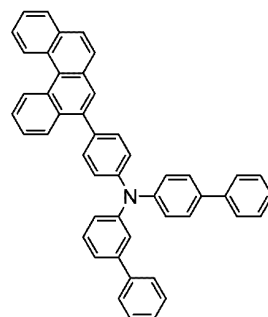
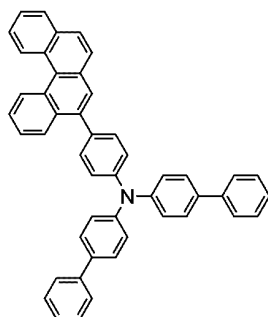
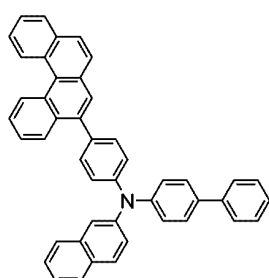
【化 2 1 5】



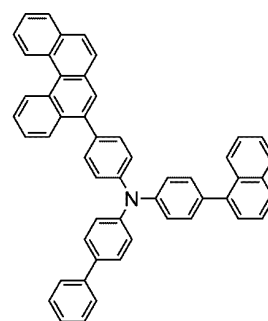
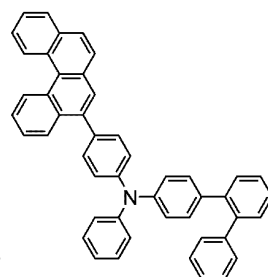
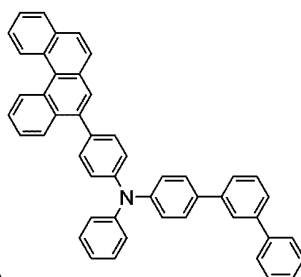
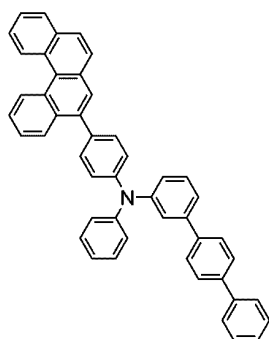
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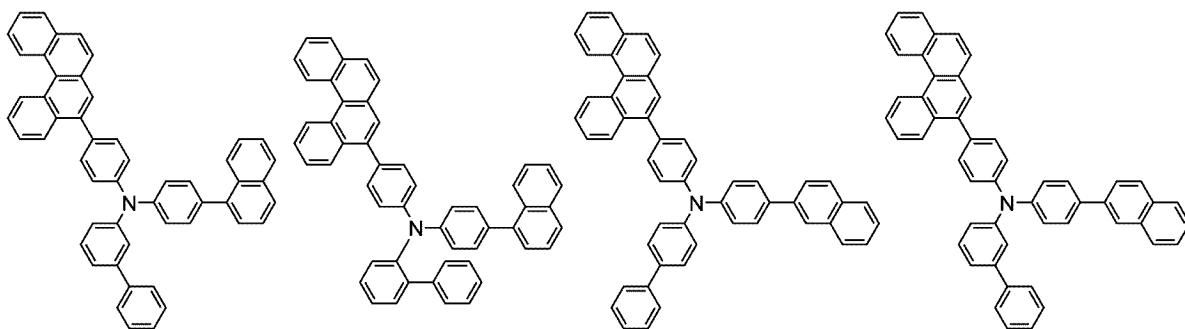
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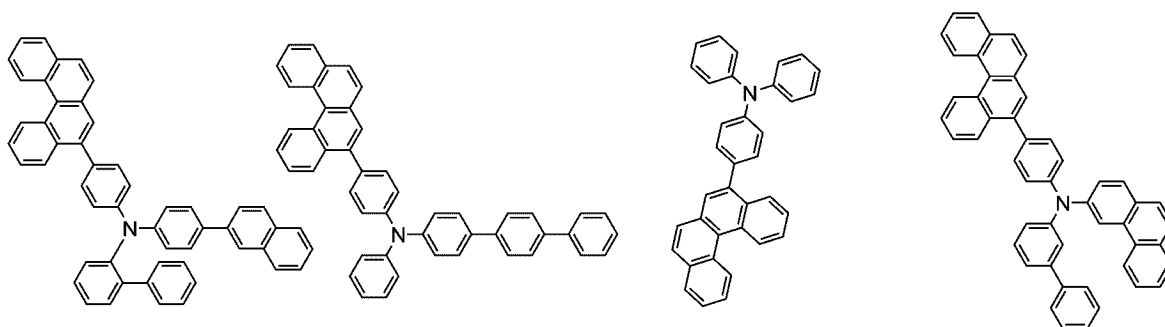
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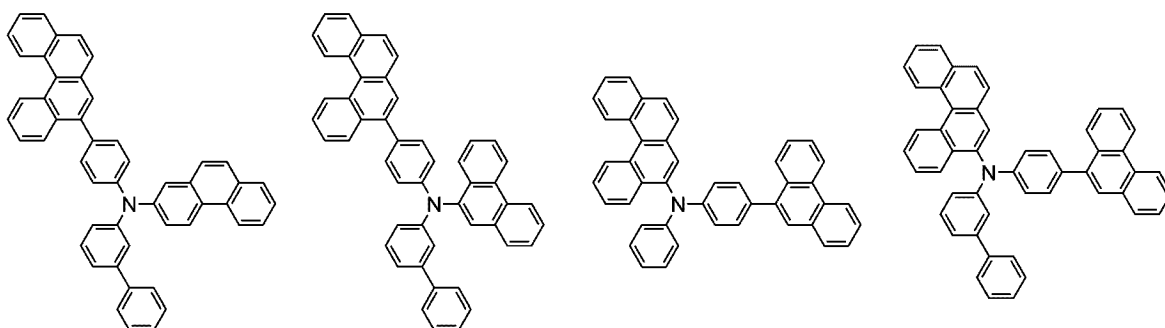
【化 2 1 6】



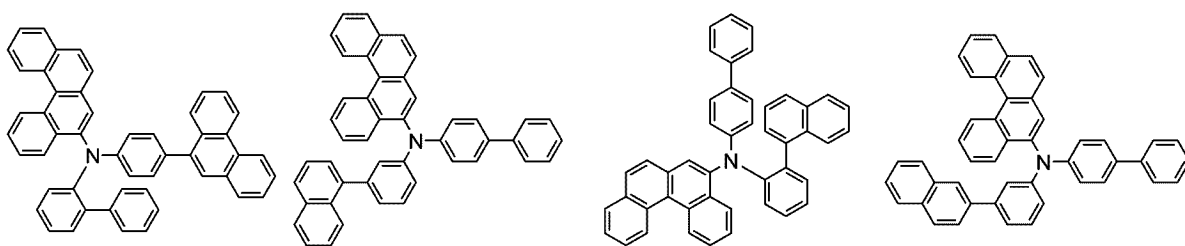
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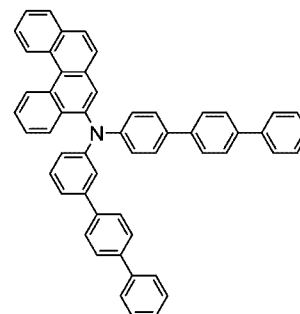
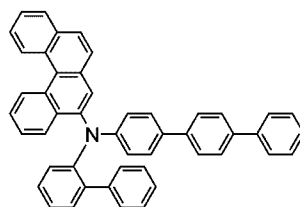
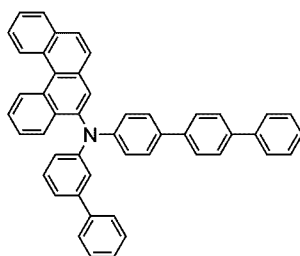
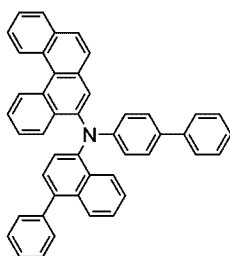
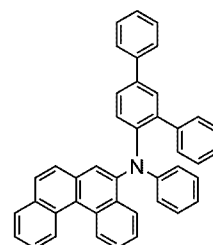
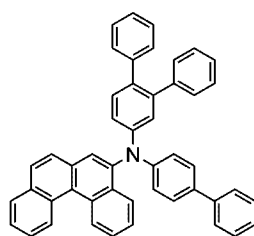
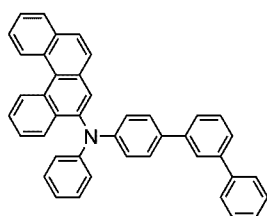
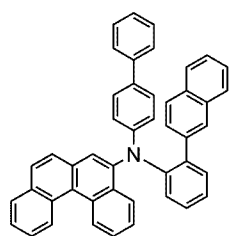
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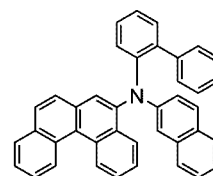
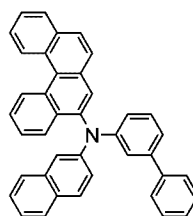
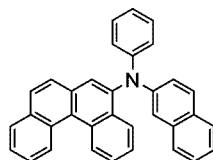
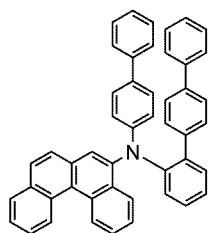
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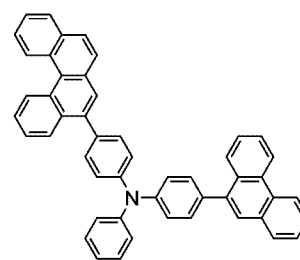
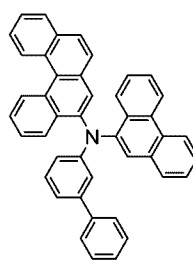
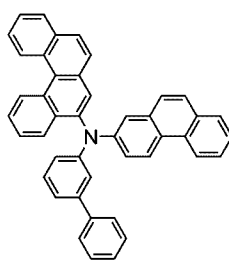
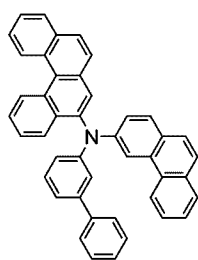
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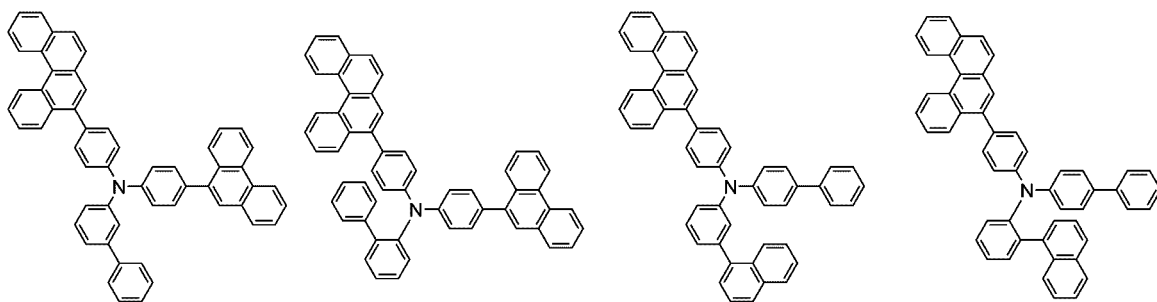


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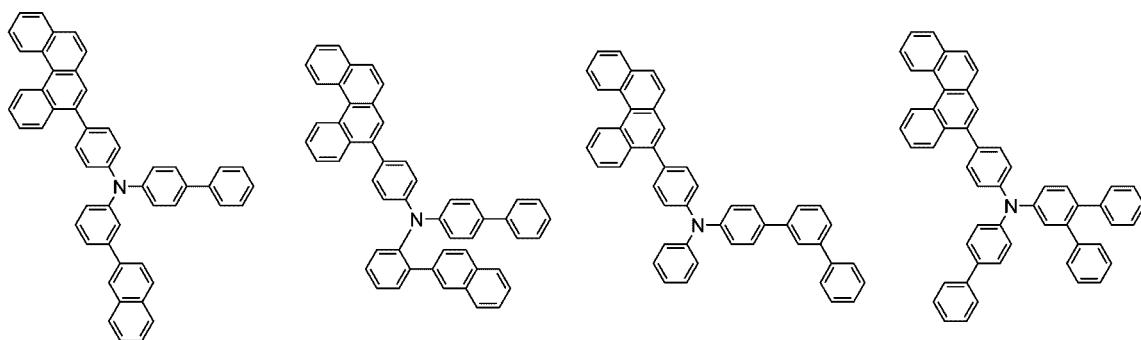
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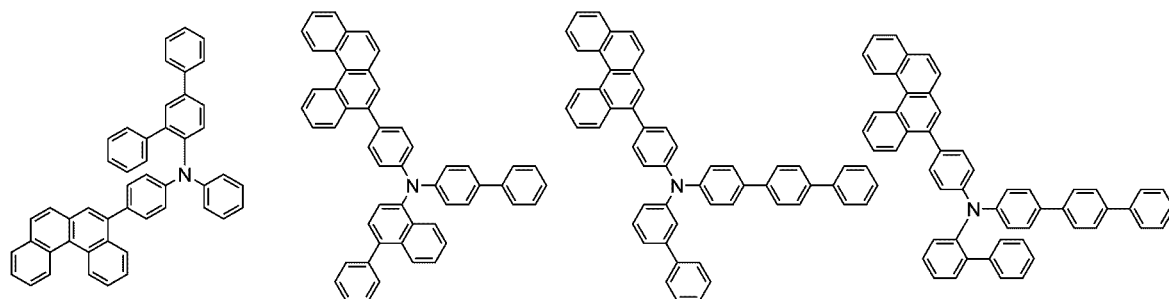
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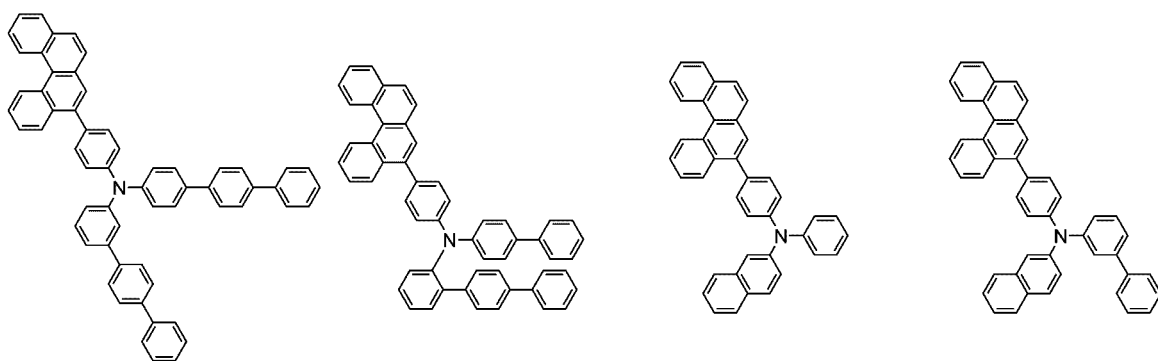
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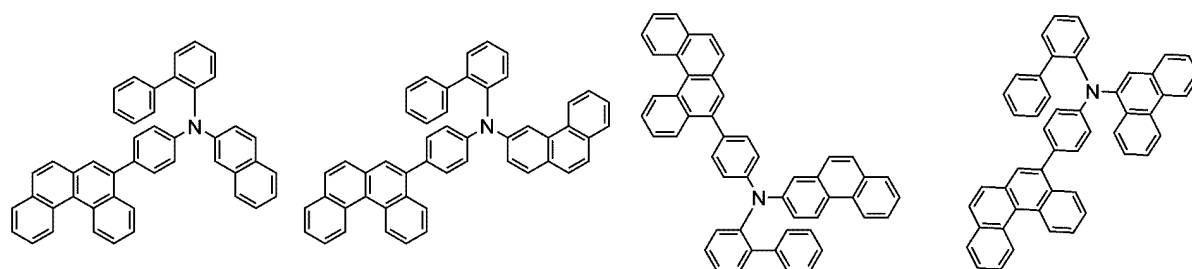


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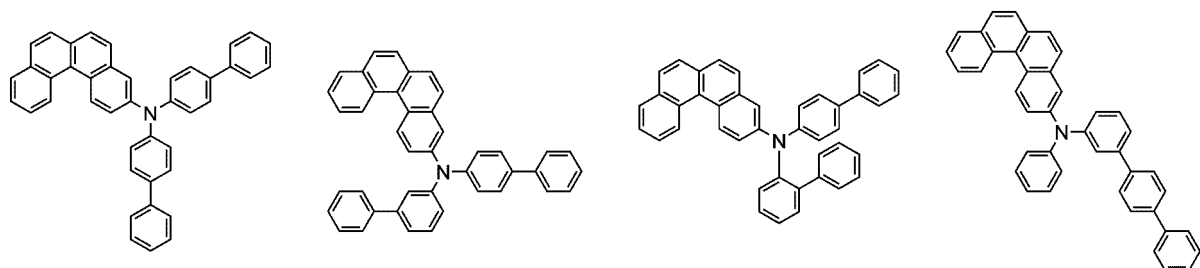
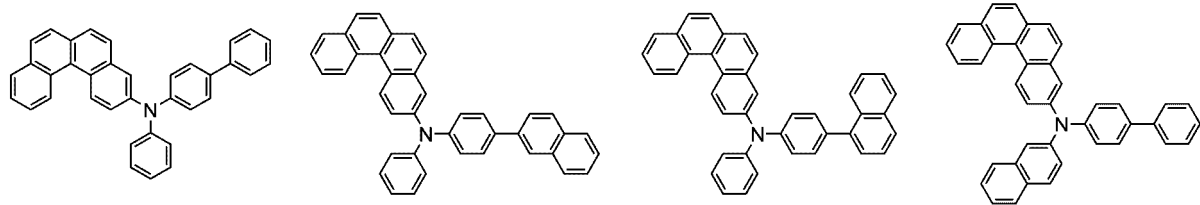
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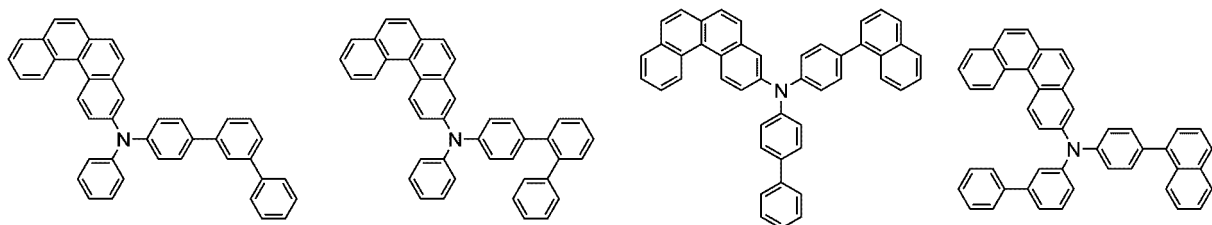


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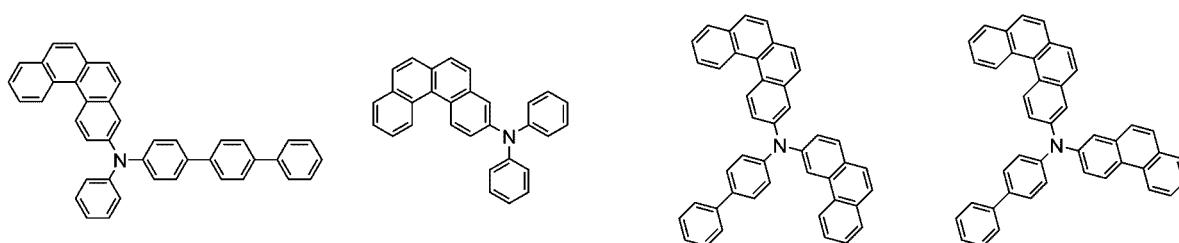
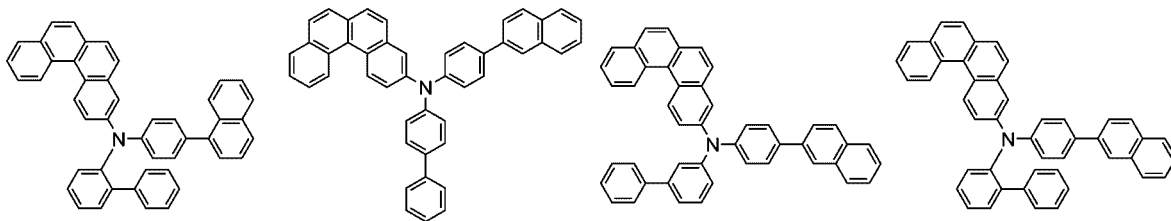
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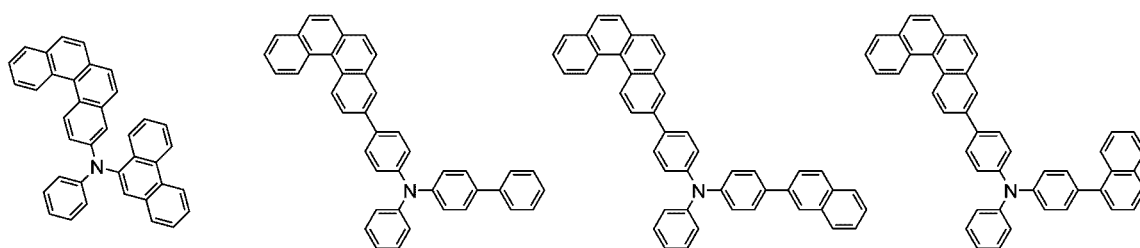
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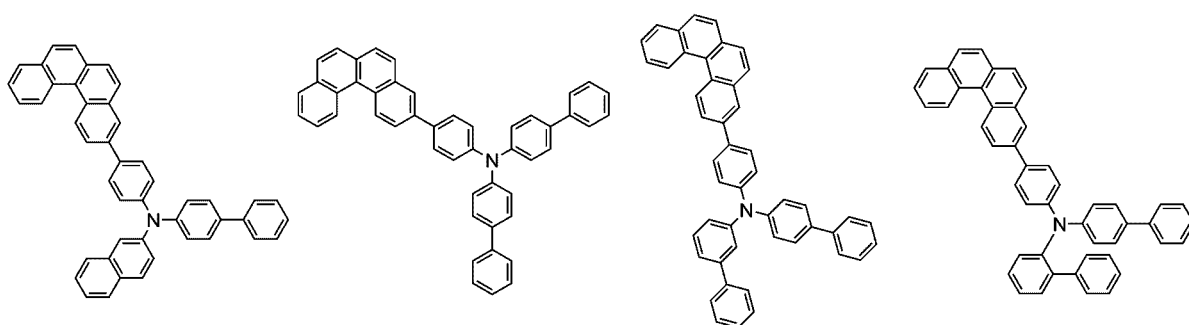
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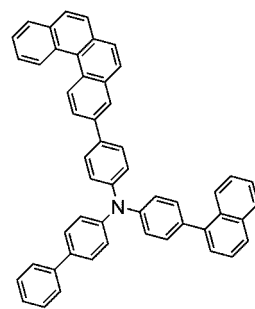
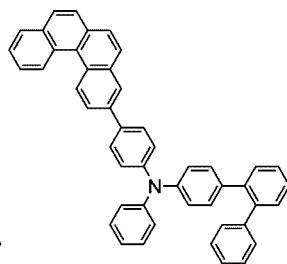
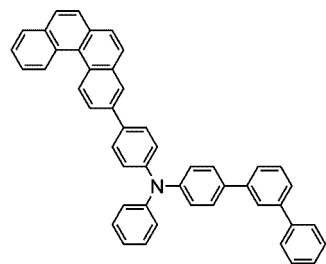
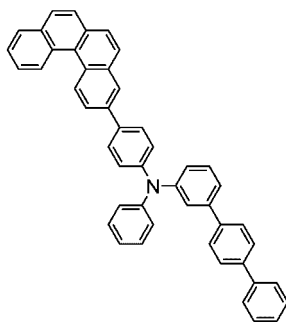


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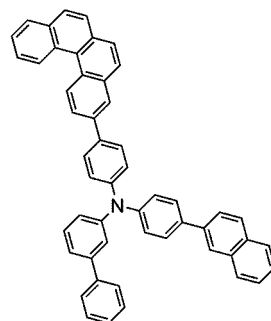
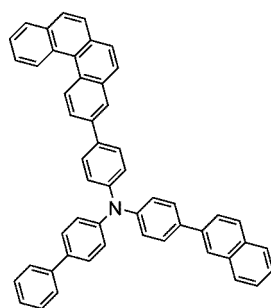
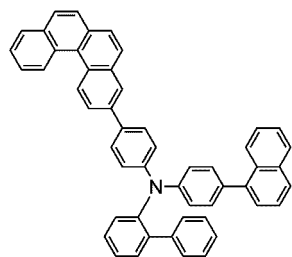
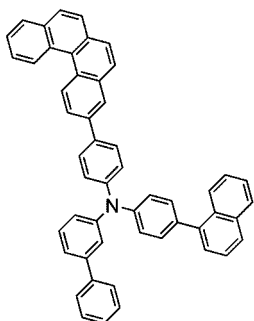
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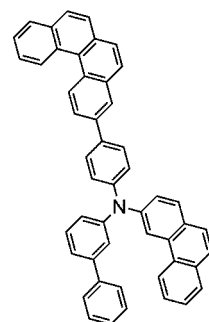
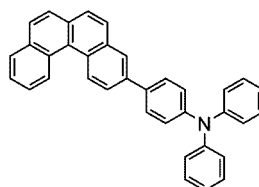
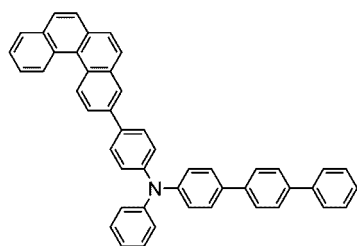
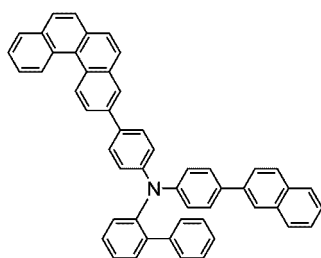
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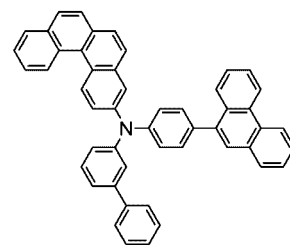
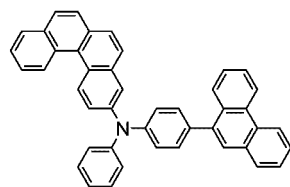
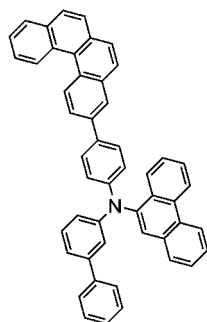
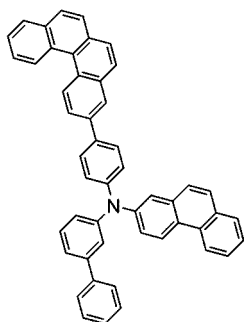
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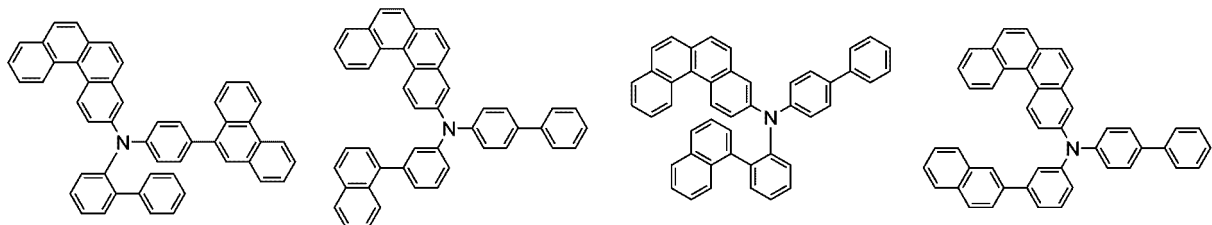
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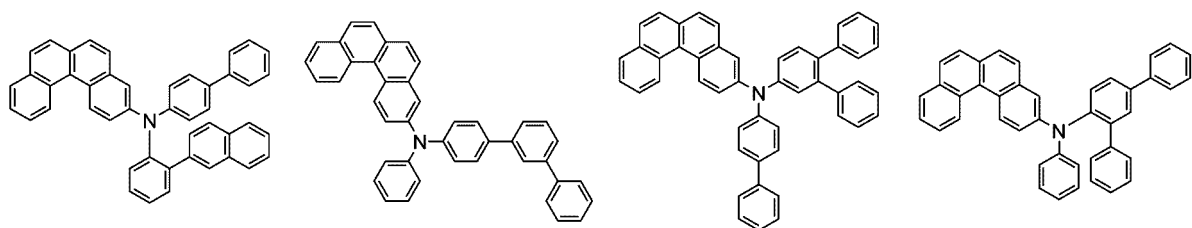
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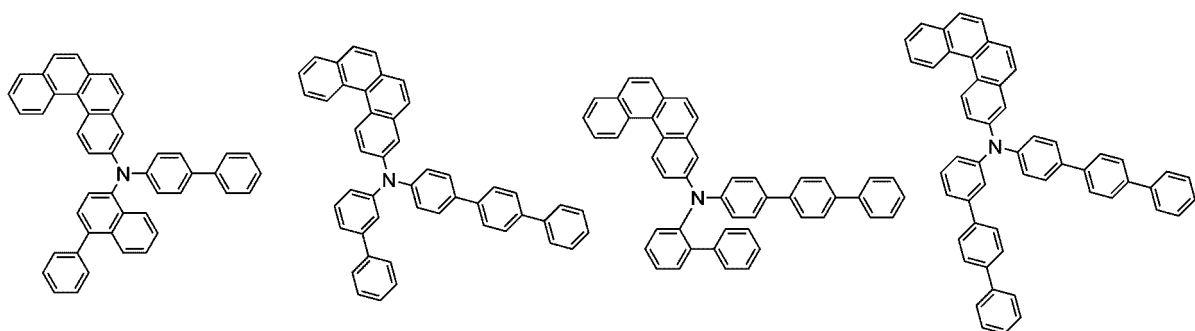
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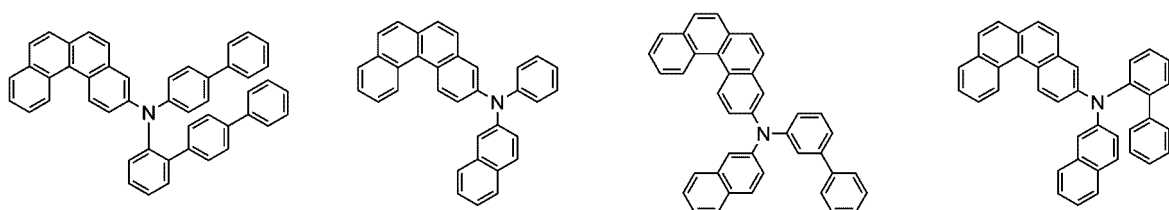
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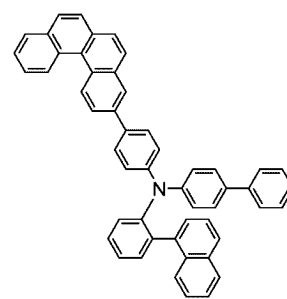
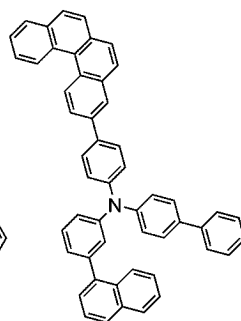
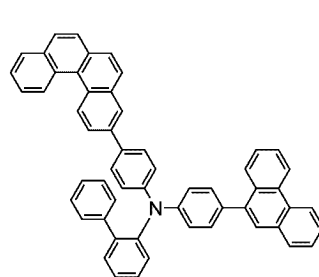
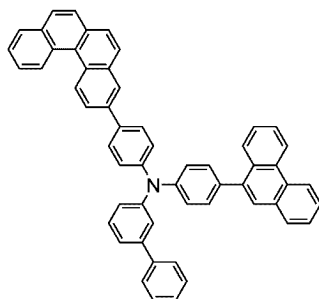
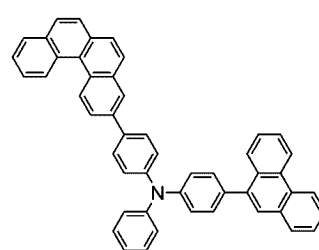
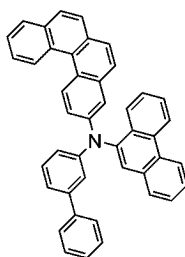
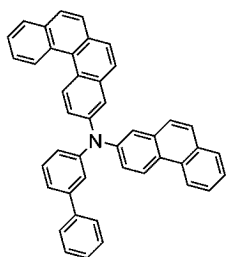
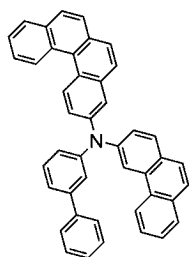
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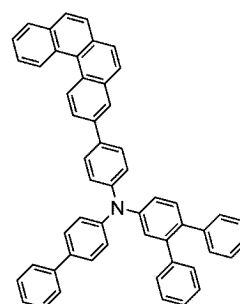
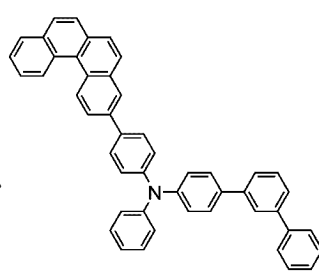
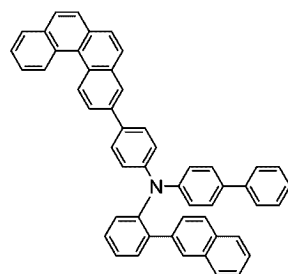
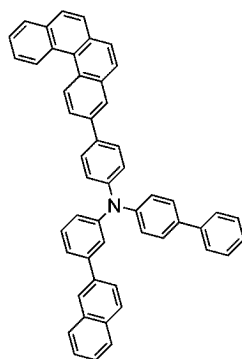
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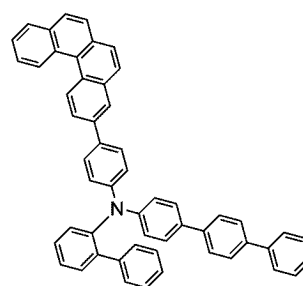
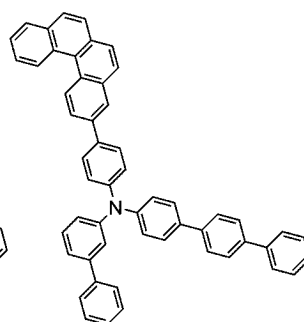
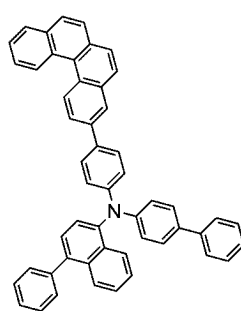
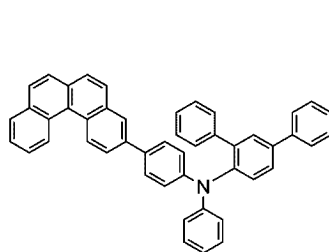
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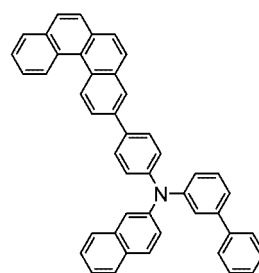
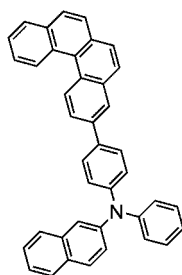
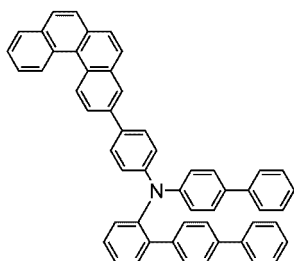
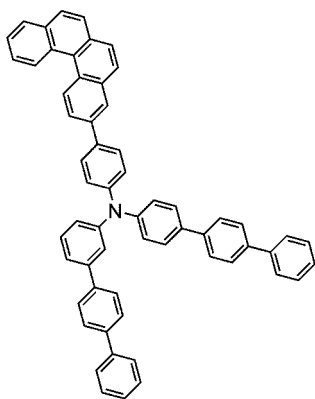


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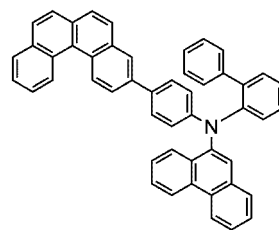
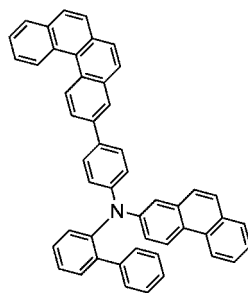
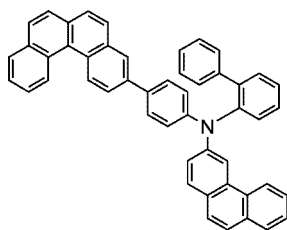
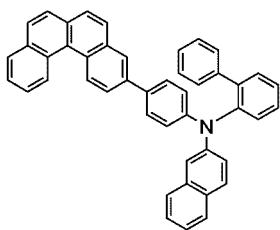
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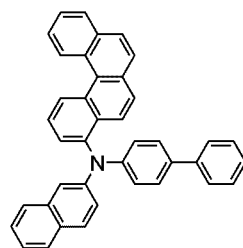
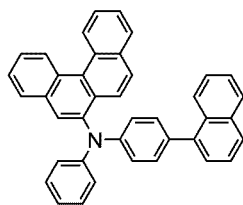
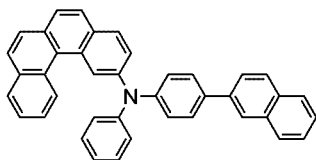
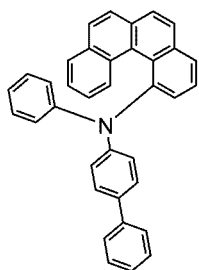


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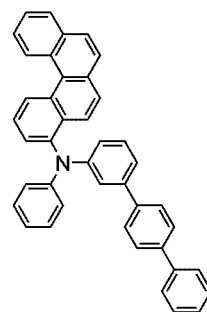
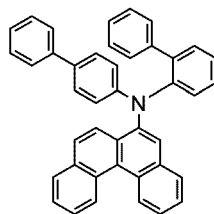
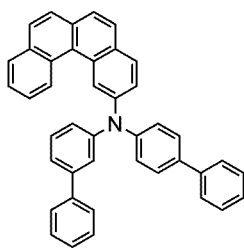
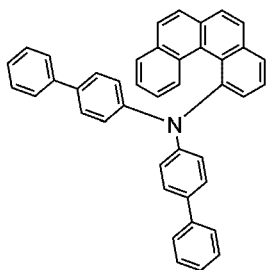


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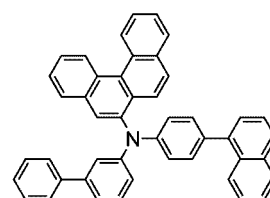
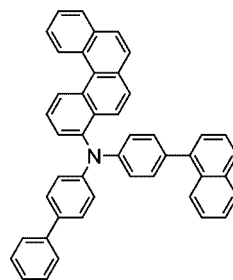
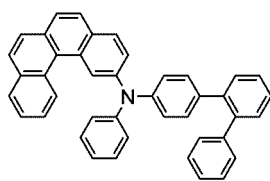
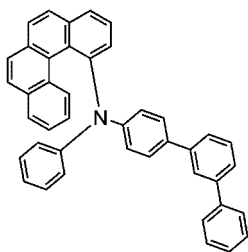


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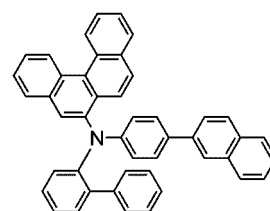
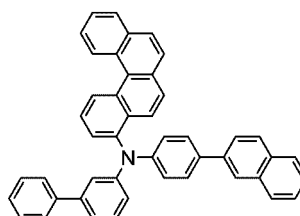
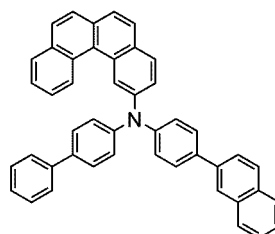
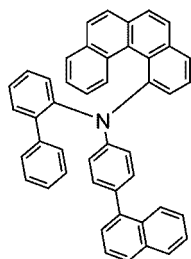


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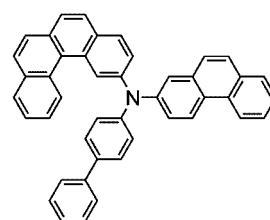
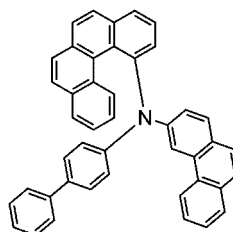
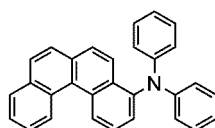
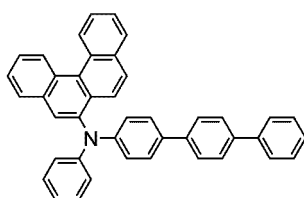
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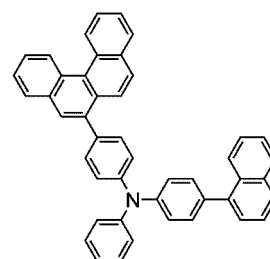
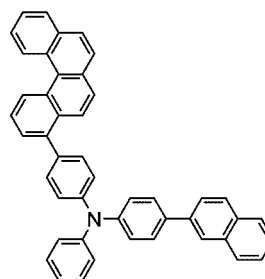
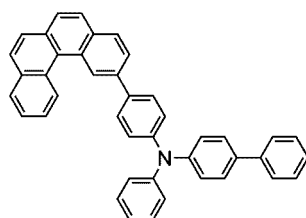
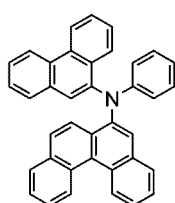
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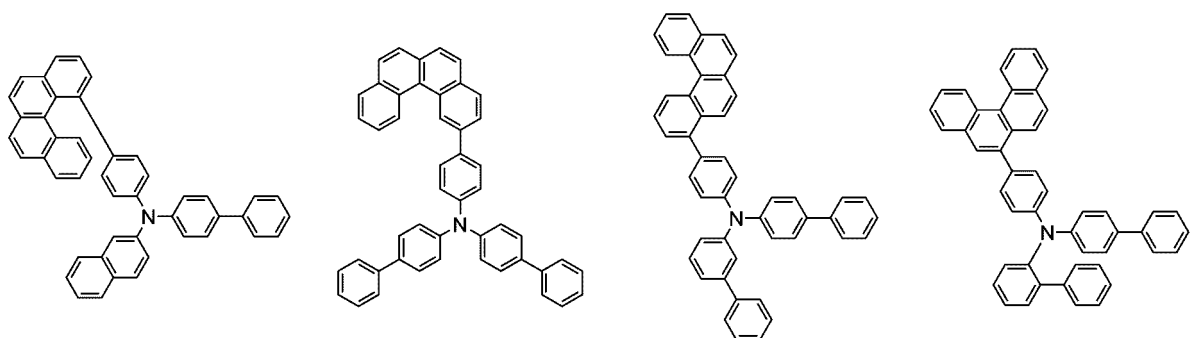
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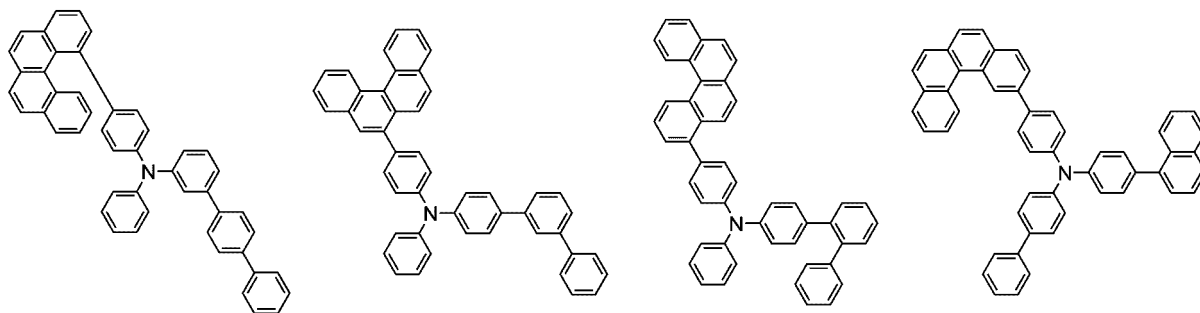
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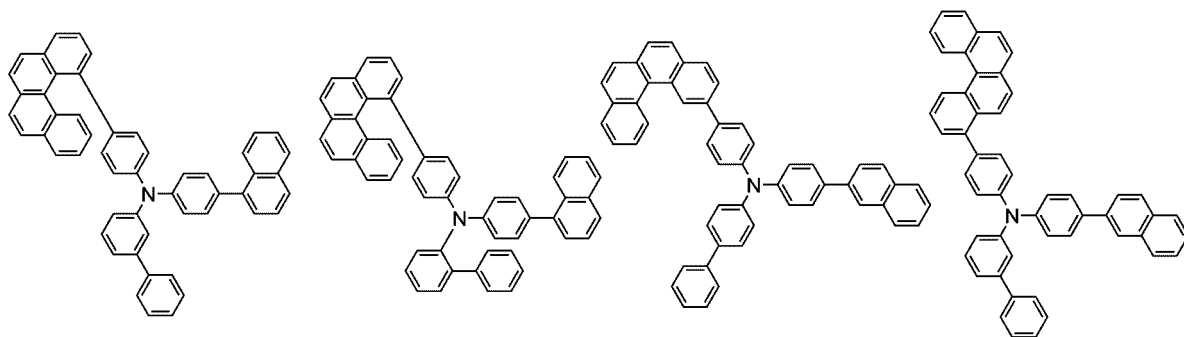
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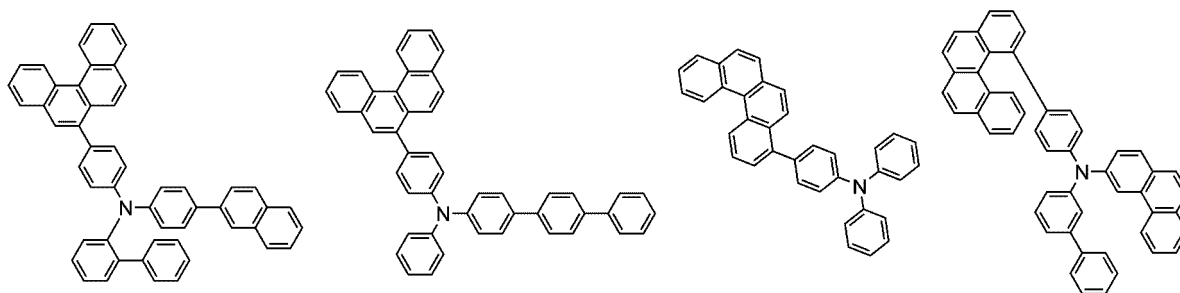
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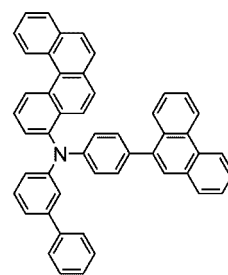
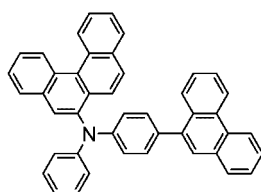
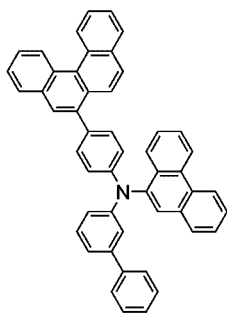
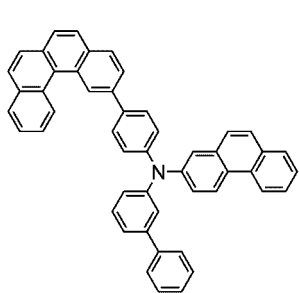
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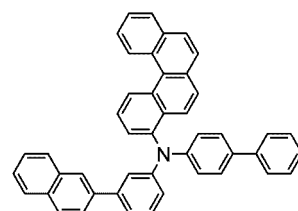
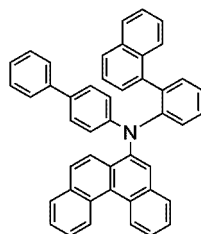
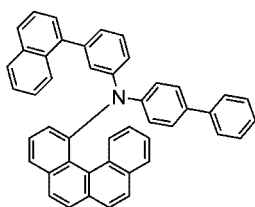
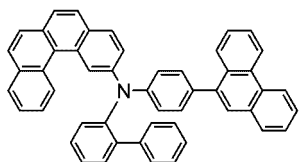
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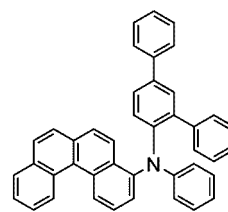
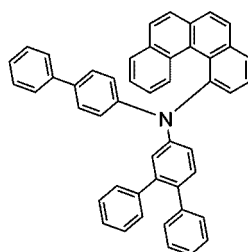
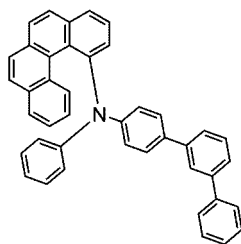
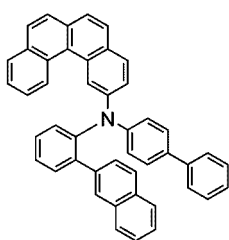
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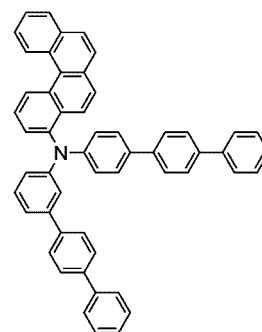
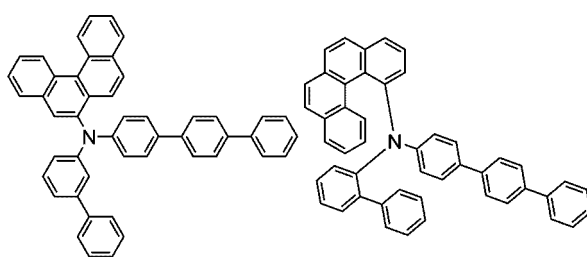
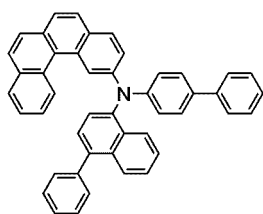
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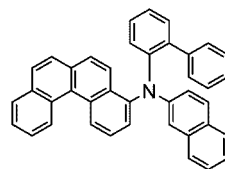
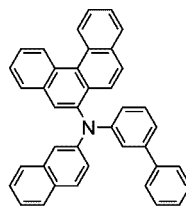
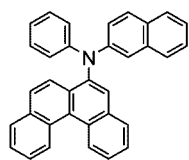
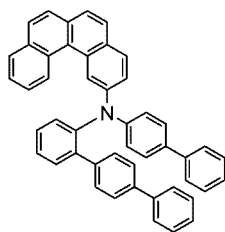
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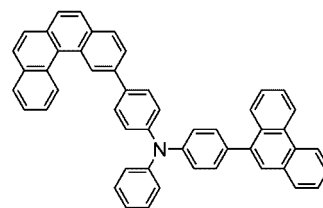
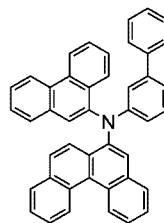
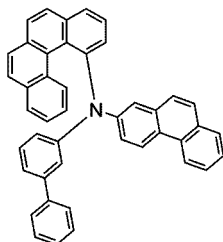
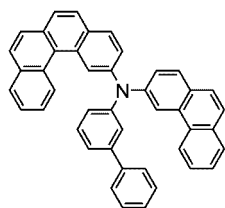
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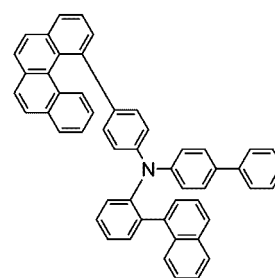
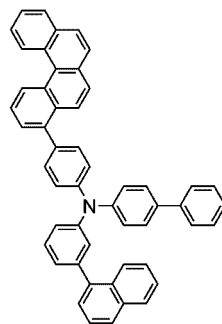
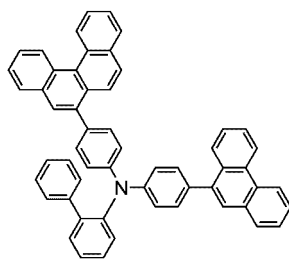
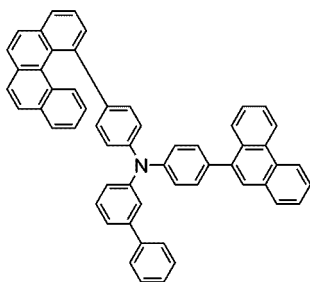
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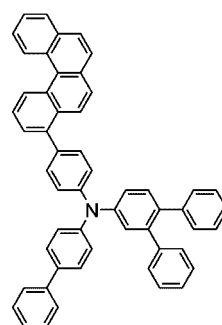
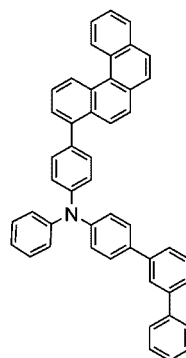
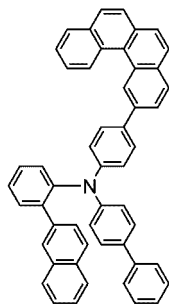
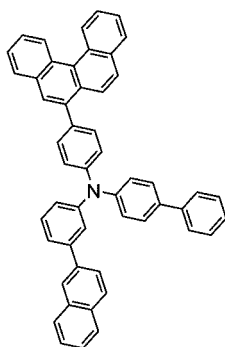
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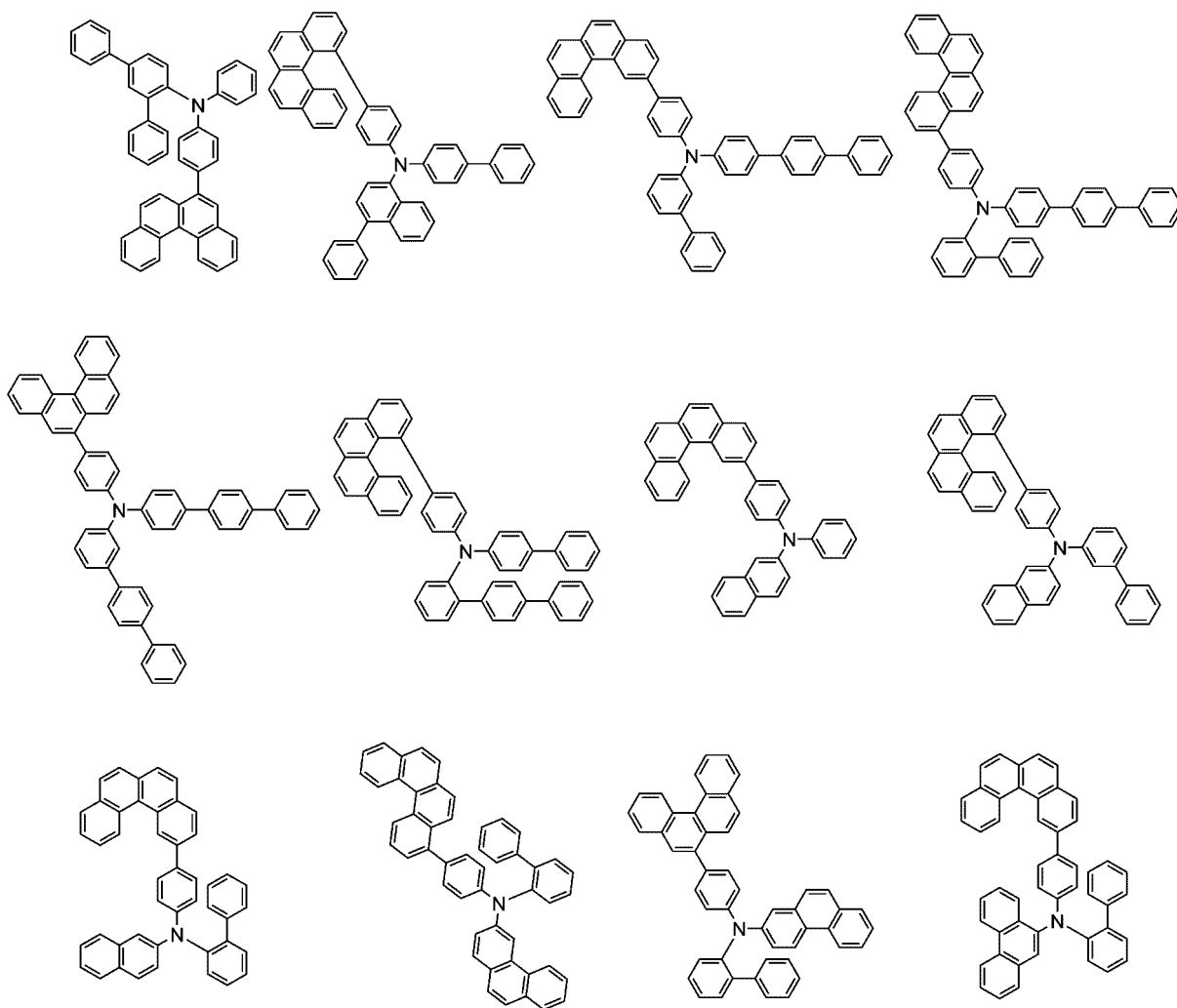
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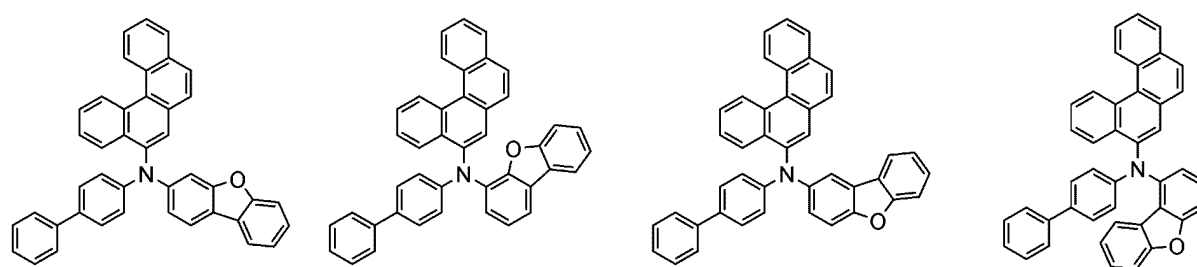
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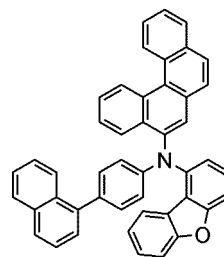
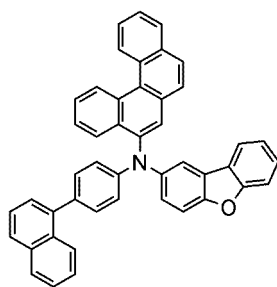
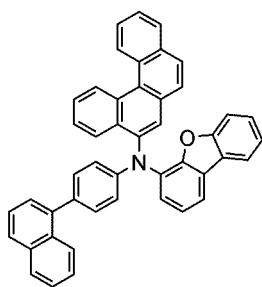
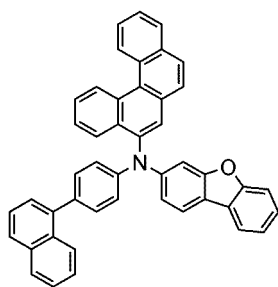


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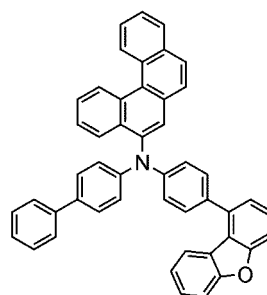
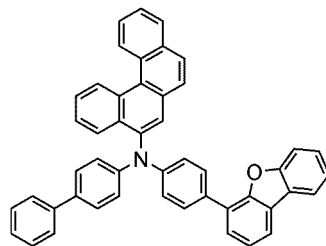
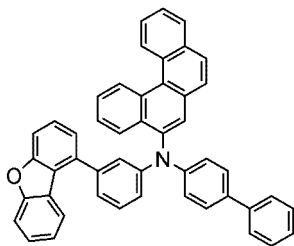
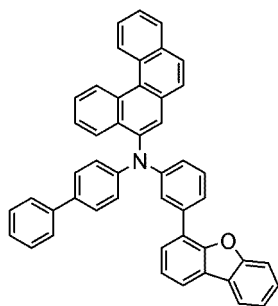
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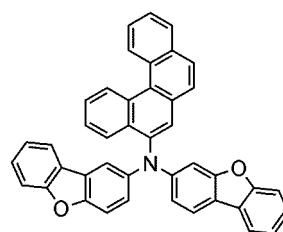
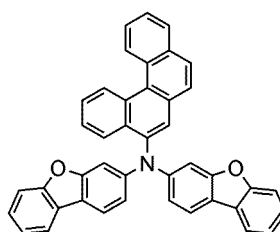
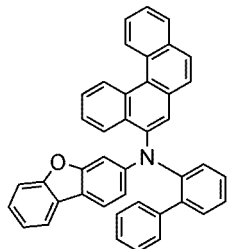
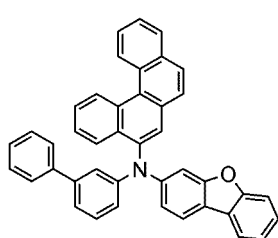
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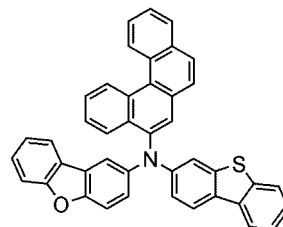
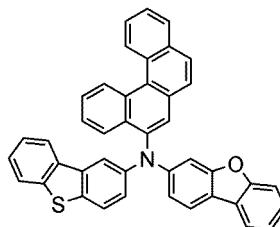
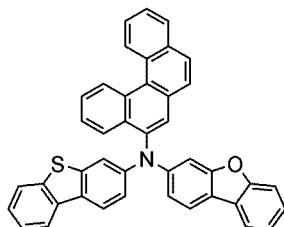
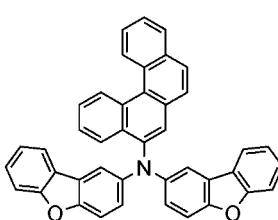
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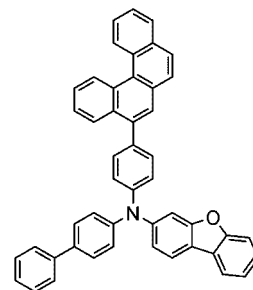
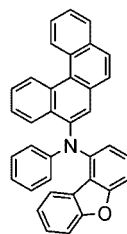
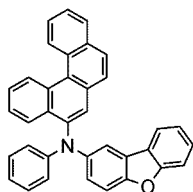
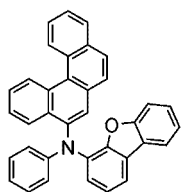
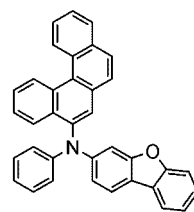
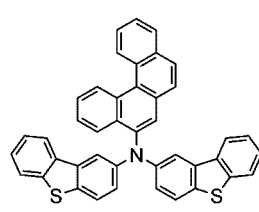
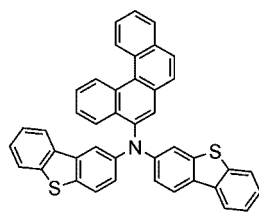
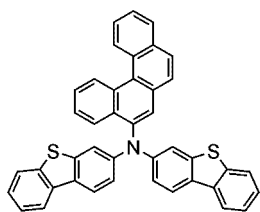
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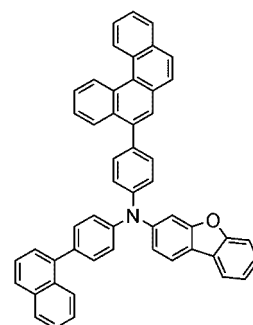
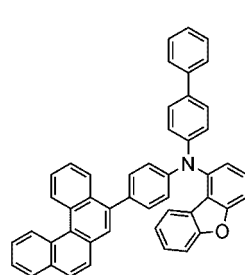
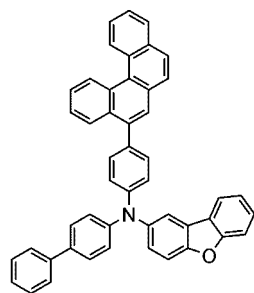
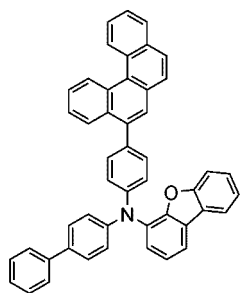
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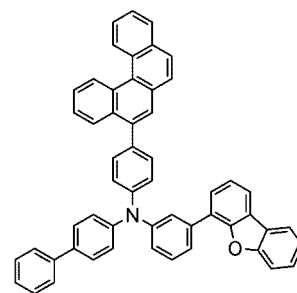
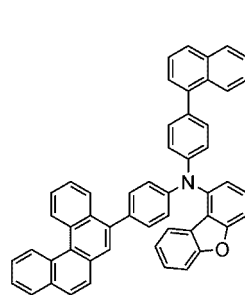
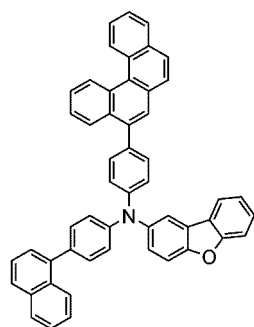
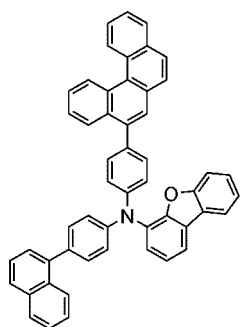
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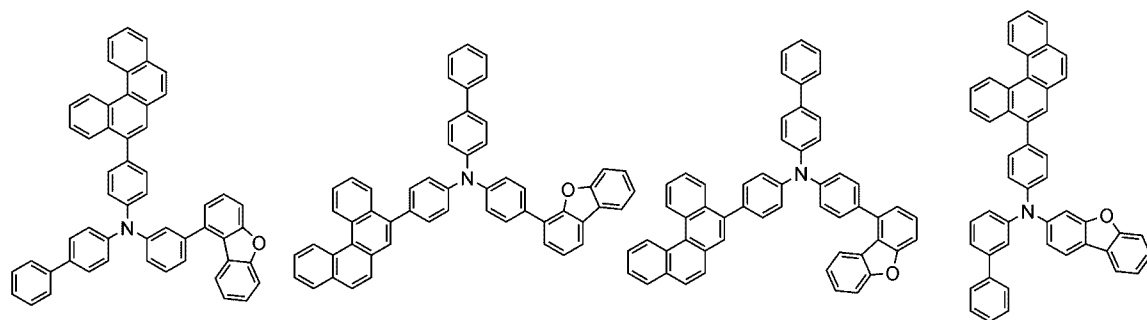


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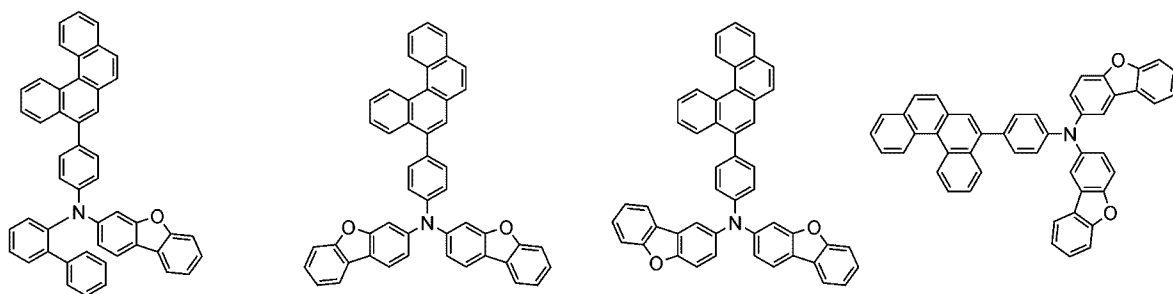
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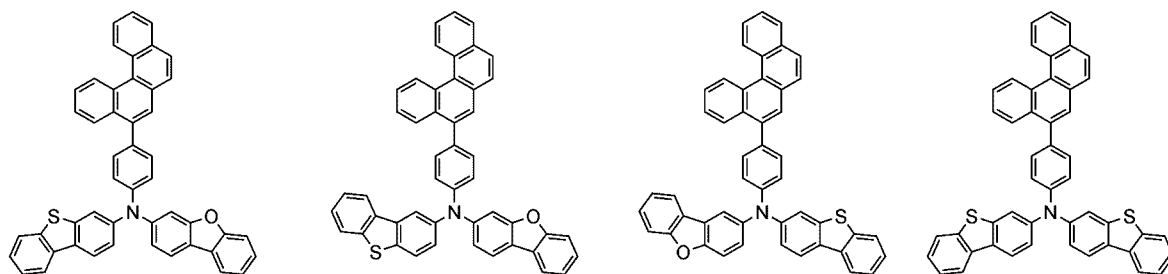
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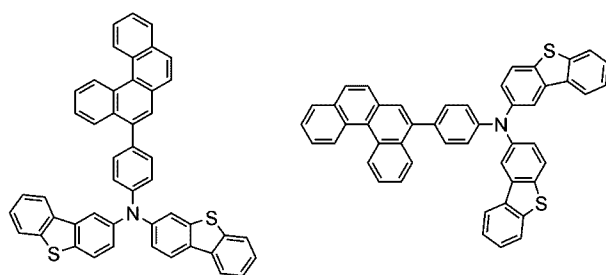
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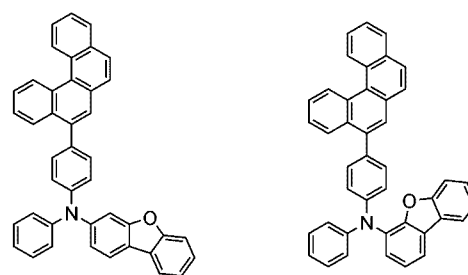
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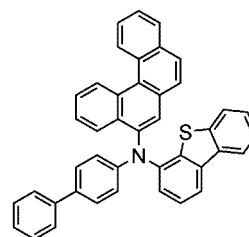
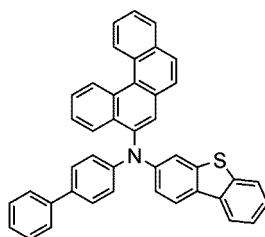
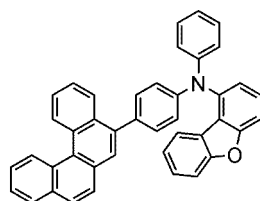
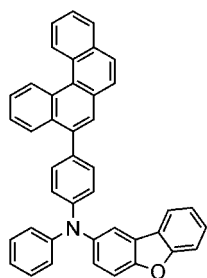


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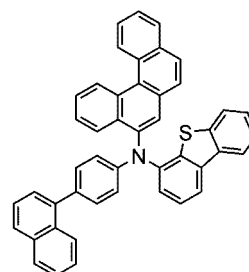
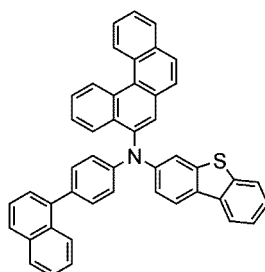
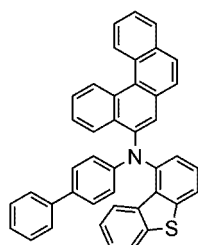
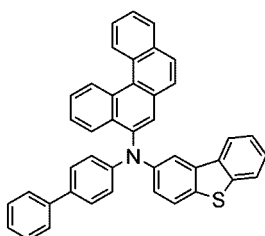


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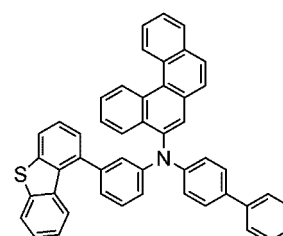
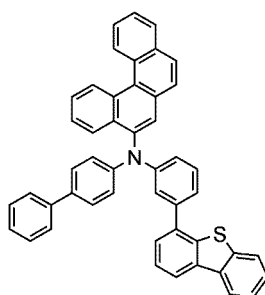
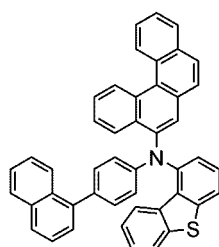
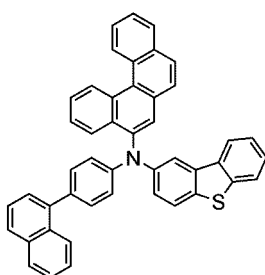
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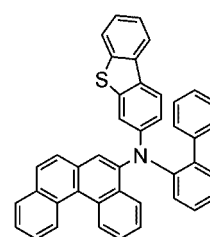
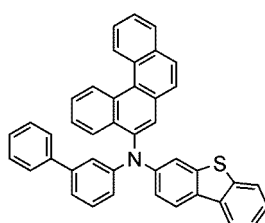
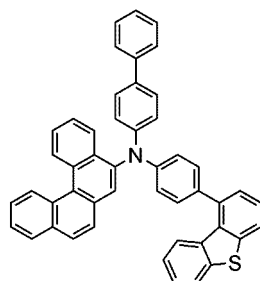
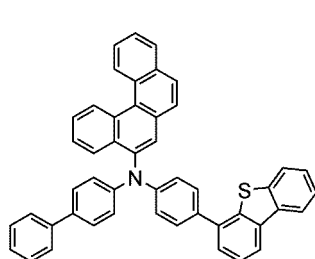
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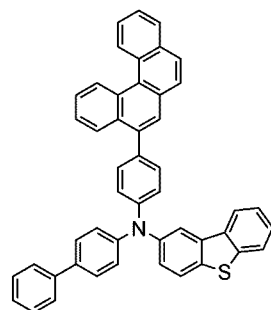
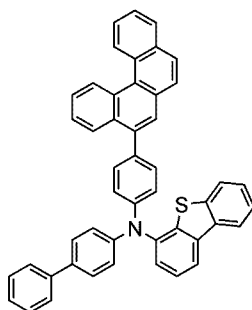
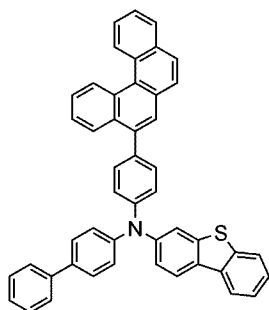
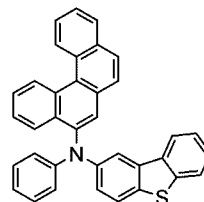
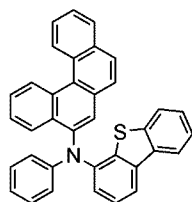
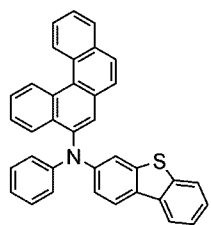
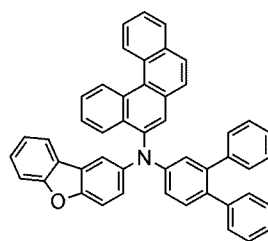
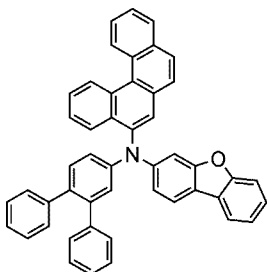
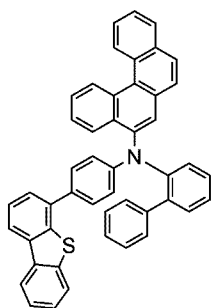
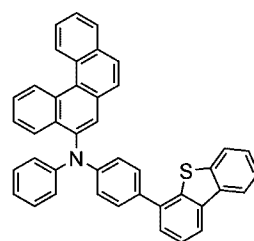
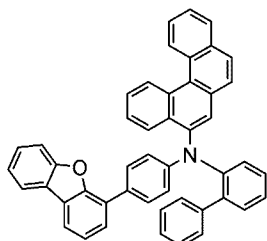
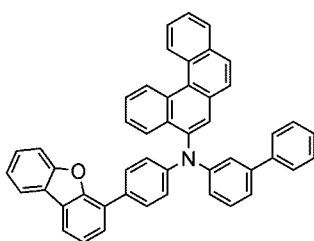


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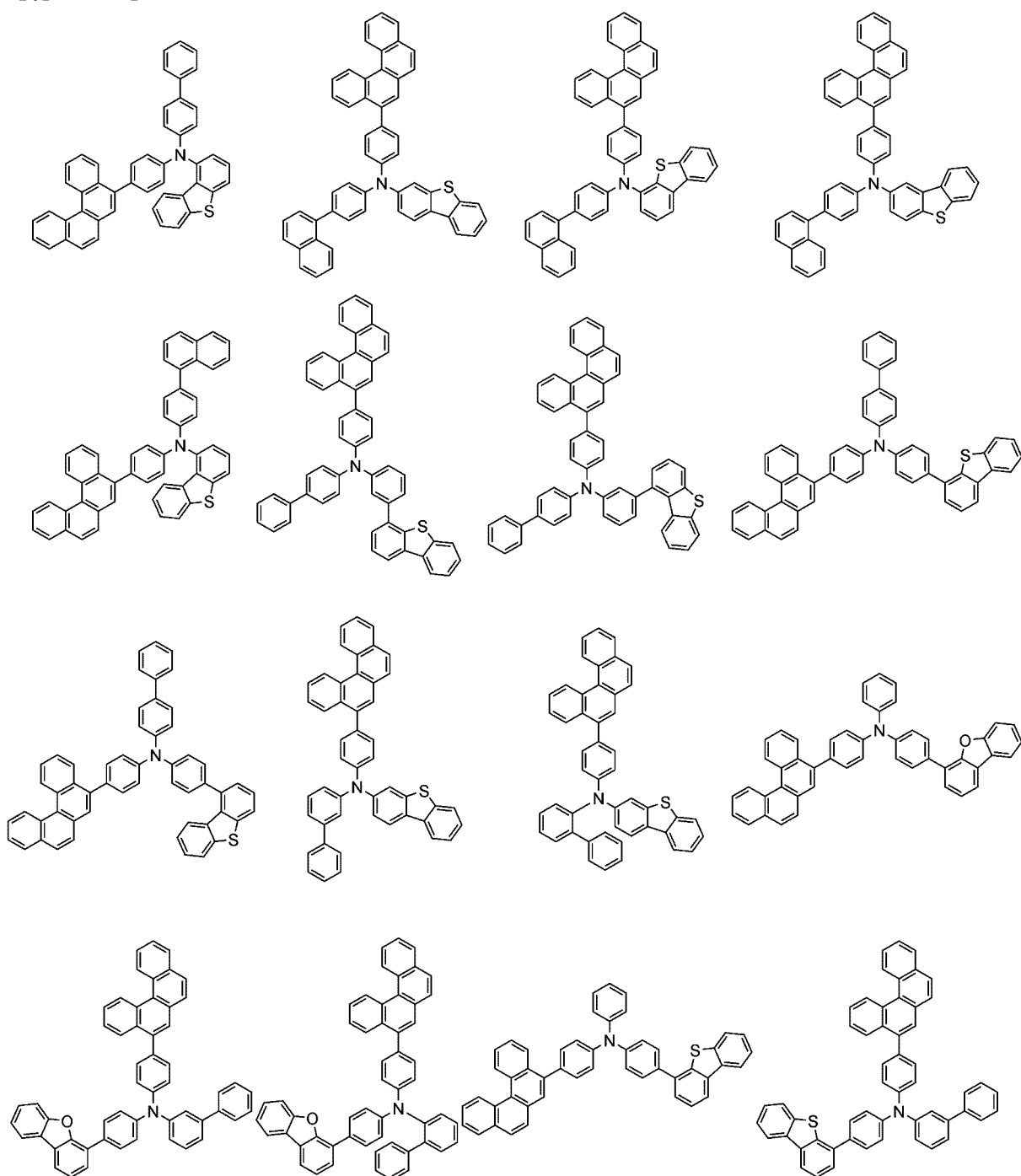
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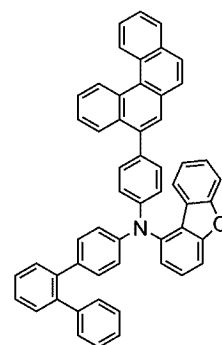
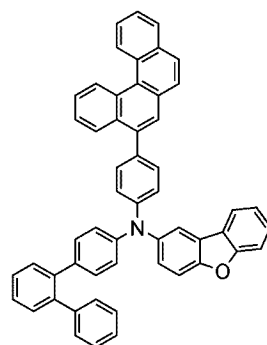
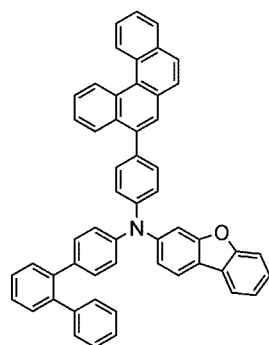
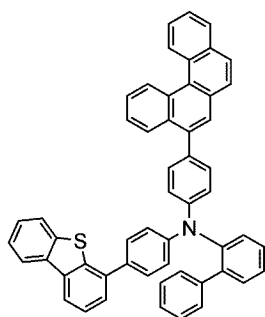
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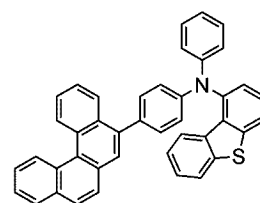
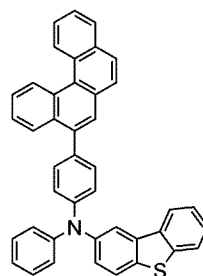
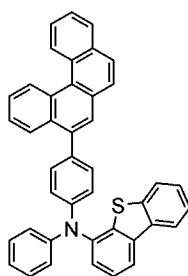
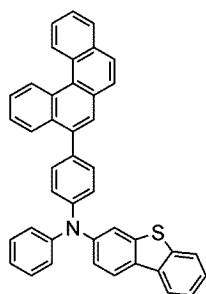
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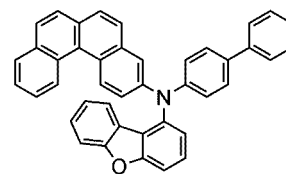
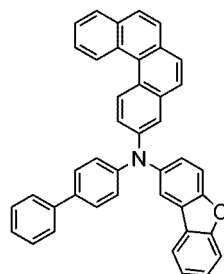
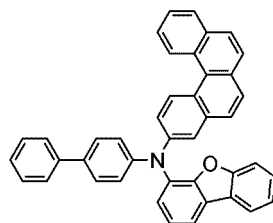
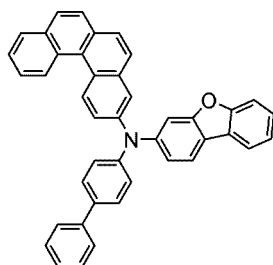


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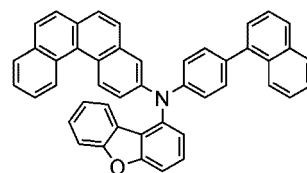
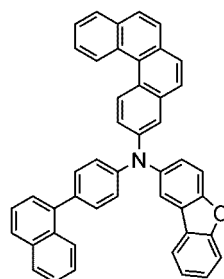
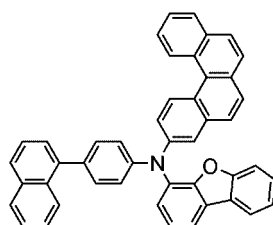
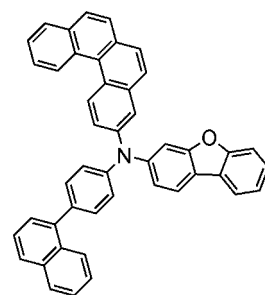


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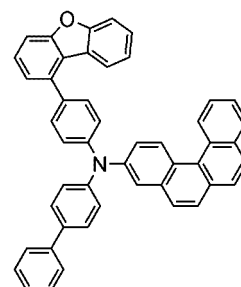
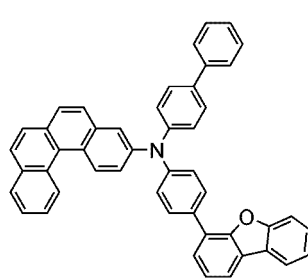
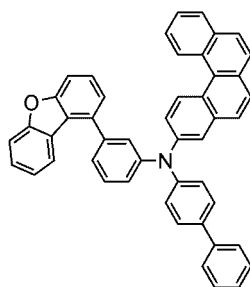
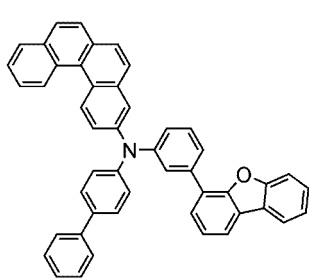
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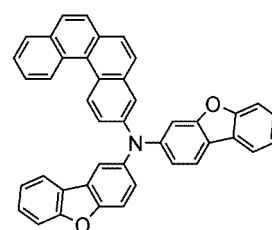
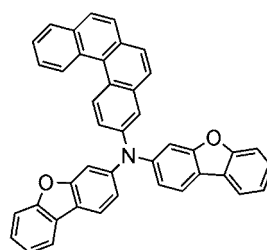
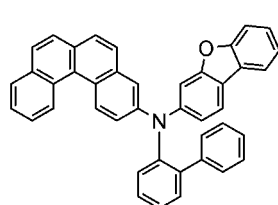
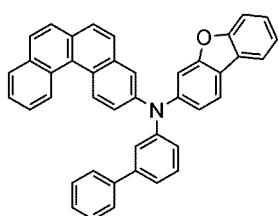
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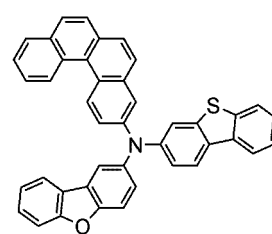
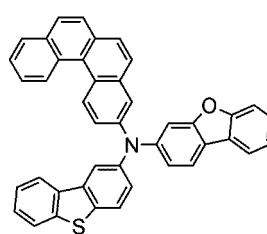
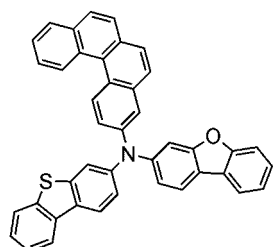
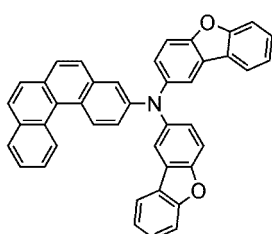
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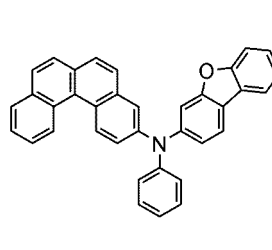
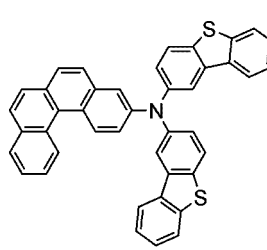
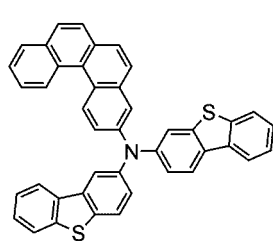
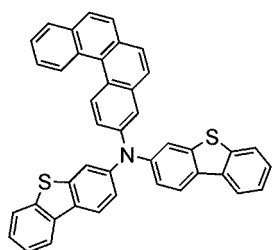
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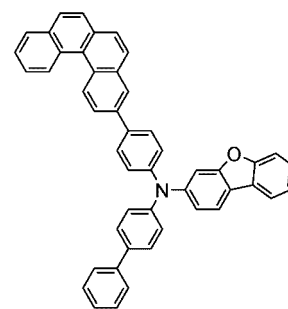
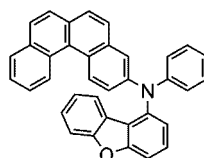
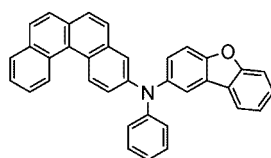
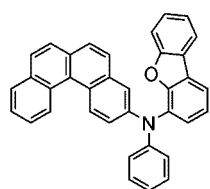
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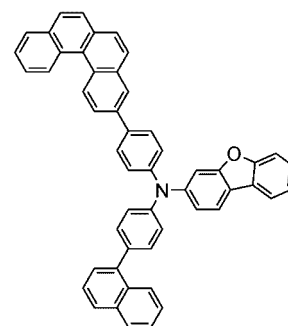
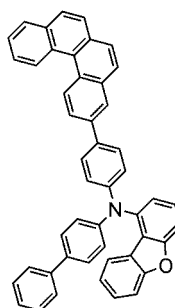
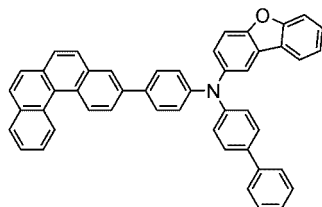
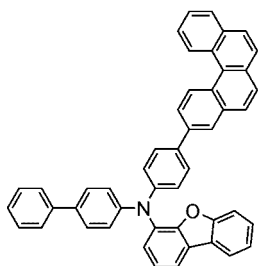
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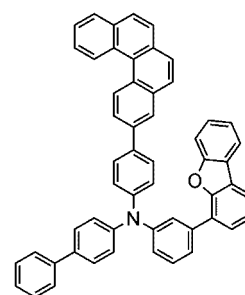
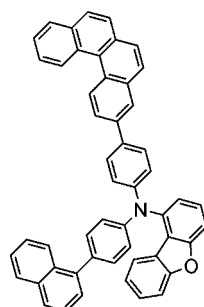
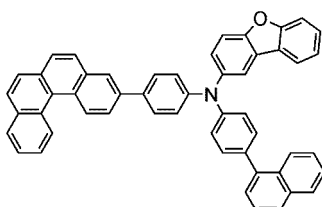
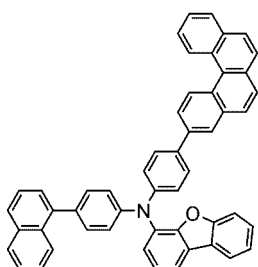
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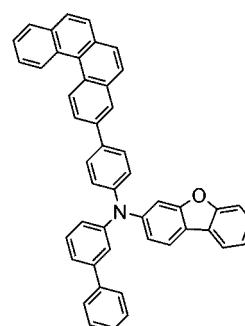
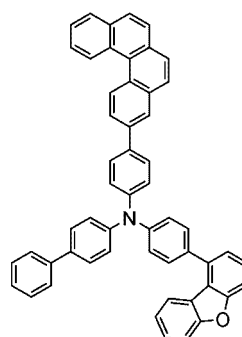
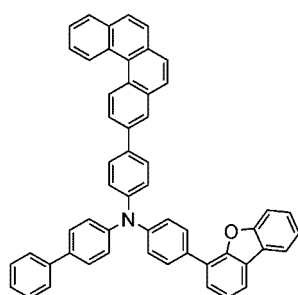
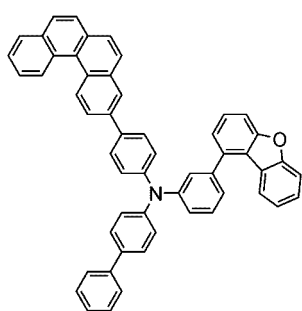
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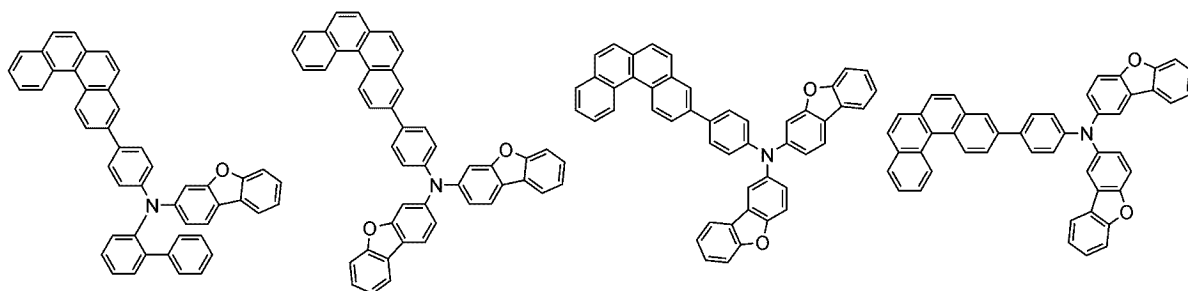
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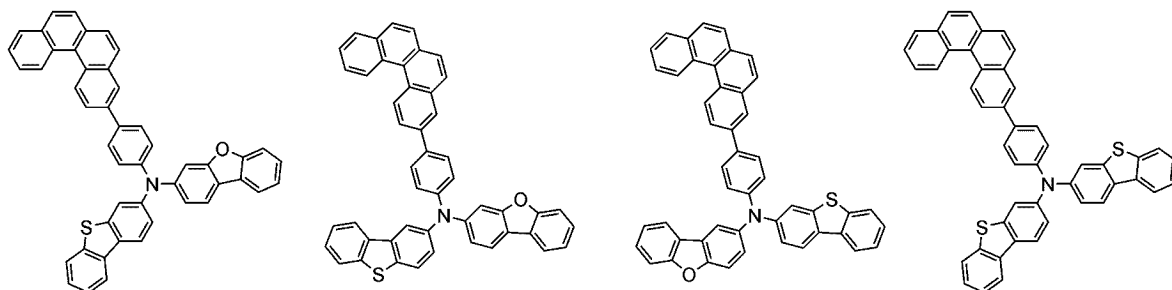
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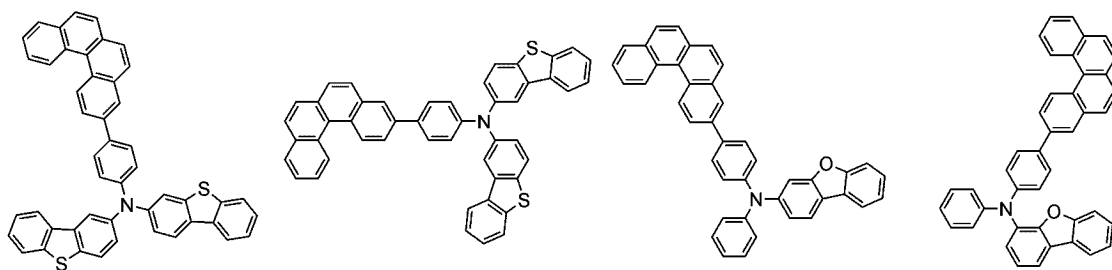
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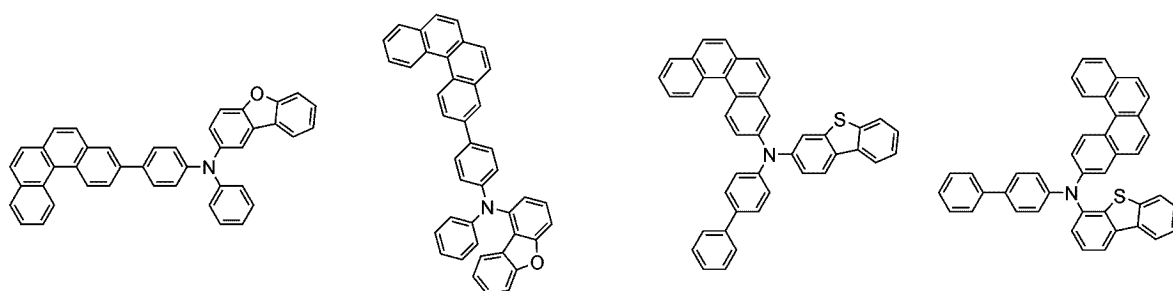
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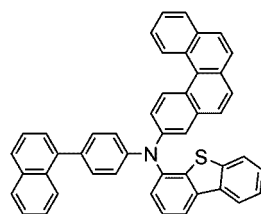
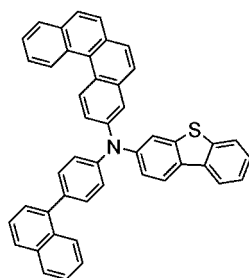
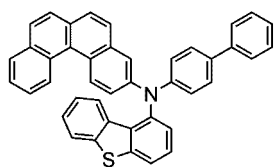
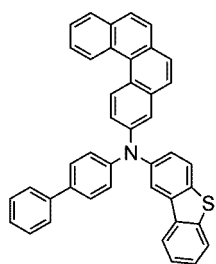
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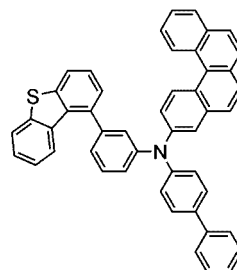
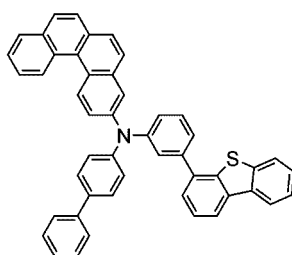
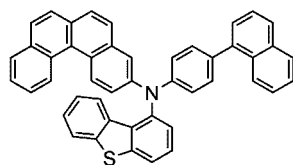
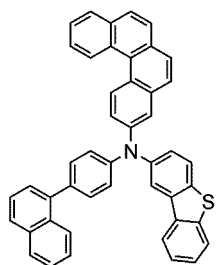
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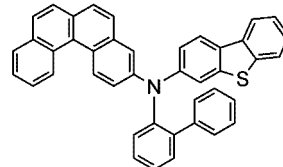
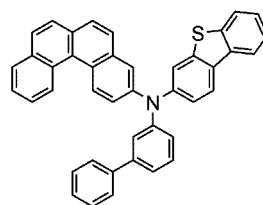
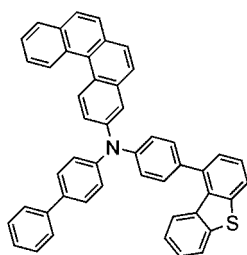
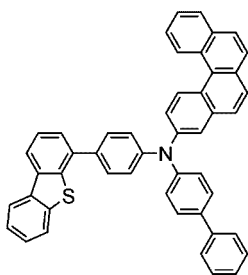
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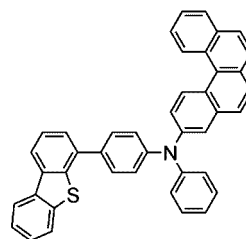
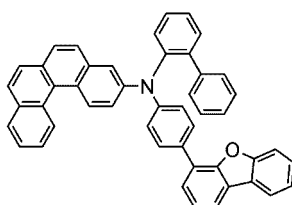
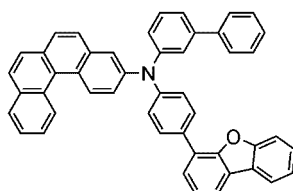
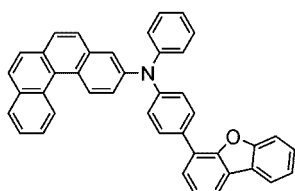
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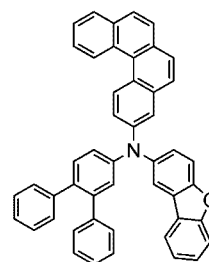
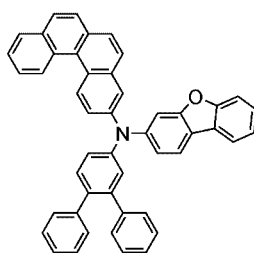
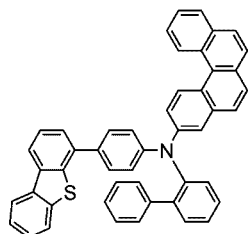
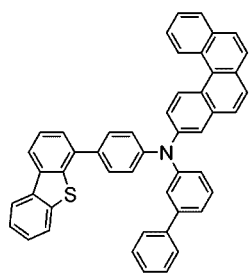
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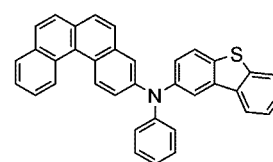
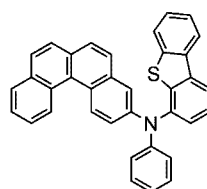
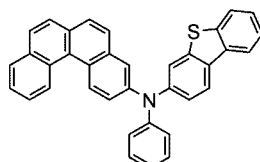
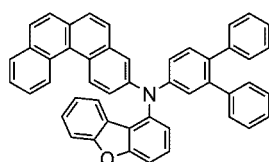
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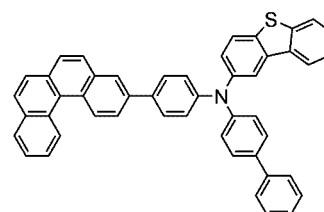
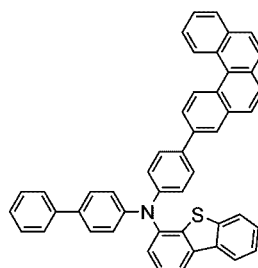
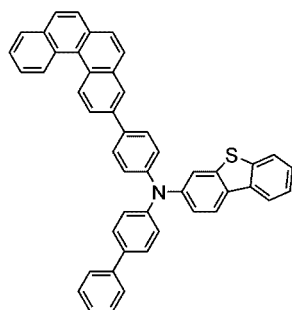
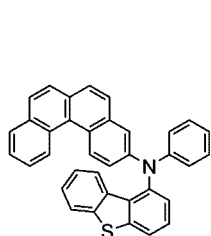
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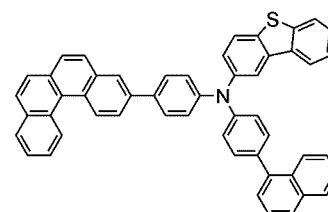
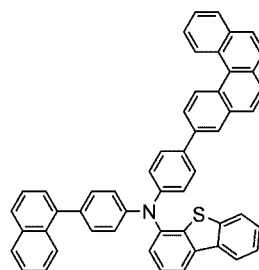
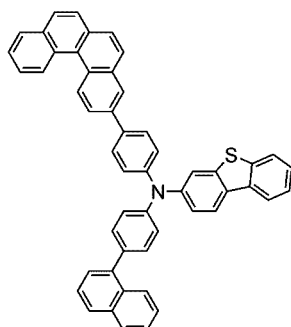
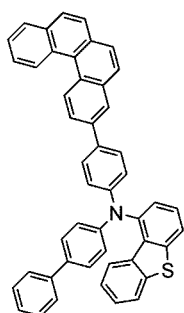
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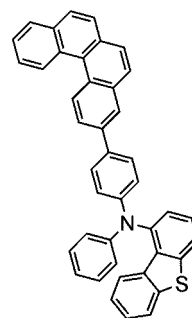
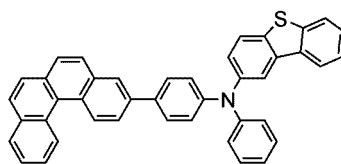
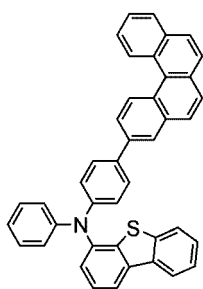
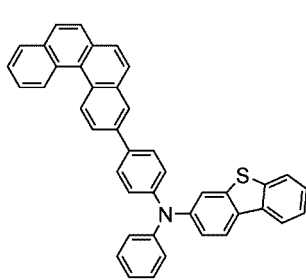
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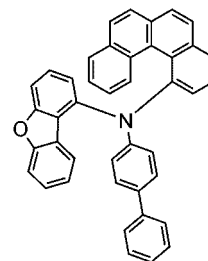
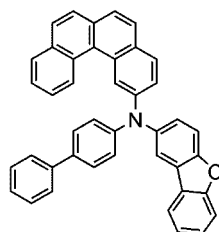
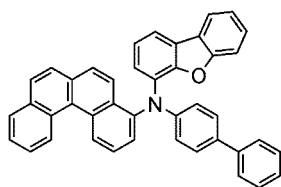
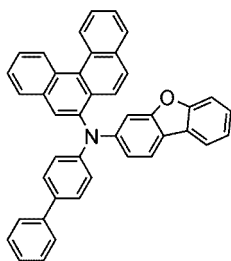
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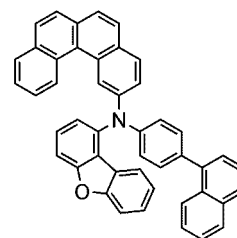
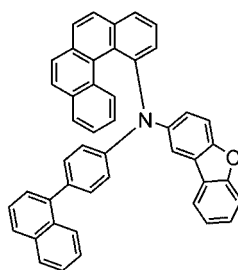
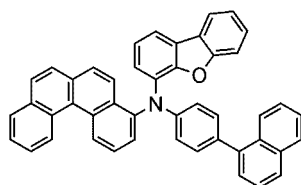
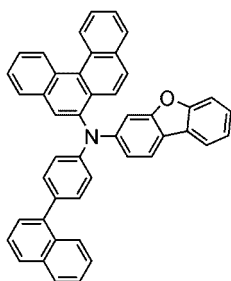


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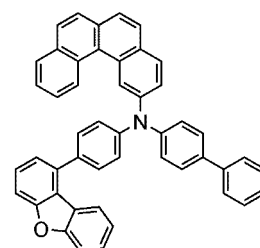
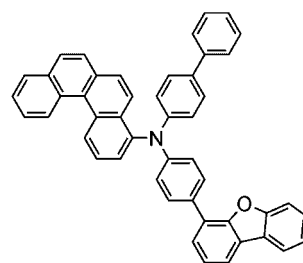
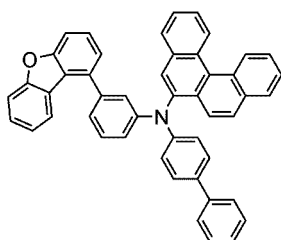
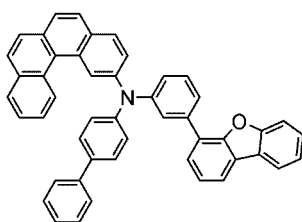
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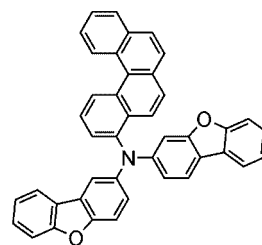
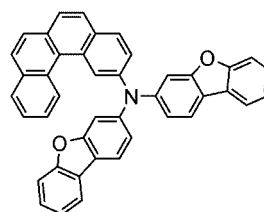
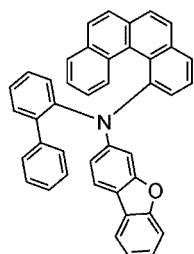
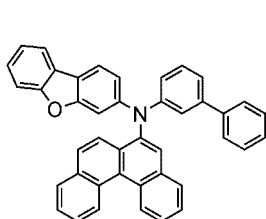
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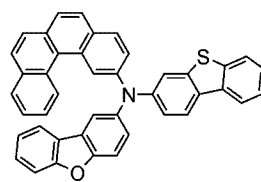
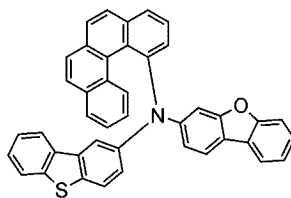
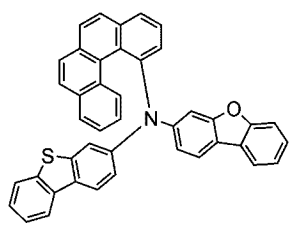
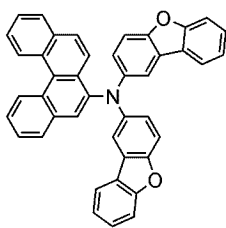


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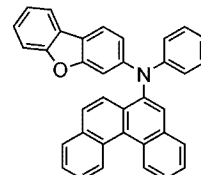
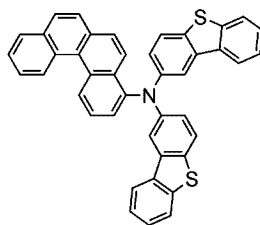
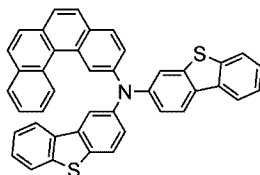
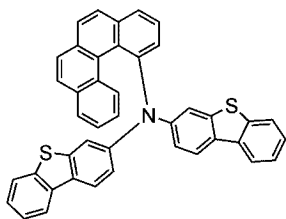


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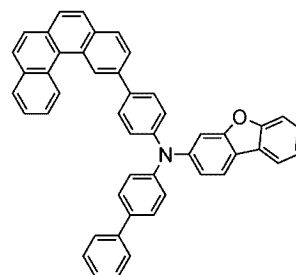
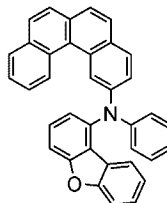
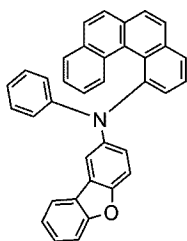
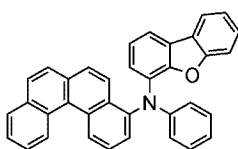
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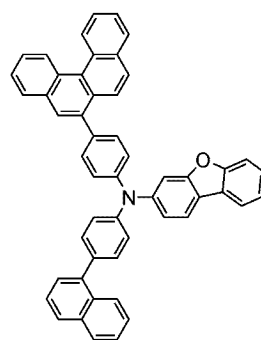
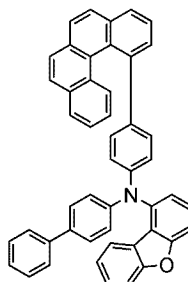
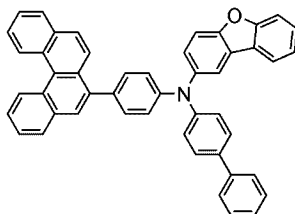
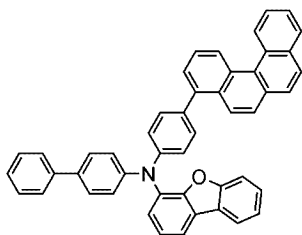
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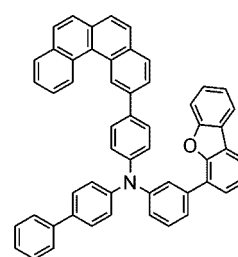
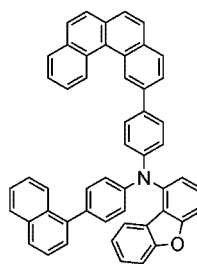
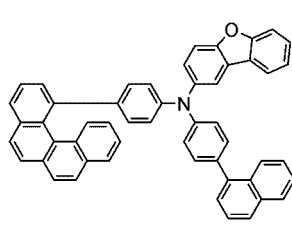
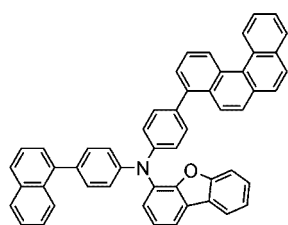
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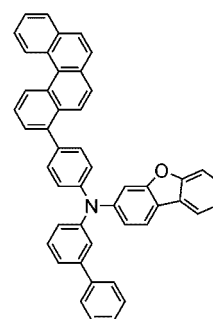
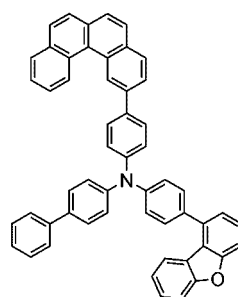
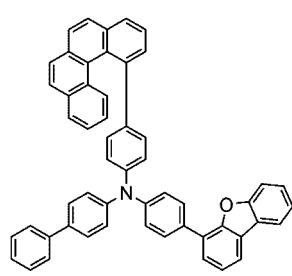
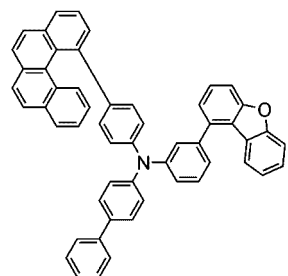
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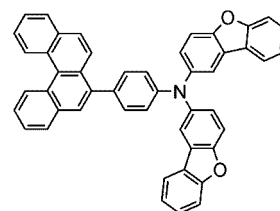
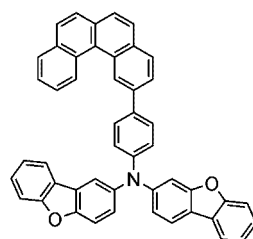
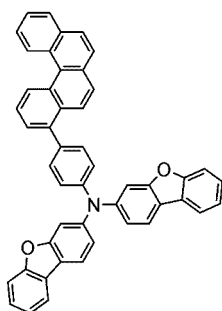
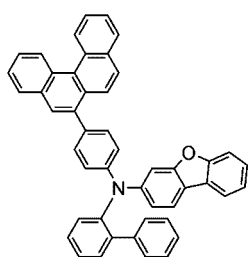
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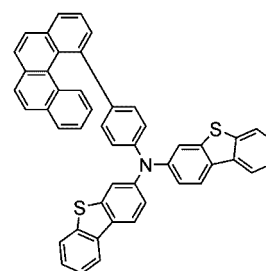
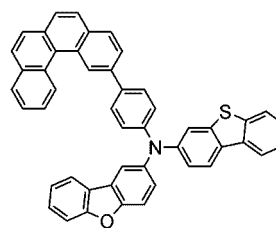
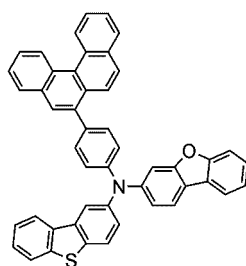
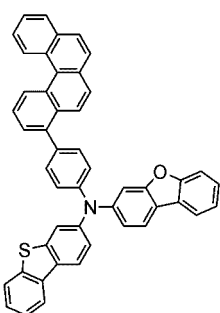
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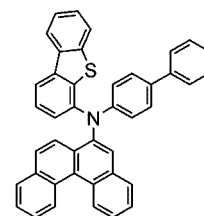
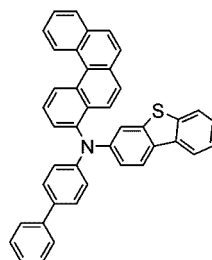
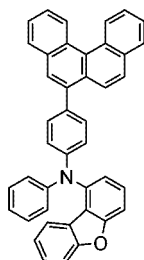
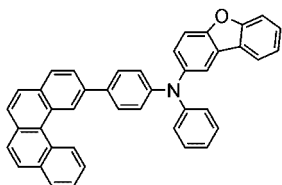
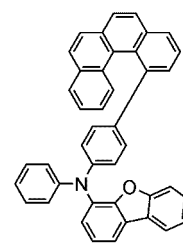
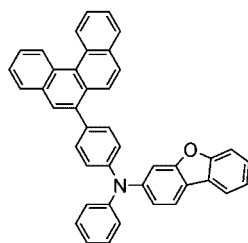
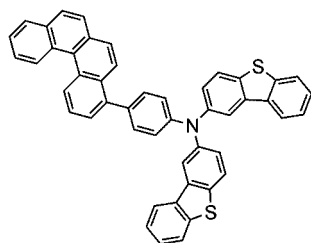
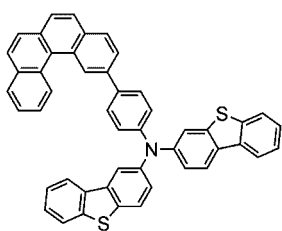
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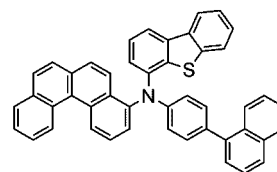
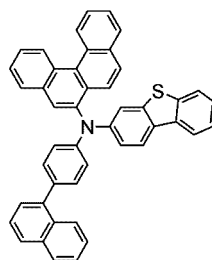
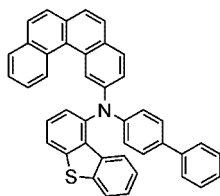
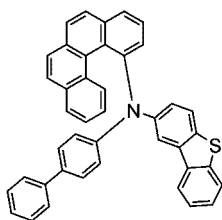
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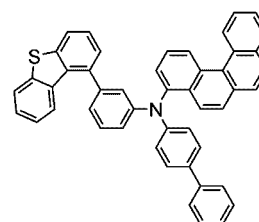
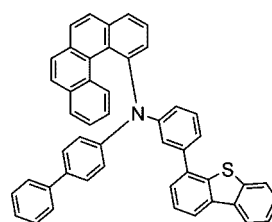
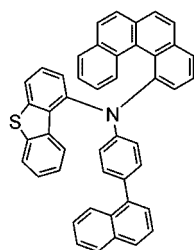
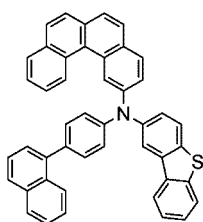
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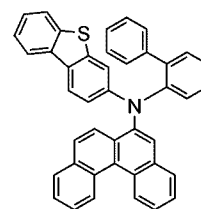
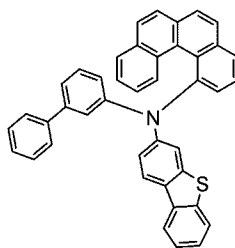
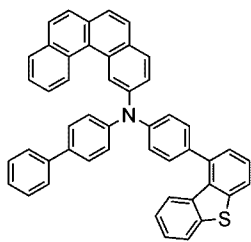
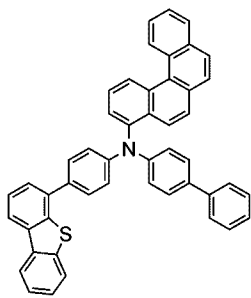


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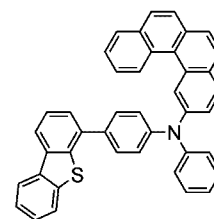
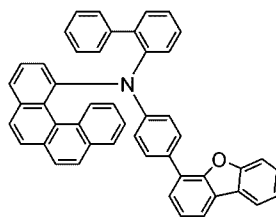
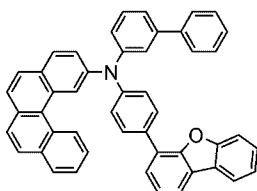
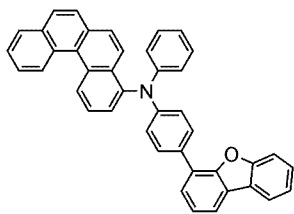
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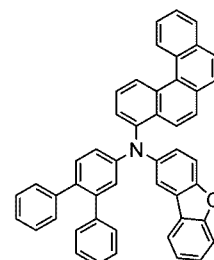
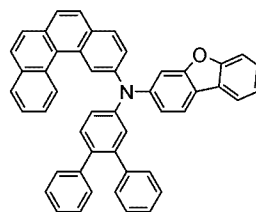
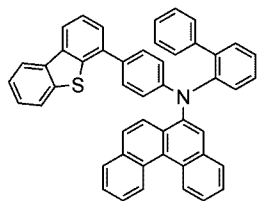
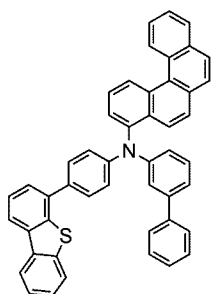
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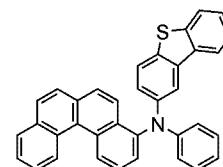
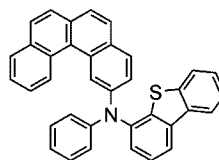
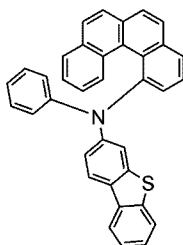
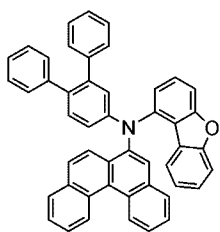
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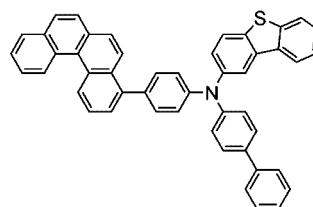
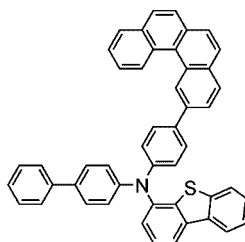
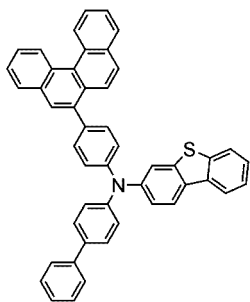
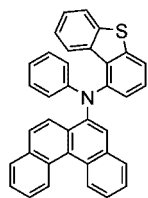
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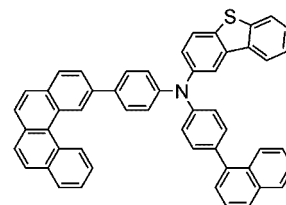
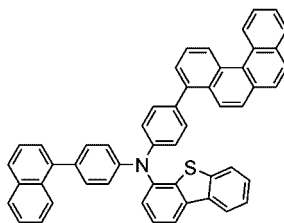
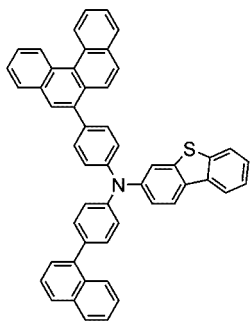
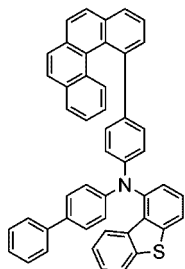
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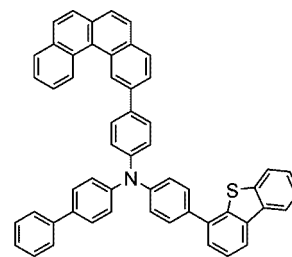
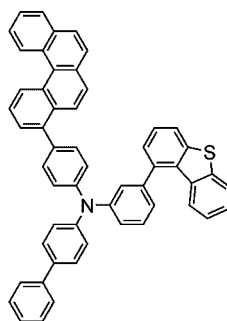
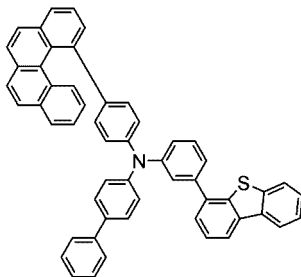
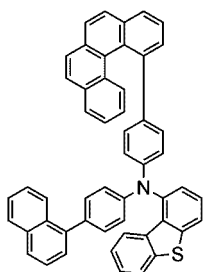
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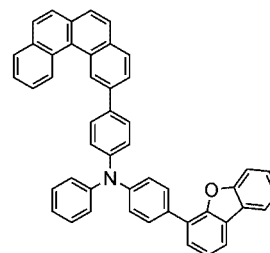
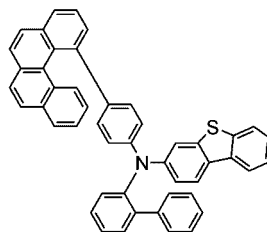
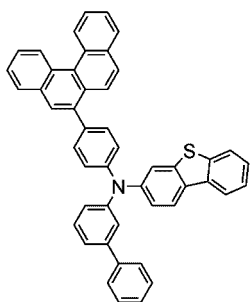
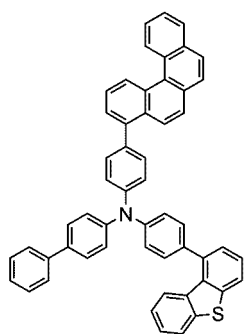
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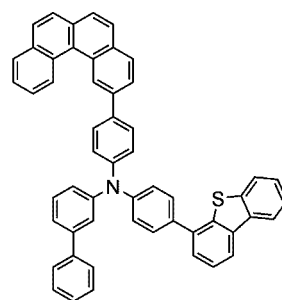
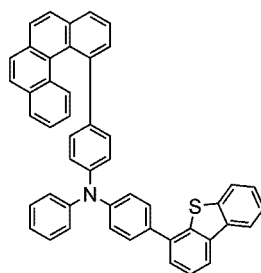
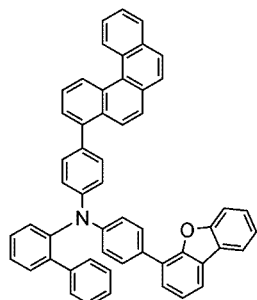
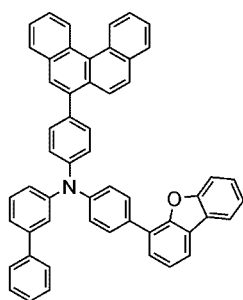
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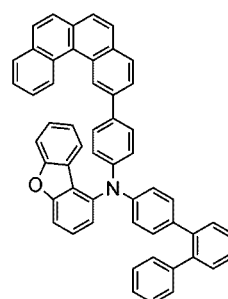
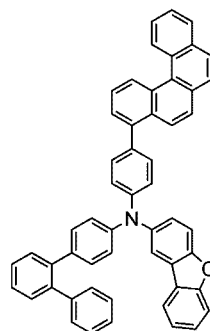
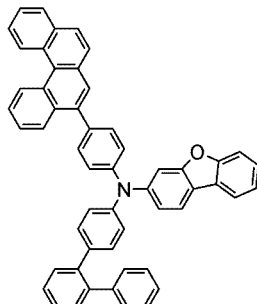
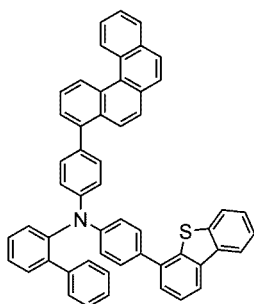
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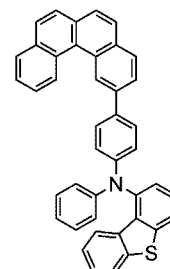
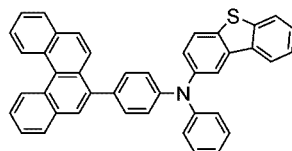
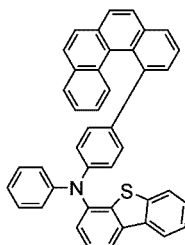
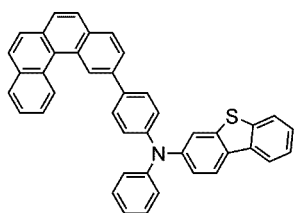
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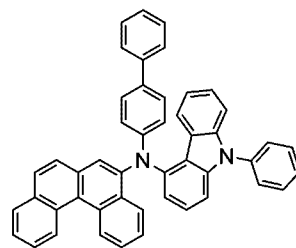
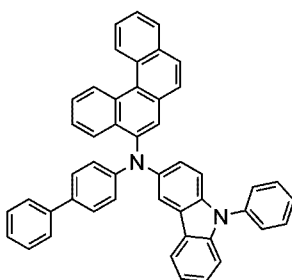
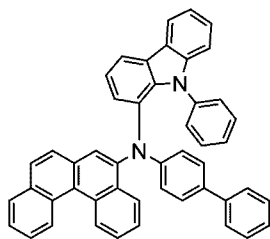
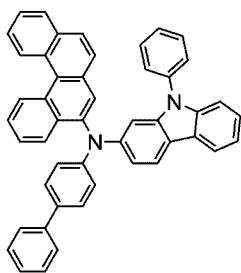


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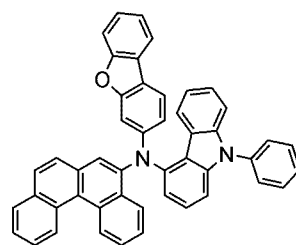
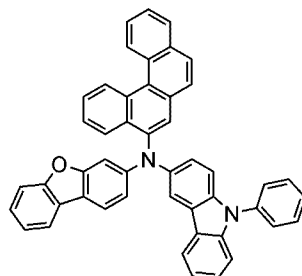
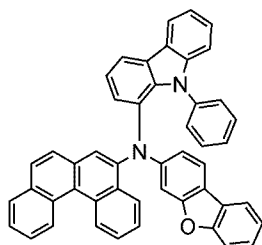
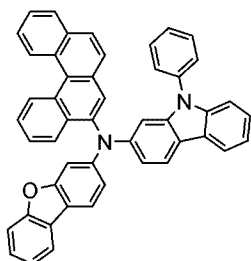
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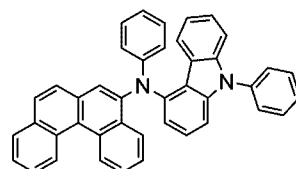
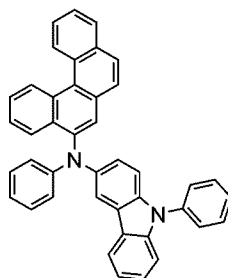
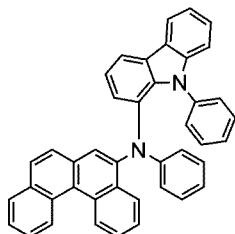
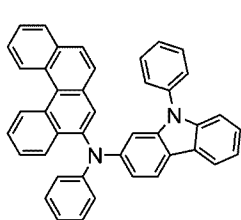
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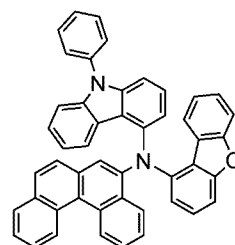
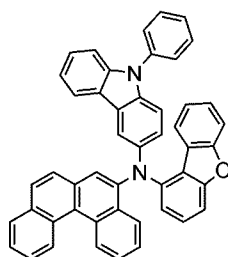
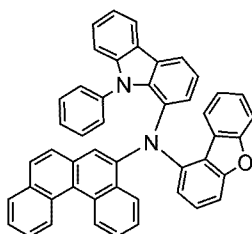
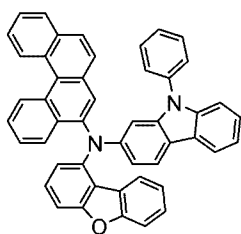
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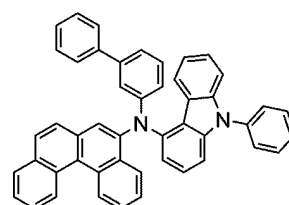
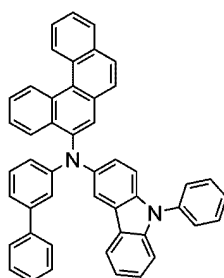
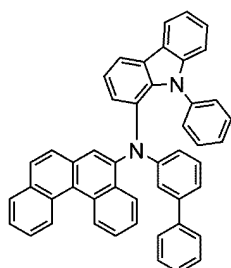
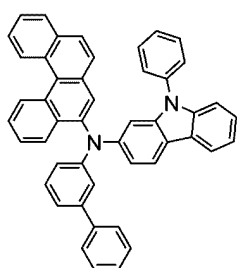
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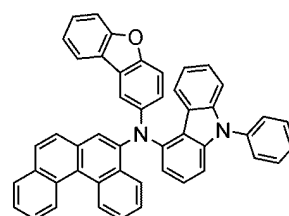
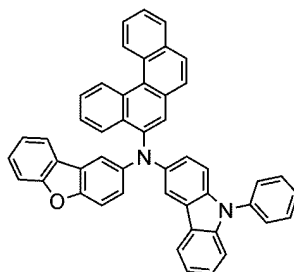
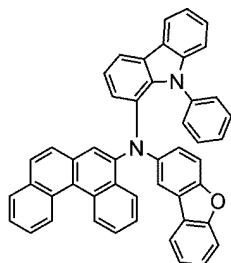
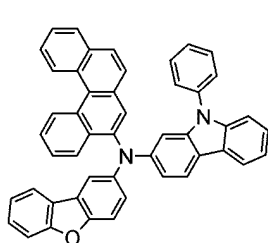
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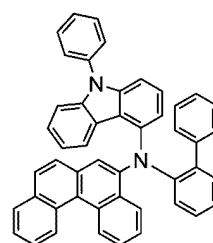
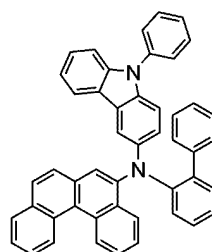
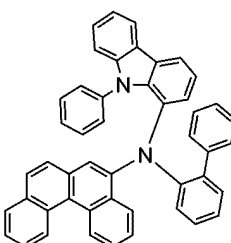
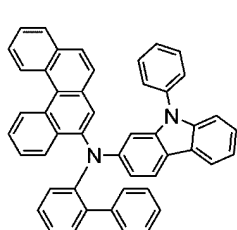
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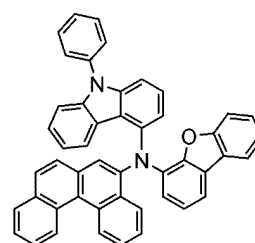
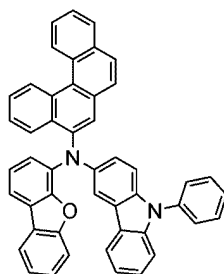
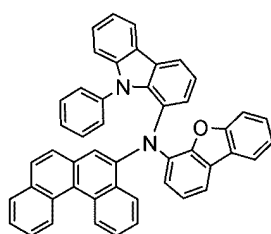
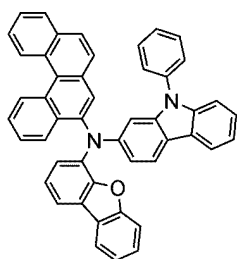
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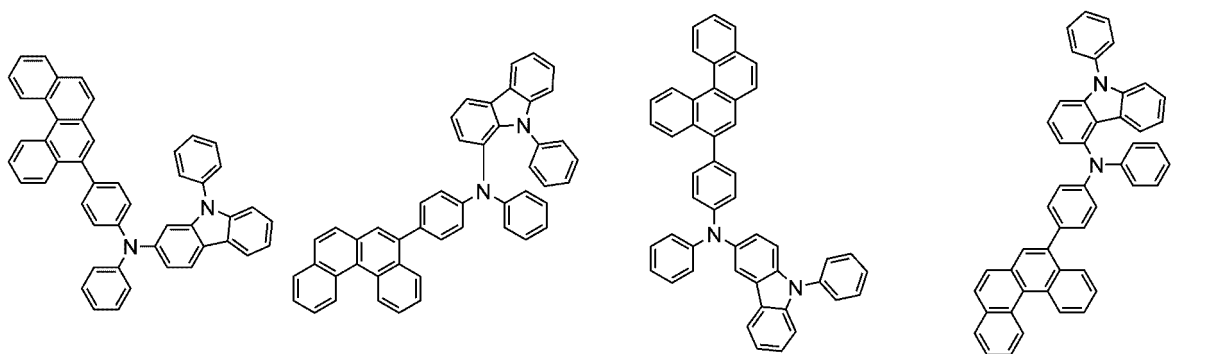
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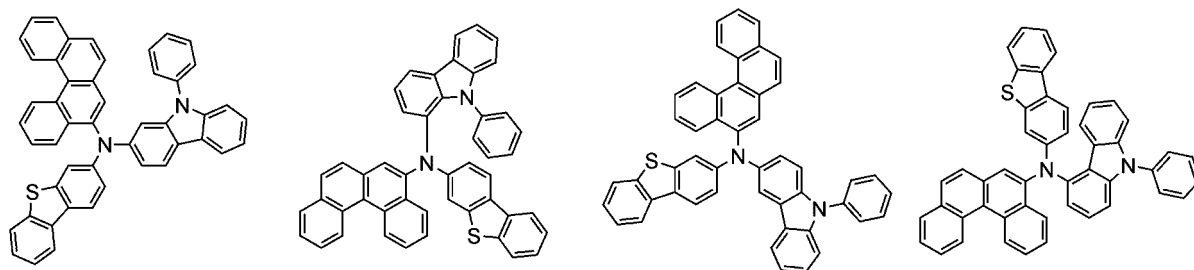
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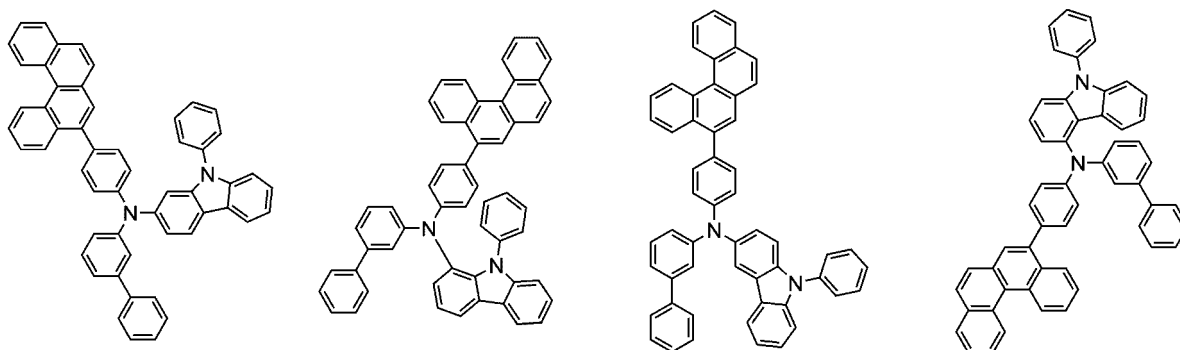
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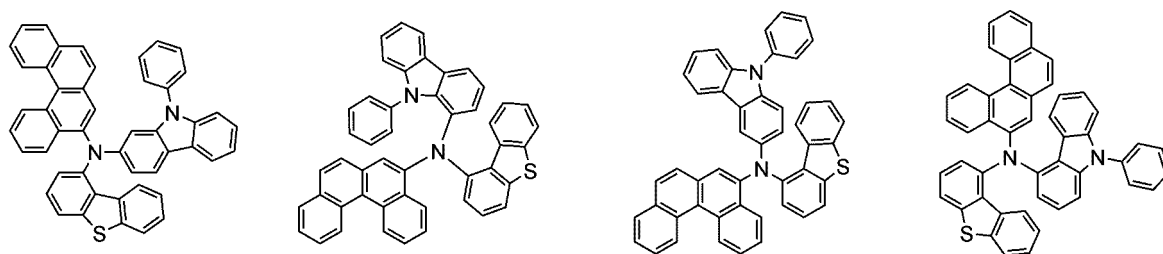
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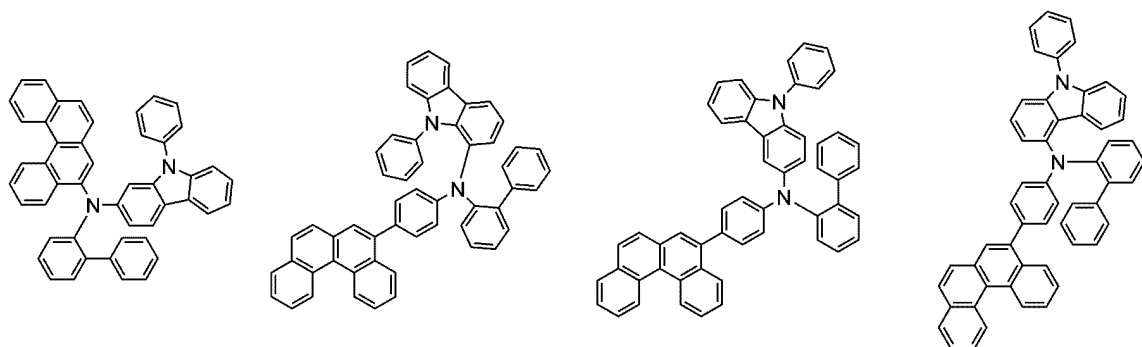
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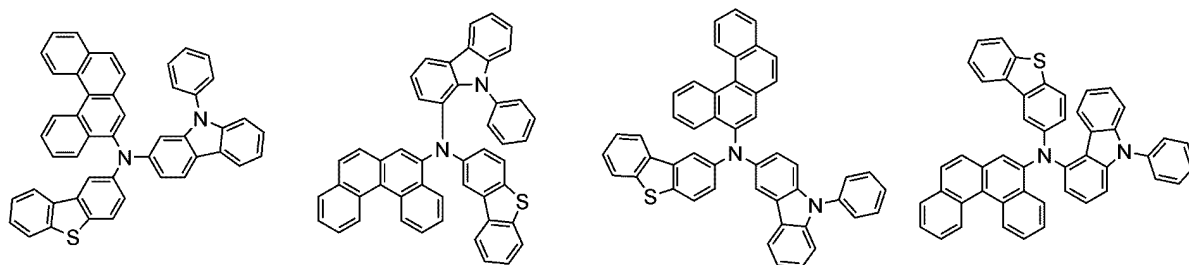
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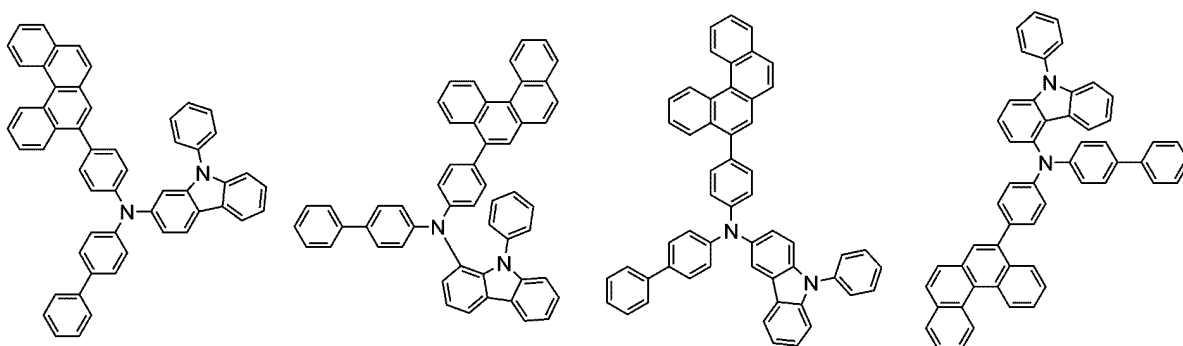
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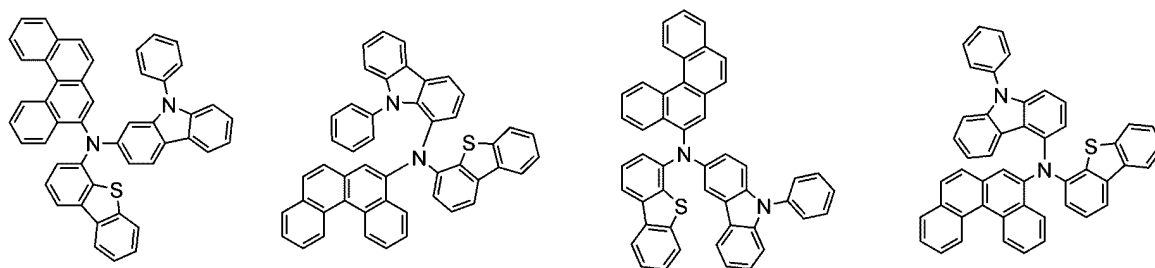
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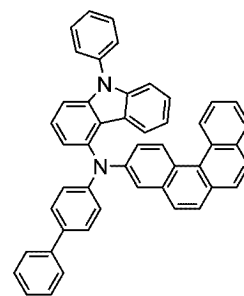
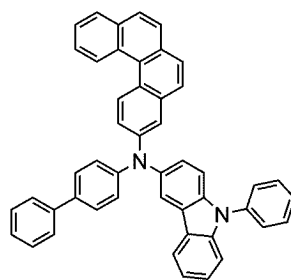
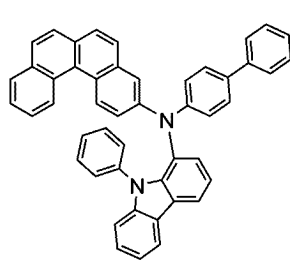
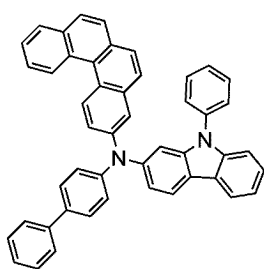
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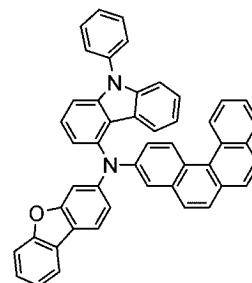
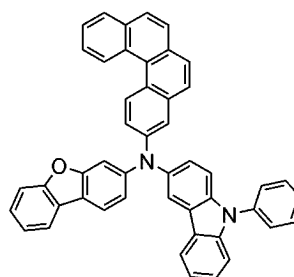
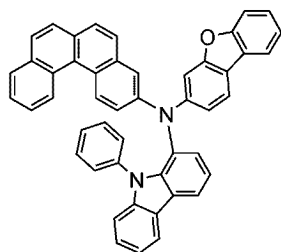
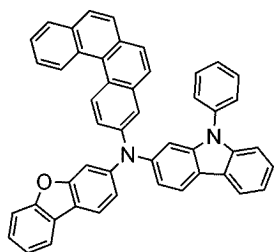
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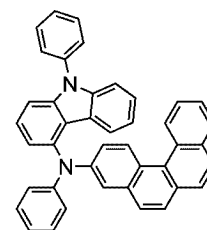
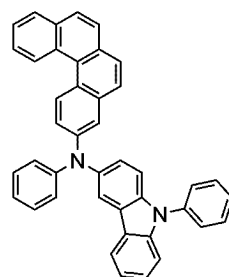
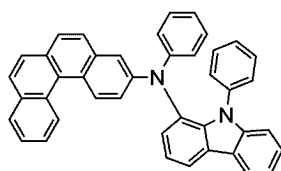
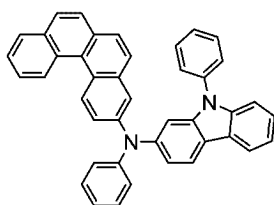
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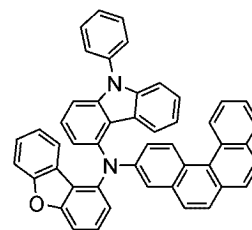
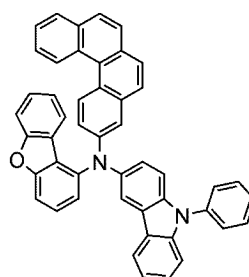
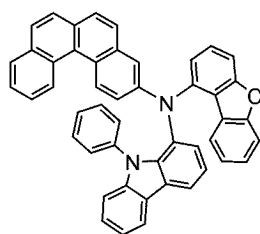
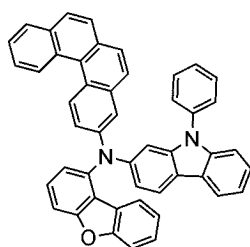
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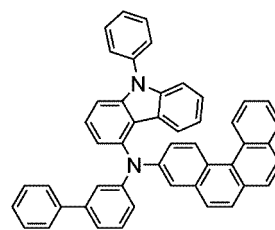
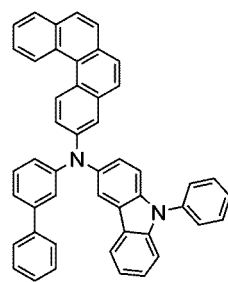
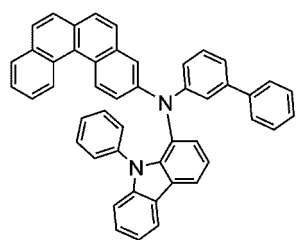
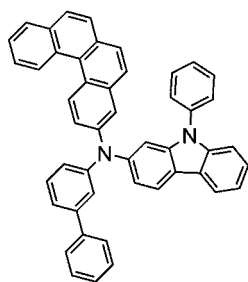
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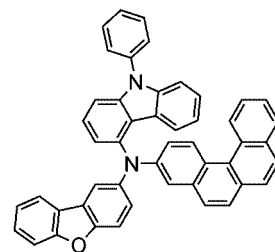
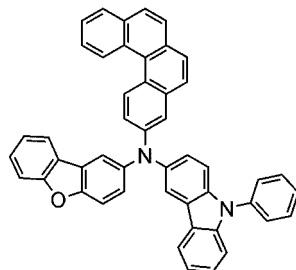
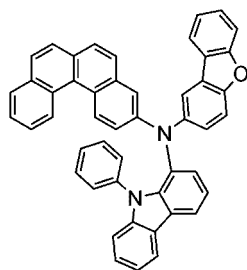
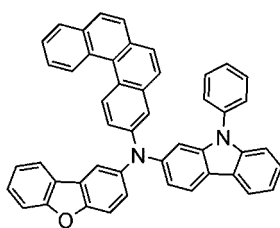
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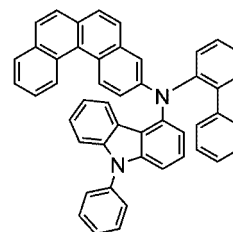
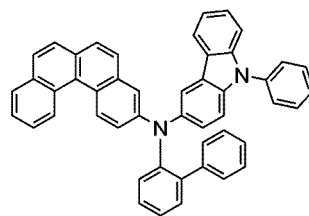
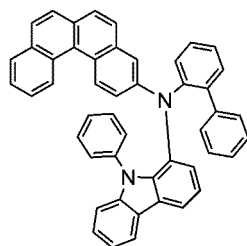
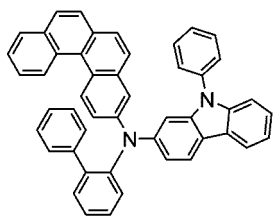
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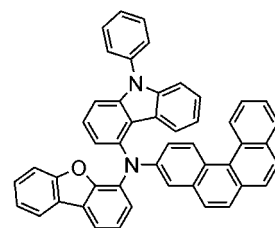
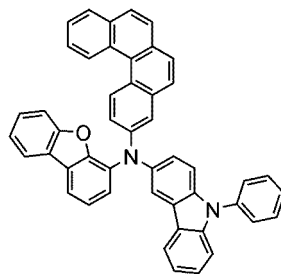
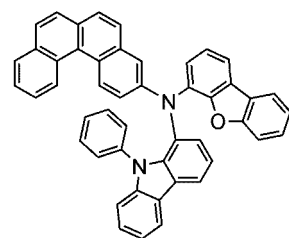
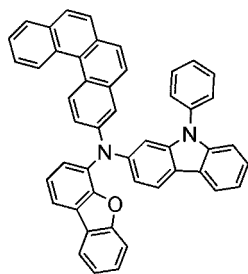
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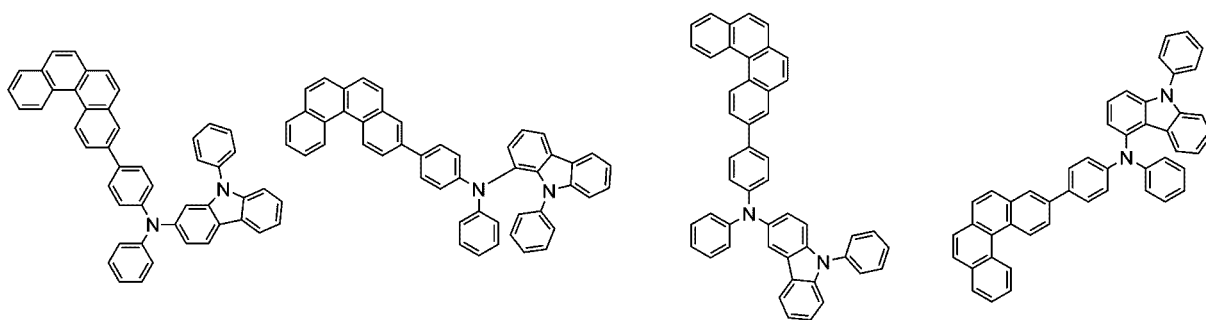
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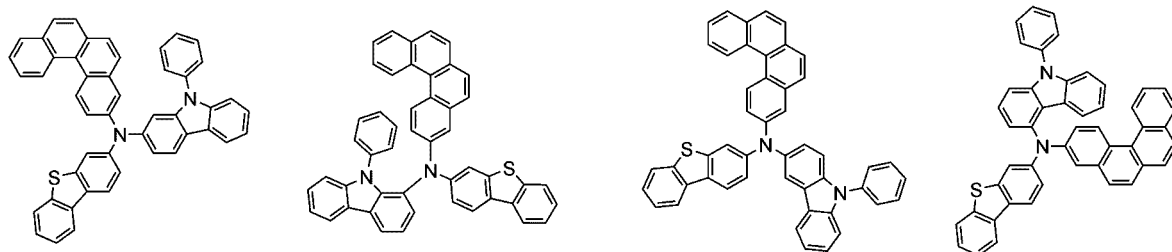
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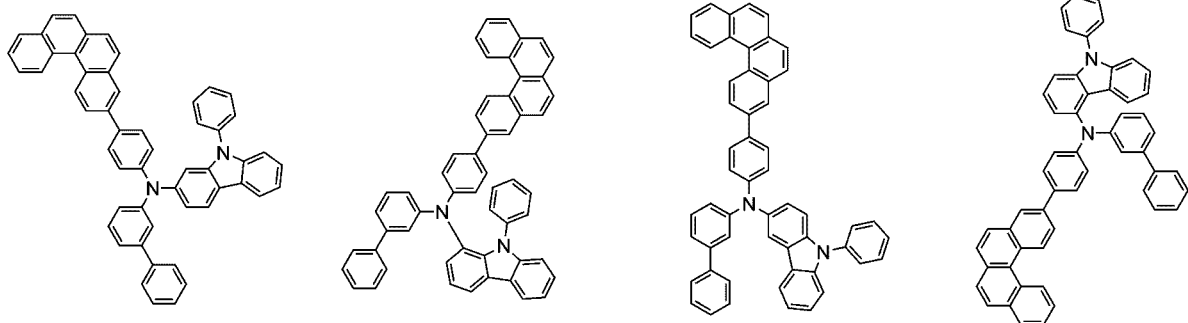
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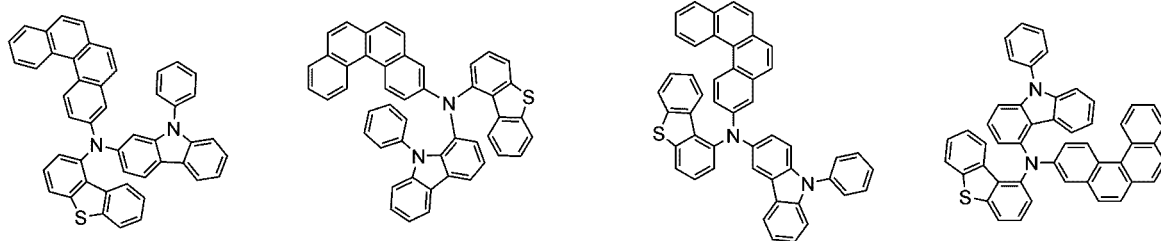
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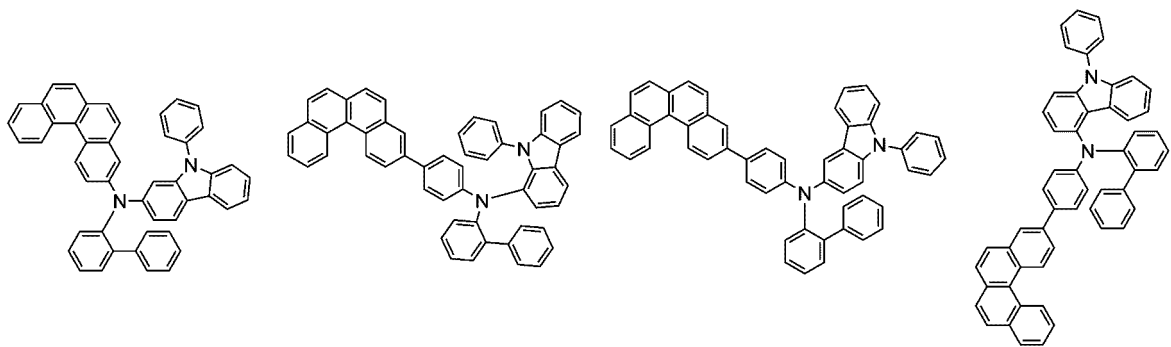
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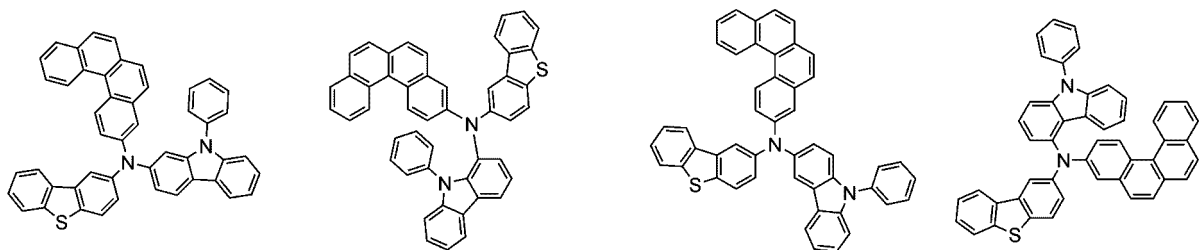
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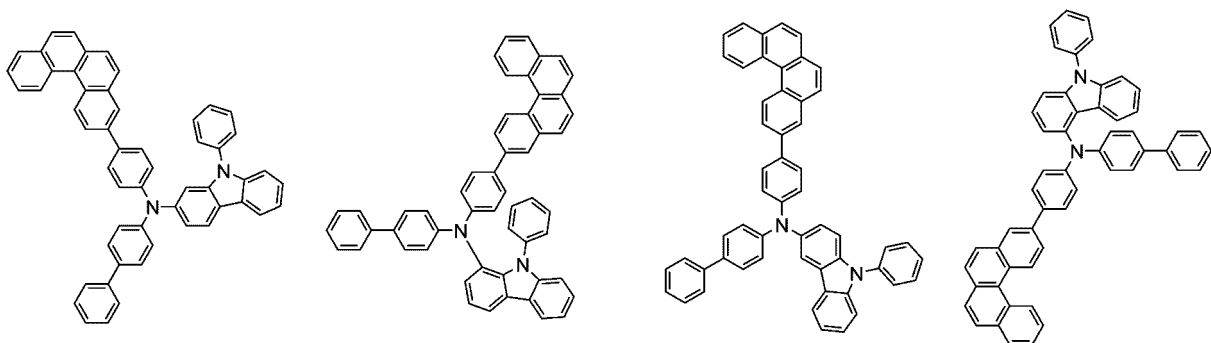
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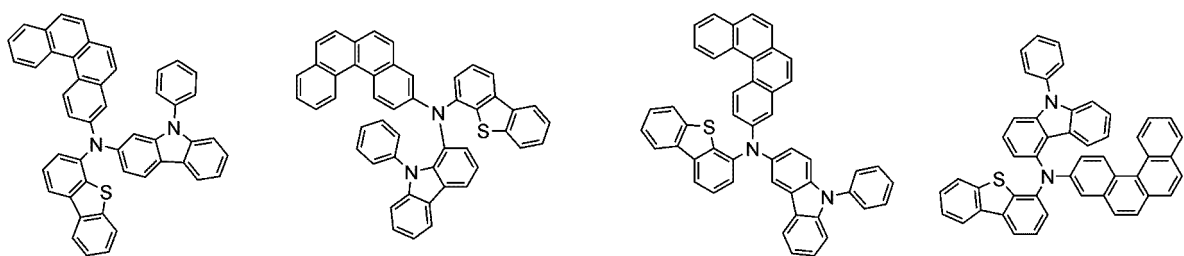
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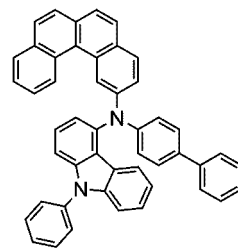
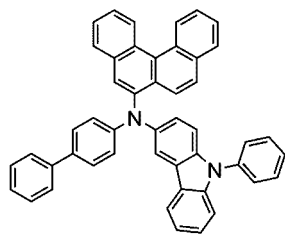
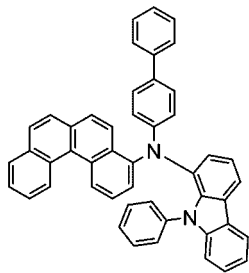
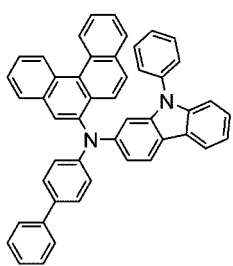
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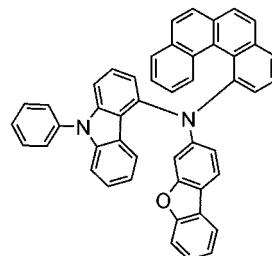
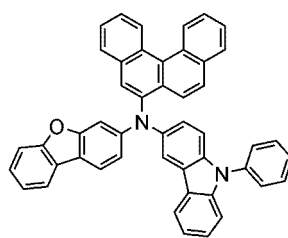
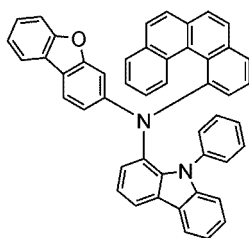
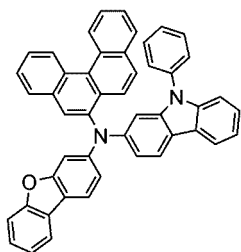
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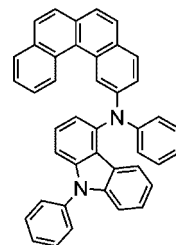
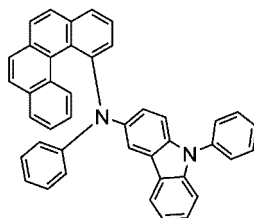
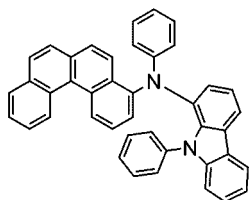
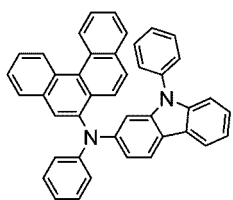
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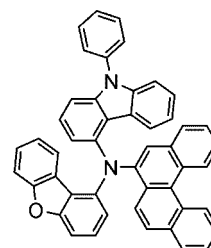
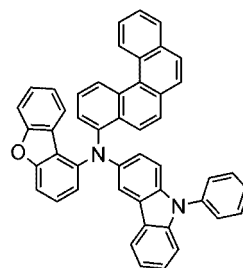
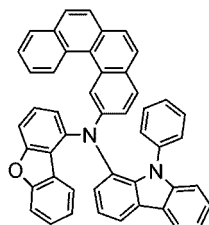
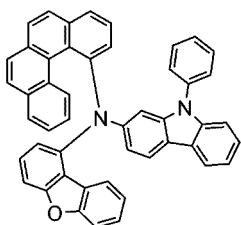
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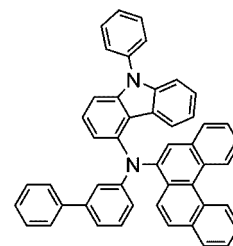
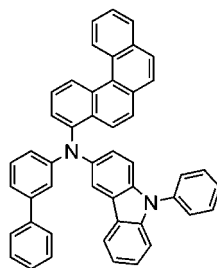
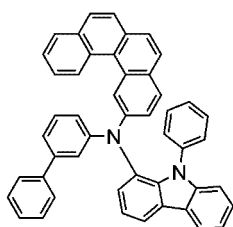
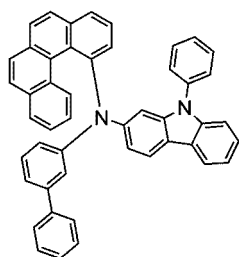
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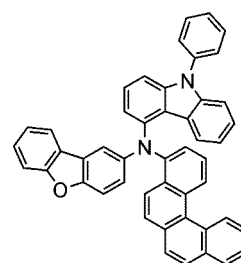
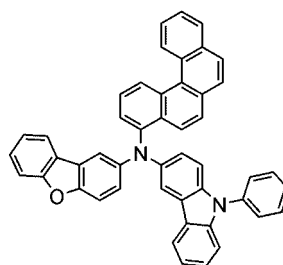
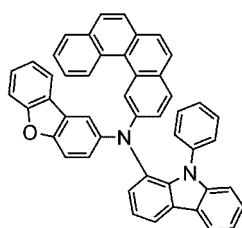
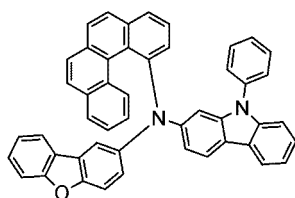
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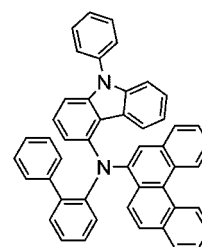
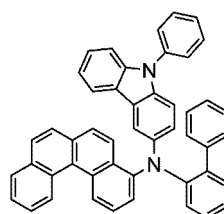
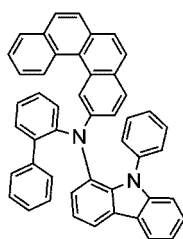
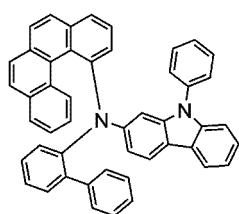
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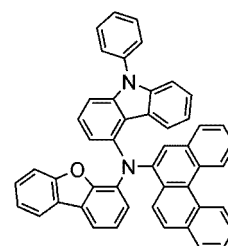
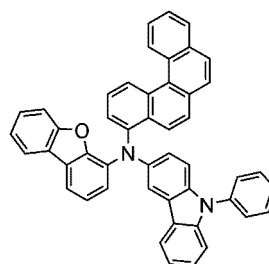
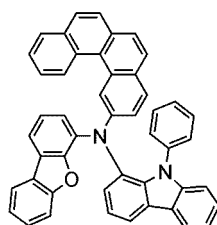
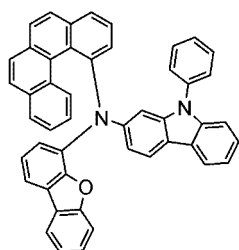
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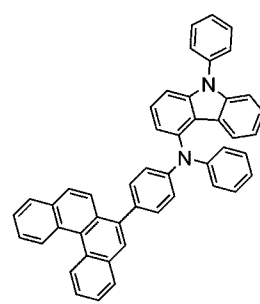
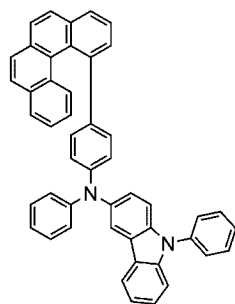
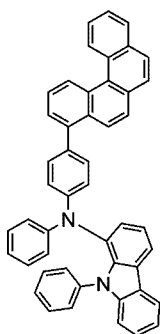
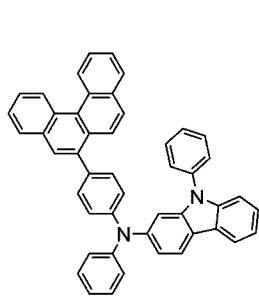
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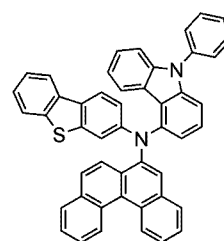
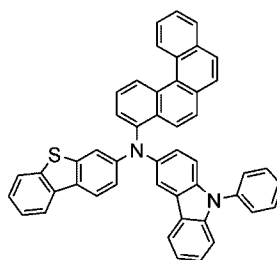
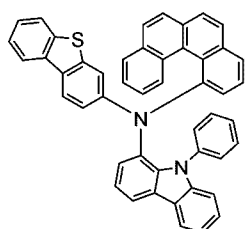
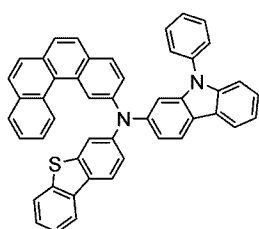
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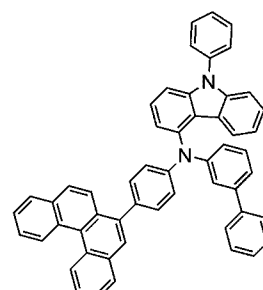
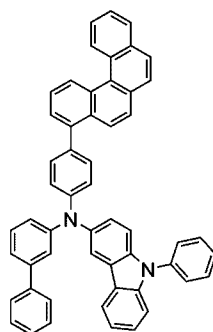
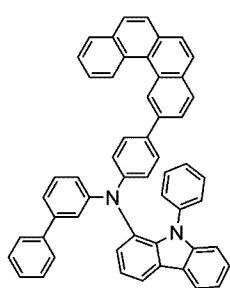
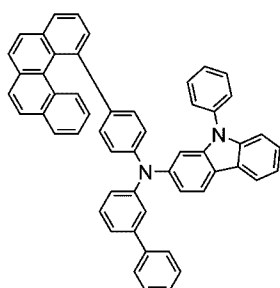
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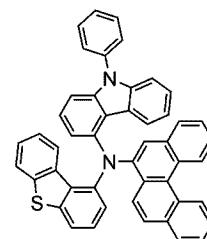
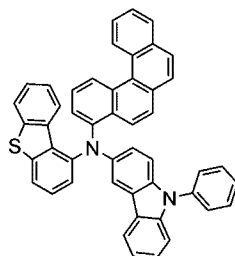
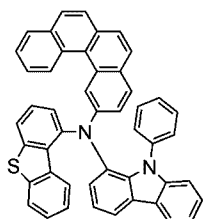
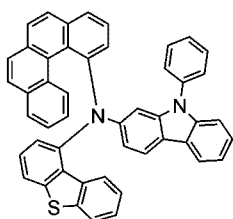
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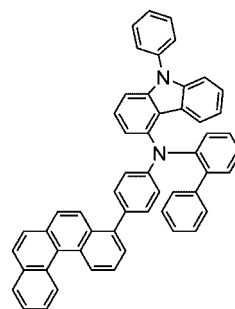
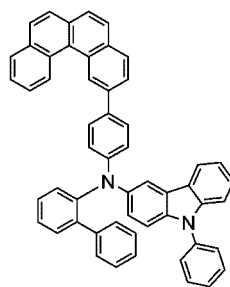
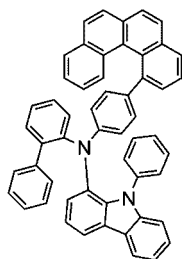
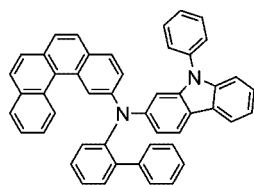
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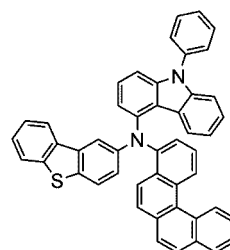
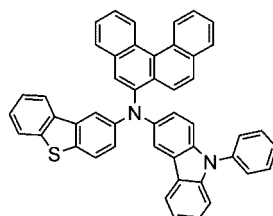
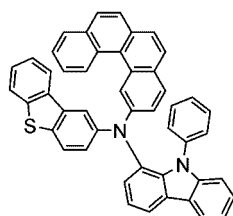
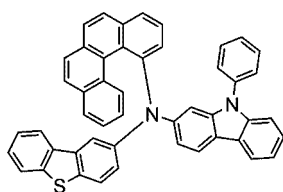
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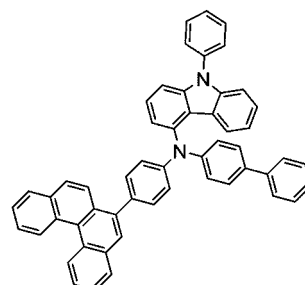
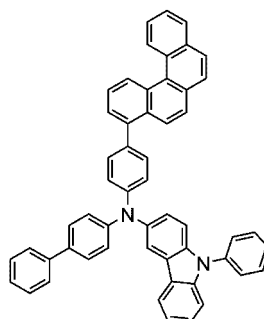
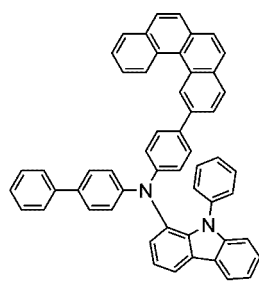
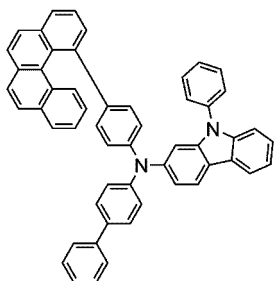
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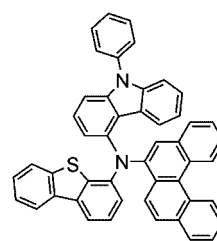
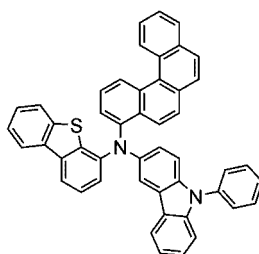
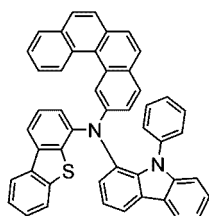
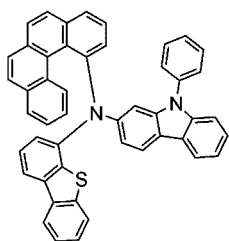
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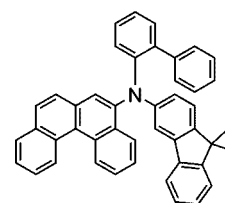
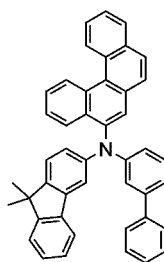
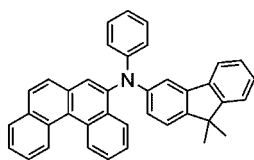
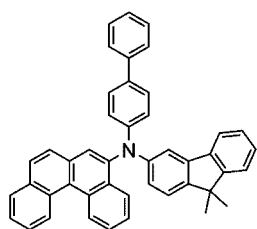
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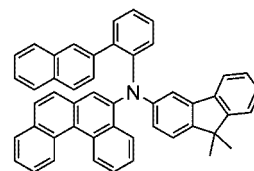
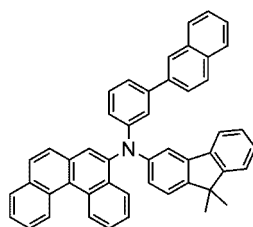
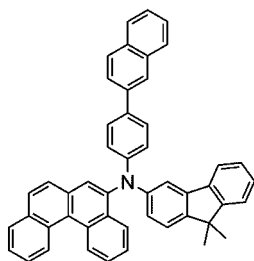
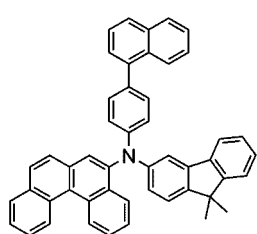
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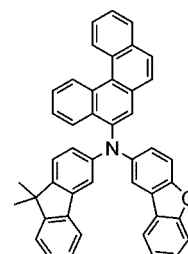
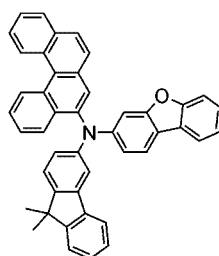
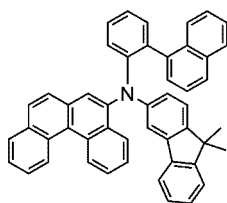
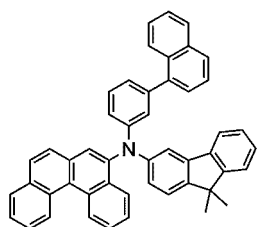
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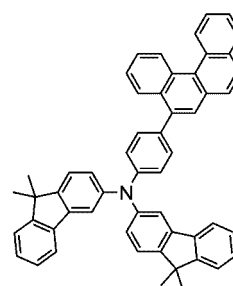
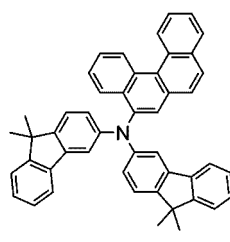
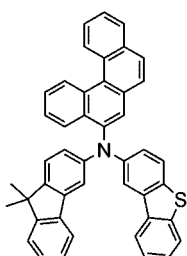
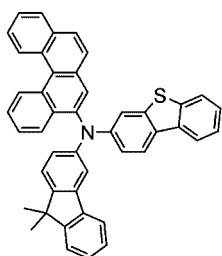
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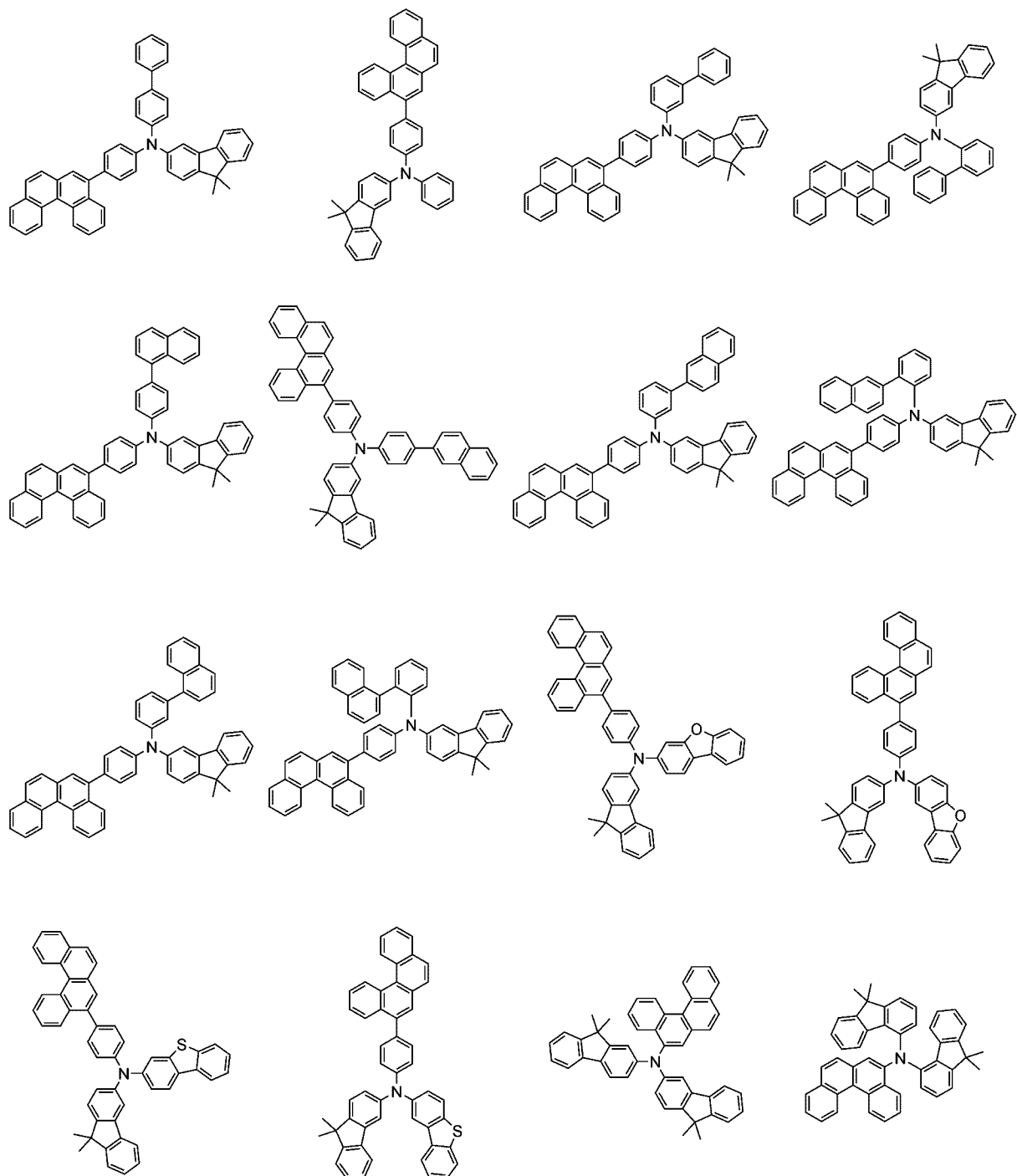
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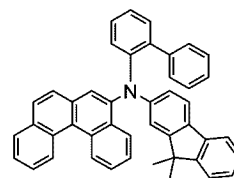
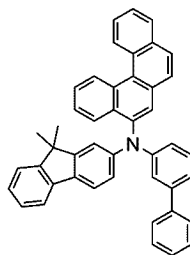
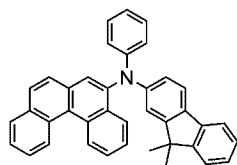
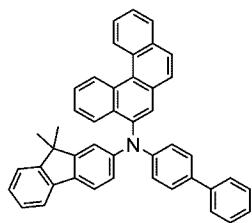
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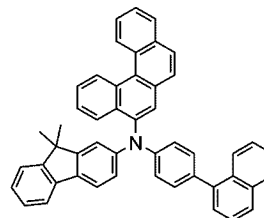
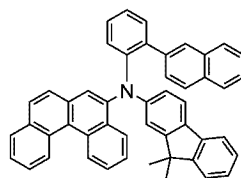
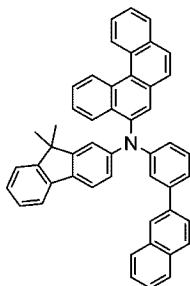
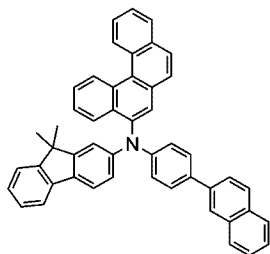
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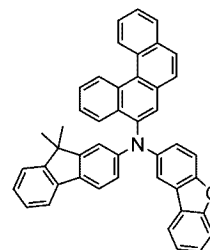
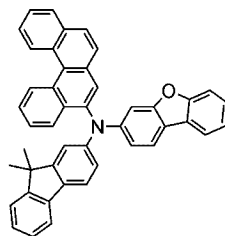
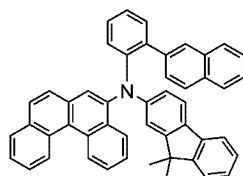
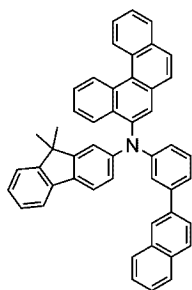
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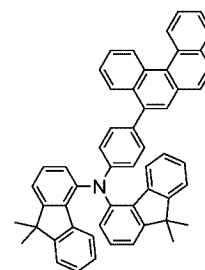
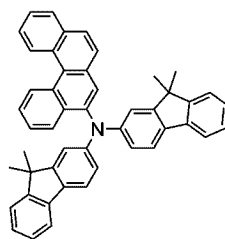
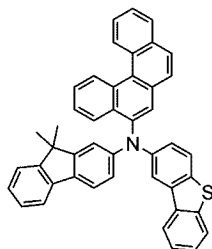
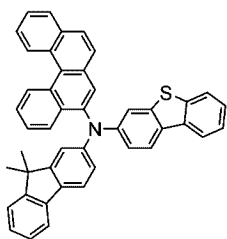
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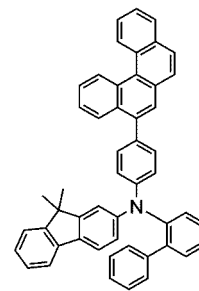
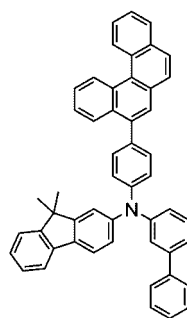
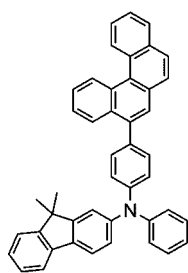
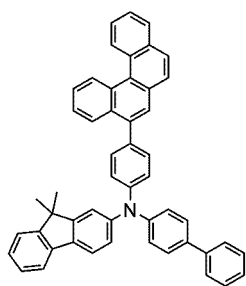
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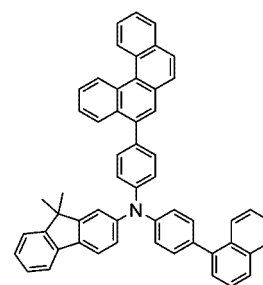
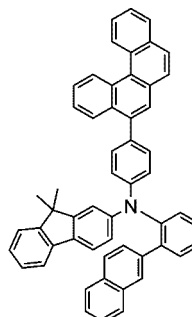
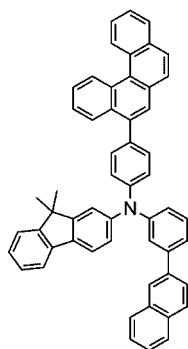
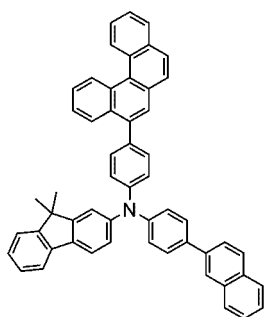
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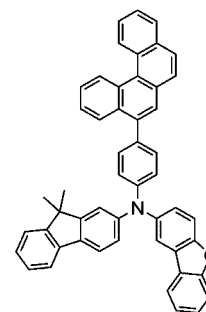
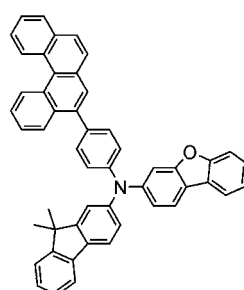
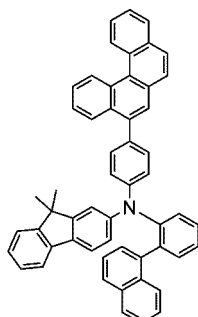
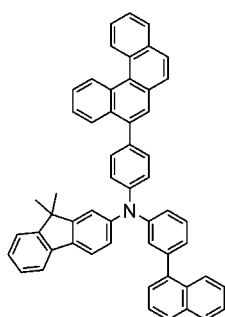
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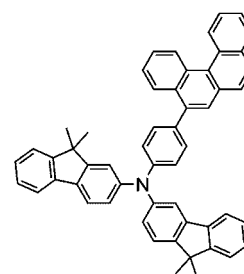
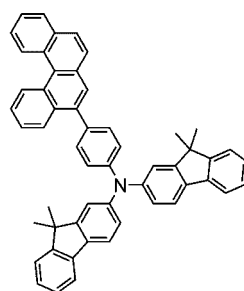
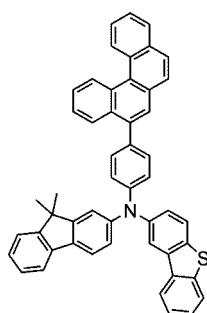
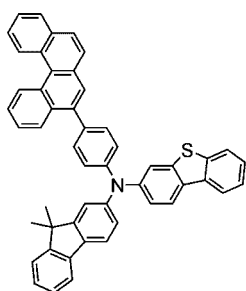
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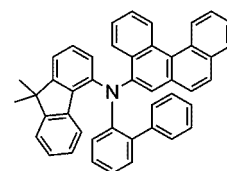
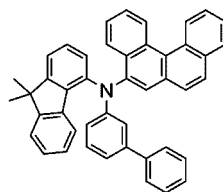
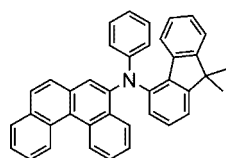
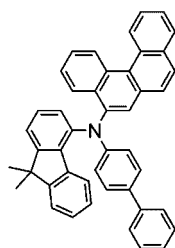
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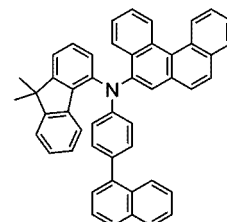
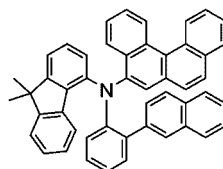
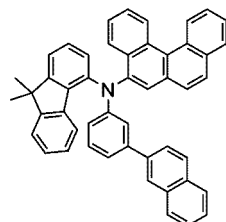
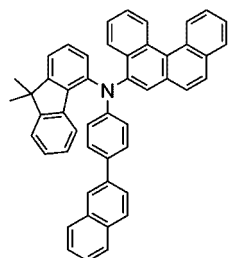
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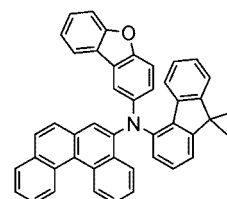
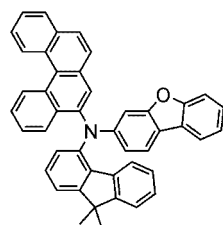
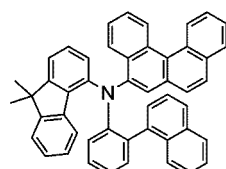
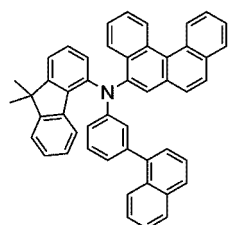
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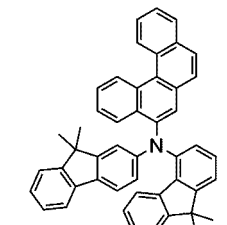
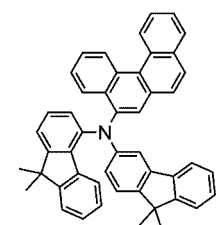
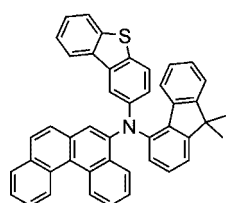
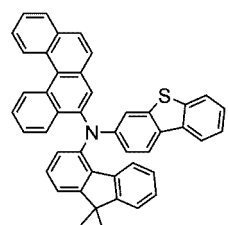
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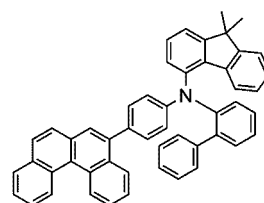
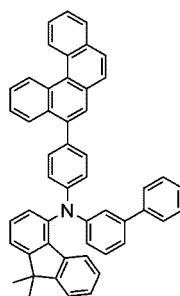
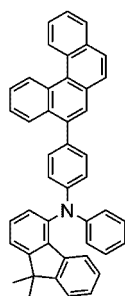
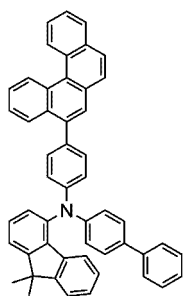
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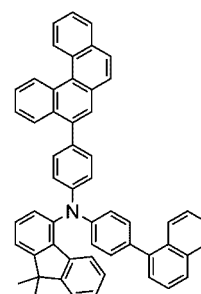
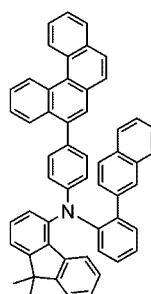
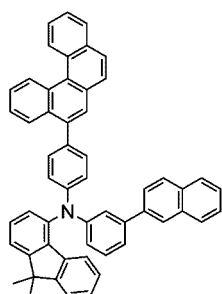
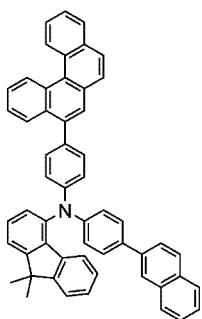
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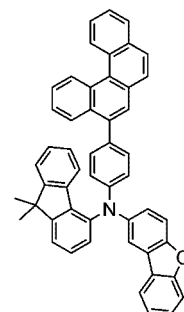
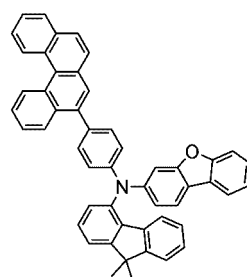
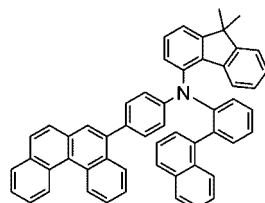
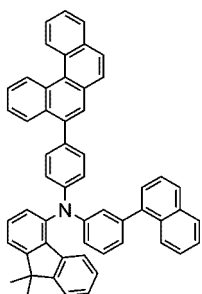
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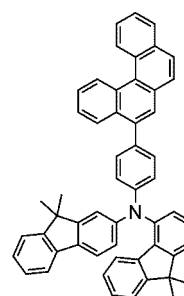
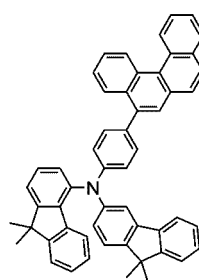
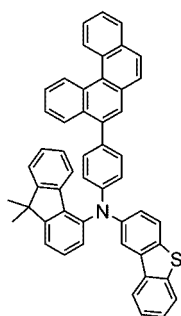
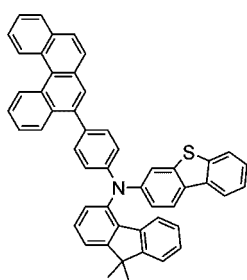
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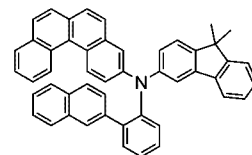
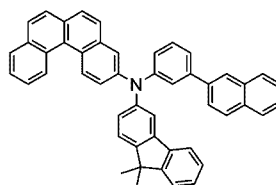
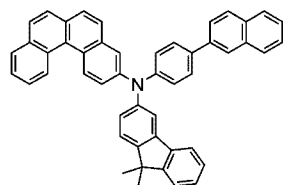
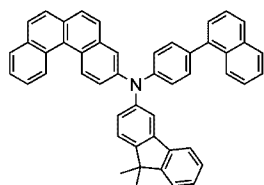
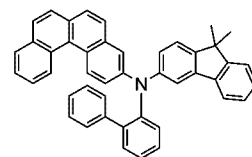
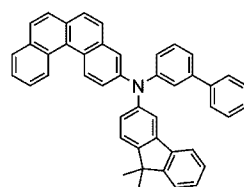
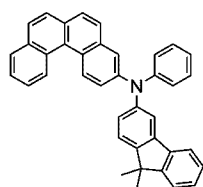
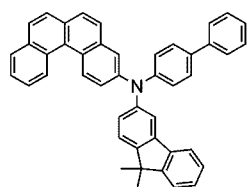
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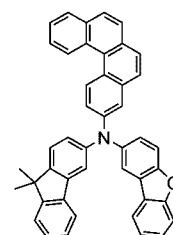
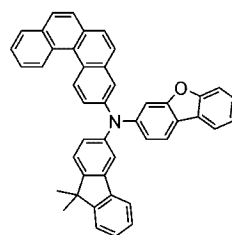
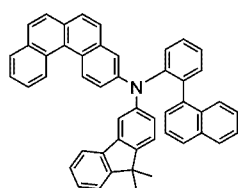
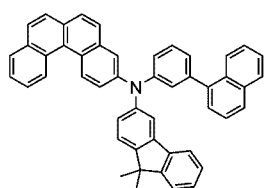
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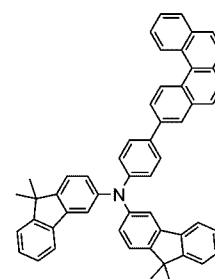
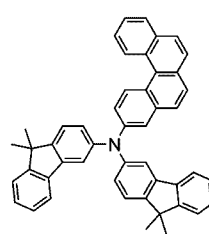
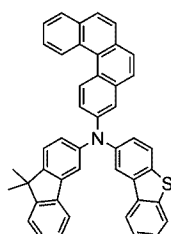
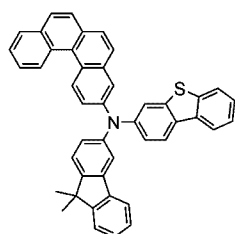
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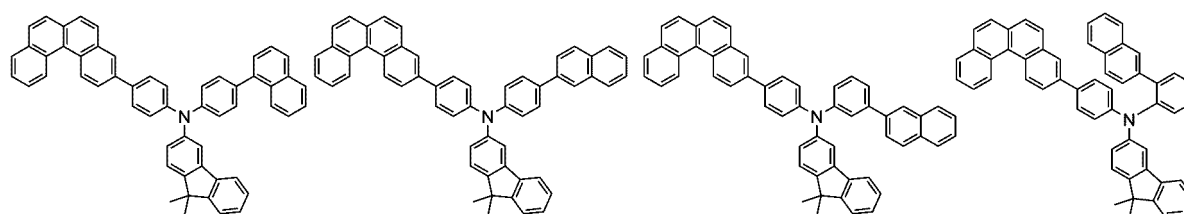
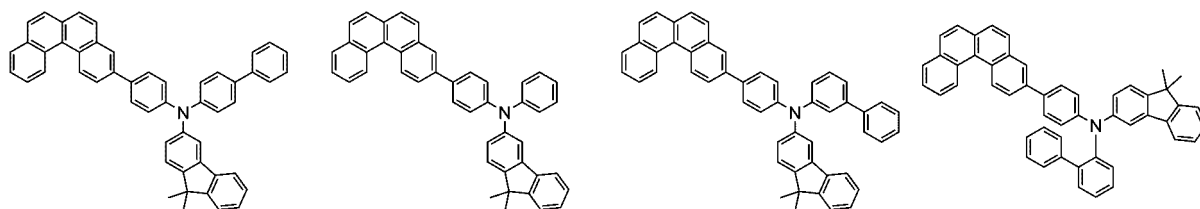


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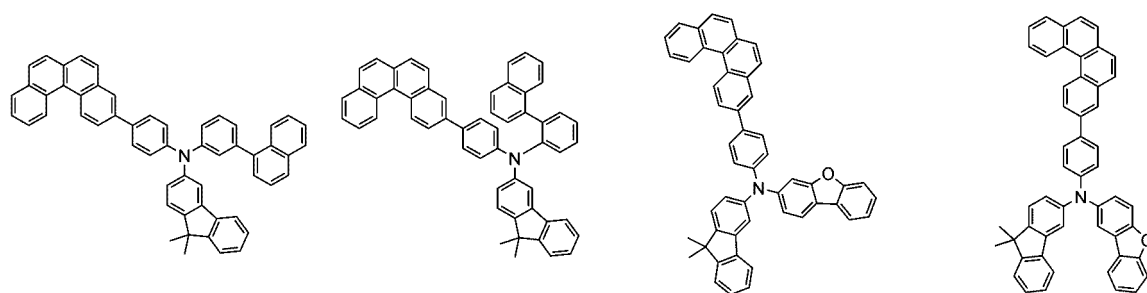
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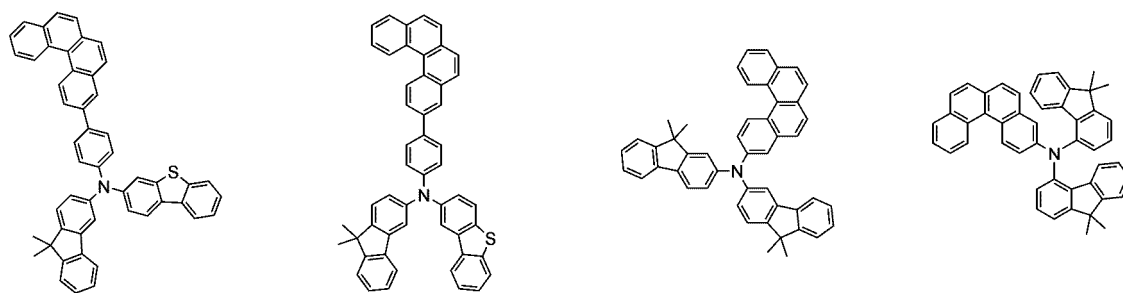
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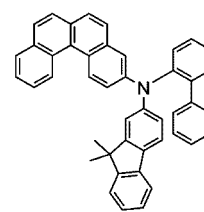
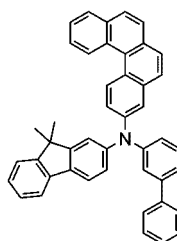
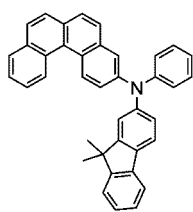
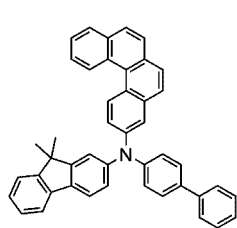


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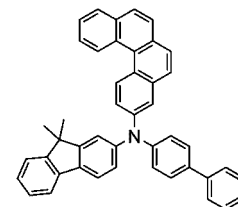
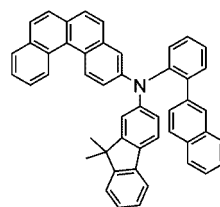
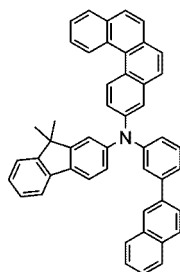
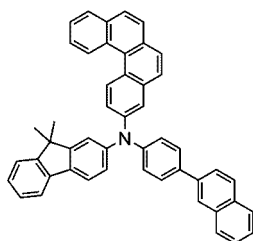
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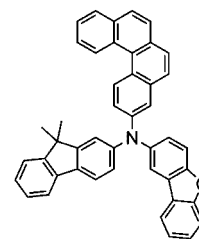
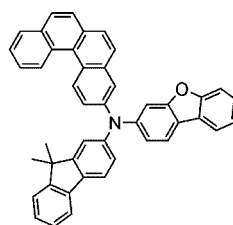
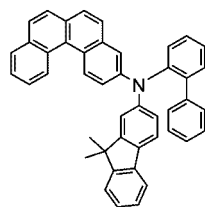
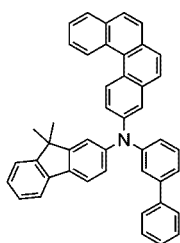
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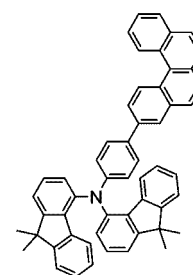
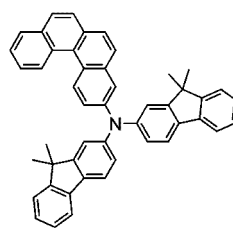
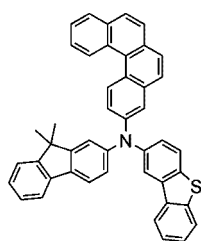
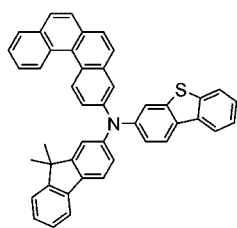
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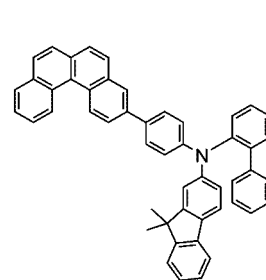
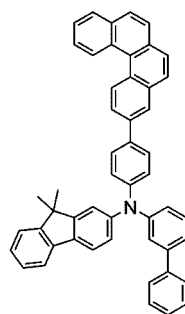
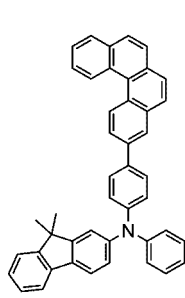
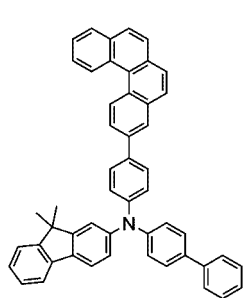
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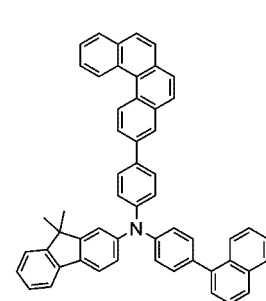
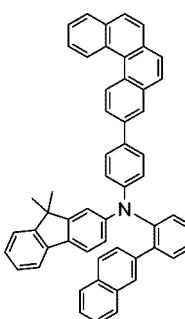
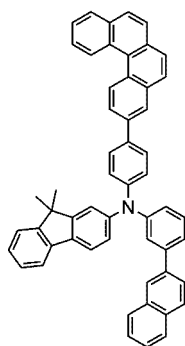
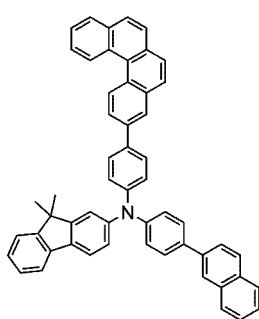
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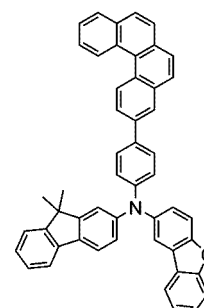
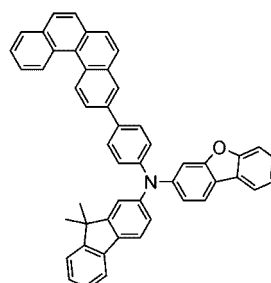
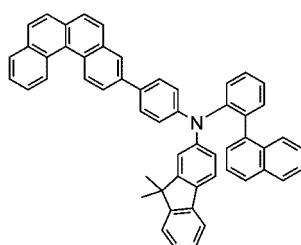
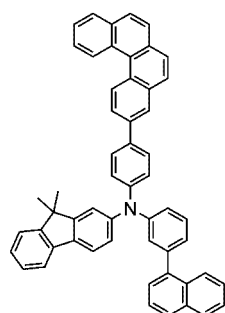
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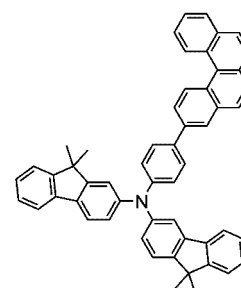
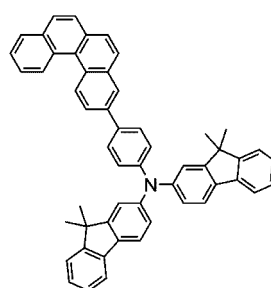
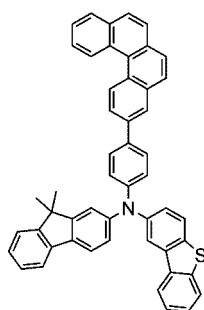
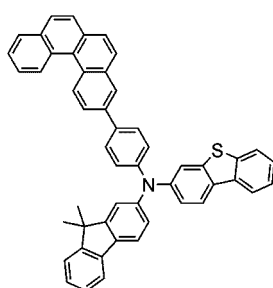
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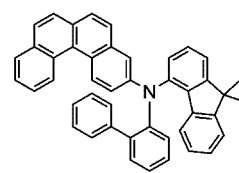
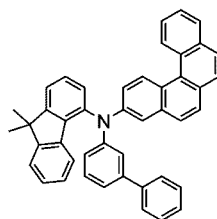
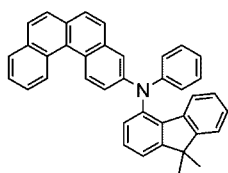
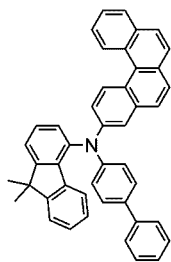
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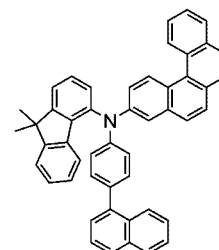
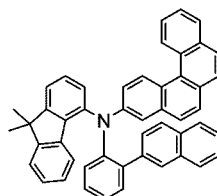
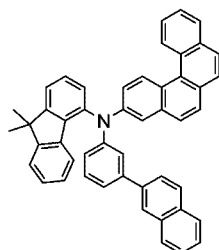
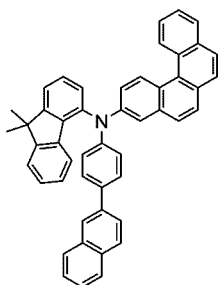
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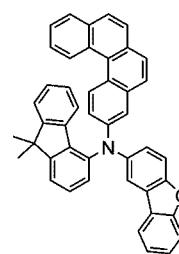
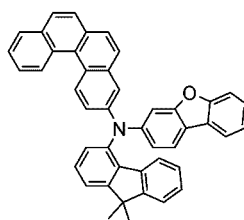
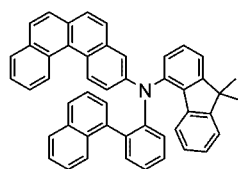
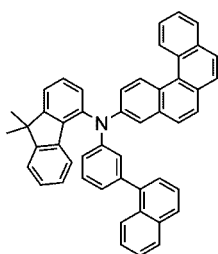
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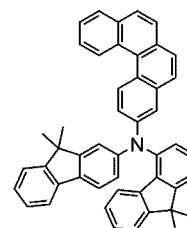
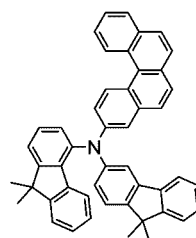
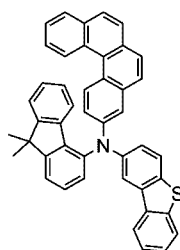
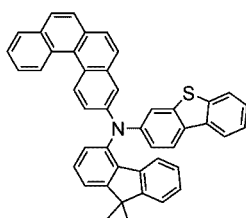
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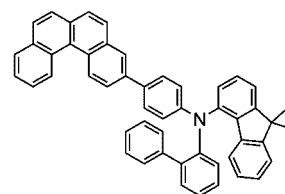
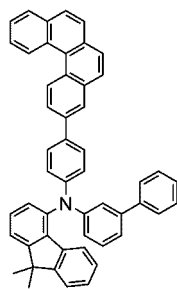
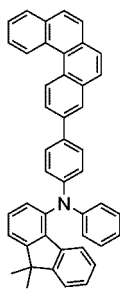
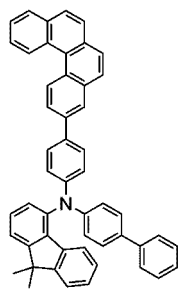
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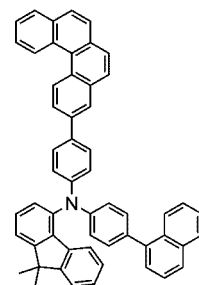
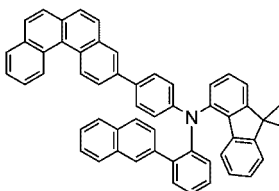
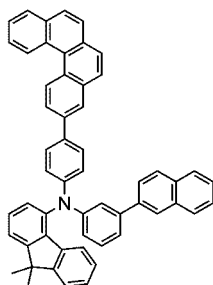
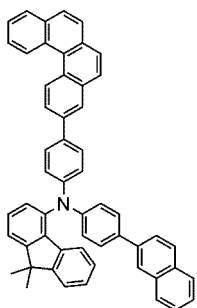
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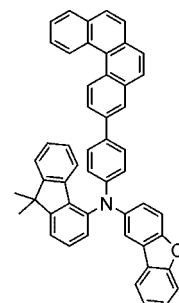
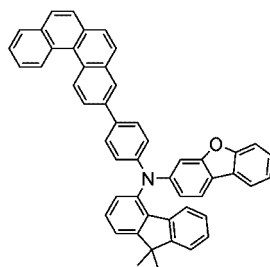
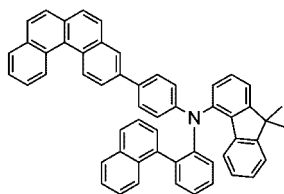
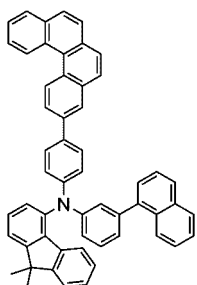
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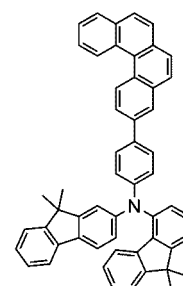
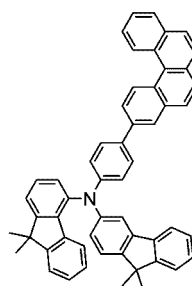
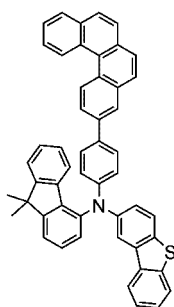
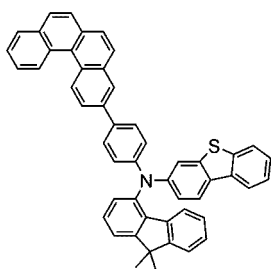
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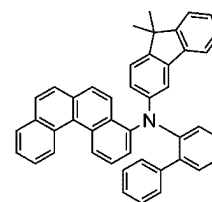
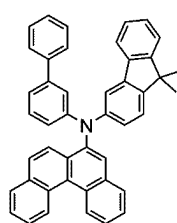
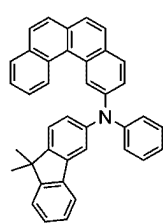
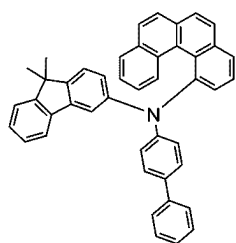
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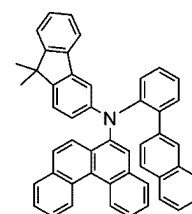
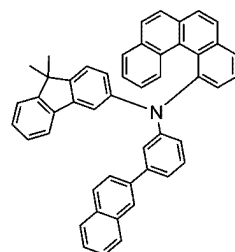
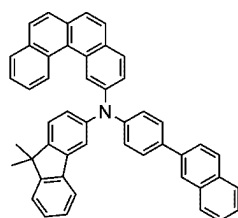
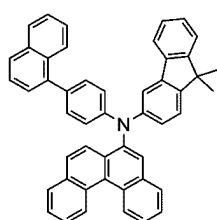
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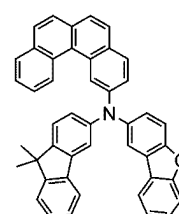
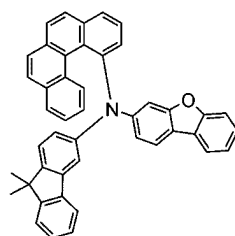
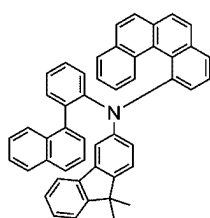
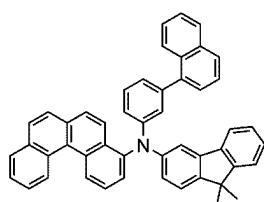
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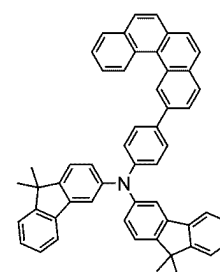
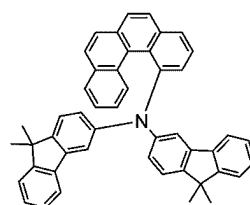
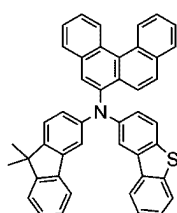
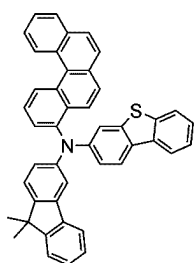
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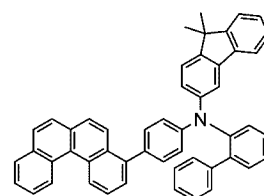
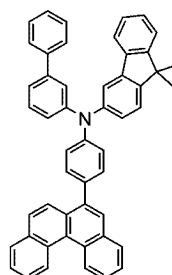
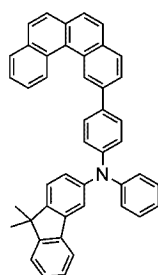
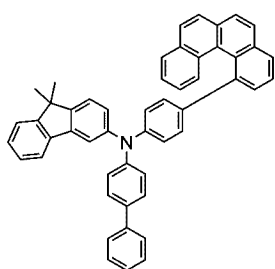
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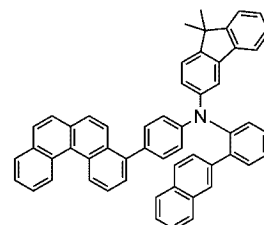
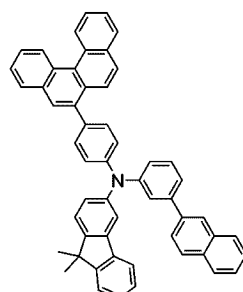
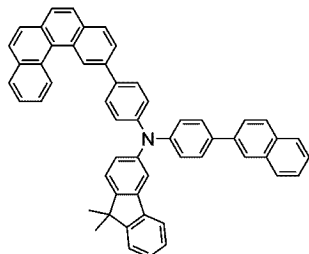
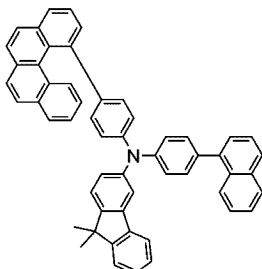
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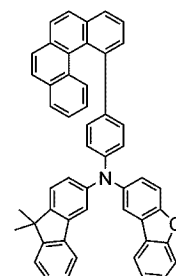
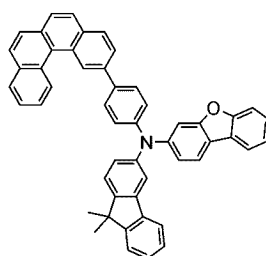
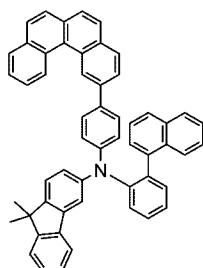
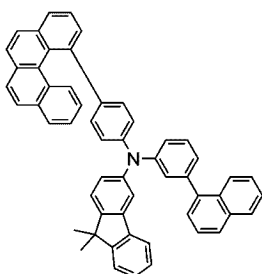
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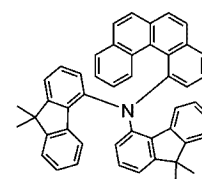
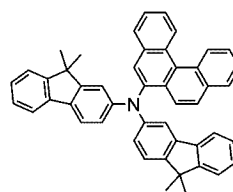
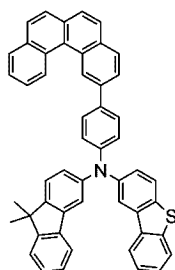
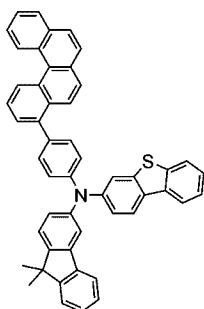
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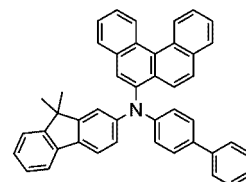
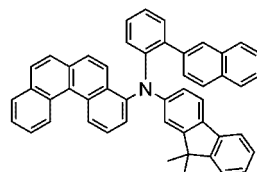
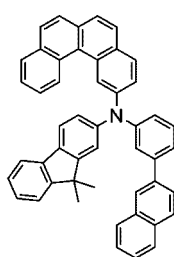
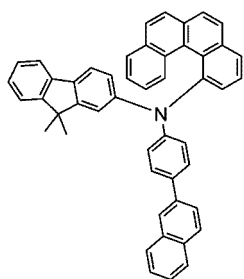
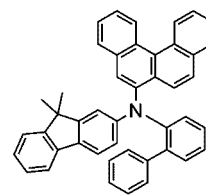
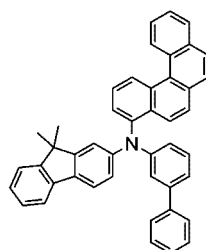
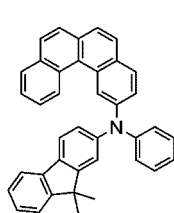
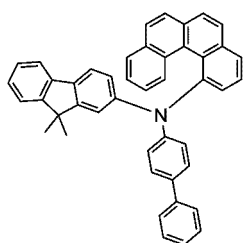
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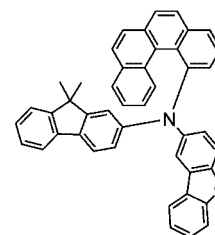
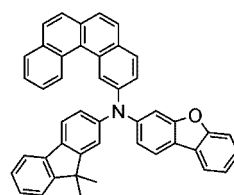
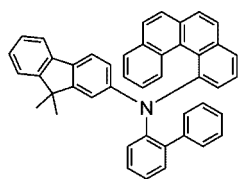
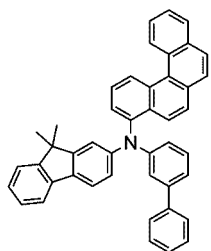
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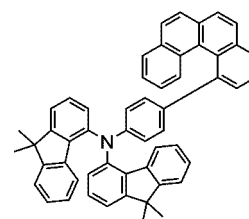
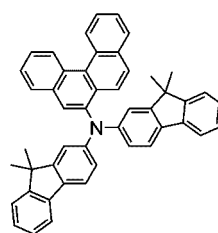
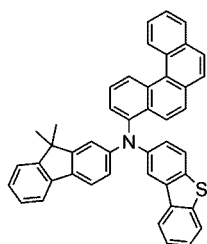
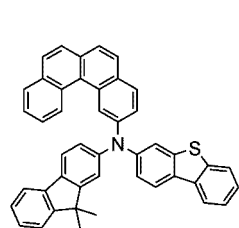
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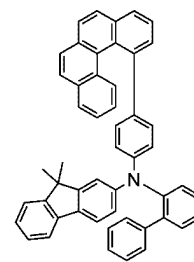
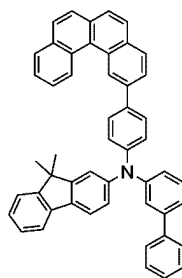
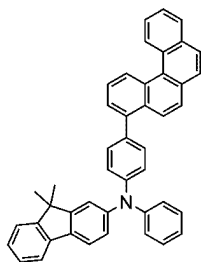
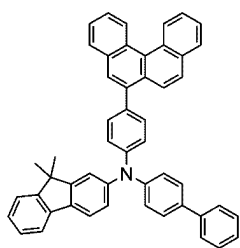


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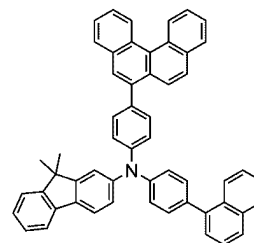
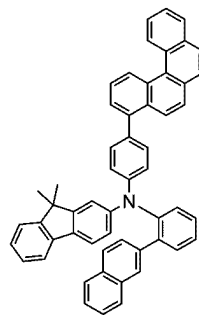
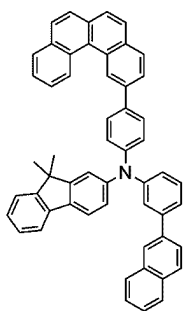
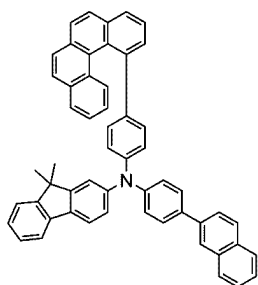
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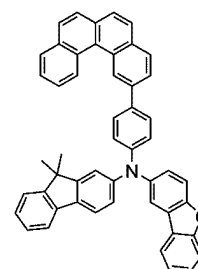
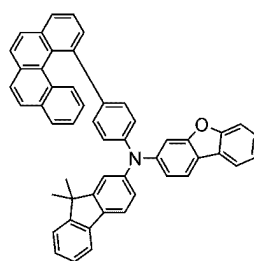
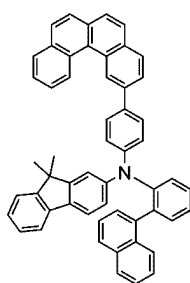
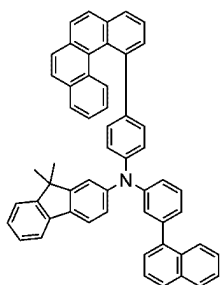
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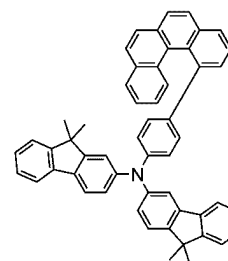
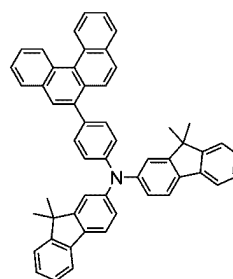
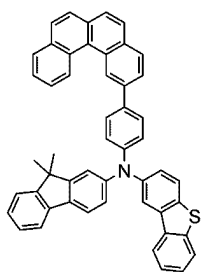
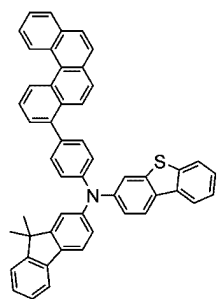
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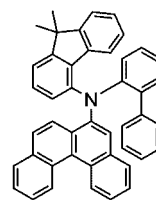
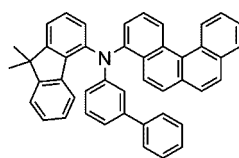
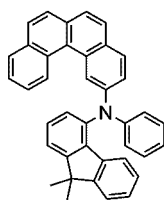
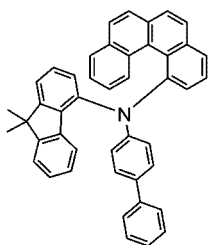
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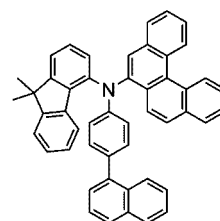
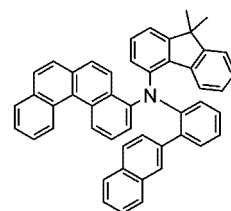
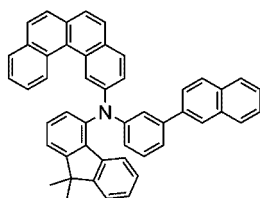
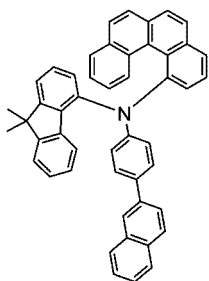
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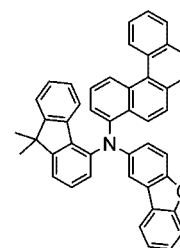
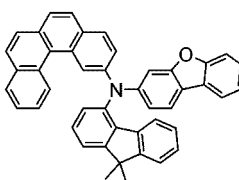
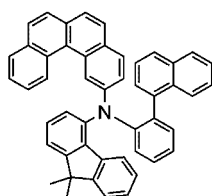
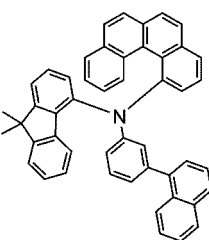
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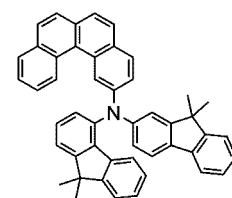
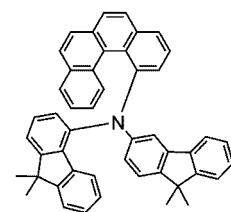
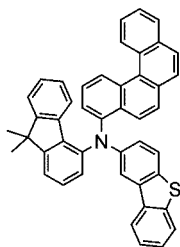
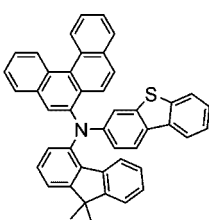
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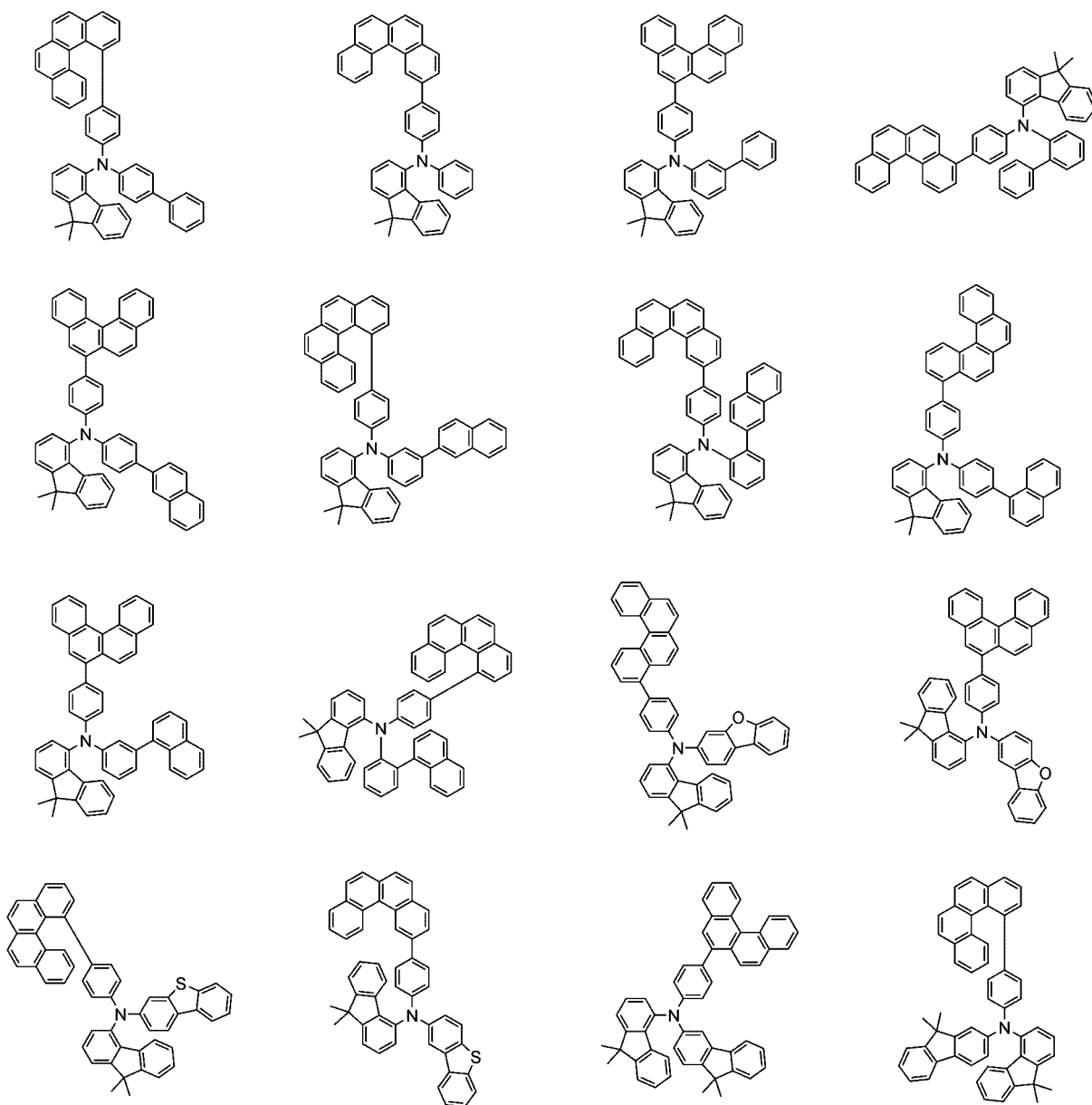
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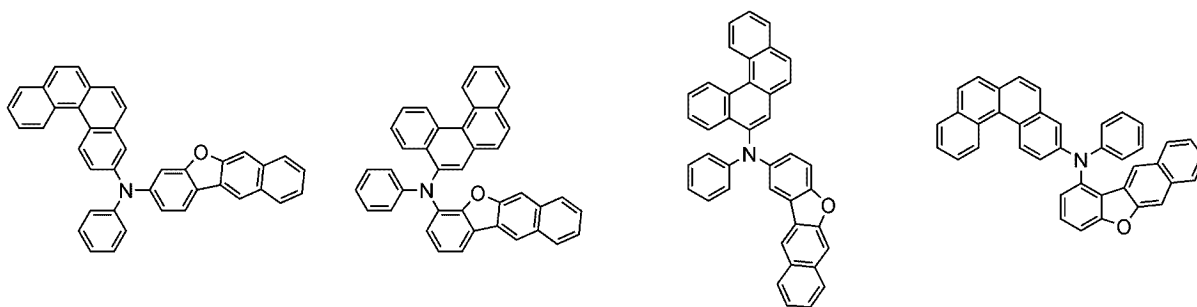
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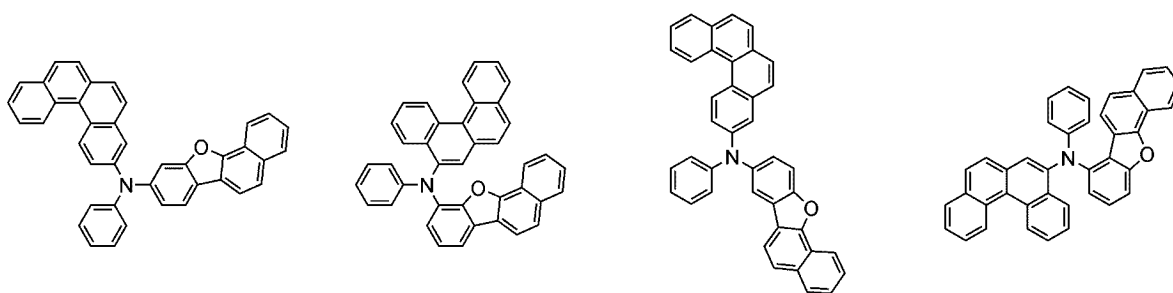
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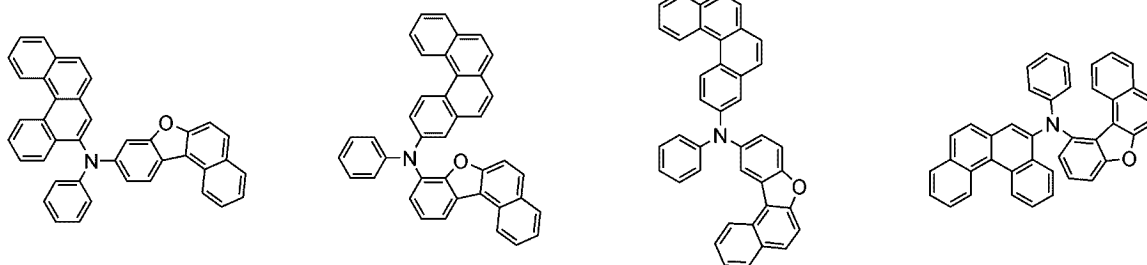
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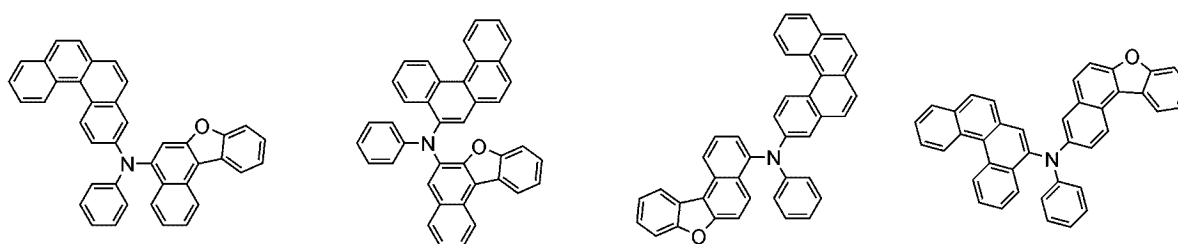
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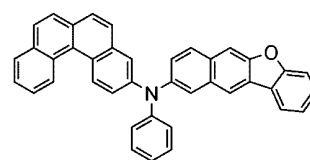
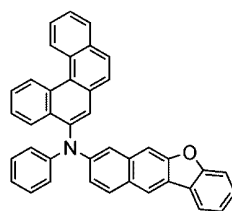
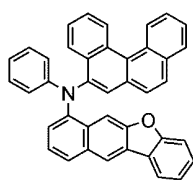
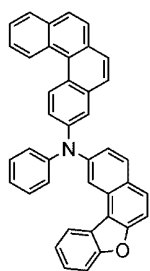
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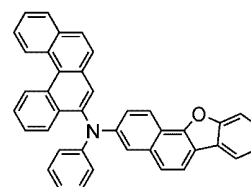
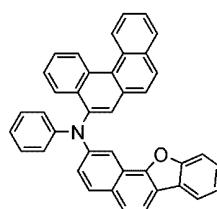
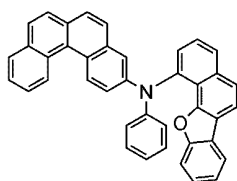
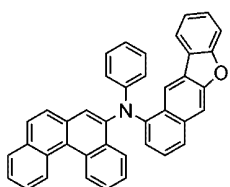
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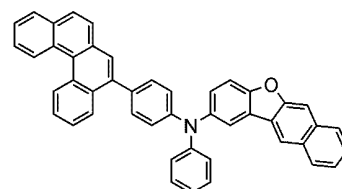
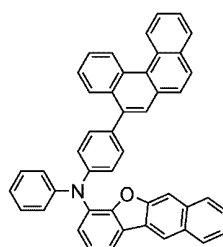
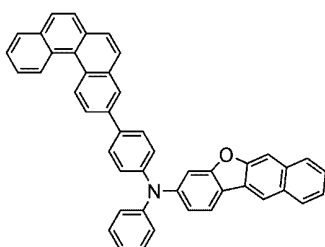
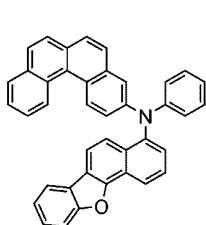
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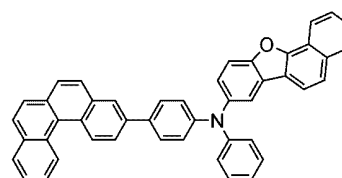
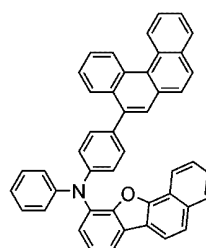
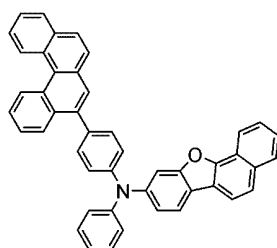
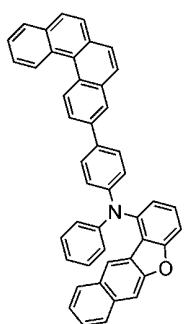
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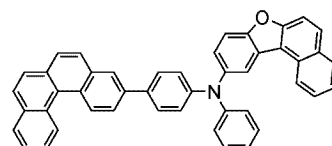
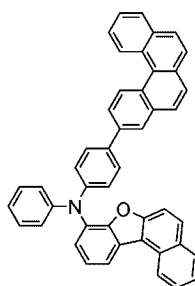
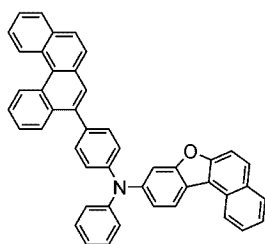
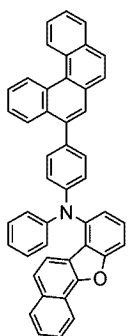
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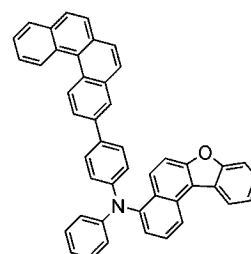
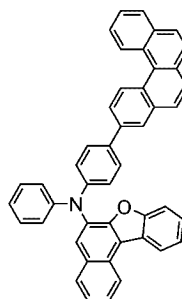
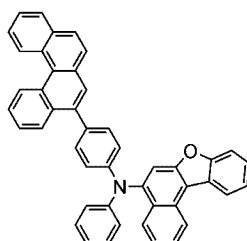
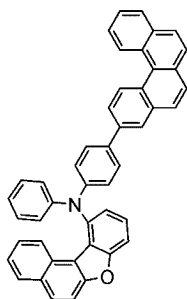
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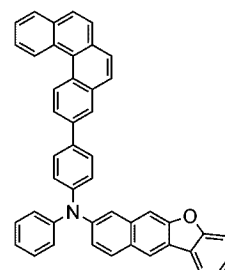
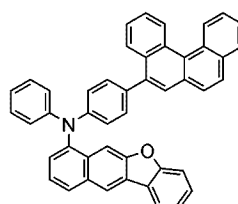
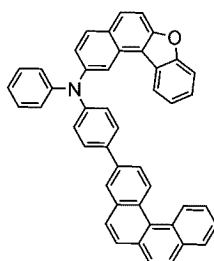
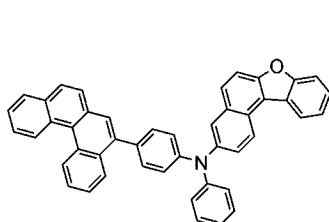
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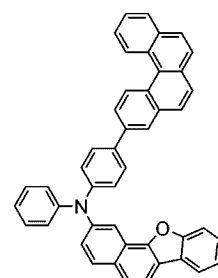
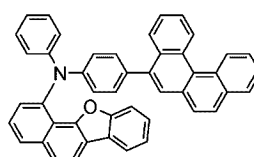
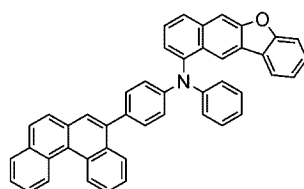
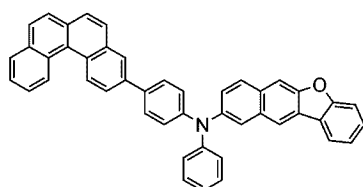
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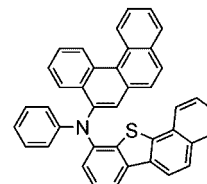
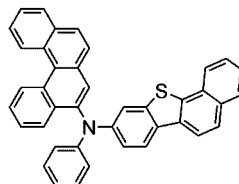
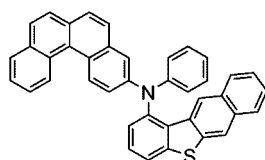
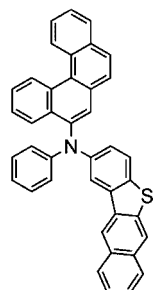
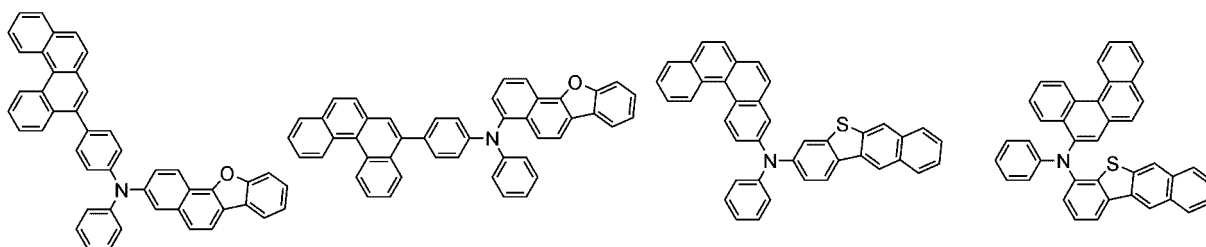
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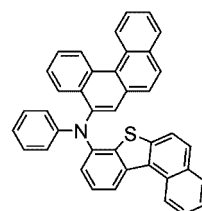
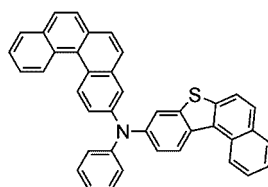
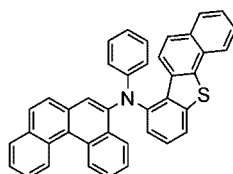
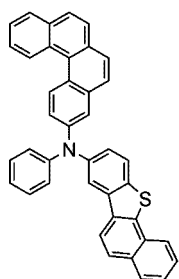
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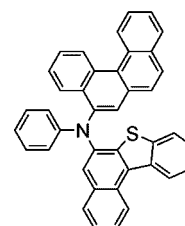
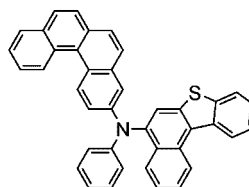
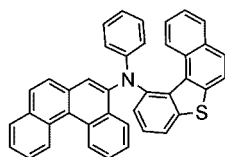
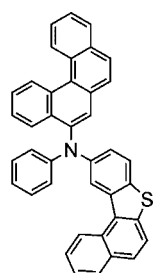
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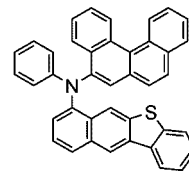
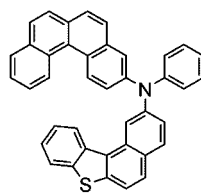
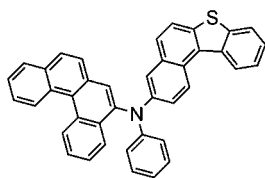
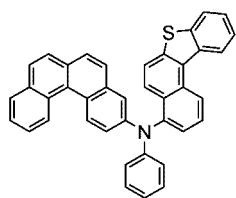


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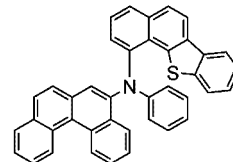
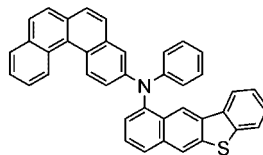
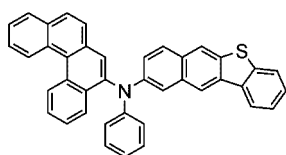
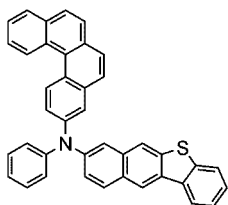
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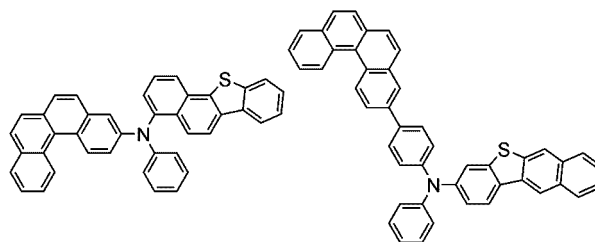
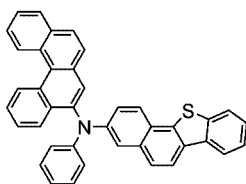
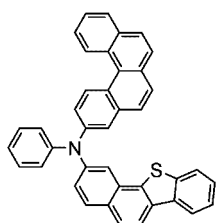
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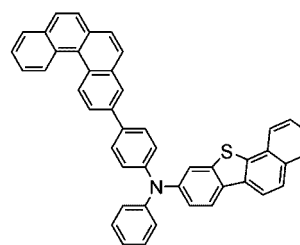
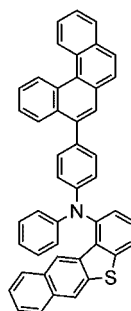
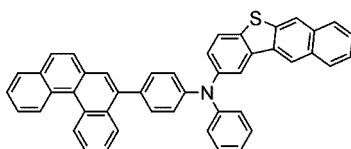
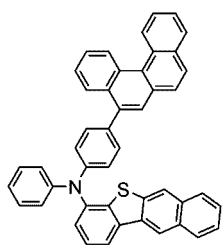
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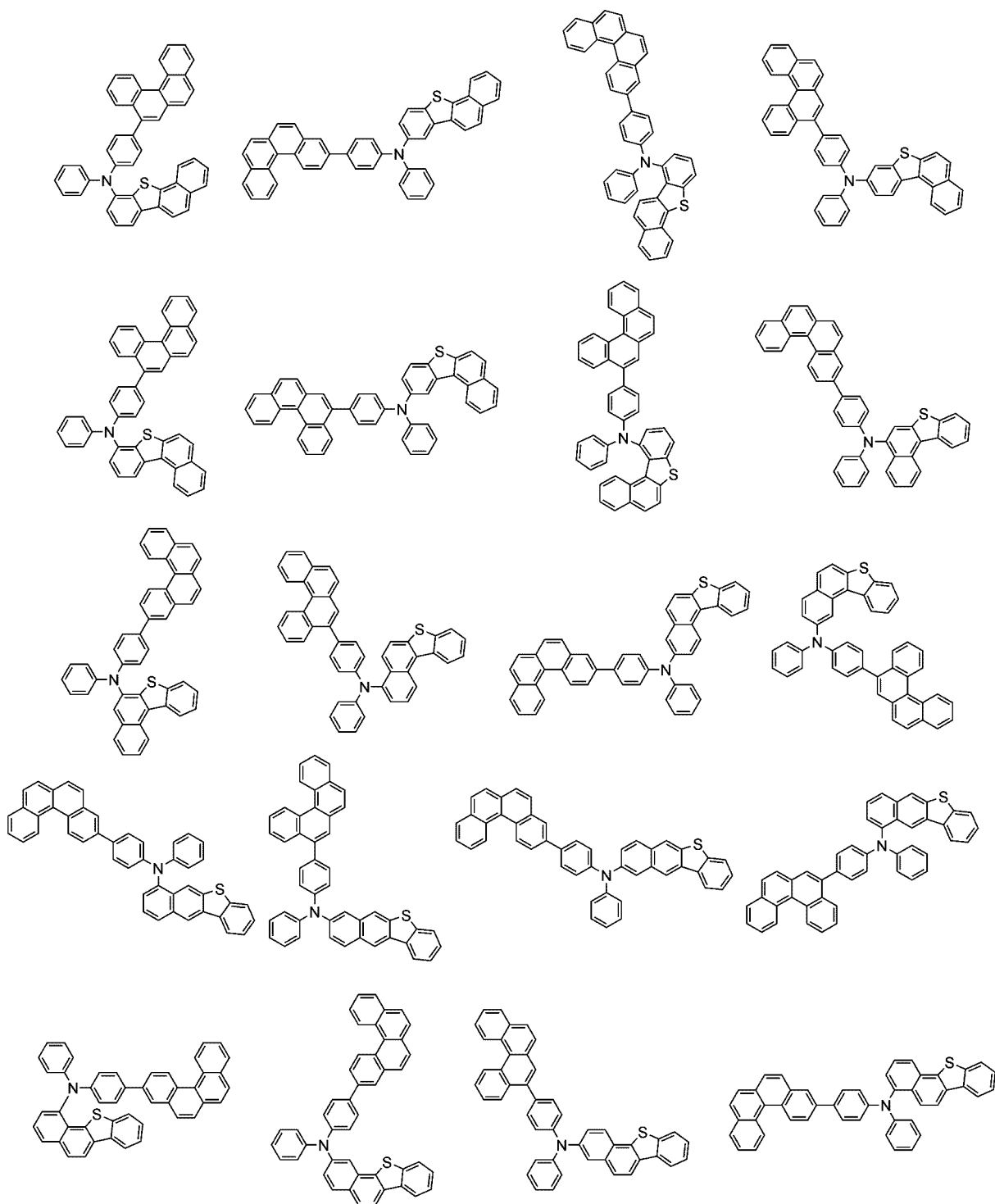
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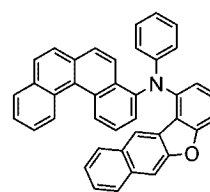
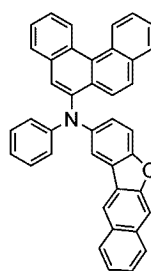
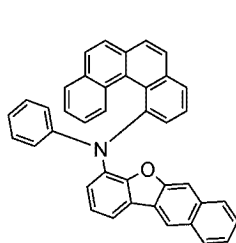
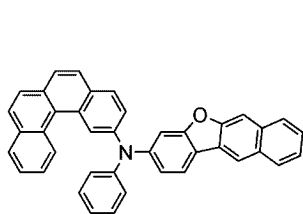
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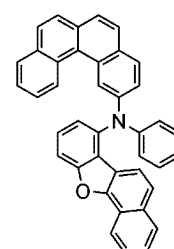
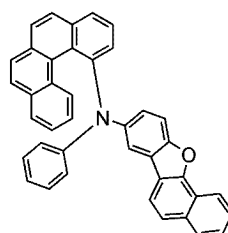
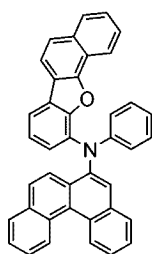
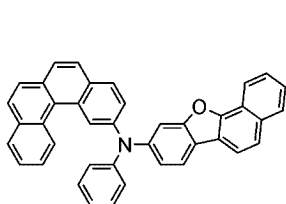
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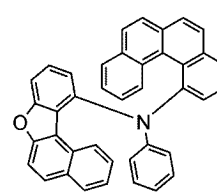
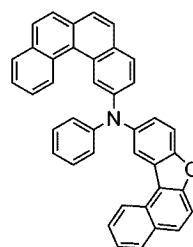
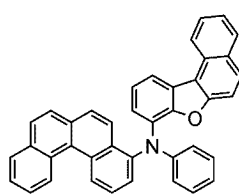
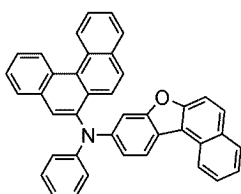
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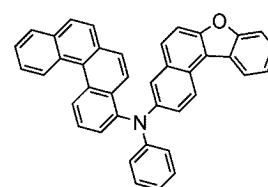
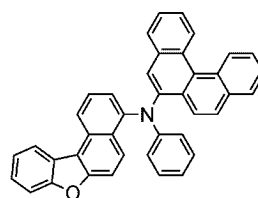
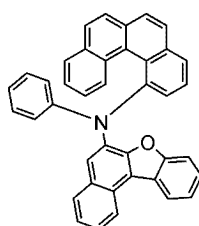
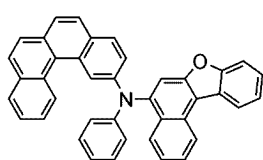
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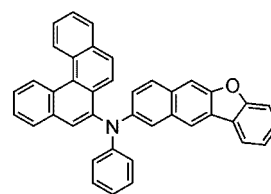
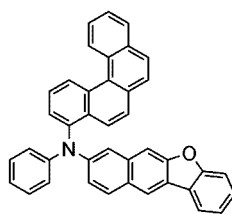
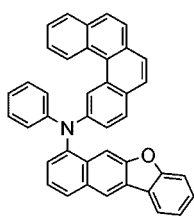
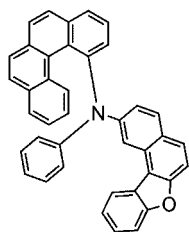
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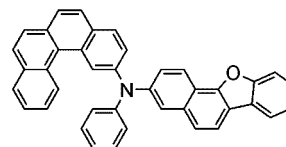
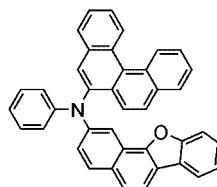
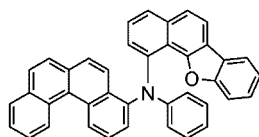
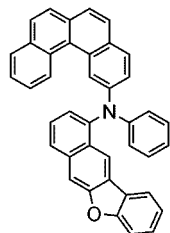
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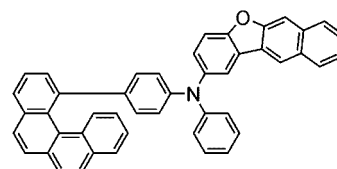
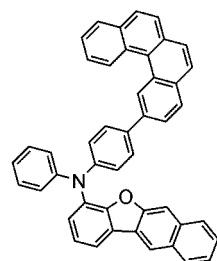
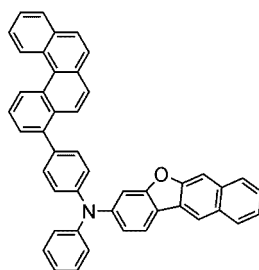
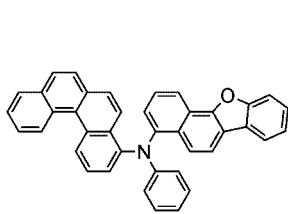
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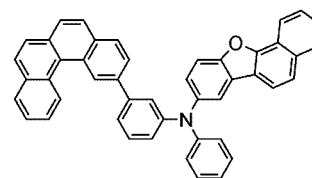
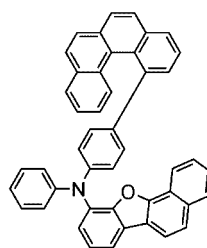
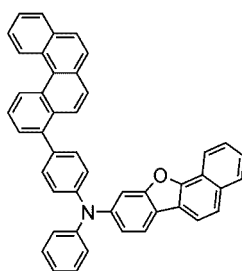
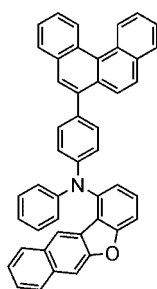
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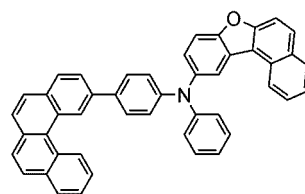
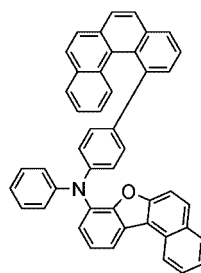
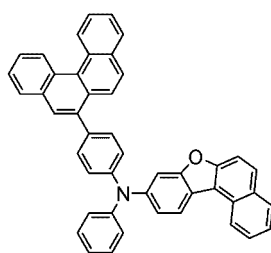
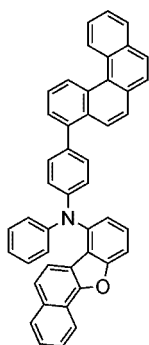
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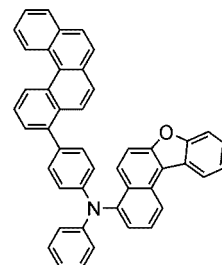
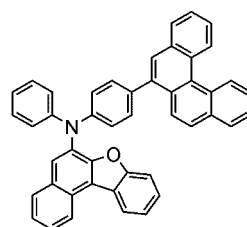
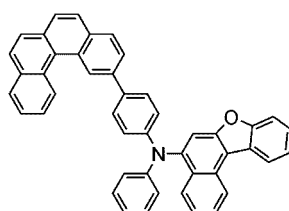
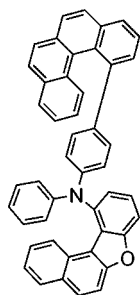
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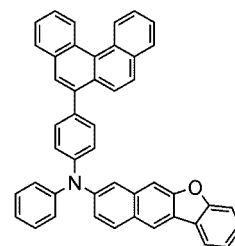
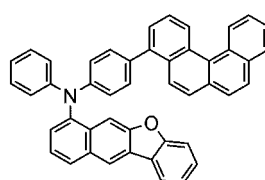
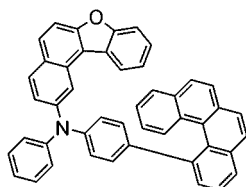
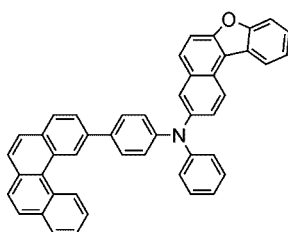
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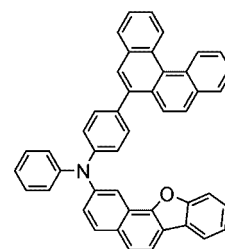
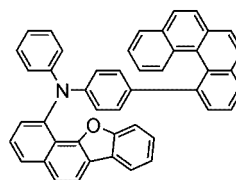
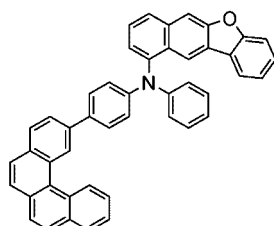
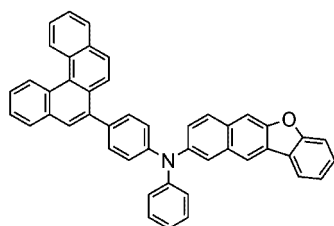
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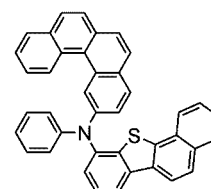
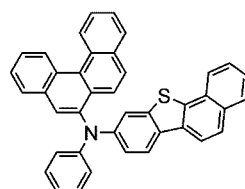
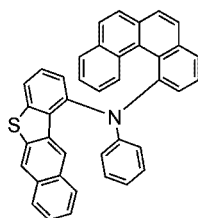
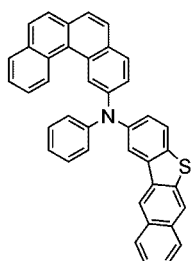
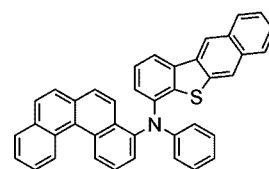
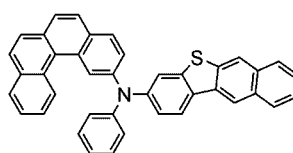
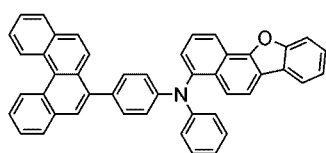
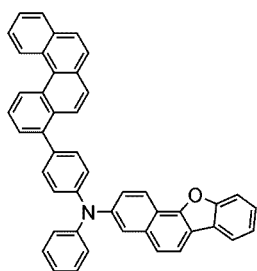
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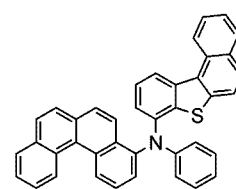
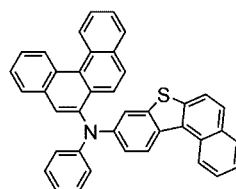
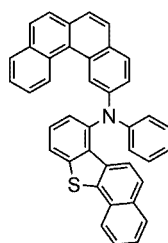
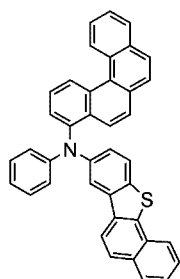
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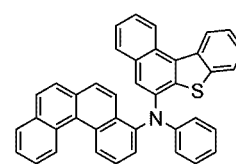
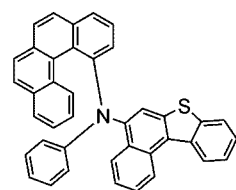
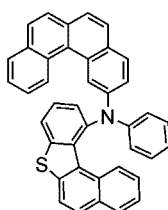
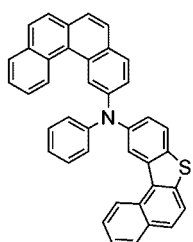
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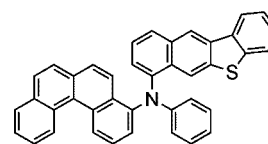
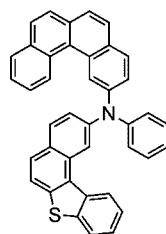
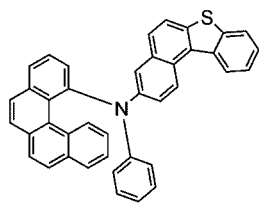
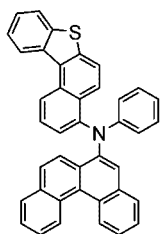


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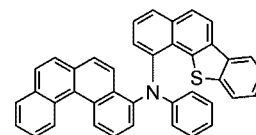
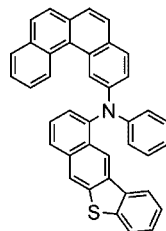
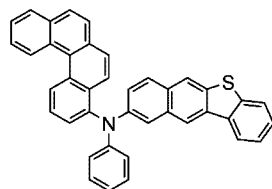
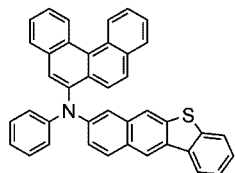
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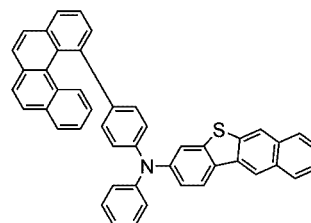
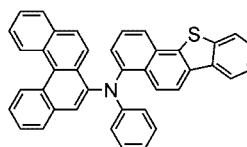
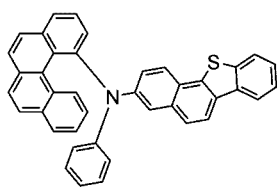
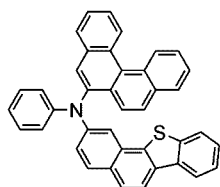
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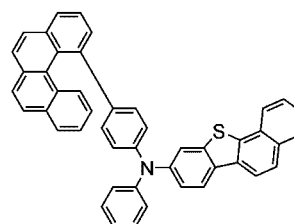
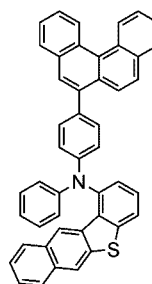
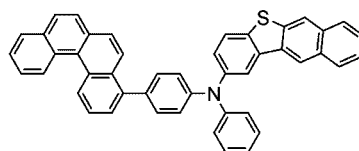
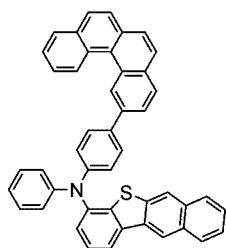
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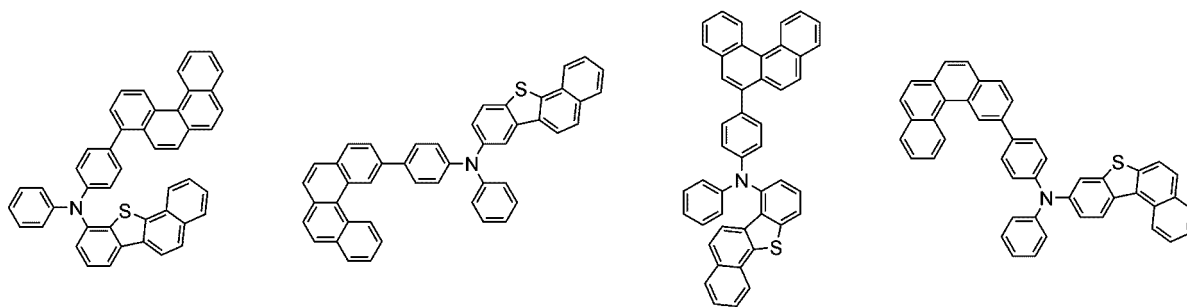
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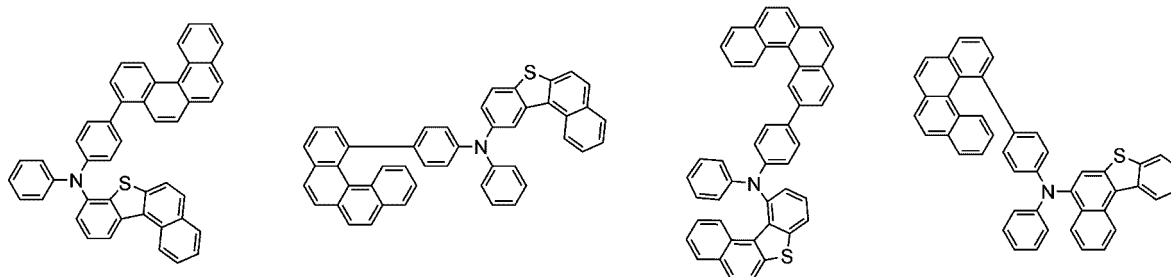
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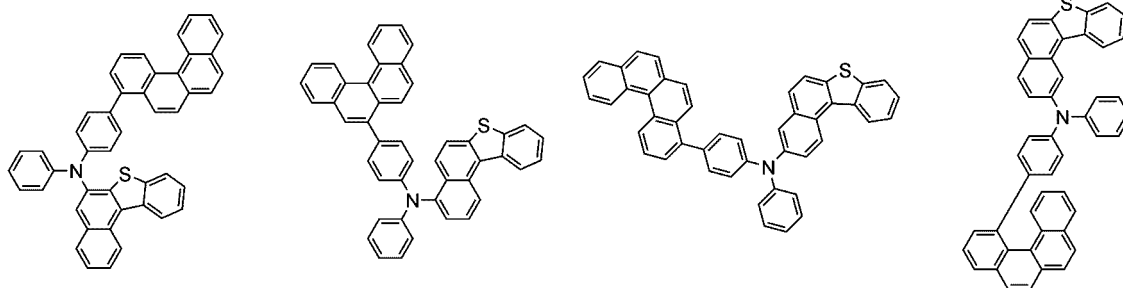
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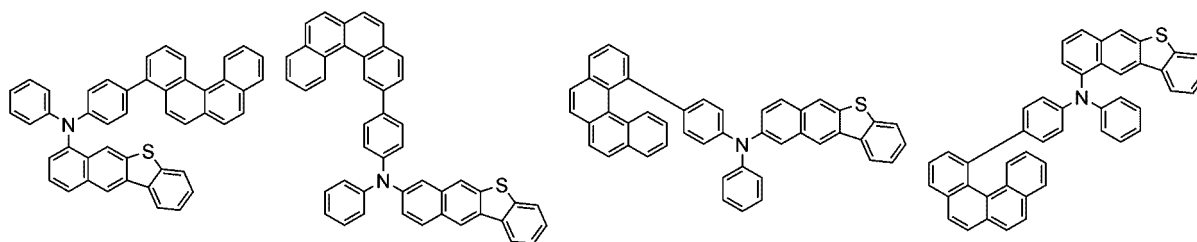
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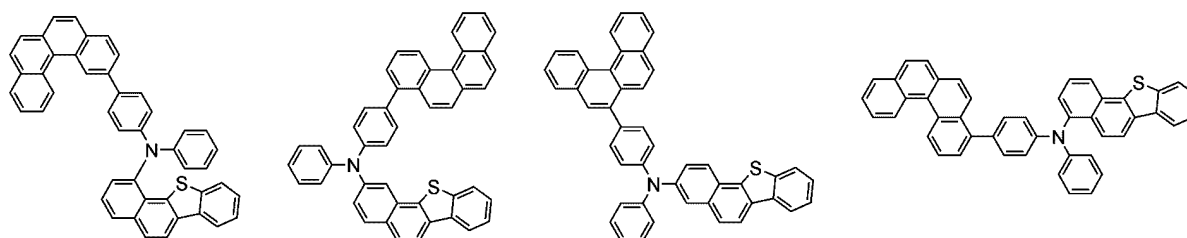
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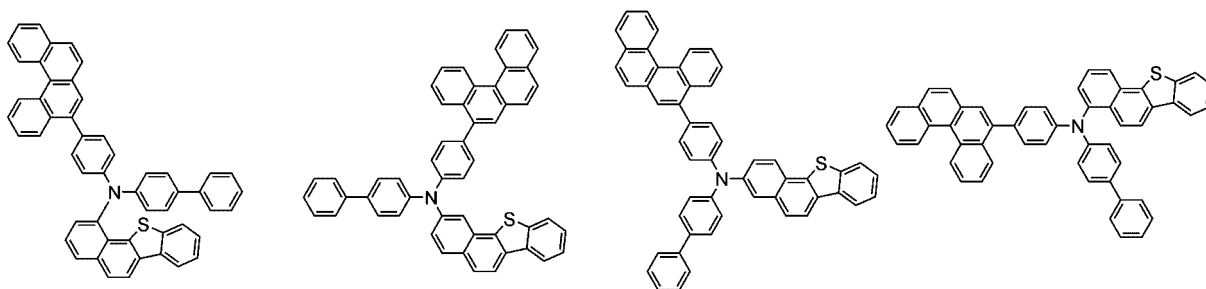
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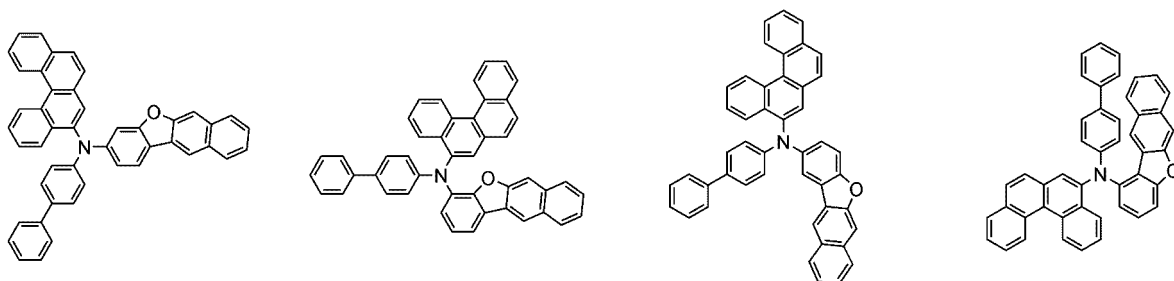
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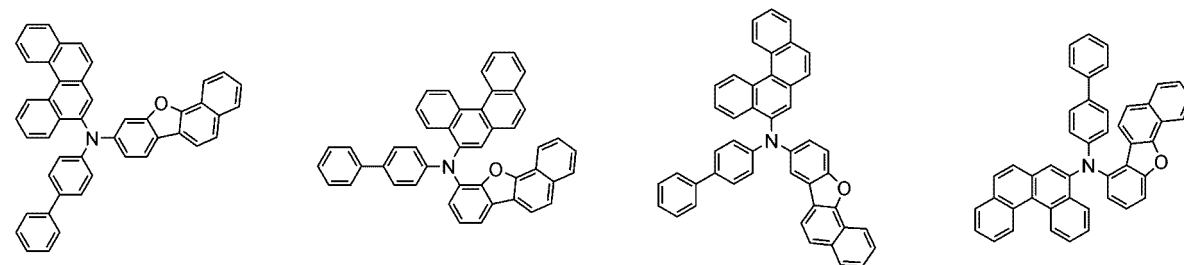


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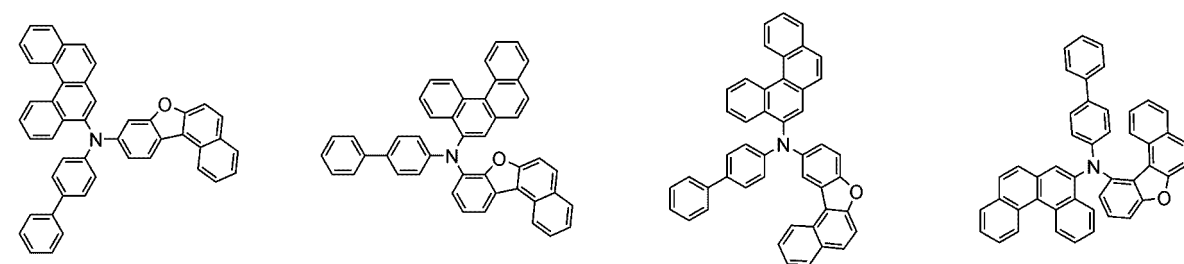
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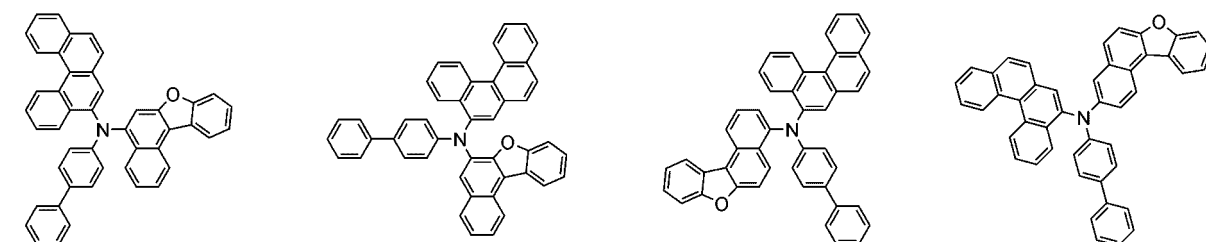
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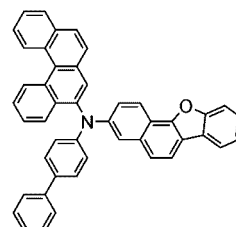
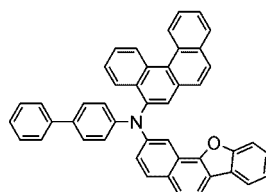
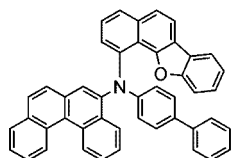
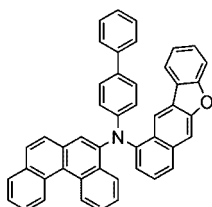
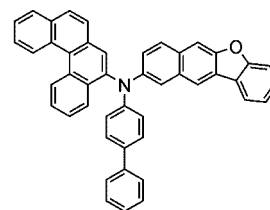
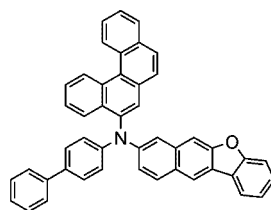
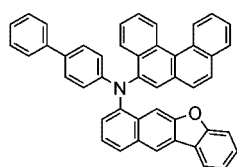
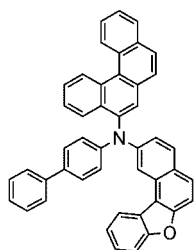


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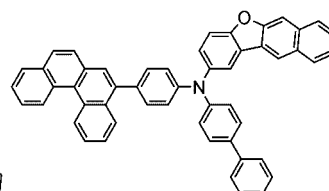
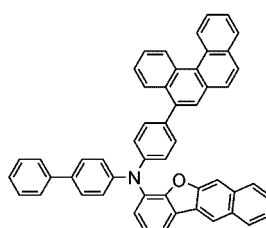
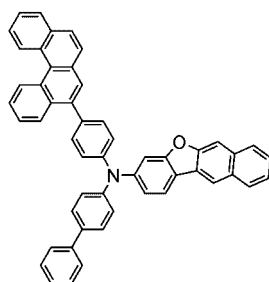
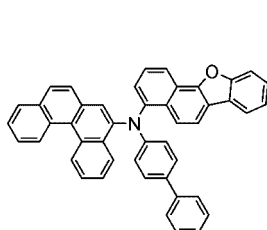


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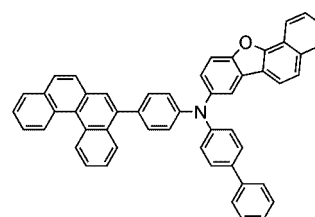
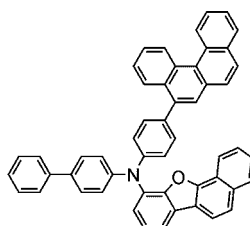
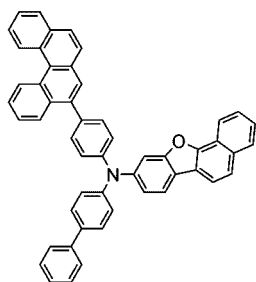
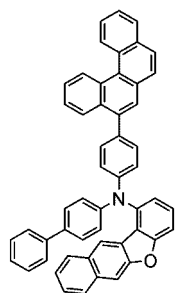
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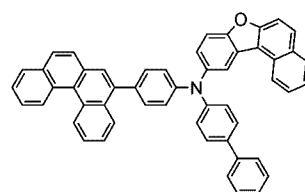
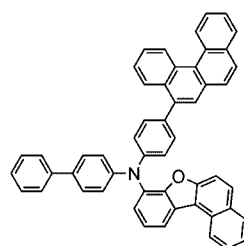
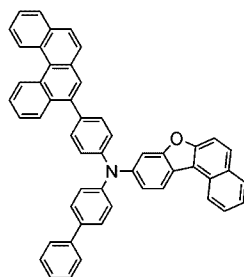
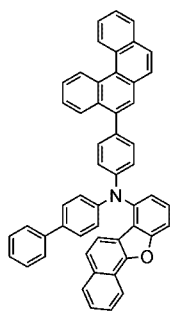


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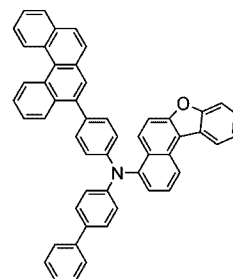
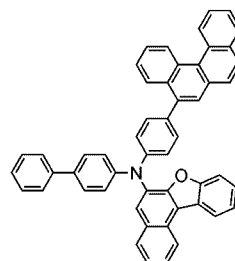
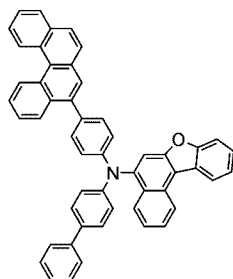
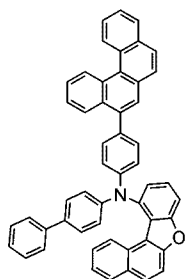
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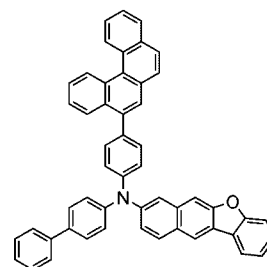
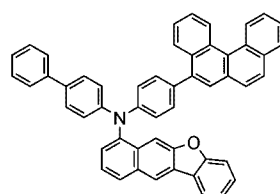
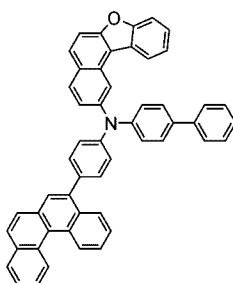
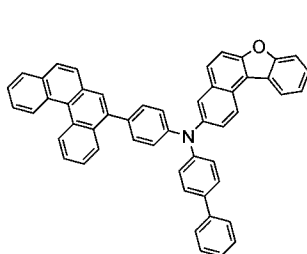
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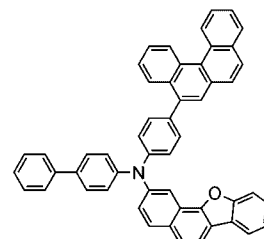
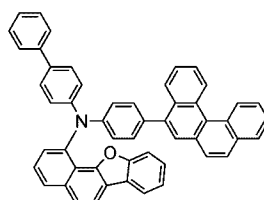
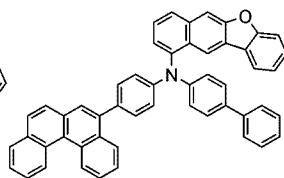
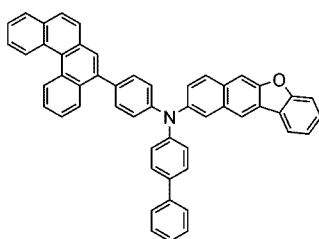
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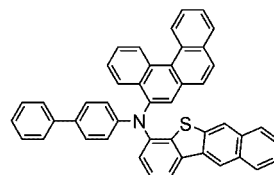
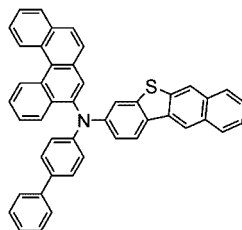
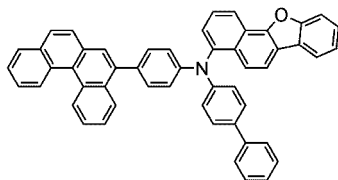
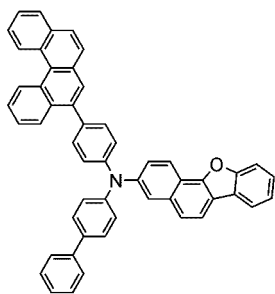
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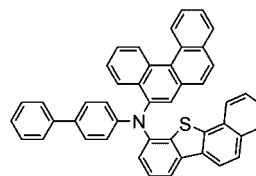
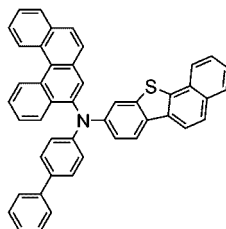
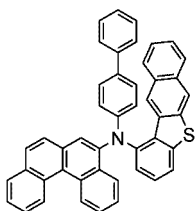
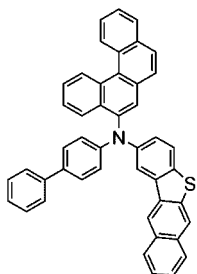
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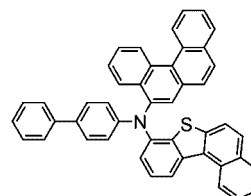
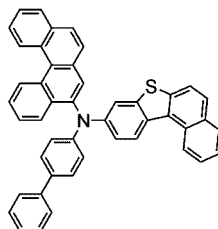
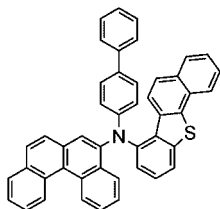
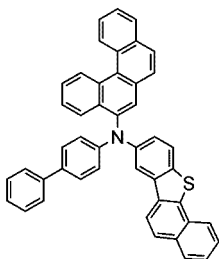
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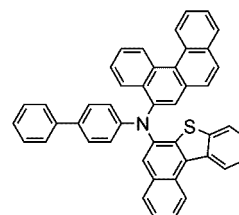
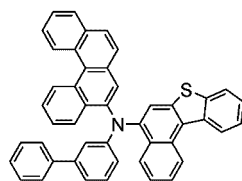
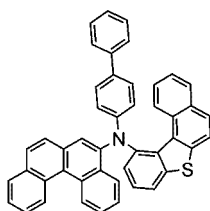
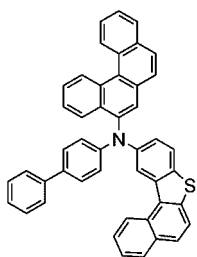
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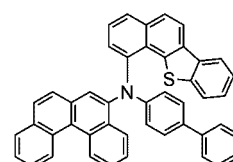
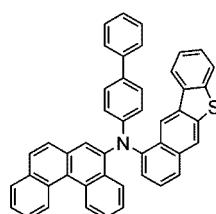
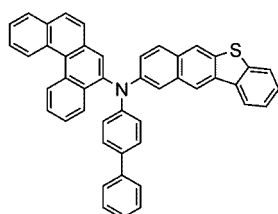
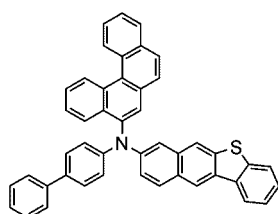
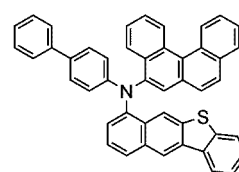
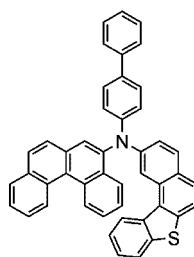
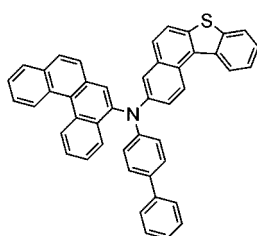
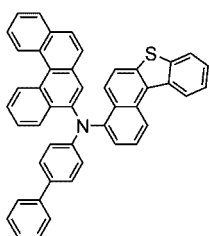
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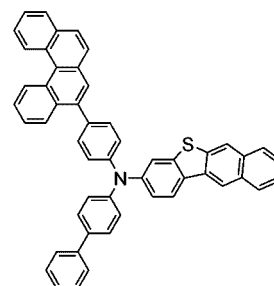
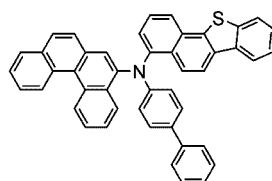
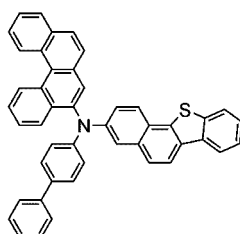
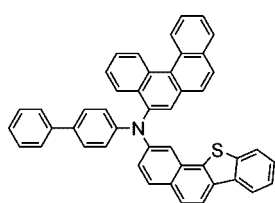
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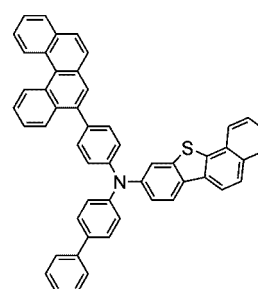
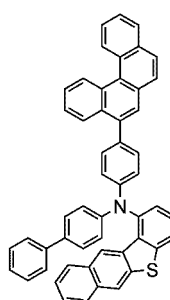
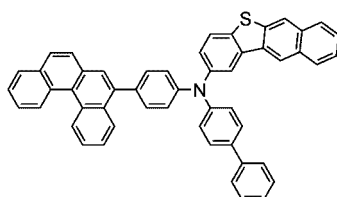
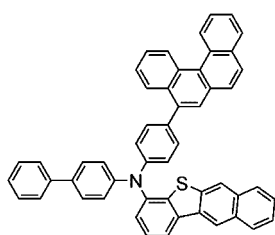
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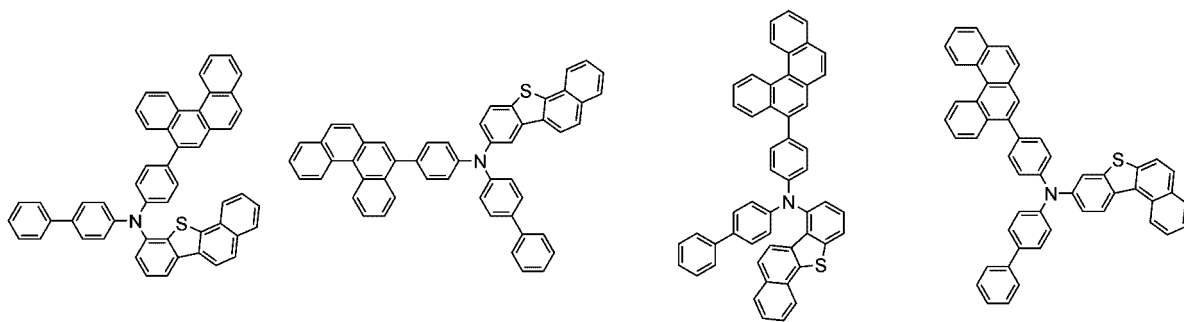


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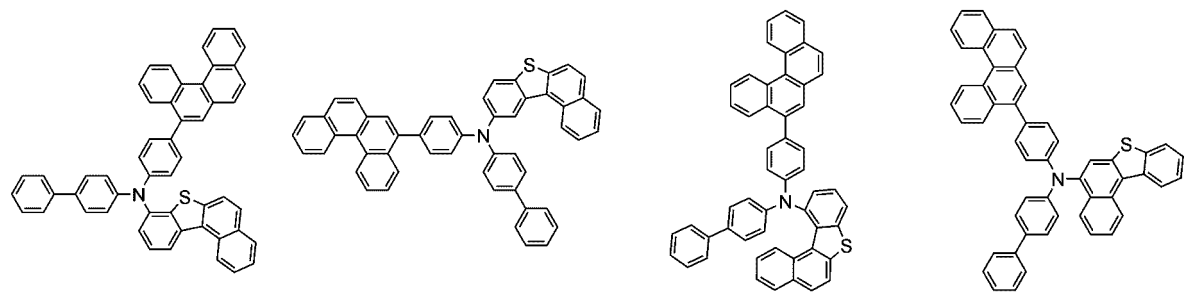
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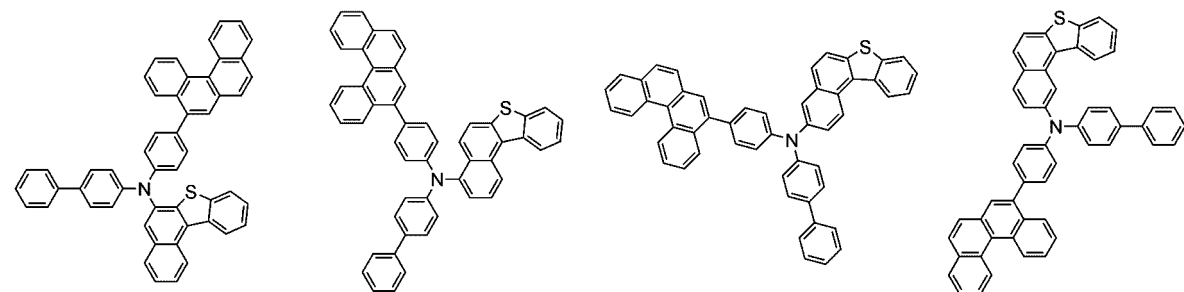
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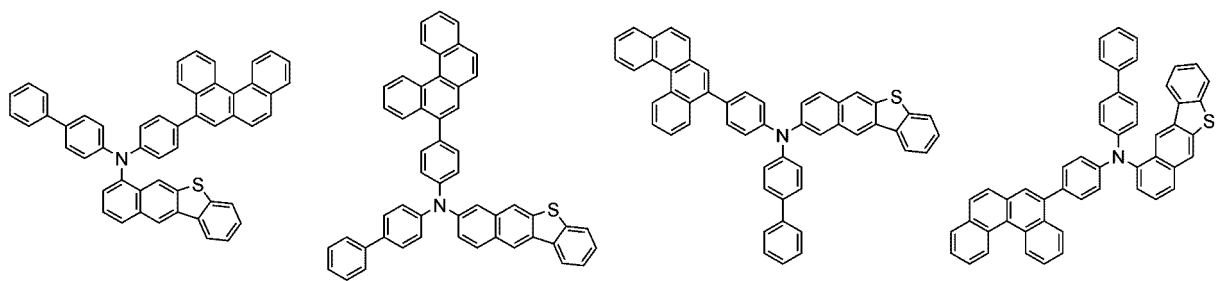
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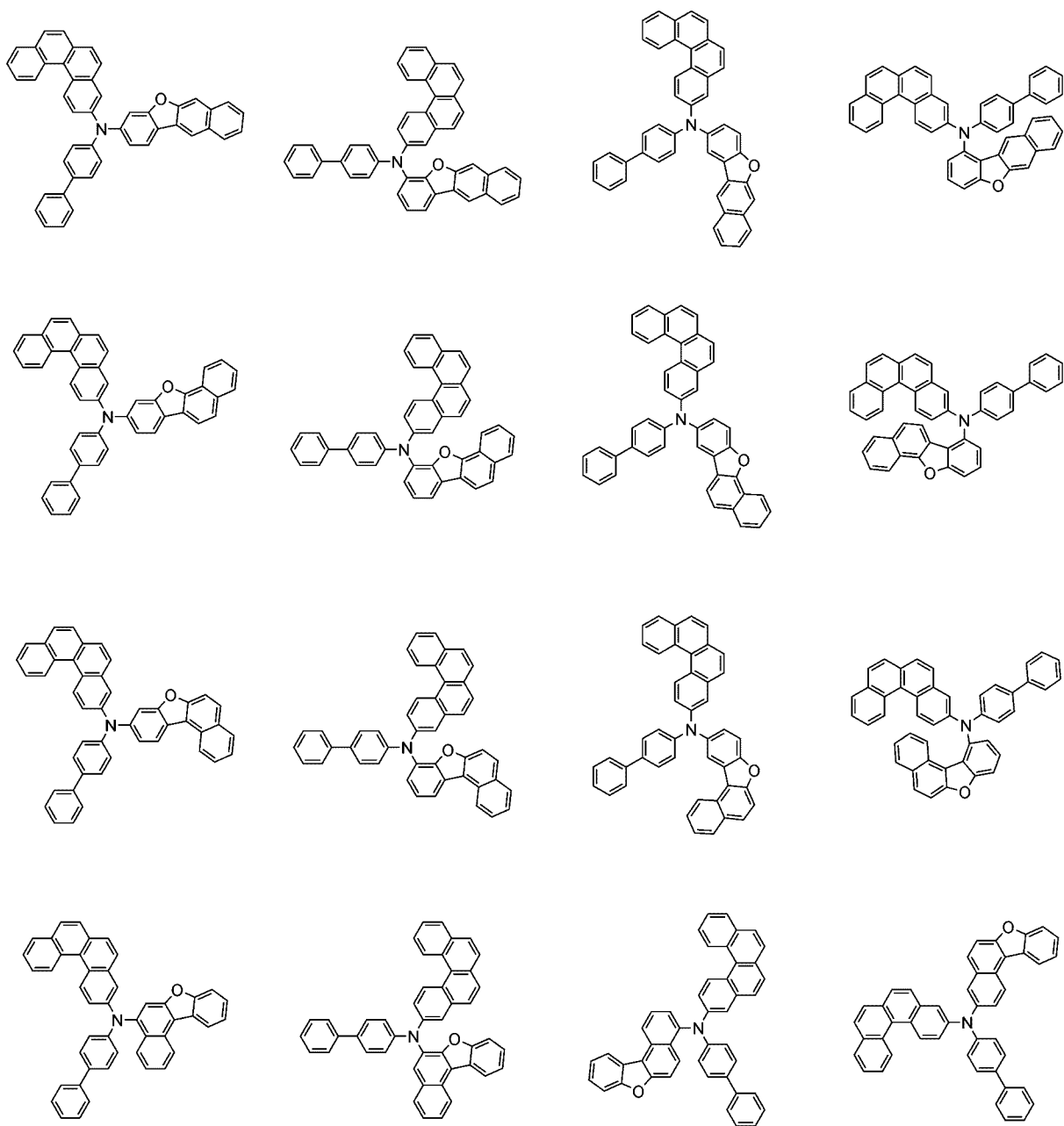
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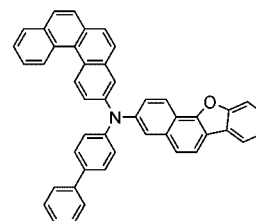
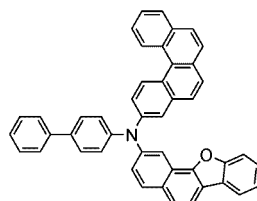
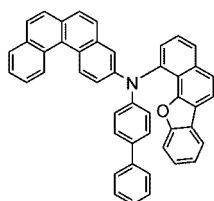
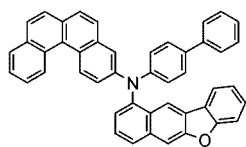
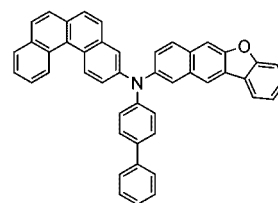
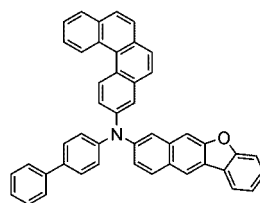
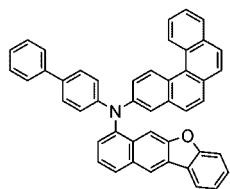
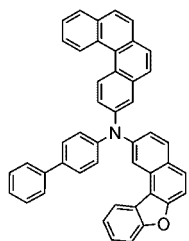
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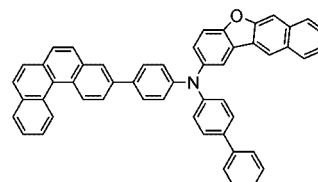
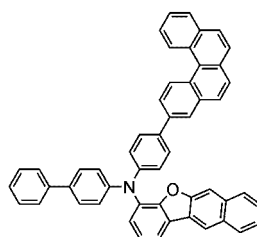
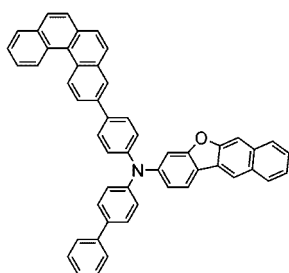
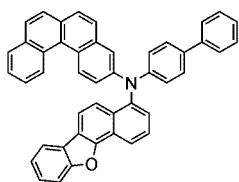
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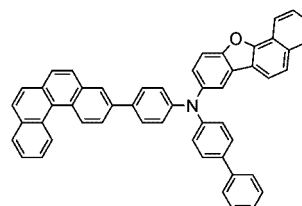
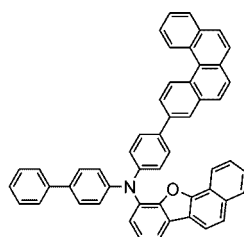
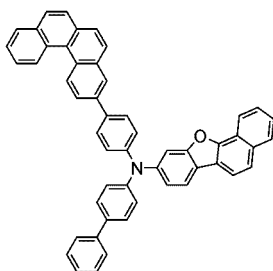
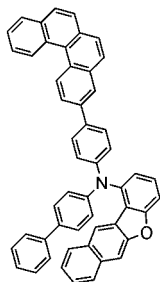
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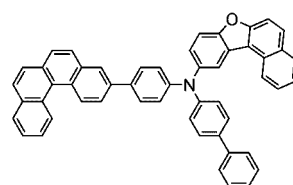
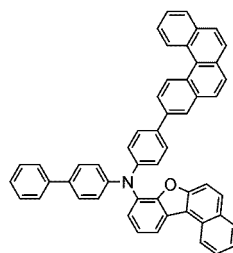
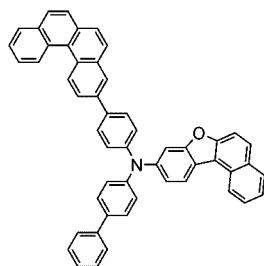
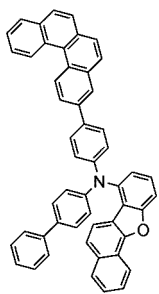


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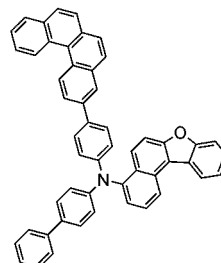
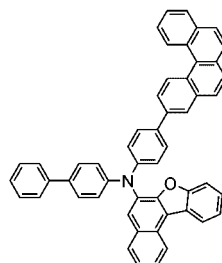
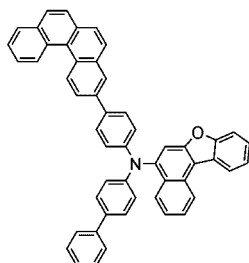
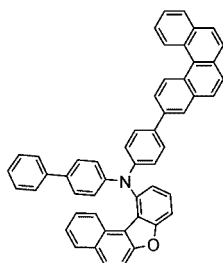
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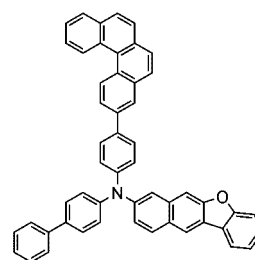
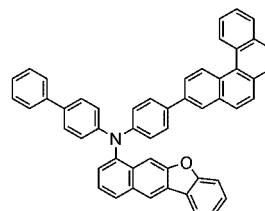
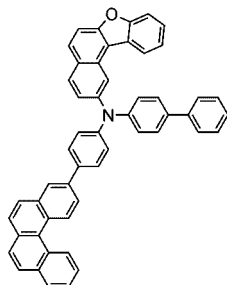
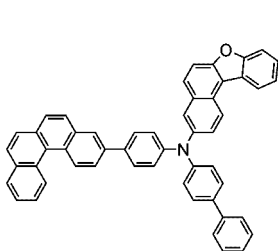
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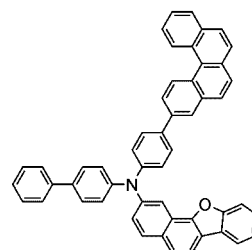
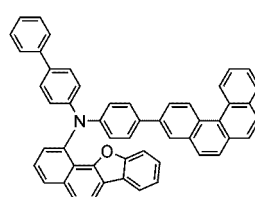
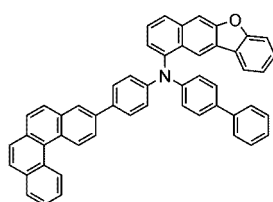
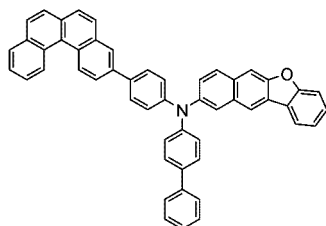
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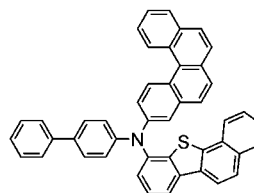
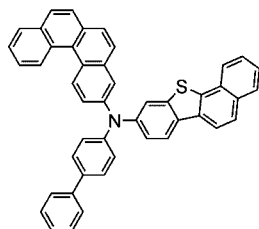
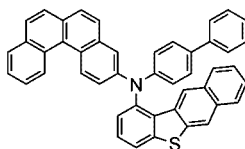
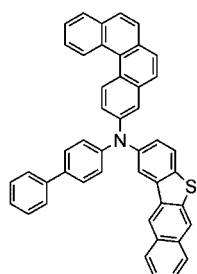
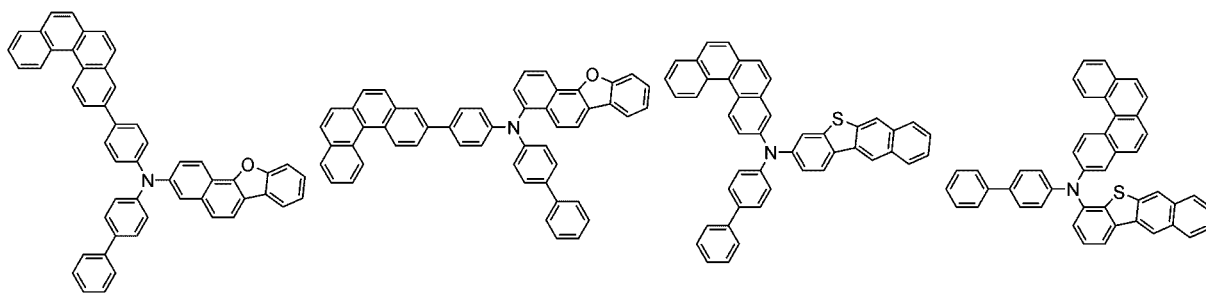
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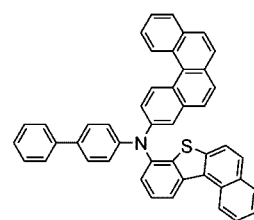
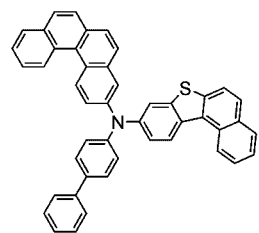
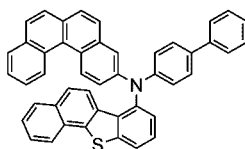
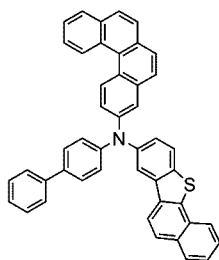
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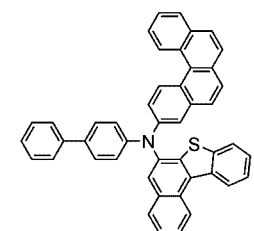
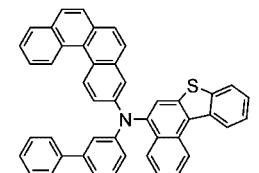
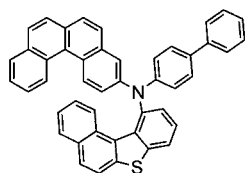
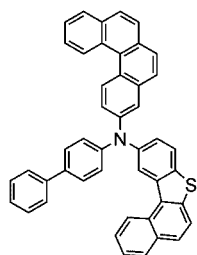
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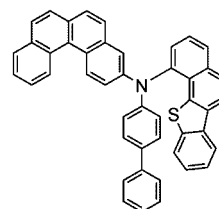
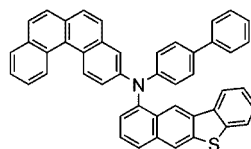
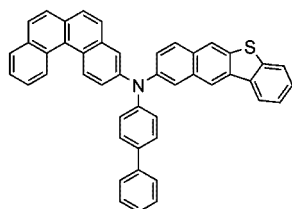
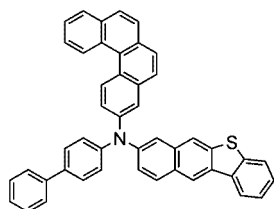
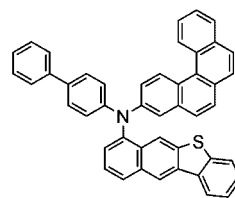
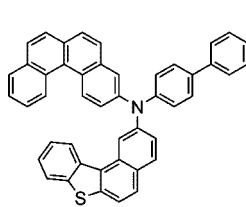
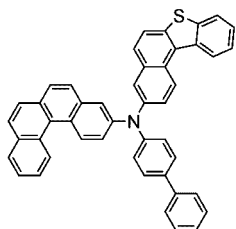
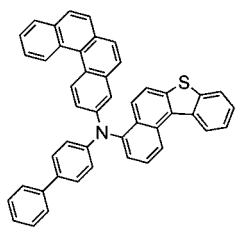


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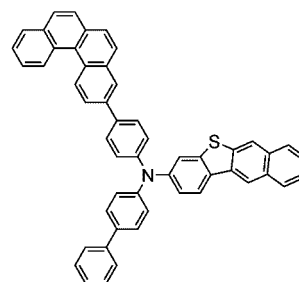
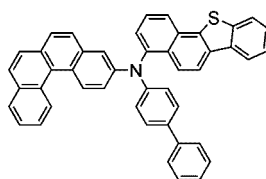
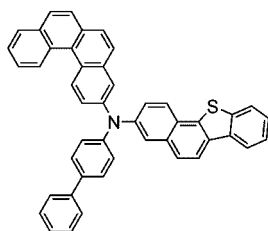
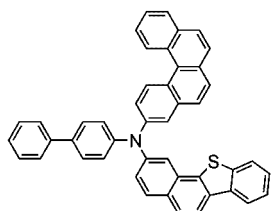
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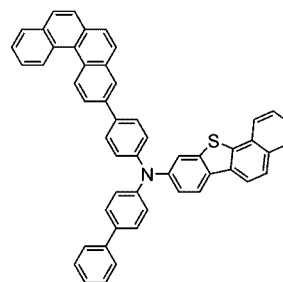
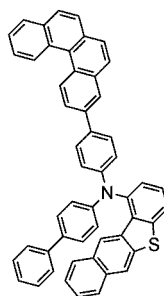
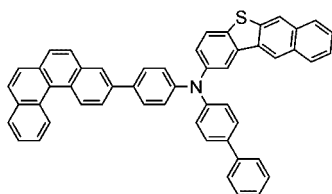
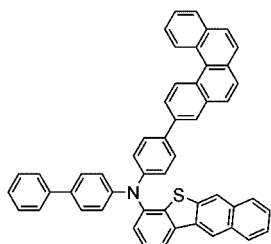
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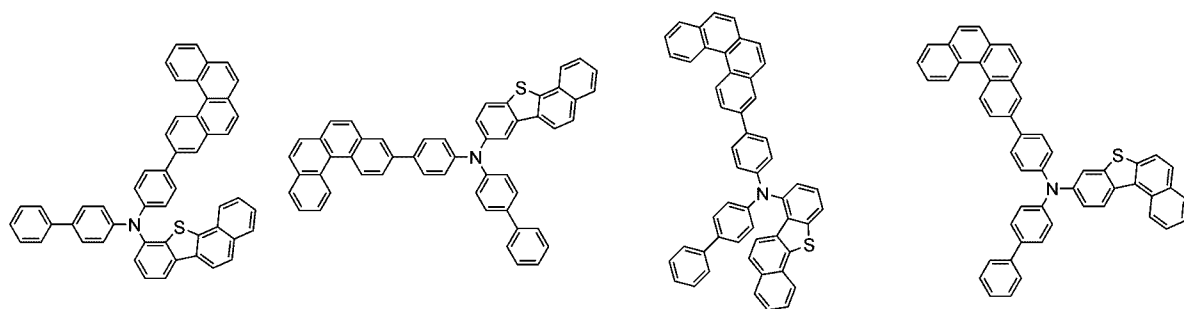


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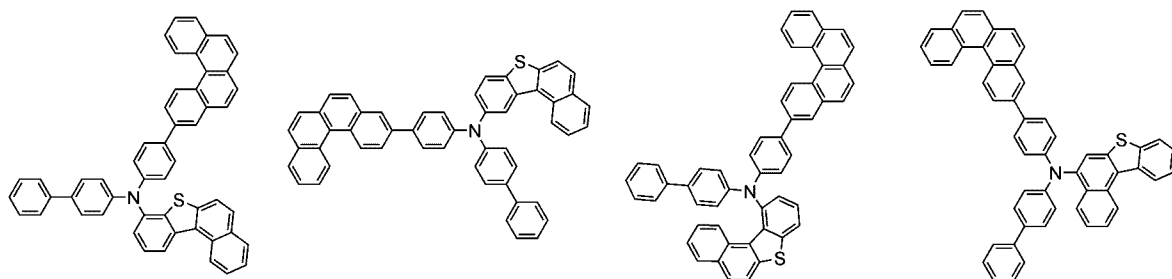
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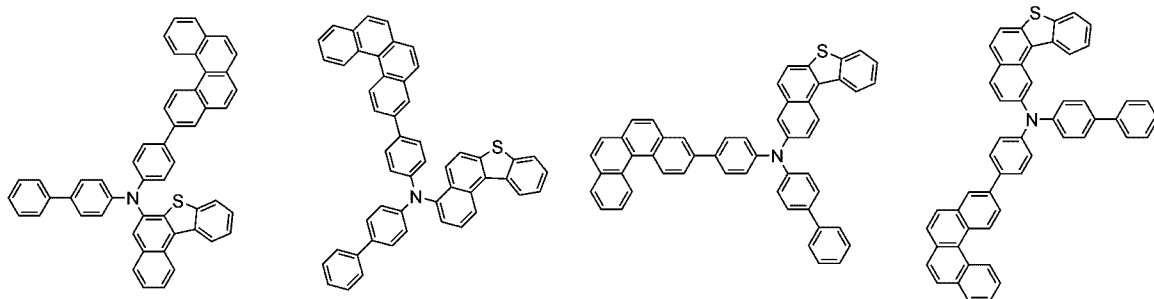
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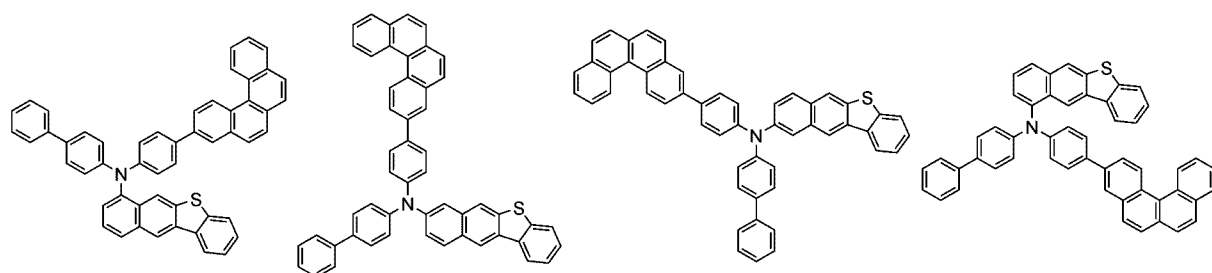
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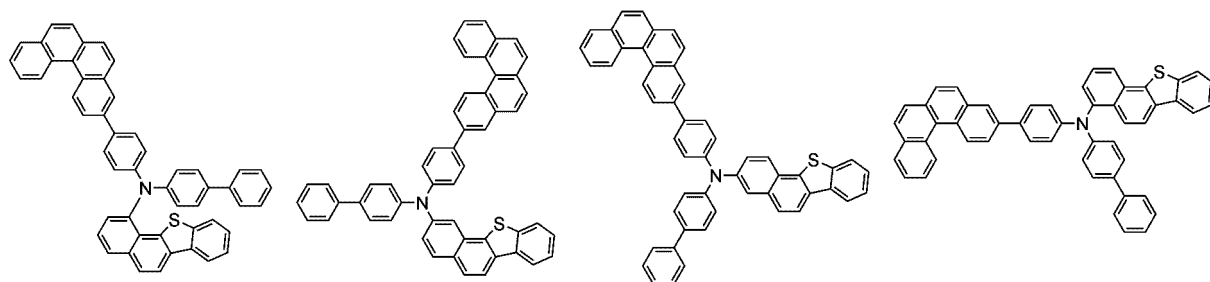
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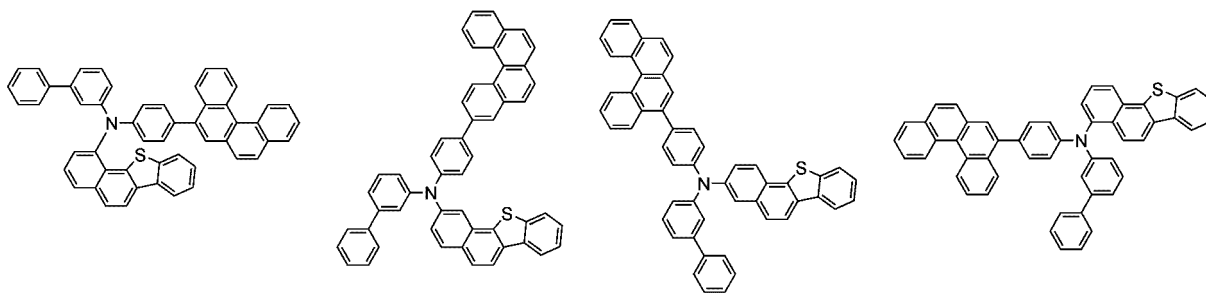
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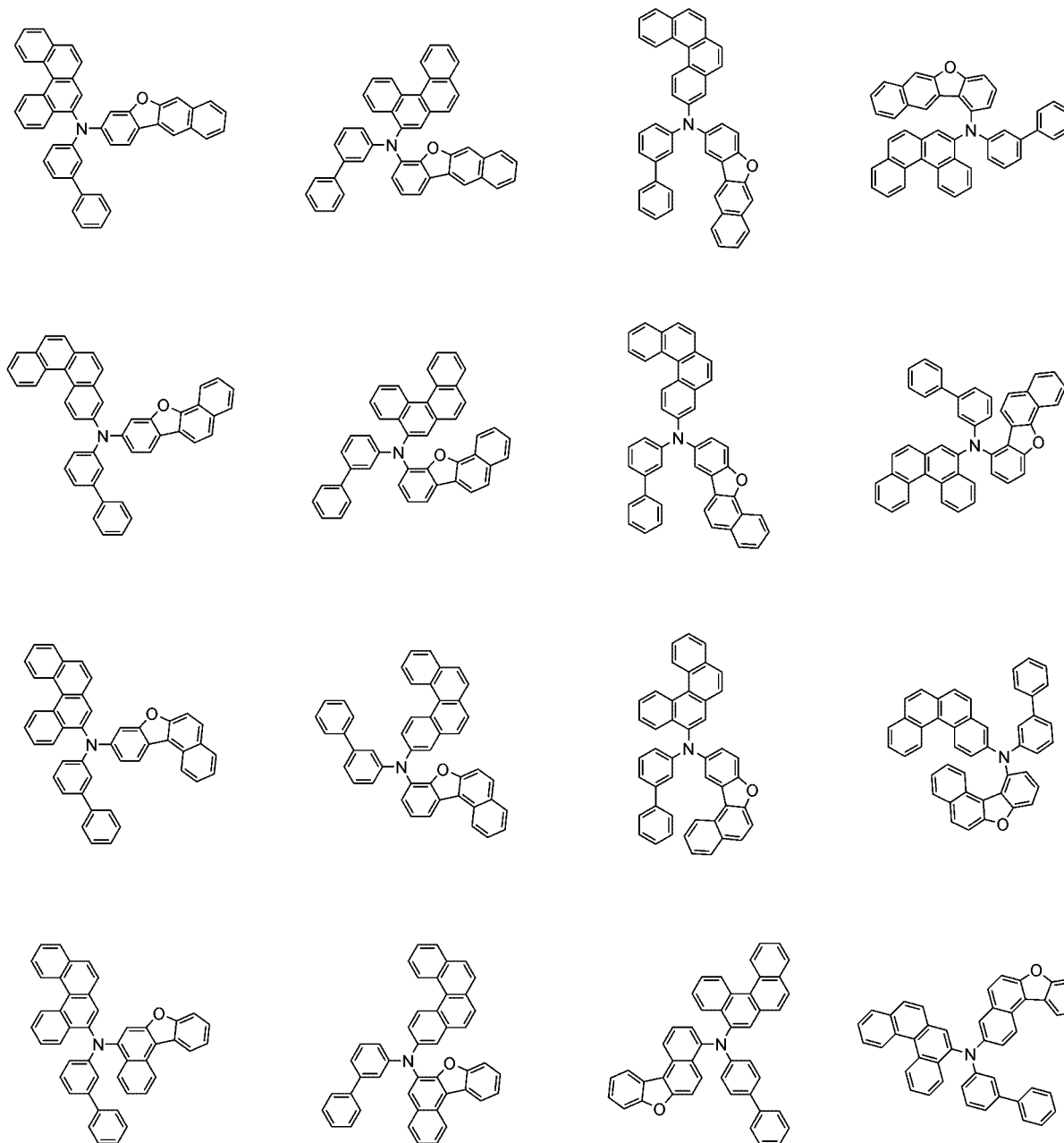
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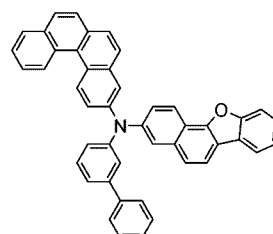
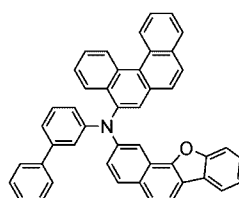
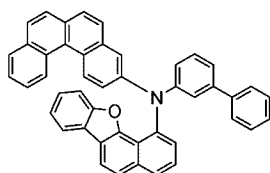
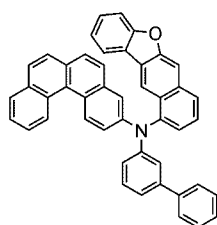
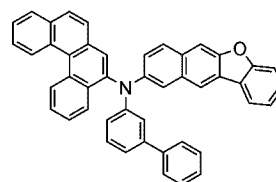
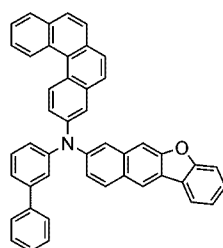
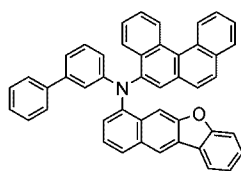
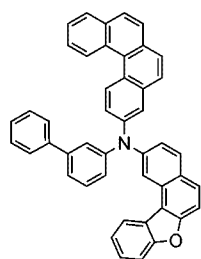
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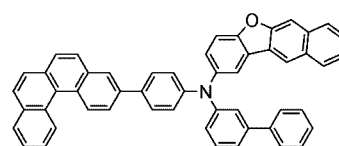
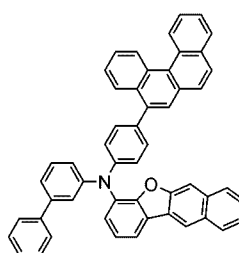
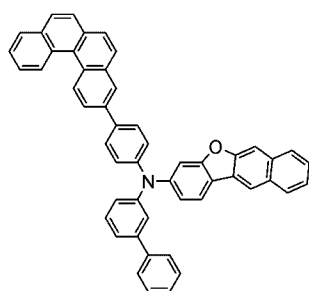
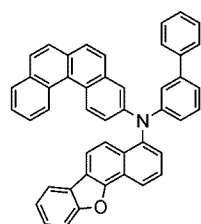
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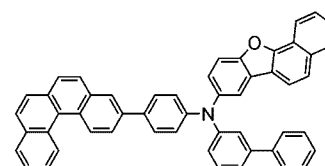
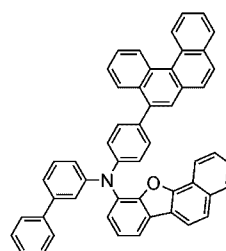
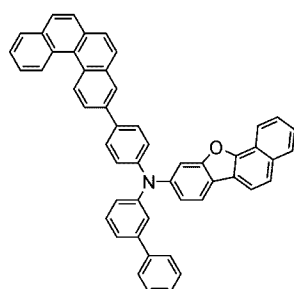
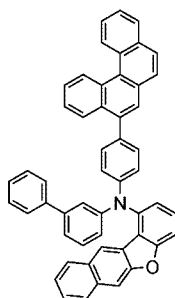
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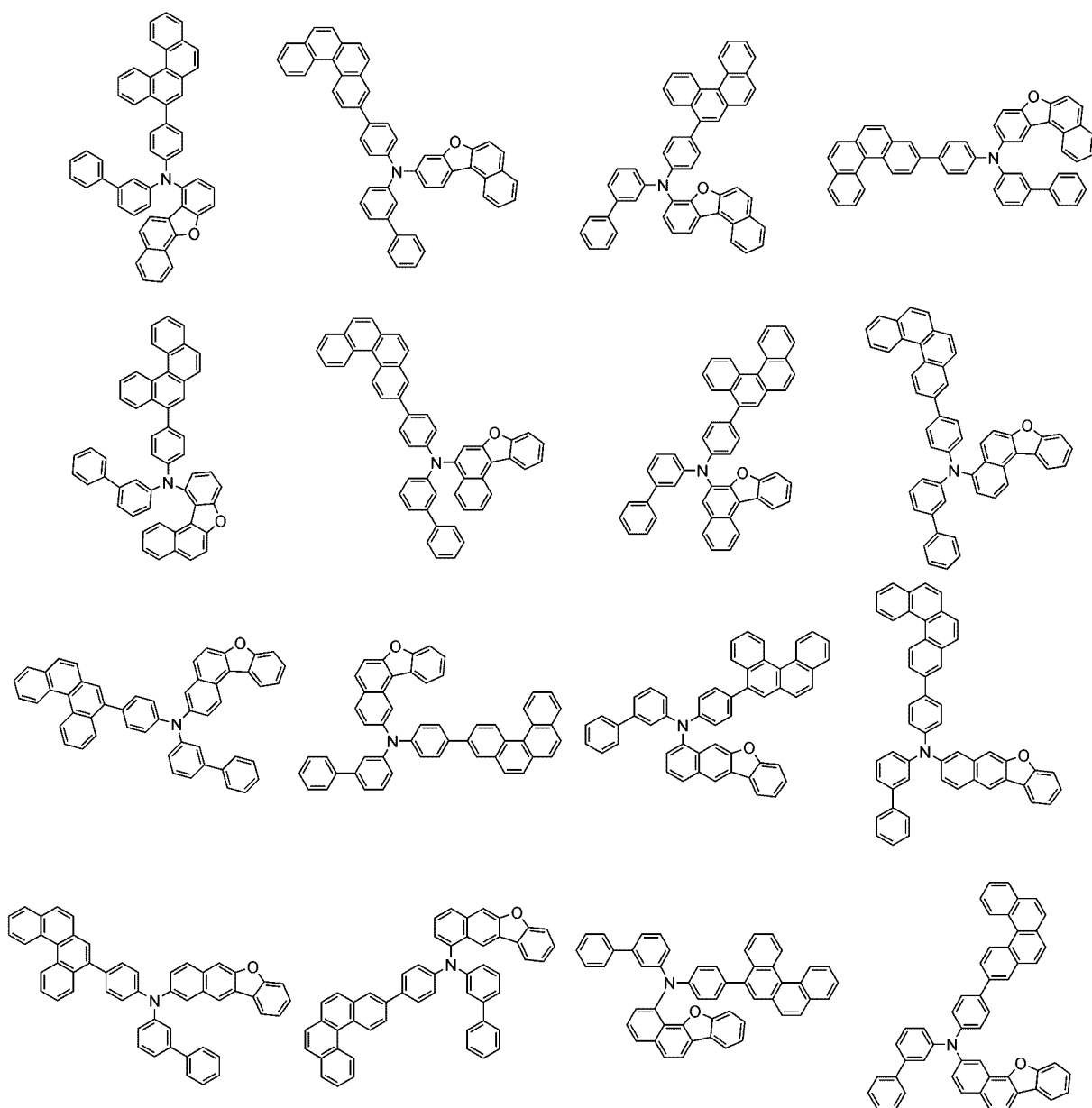


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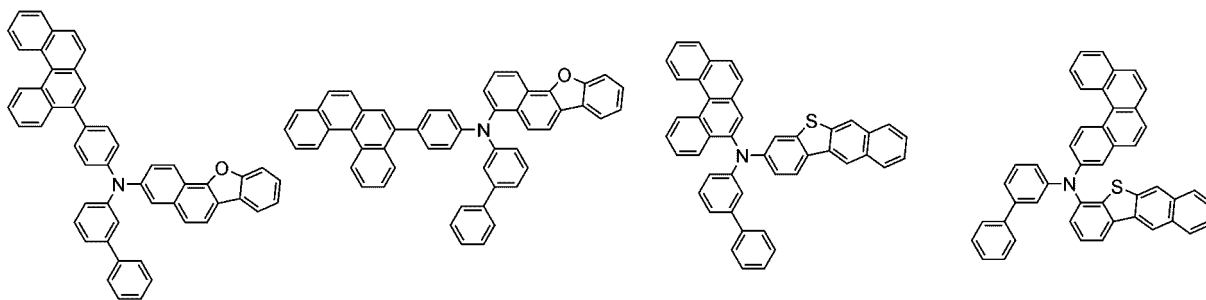
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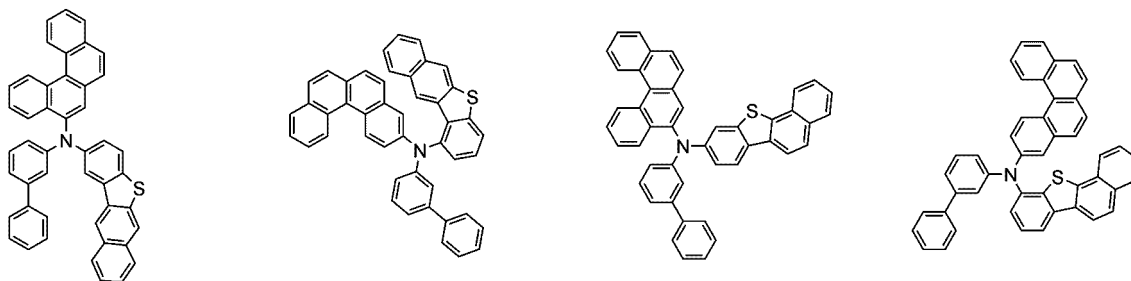
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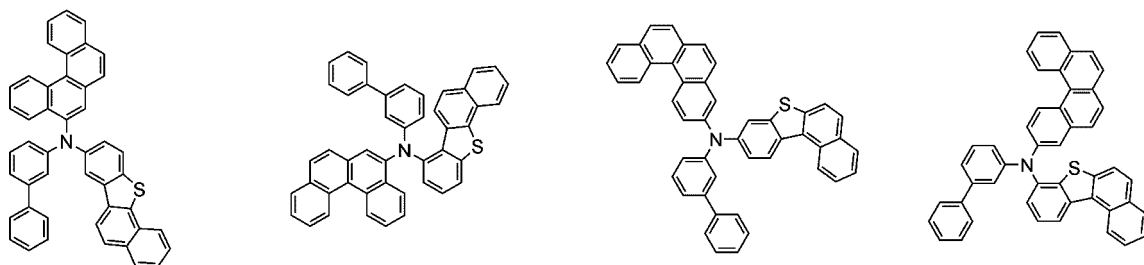
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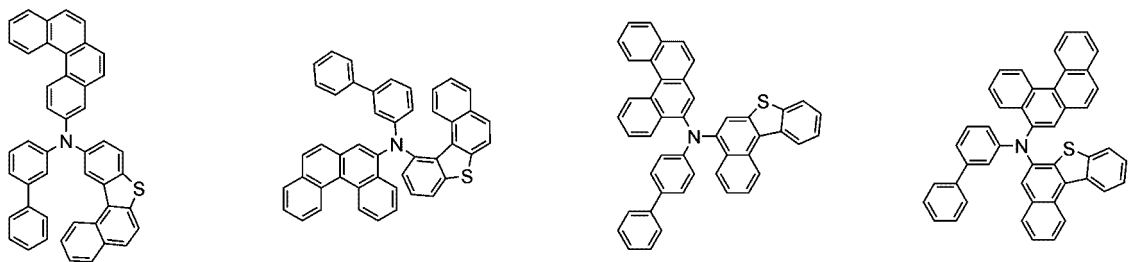
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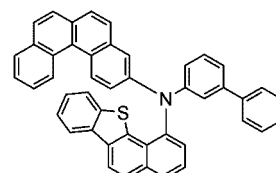
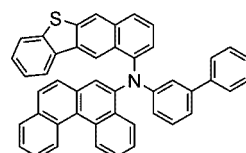
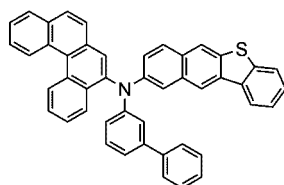
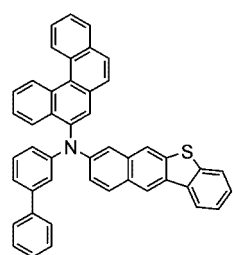
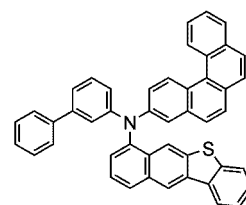
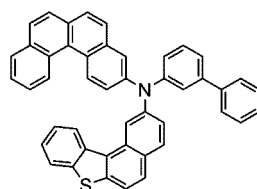
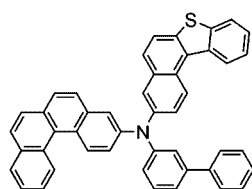
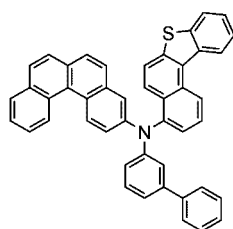
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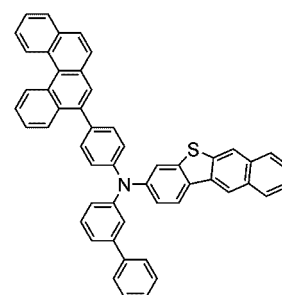
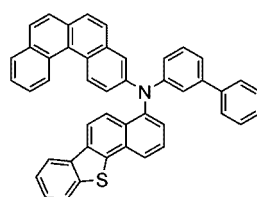
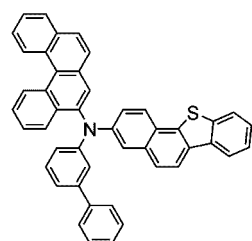
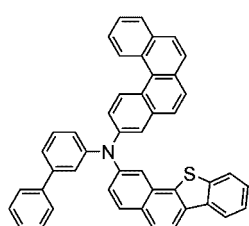
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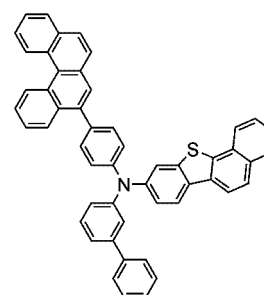
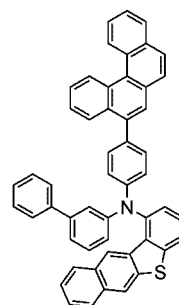
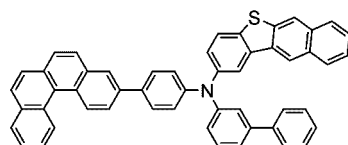
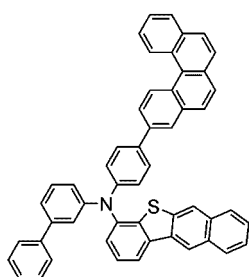
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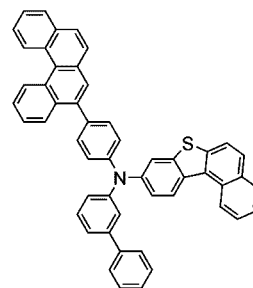
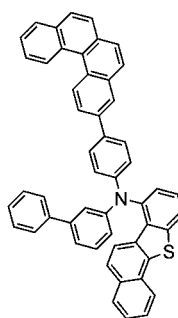
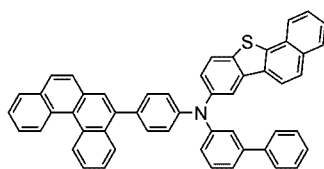
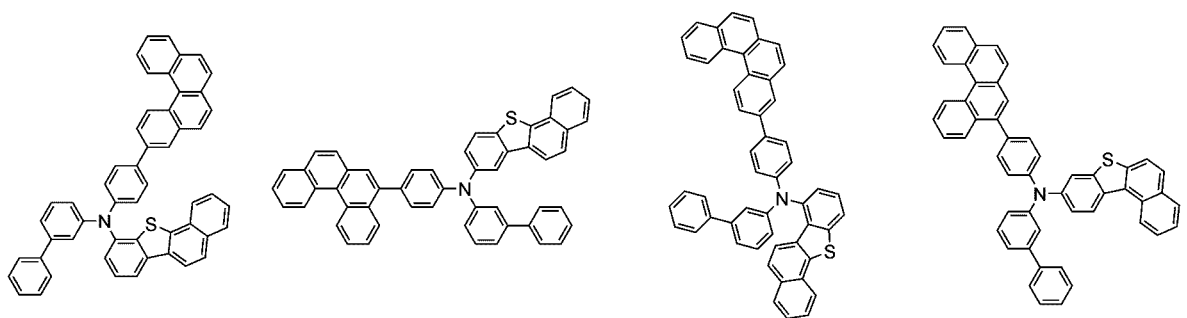


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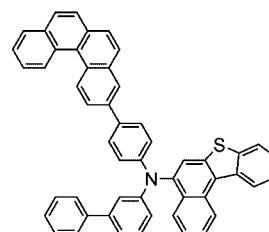
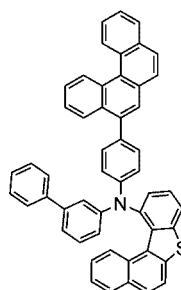
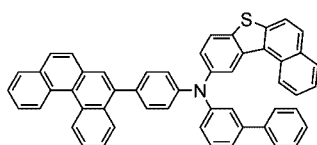
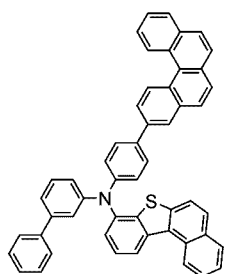
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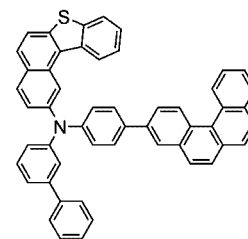
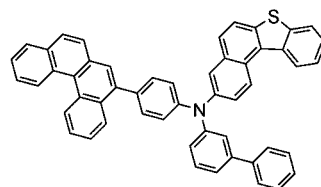
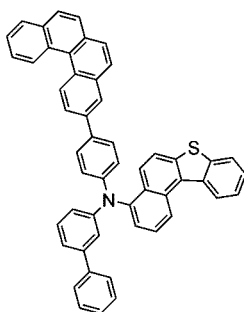
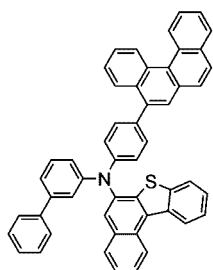
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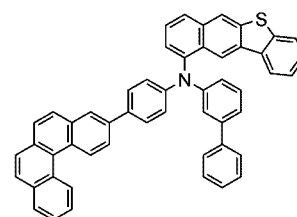
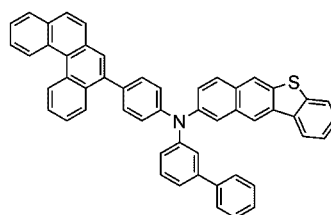
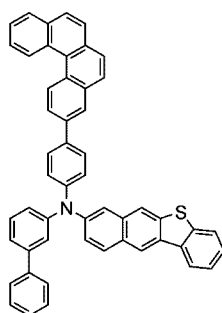
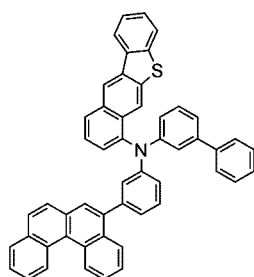
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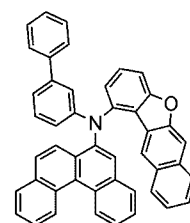
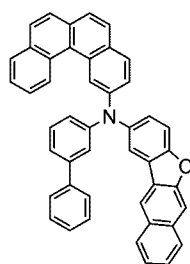
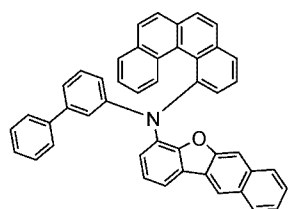
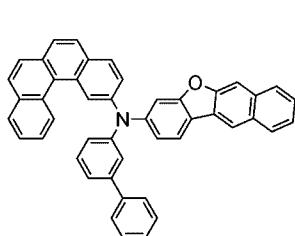
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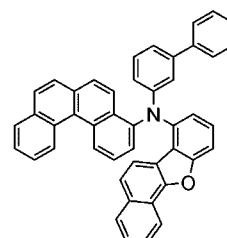
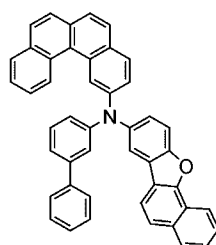
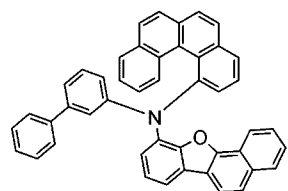
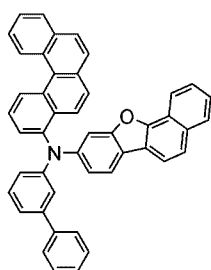
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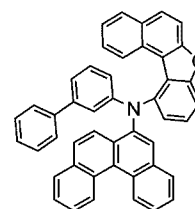
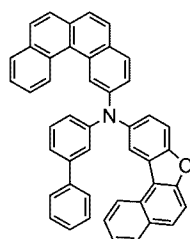
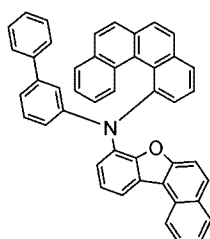
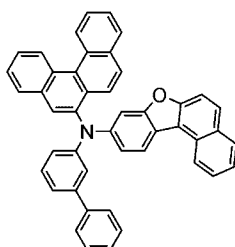
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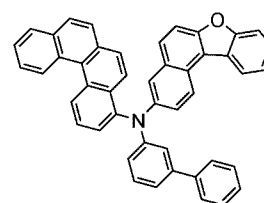
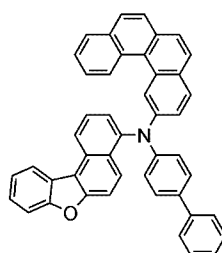
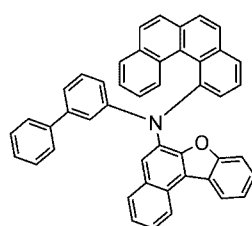
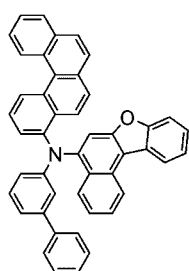
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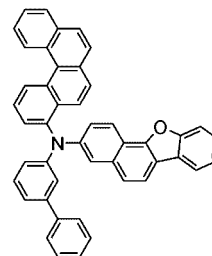
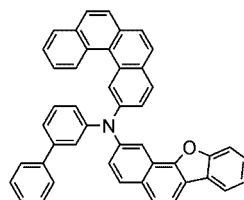
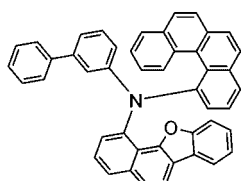
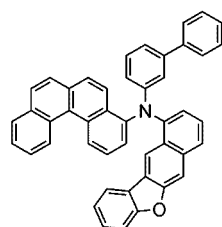
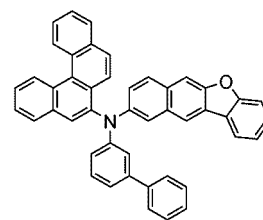
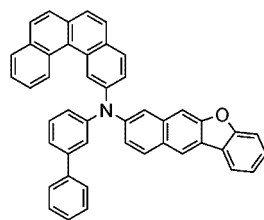
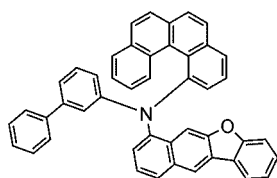
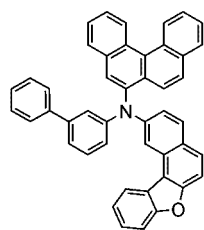
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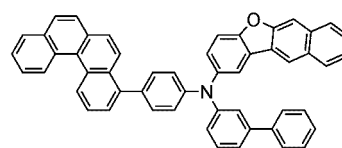
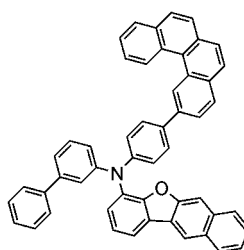
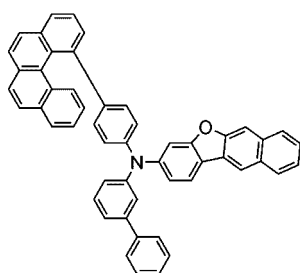
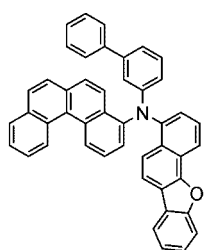
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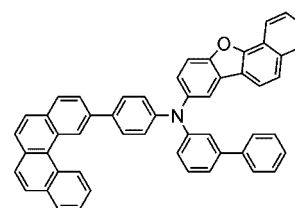
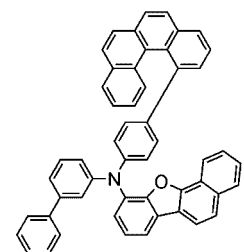
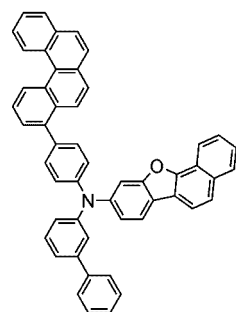
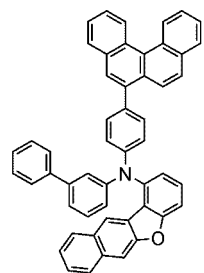
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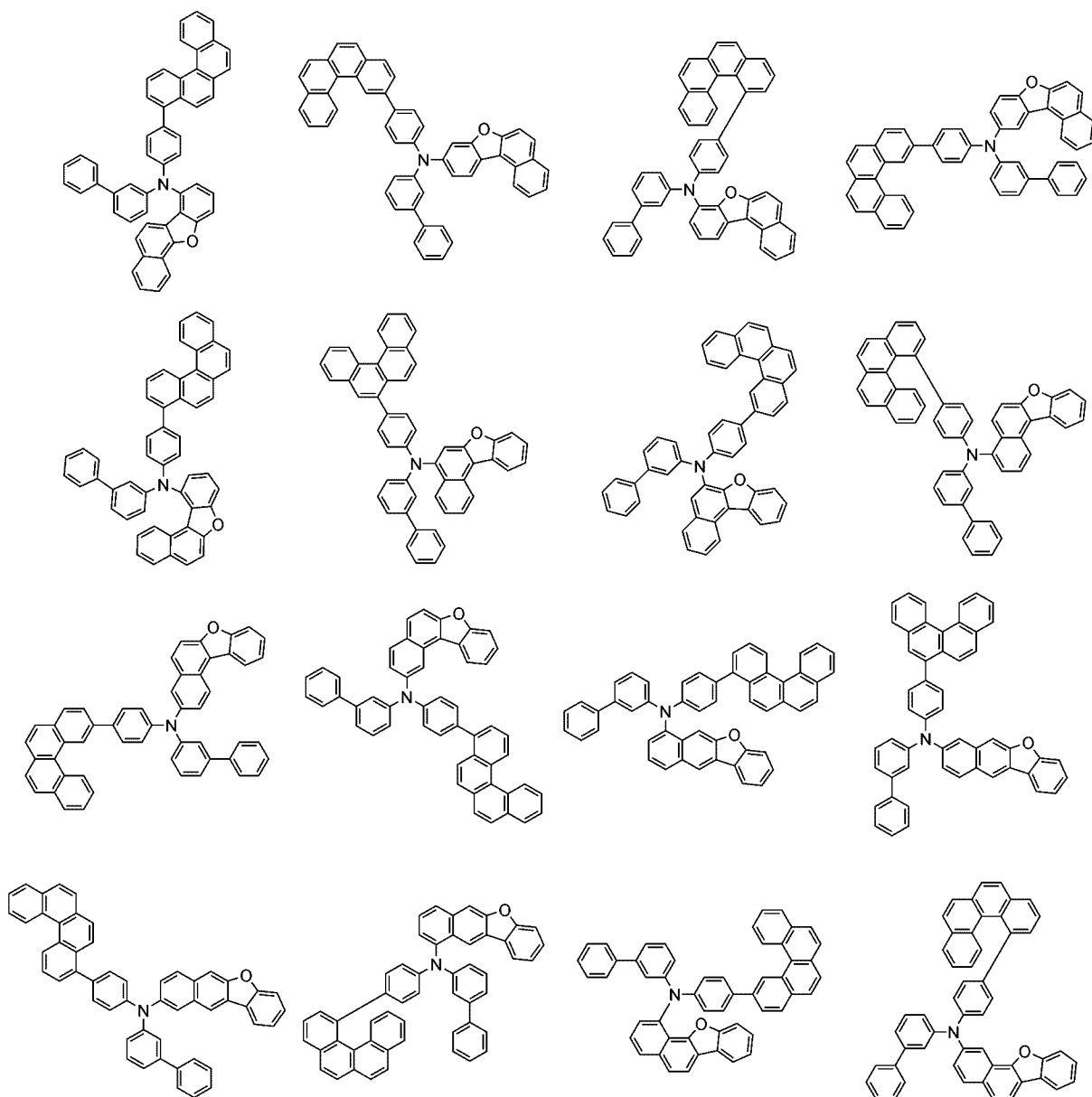


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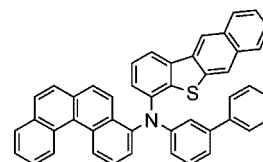
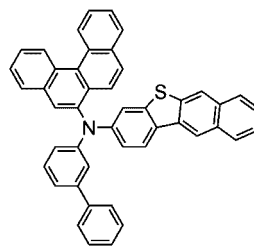
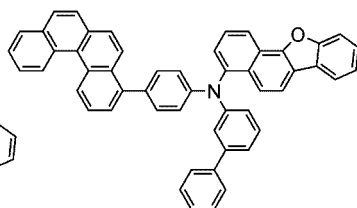
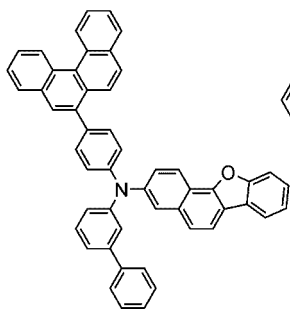
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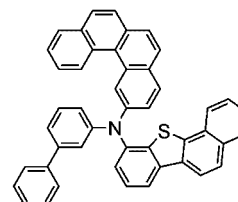
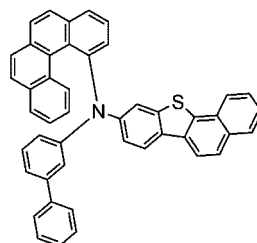
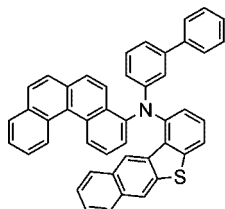
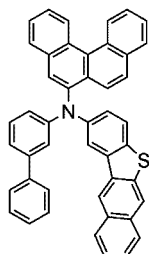
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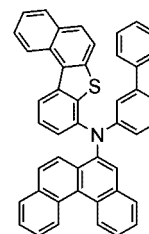
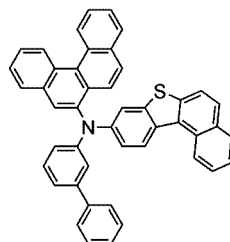
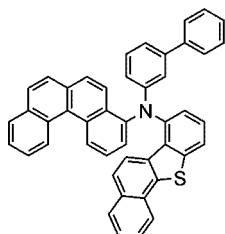
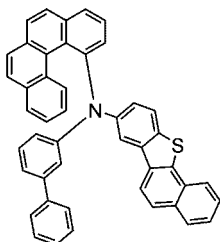
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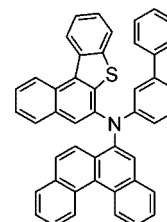
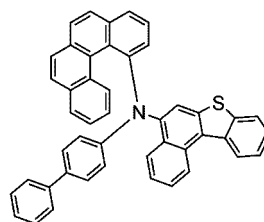
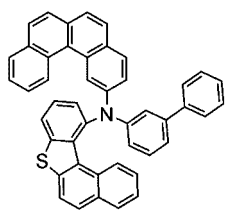
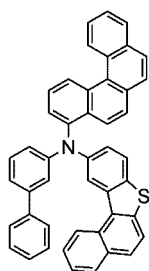
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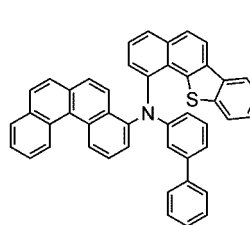
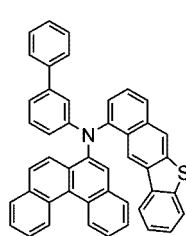
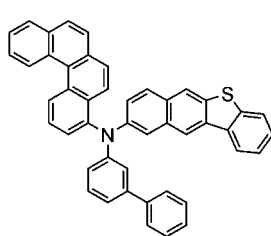
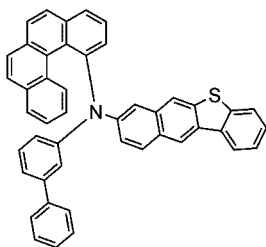
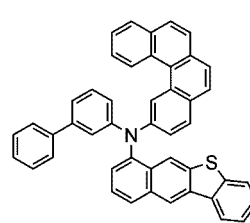
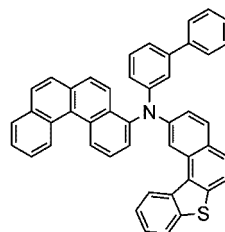
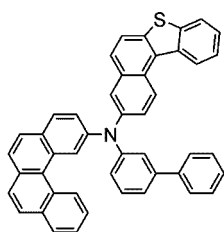
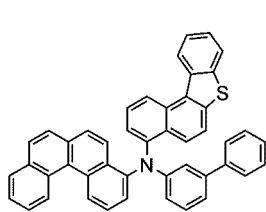
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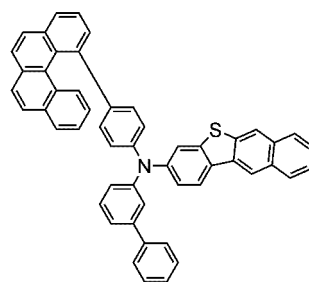
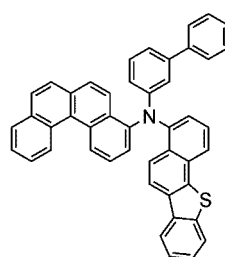
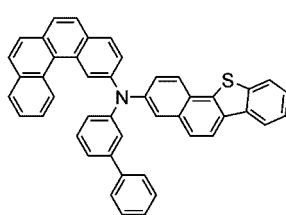
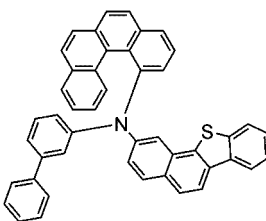
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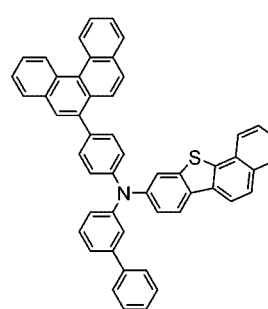
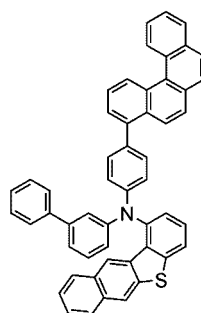
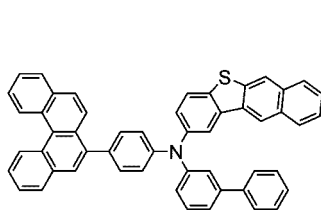
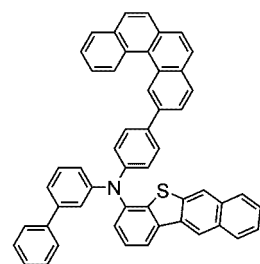
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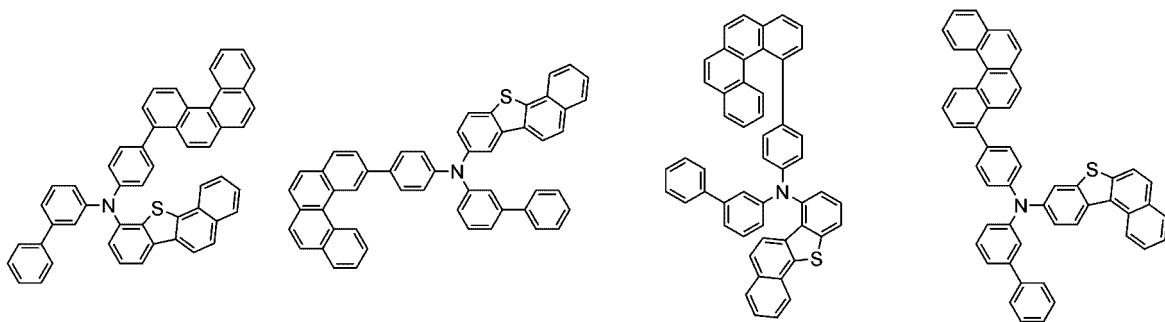


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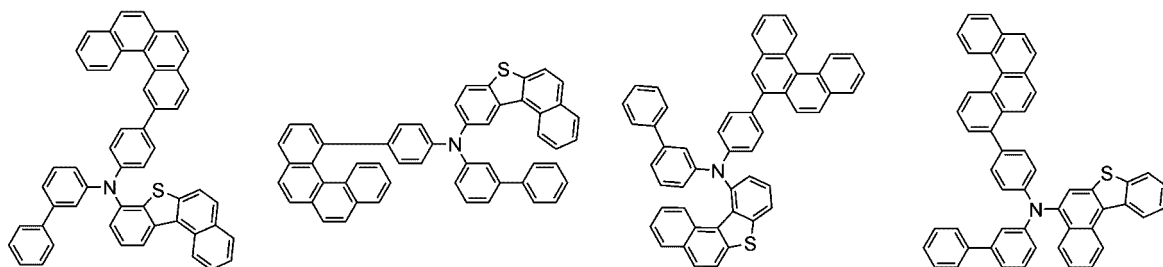
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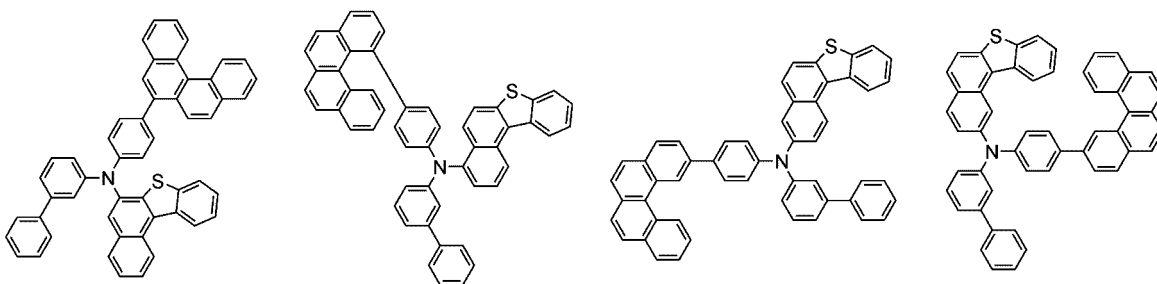
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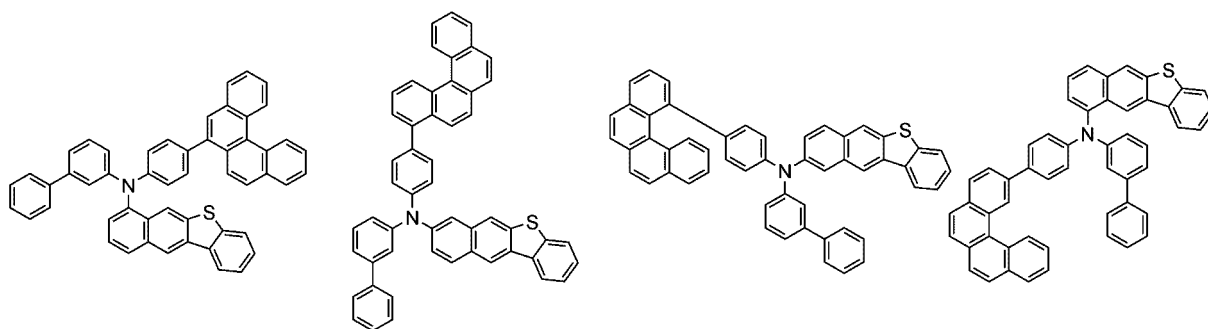
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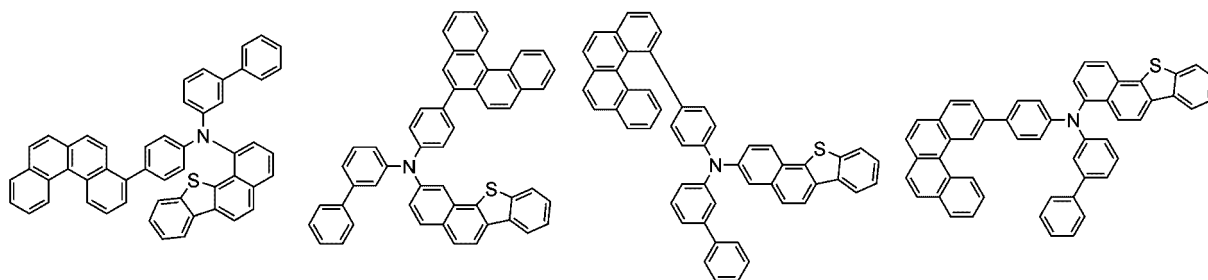
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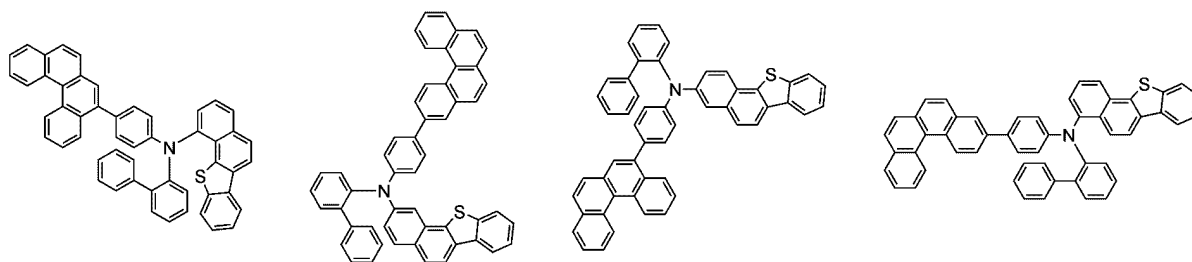
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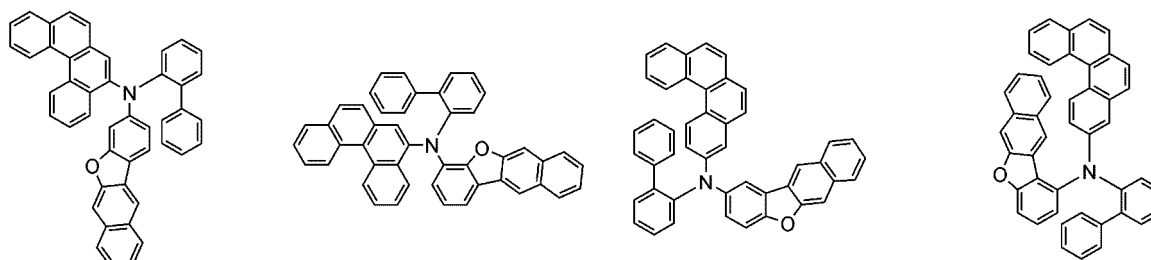
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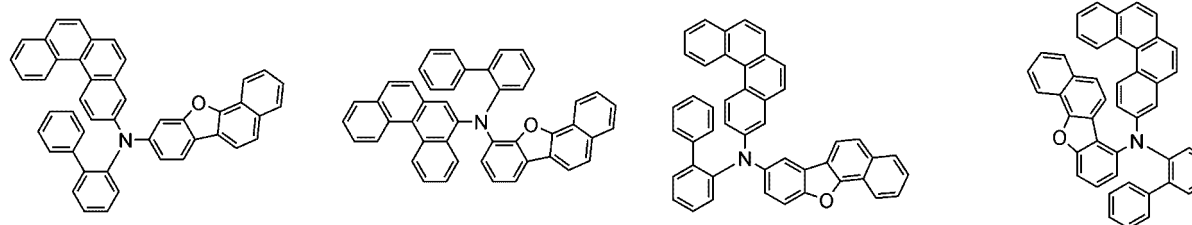


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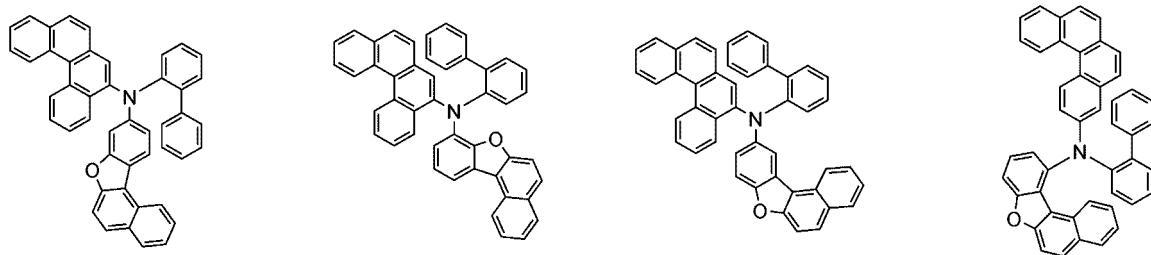
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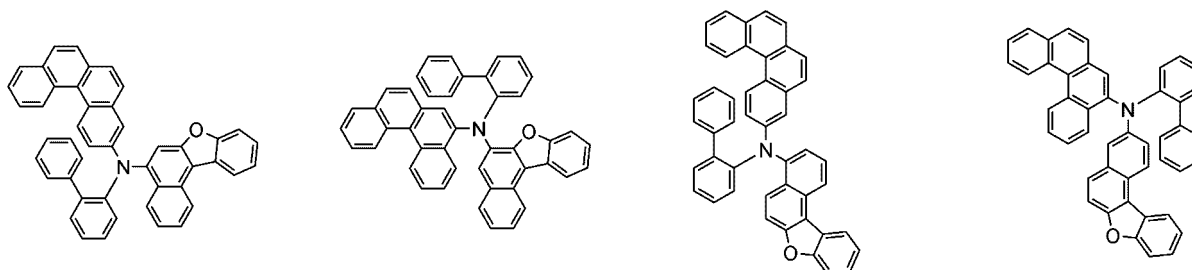
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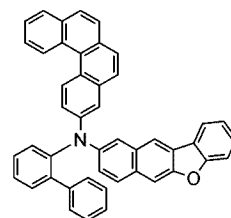
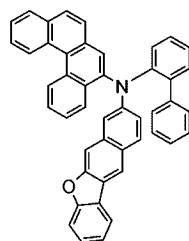
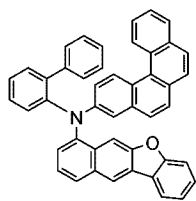
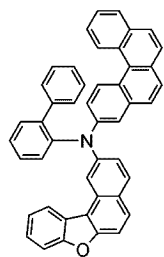


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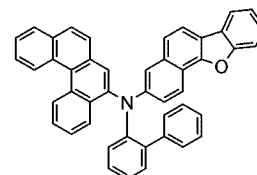
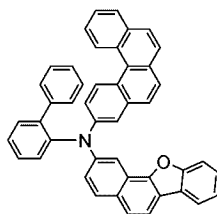
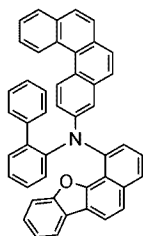
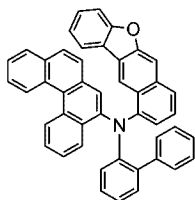


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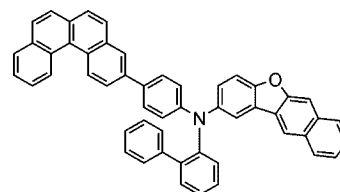
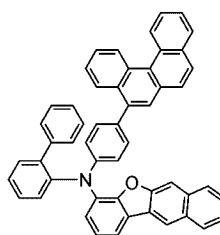
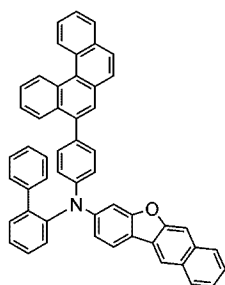
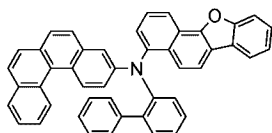
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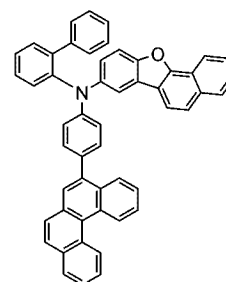
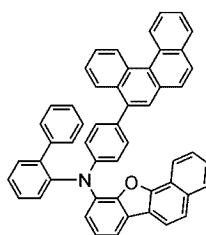
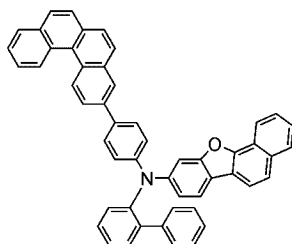
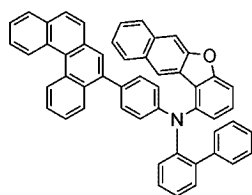
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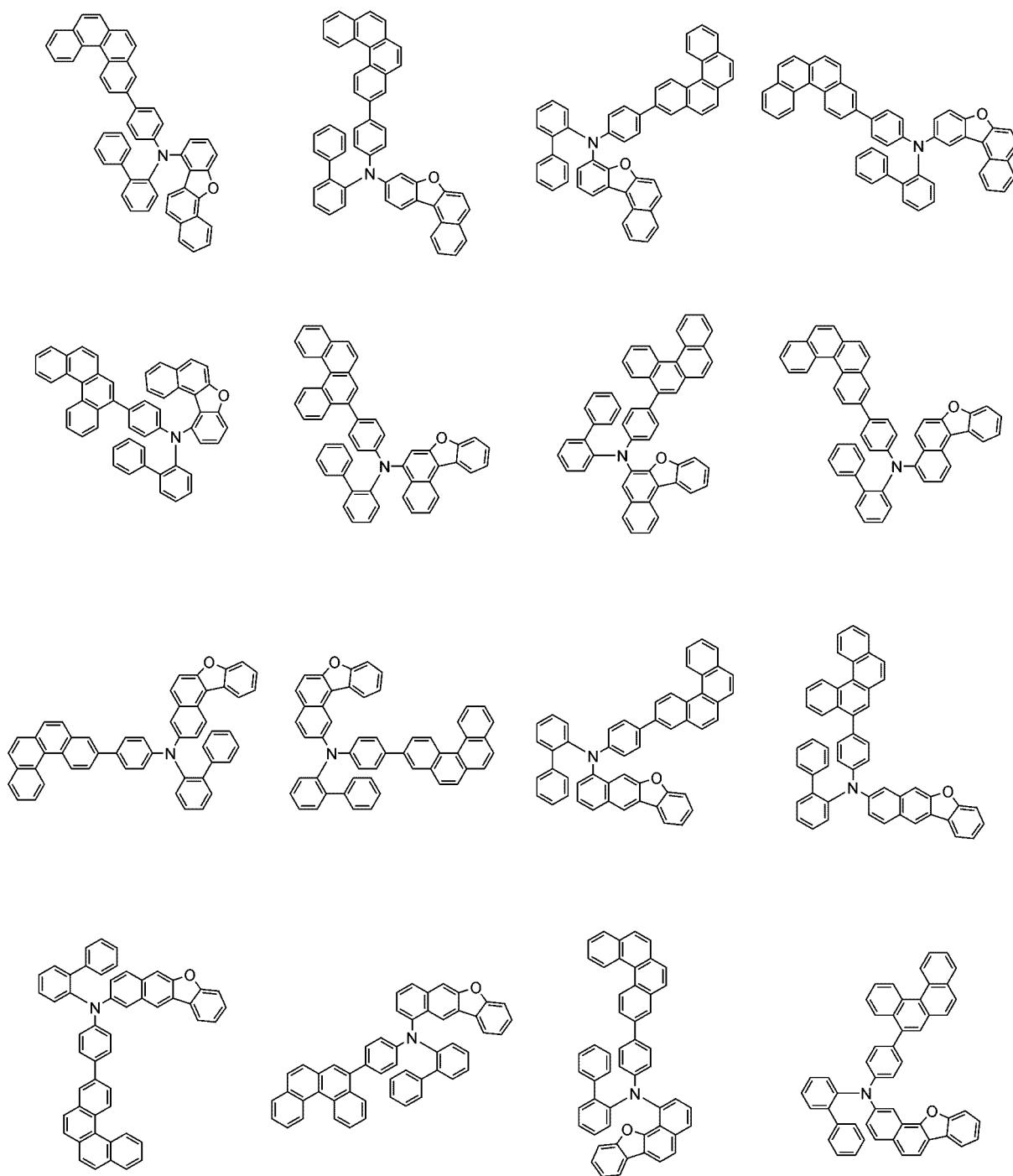
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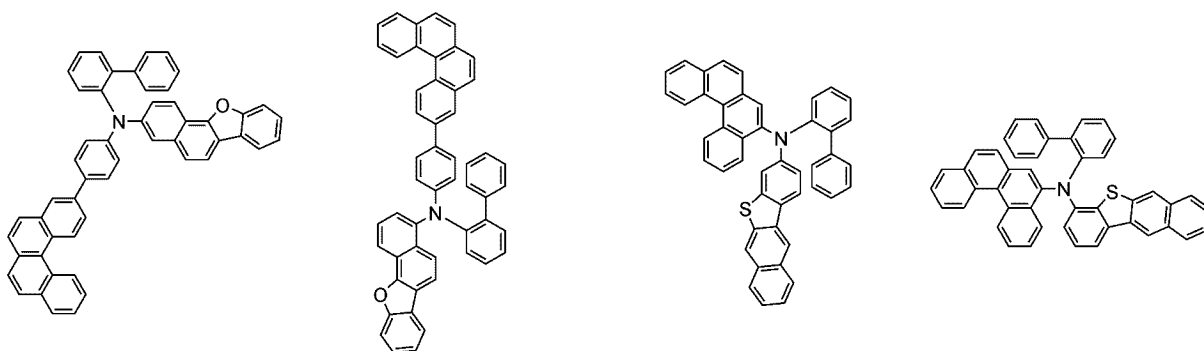
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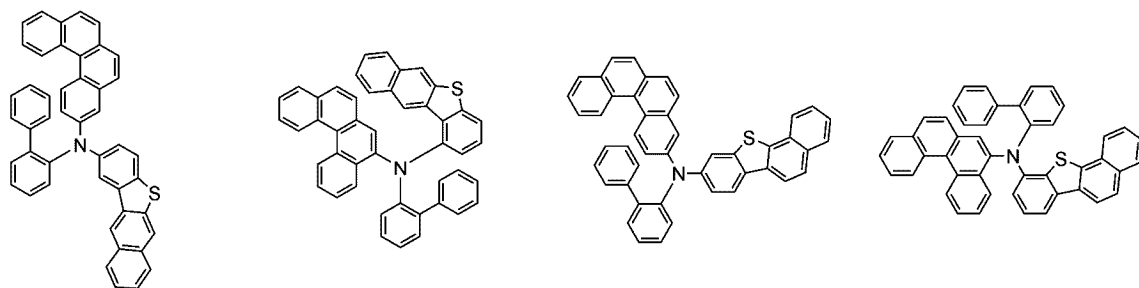
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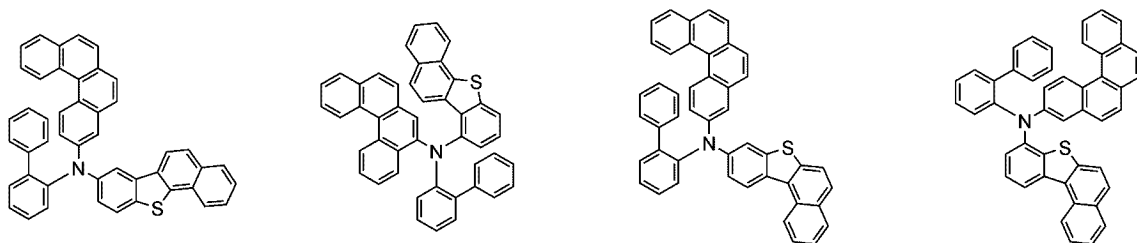
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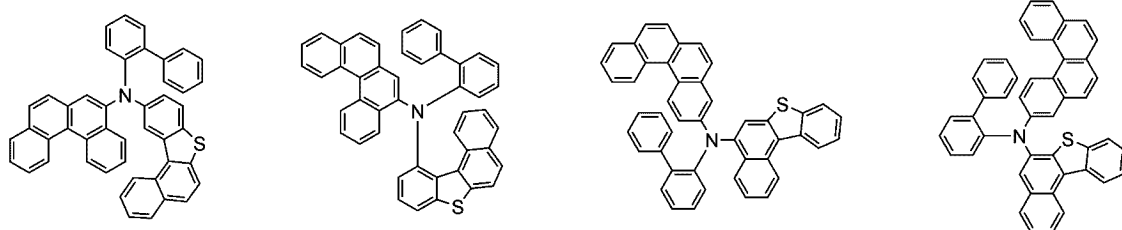
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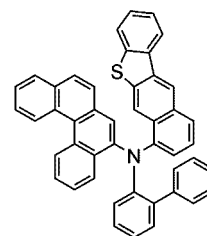
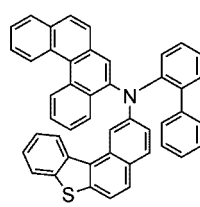
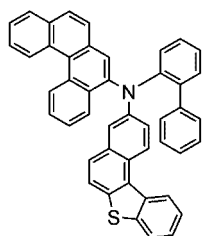
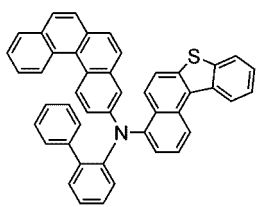
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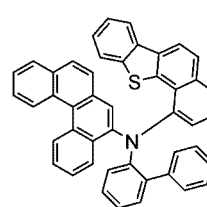
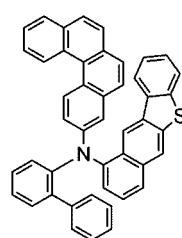
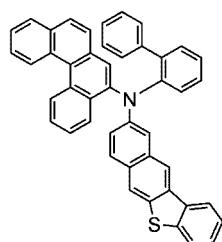
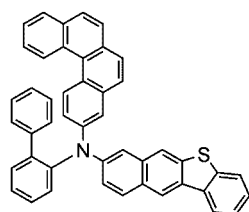
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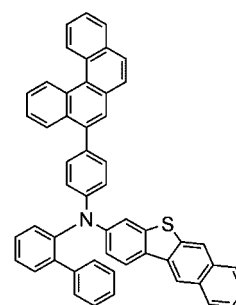
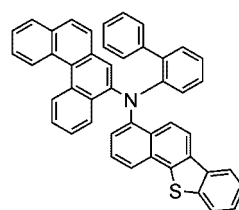
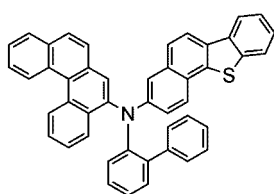
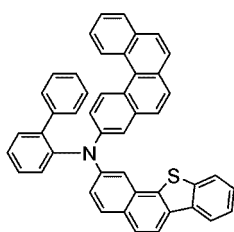
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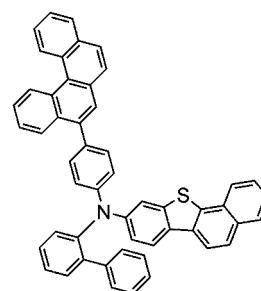
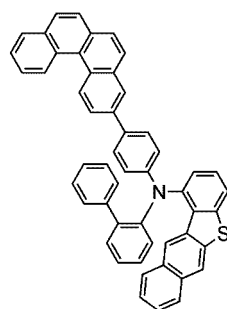
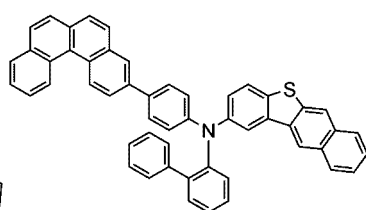
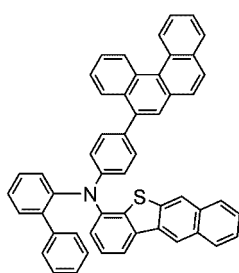
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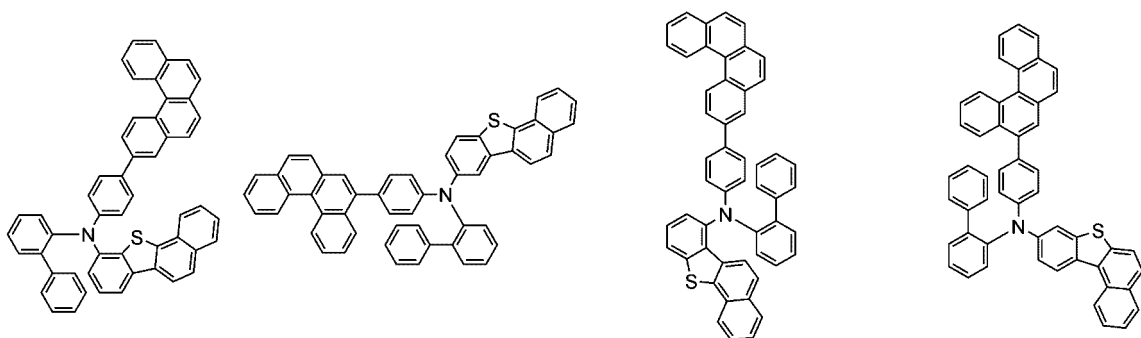
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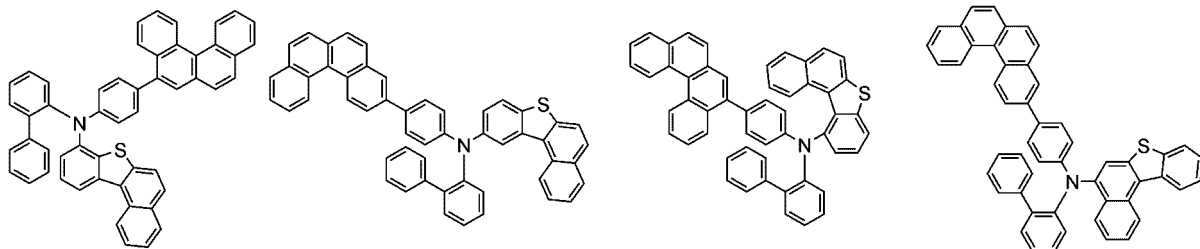
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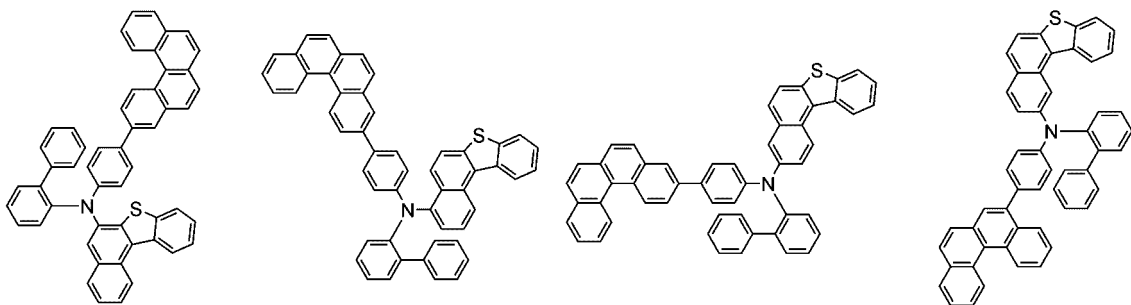
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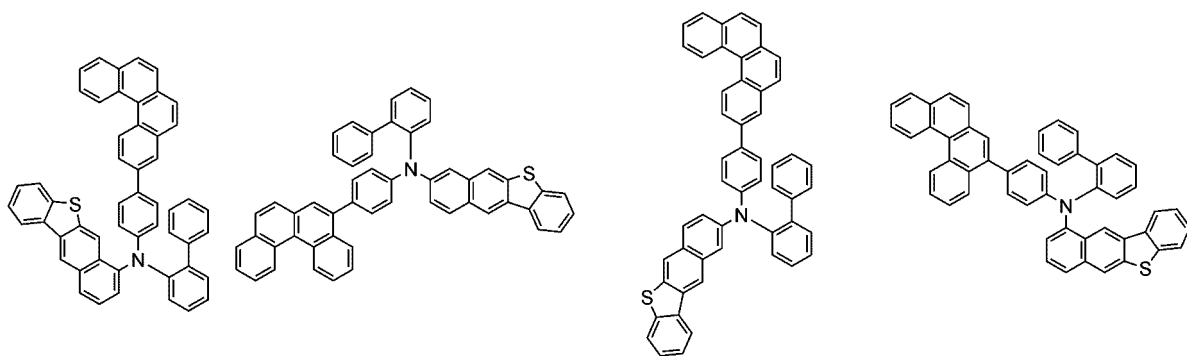
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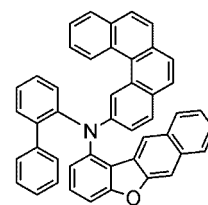
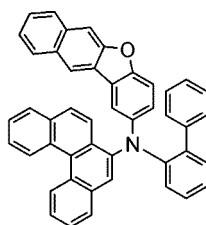
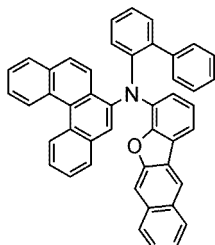
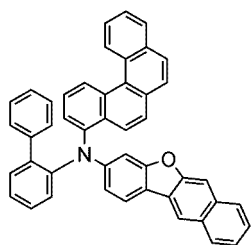
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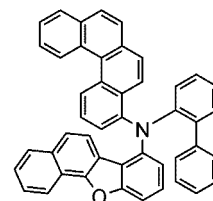
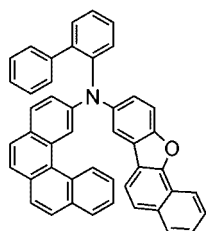
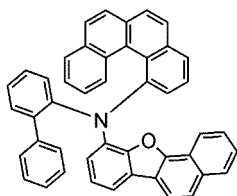
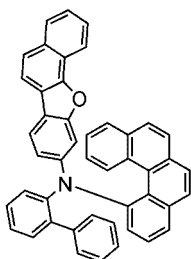
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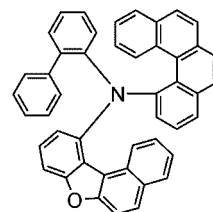
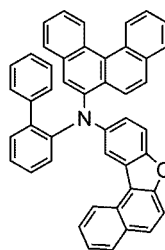
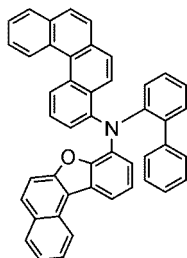
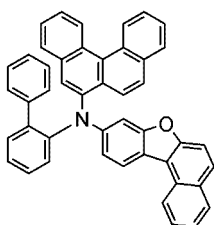
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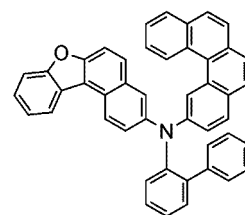
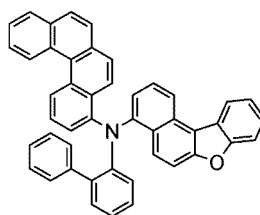
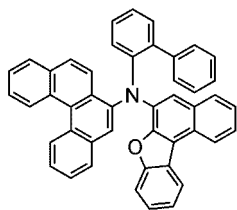
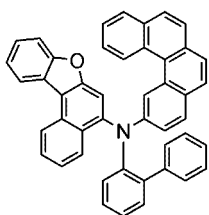
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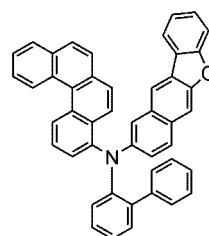
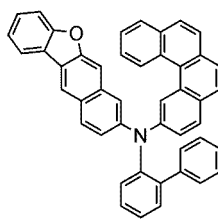
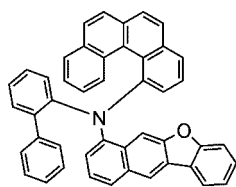
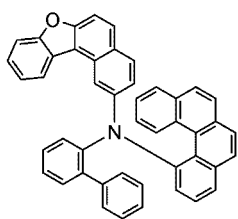
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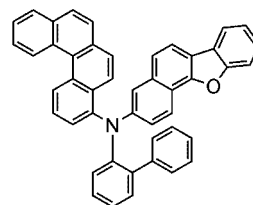
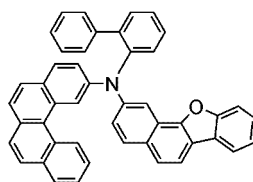
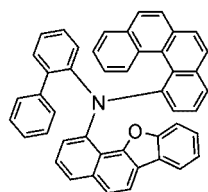
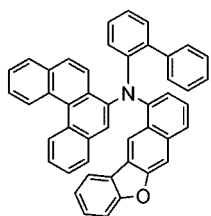
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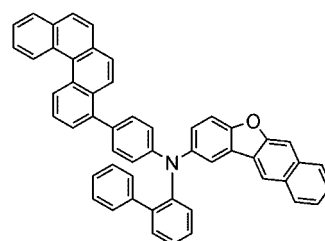
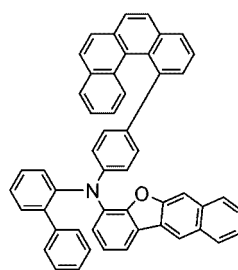
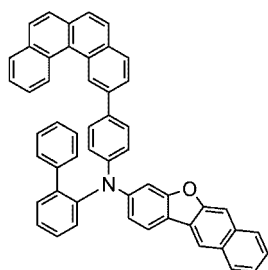
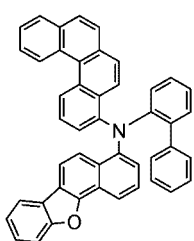
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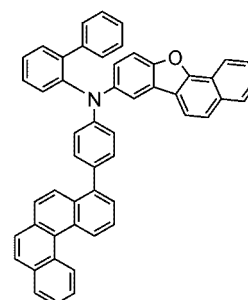
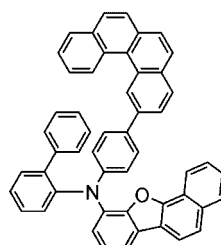
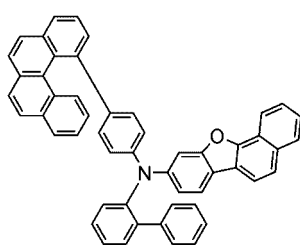
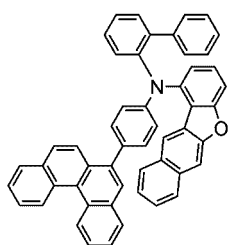
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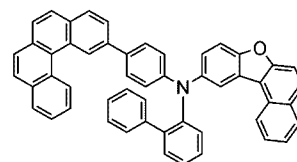
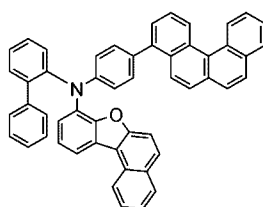
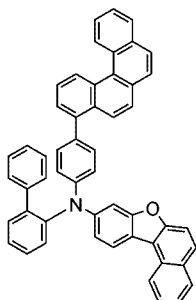
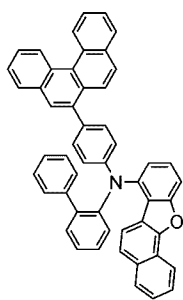
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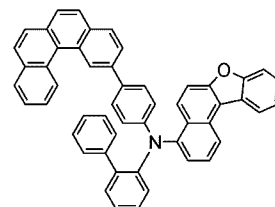
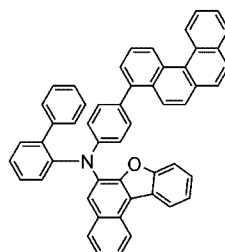
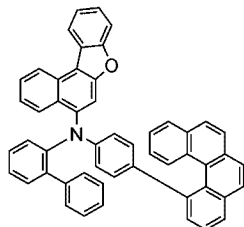
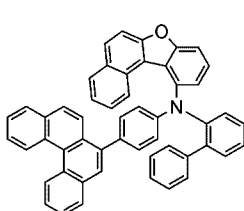
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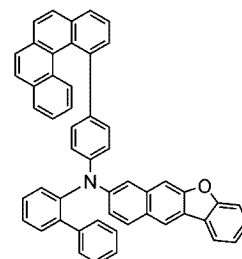
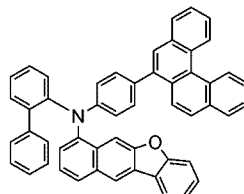
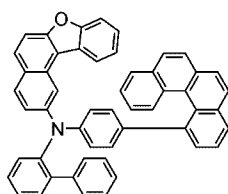
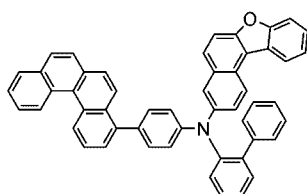
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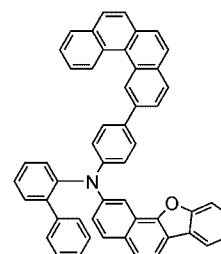
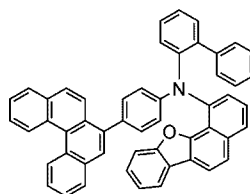
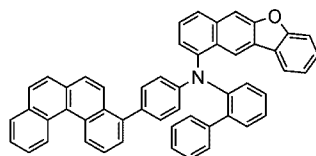
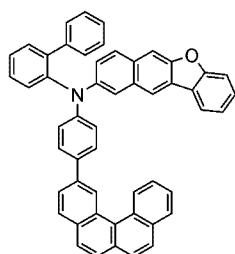
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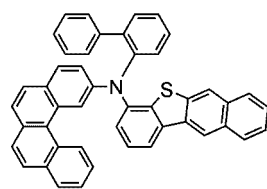
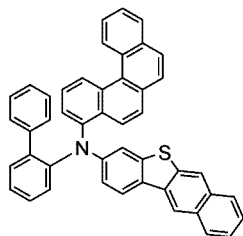
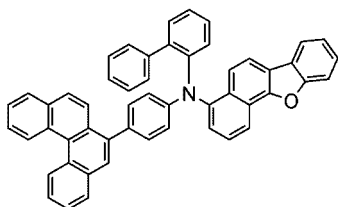
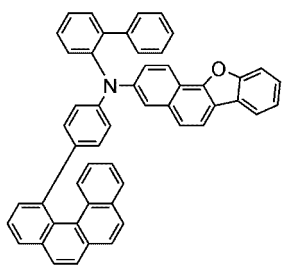
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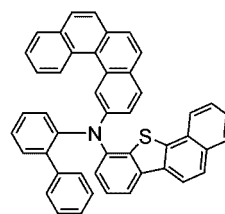
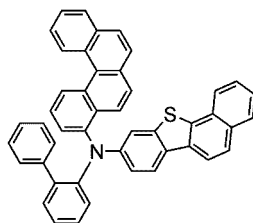
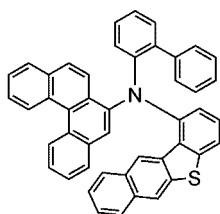
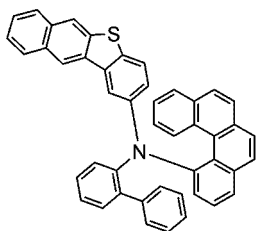
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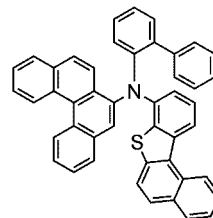
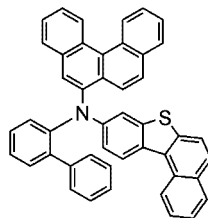
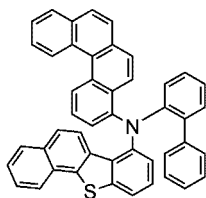
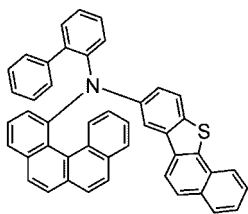
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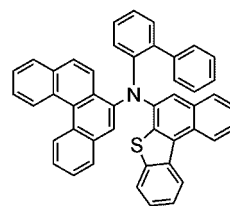
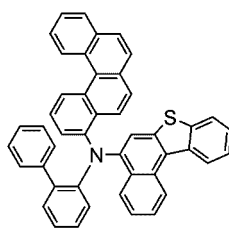
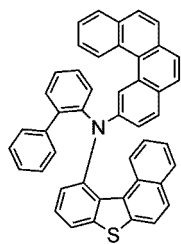
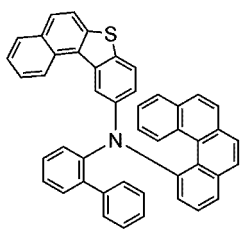
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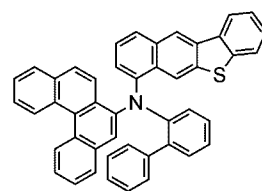
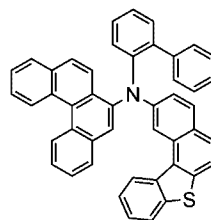
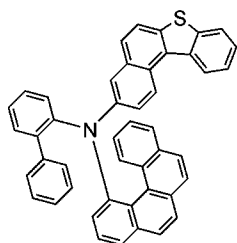
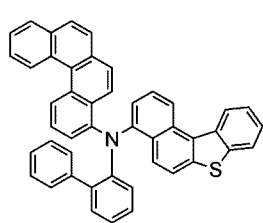
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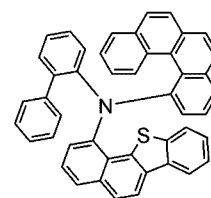
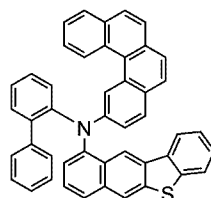
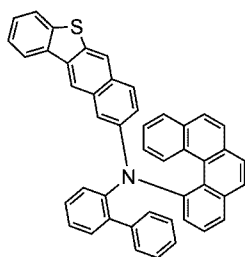
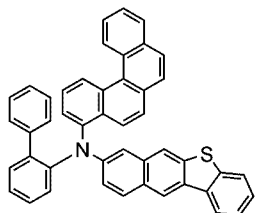
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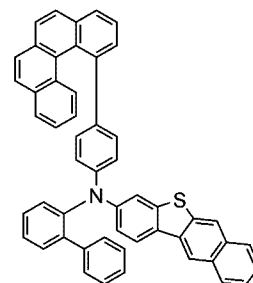
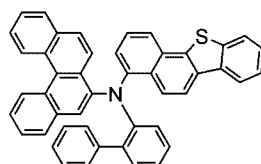
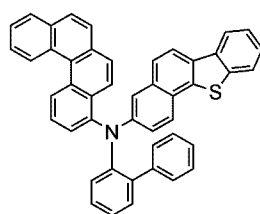
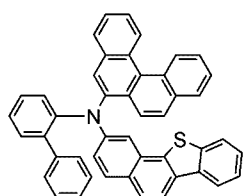
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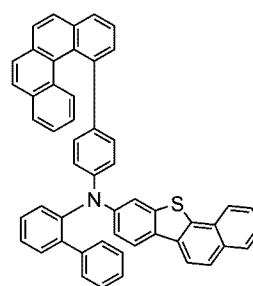
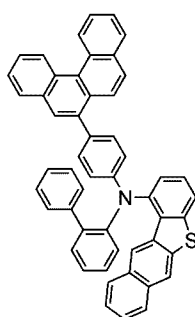
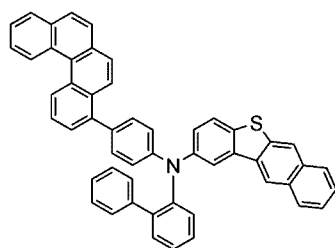
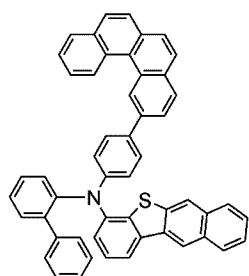
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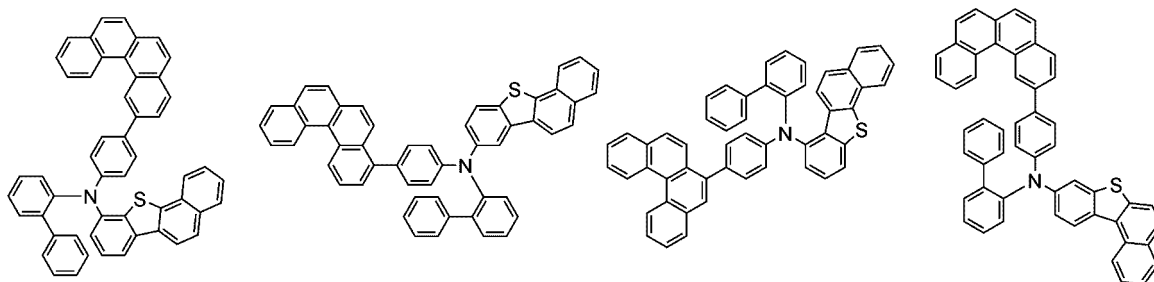
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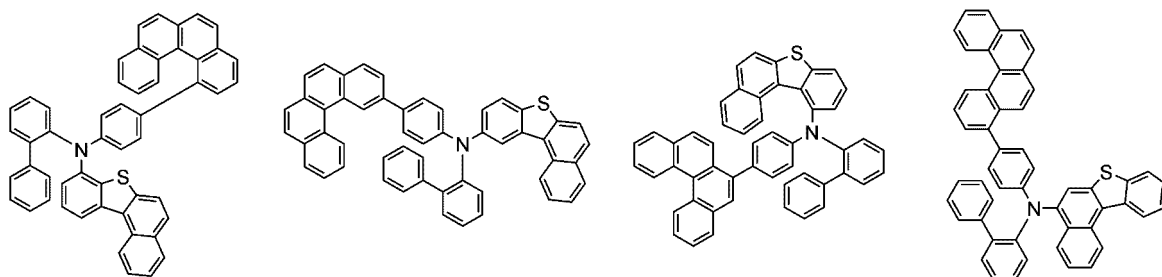
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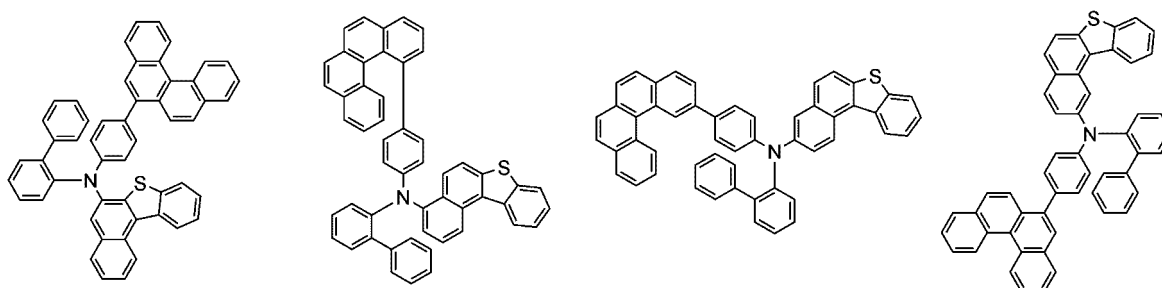
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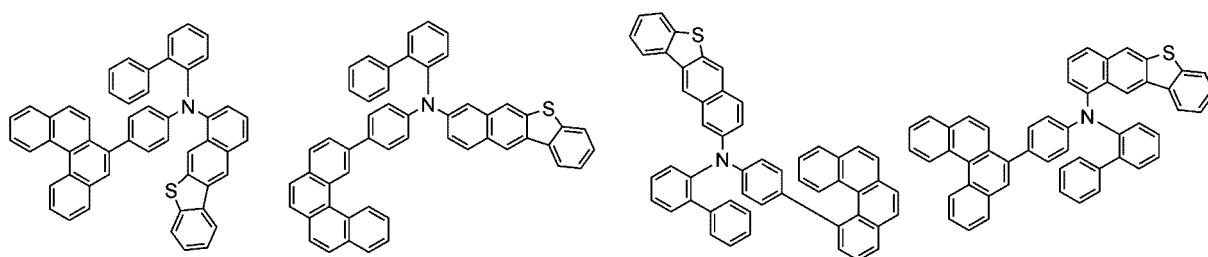
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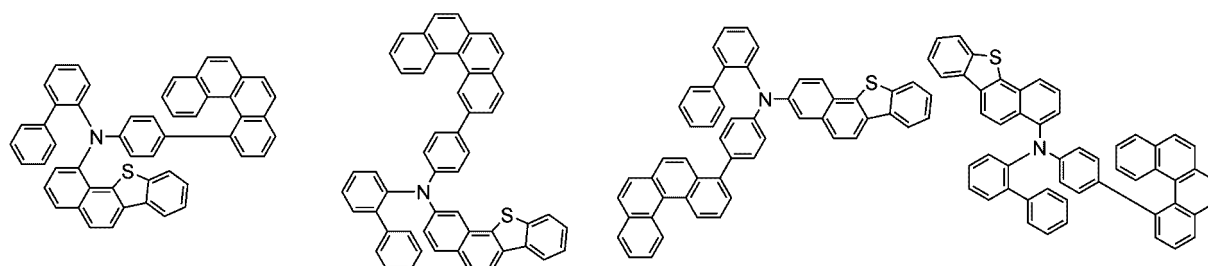


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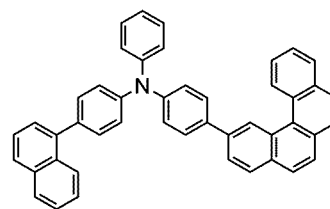
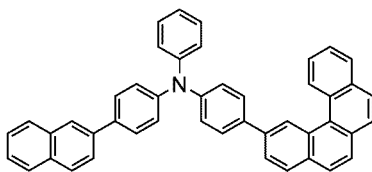
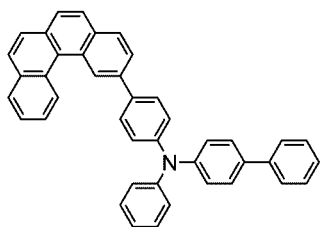
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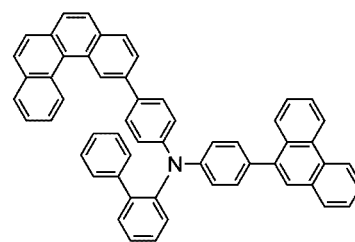
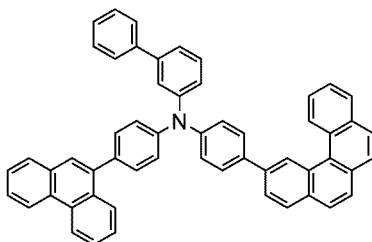
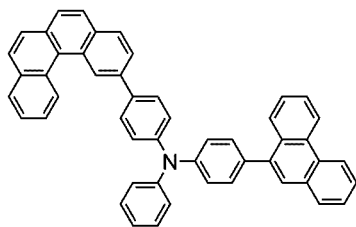


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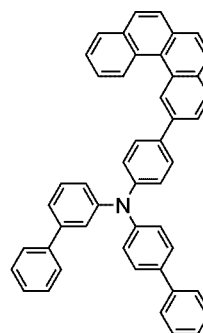
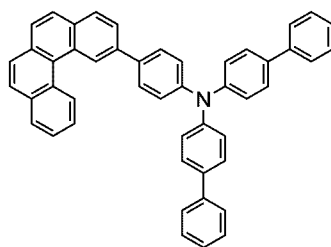
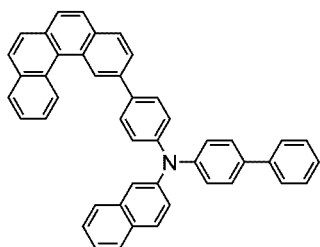
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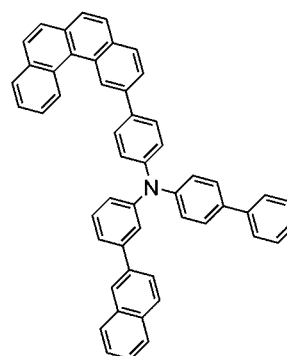
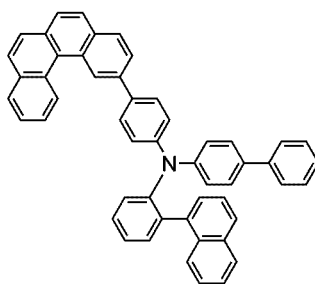
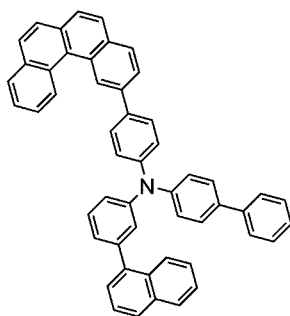
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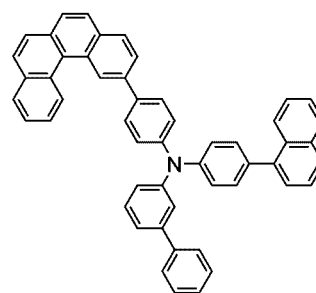
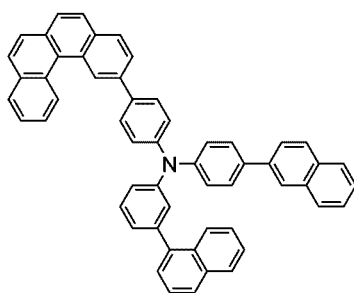
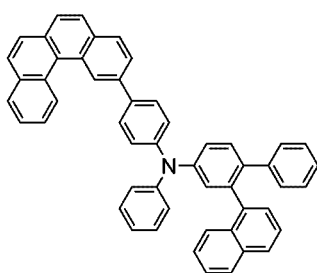
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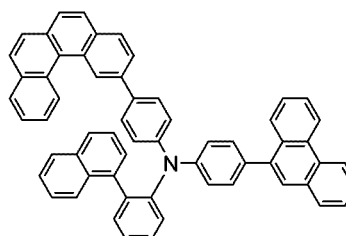
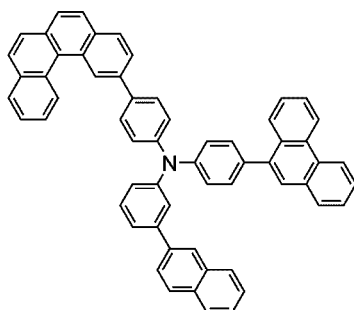
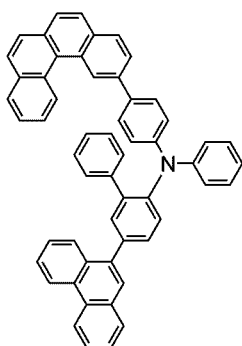
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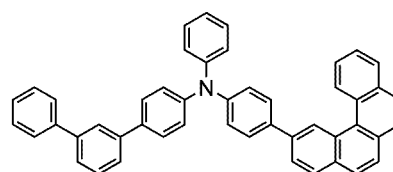
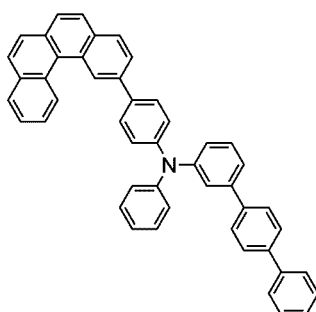
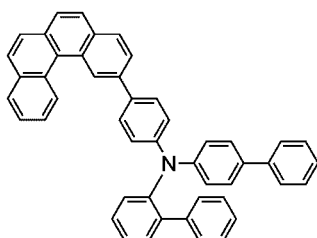
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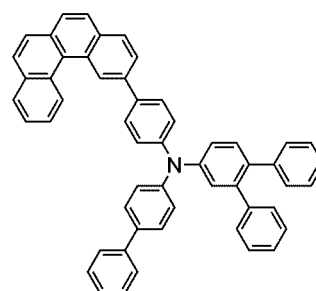
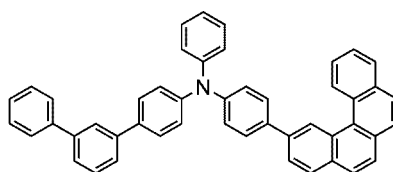
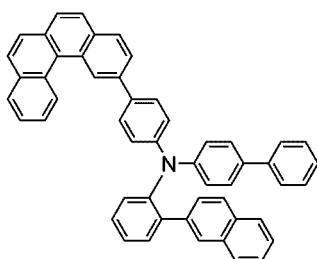
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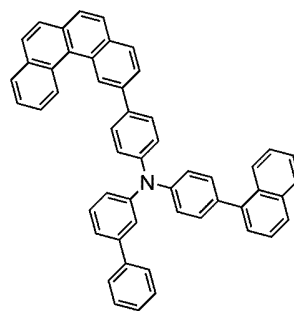
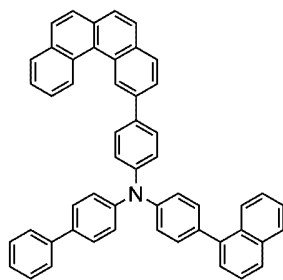
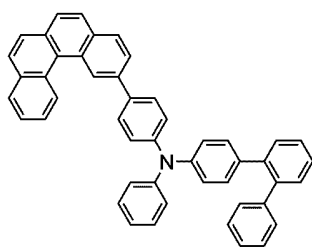
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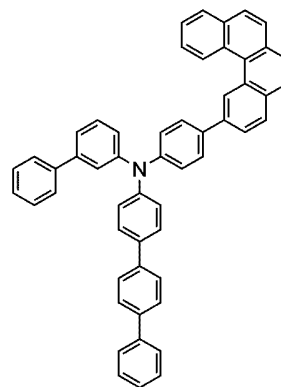
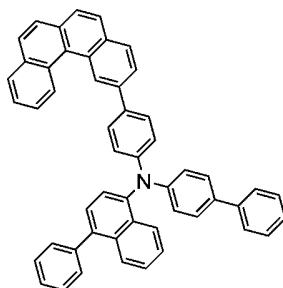
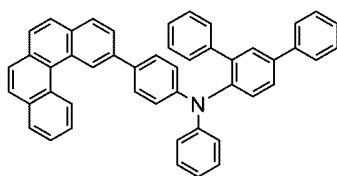
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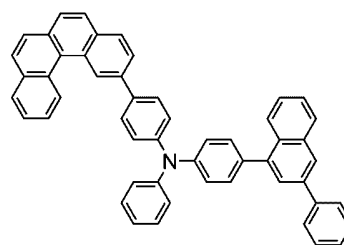
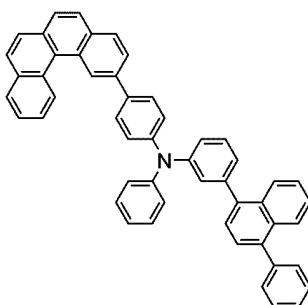
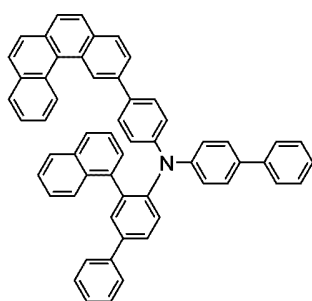
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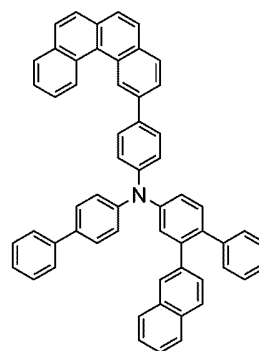
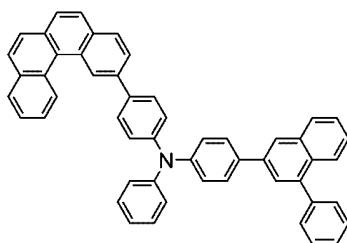
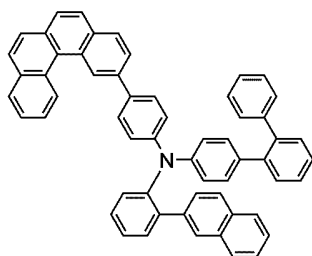
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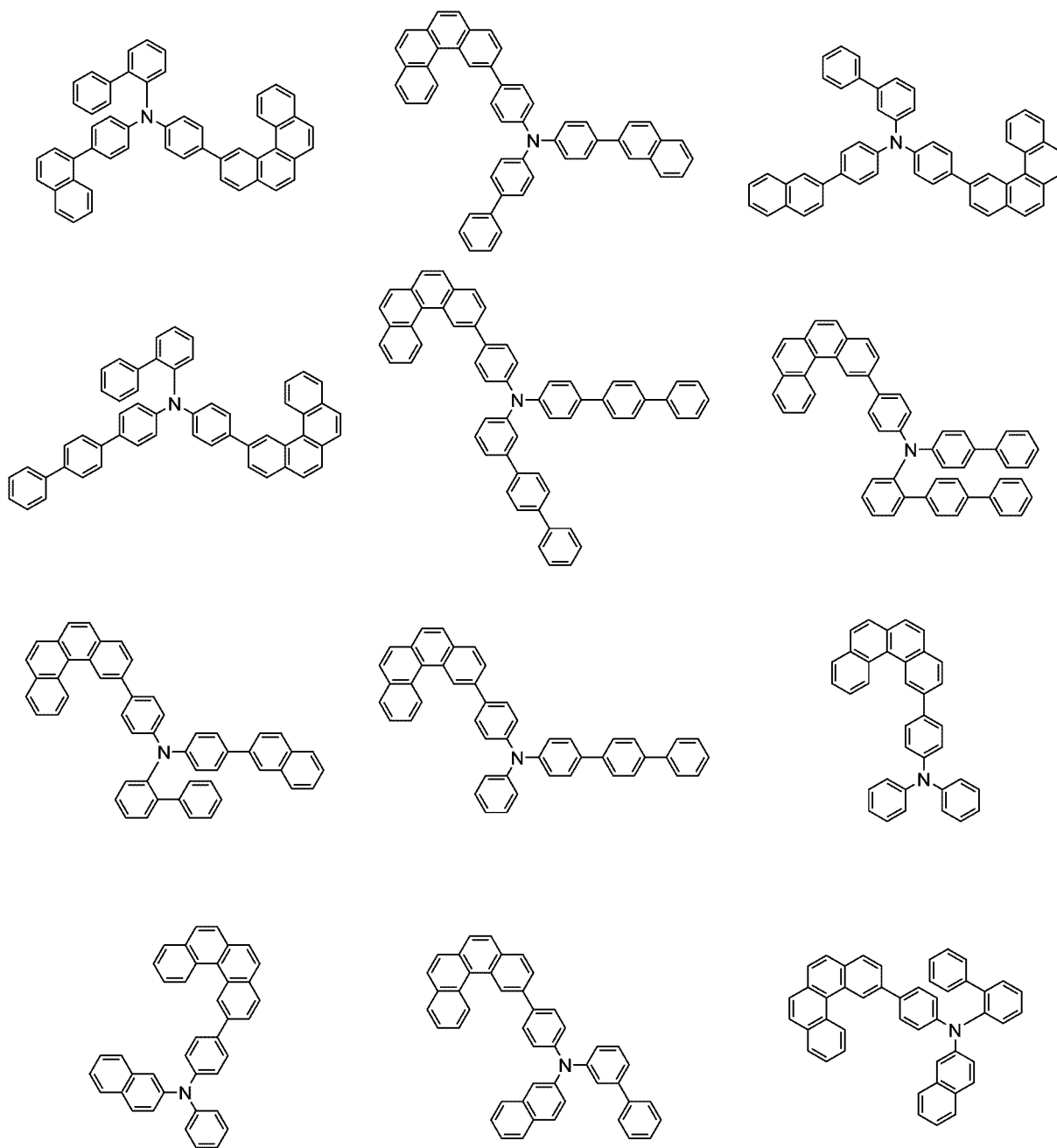
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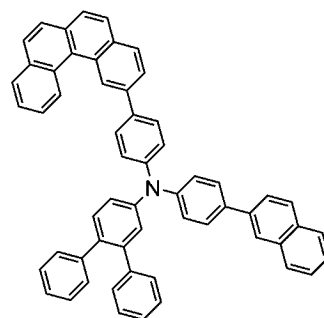
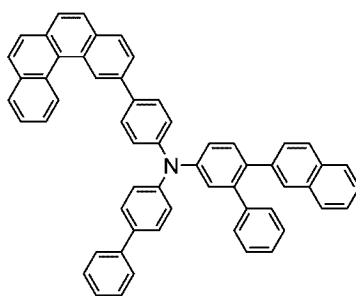
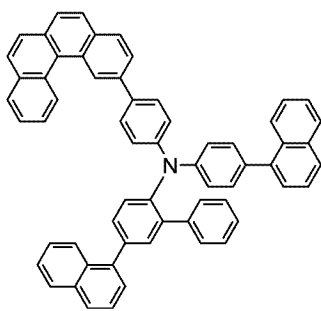
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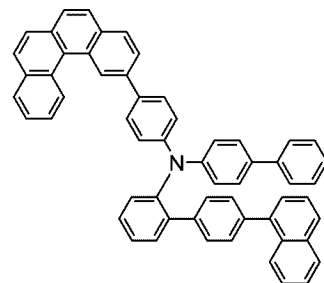
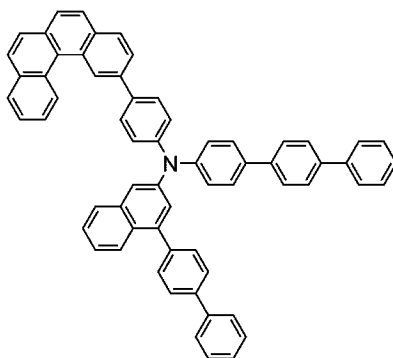
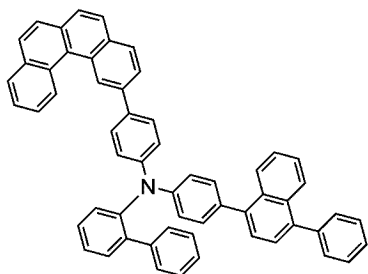
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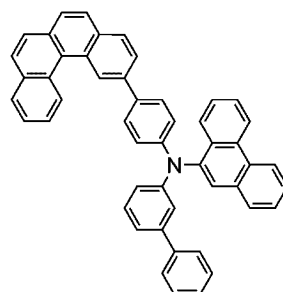
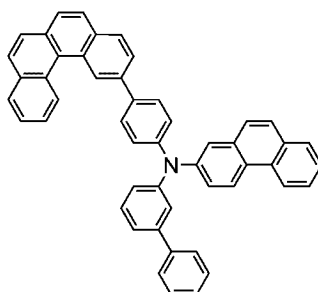
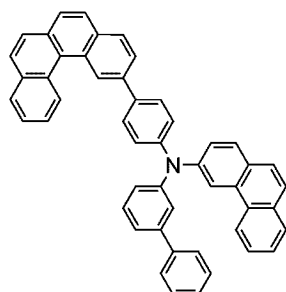
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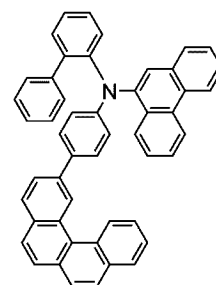
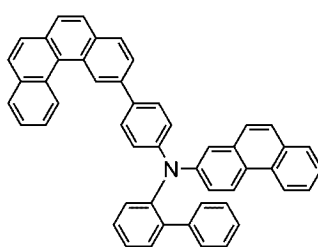
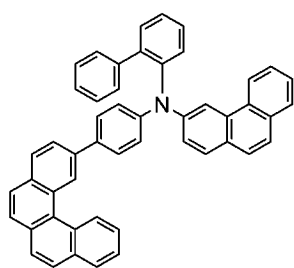
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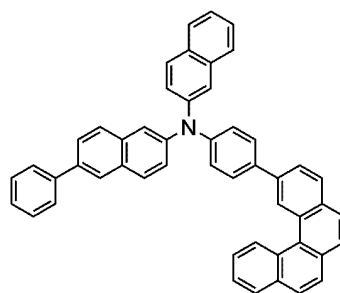
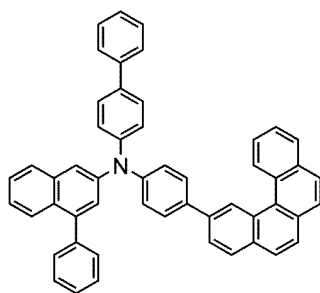
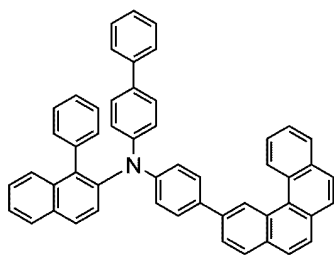
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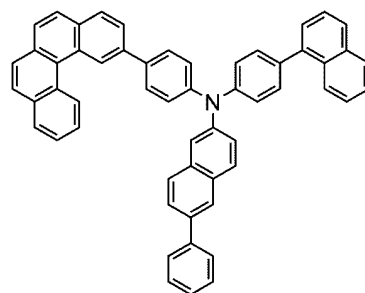
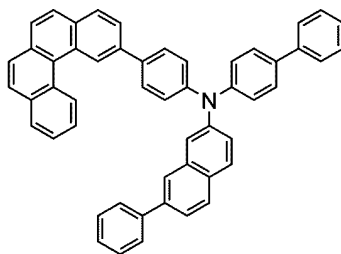
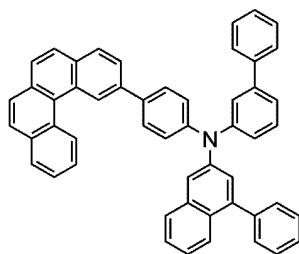
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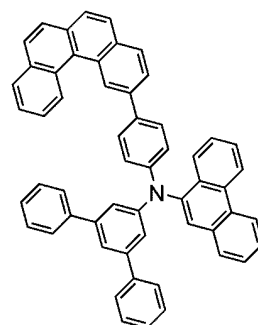
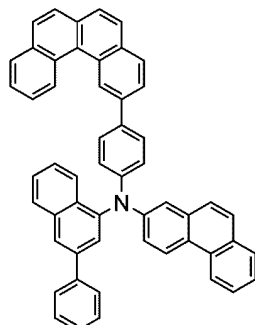
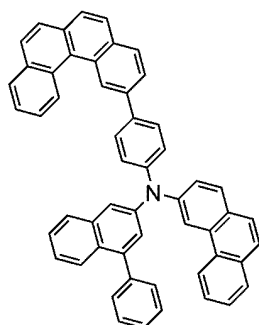
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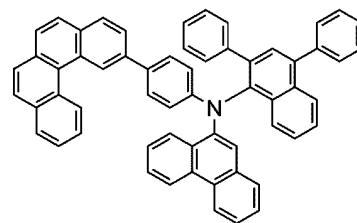
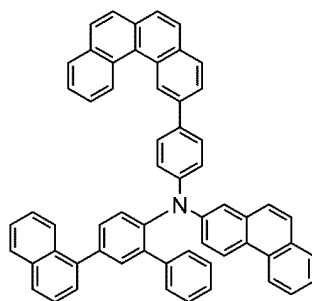
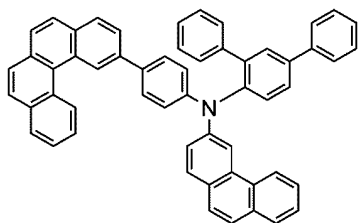
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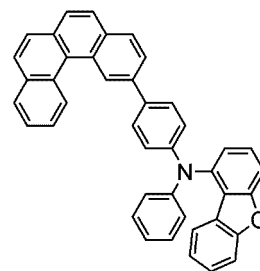
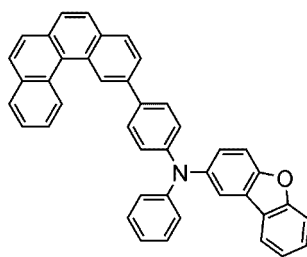
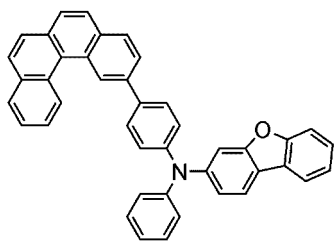
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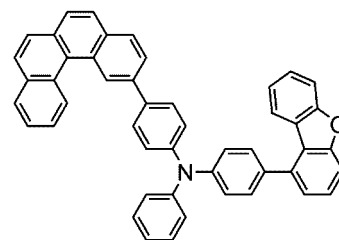
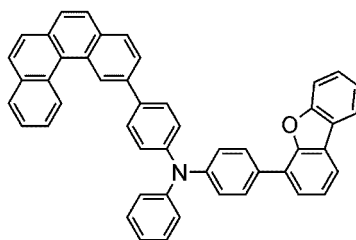
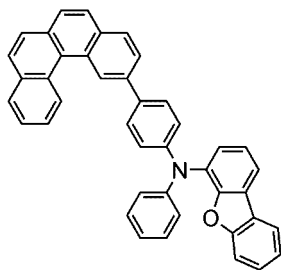
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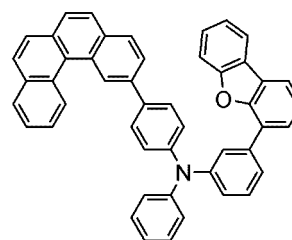
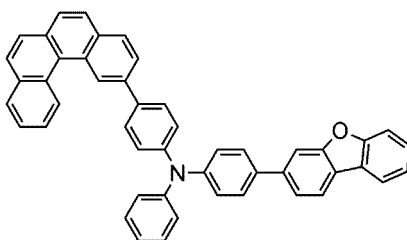
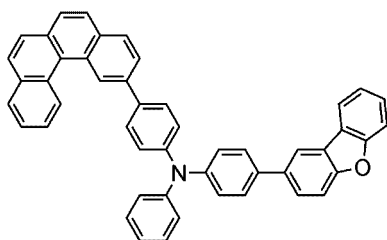
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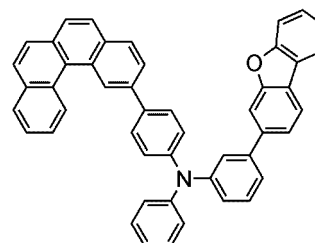
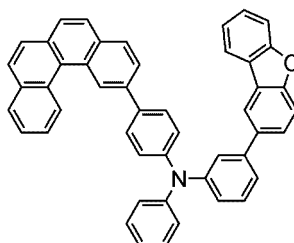
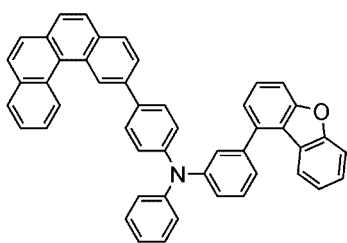
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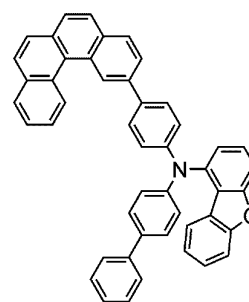
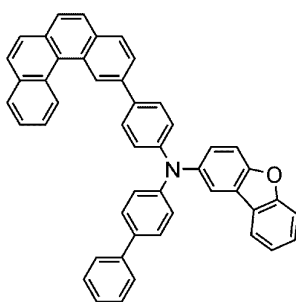
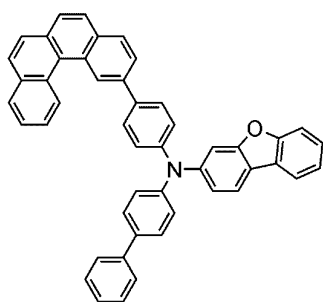
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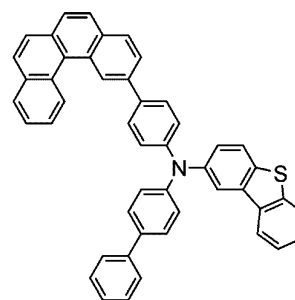
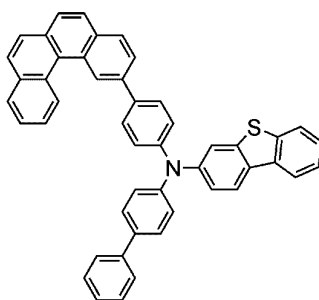
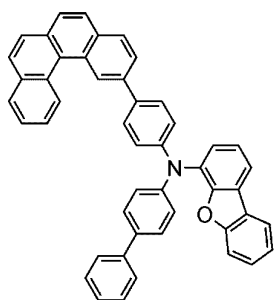
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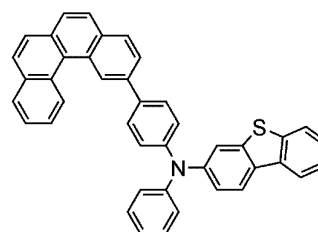
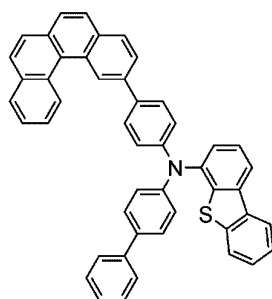
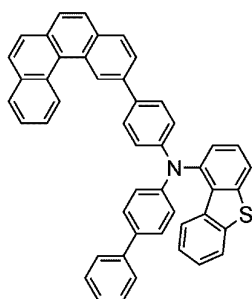
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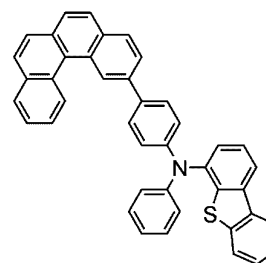
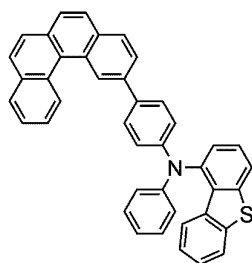
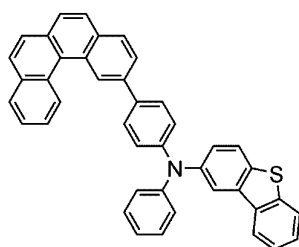
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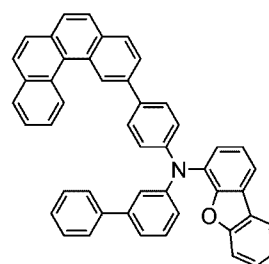
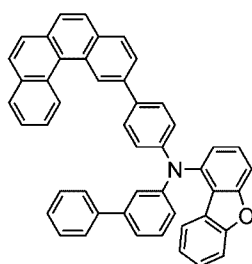
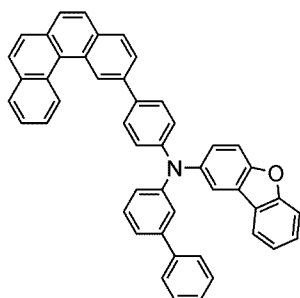
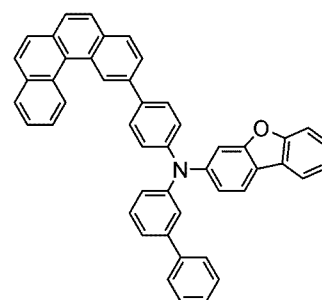
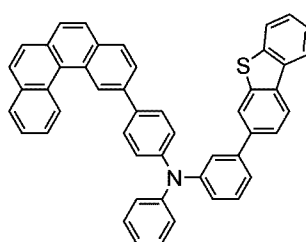
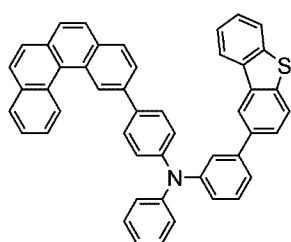
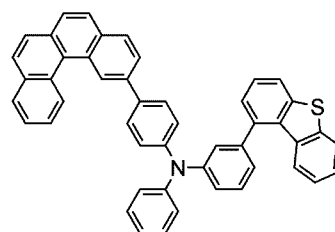
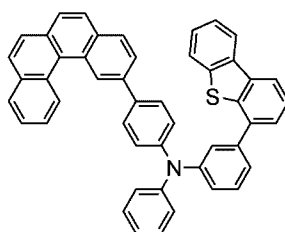
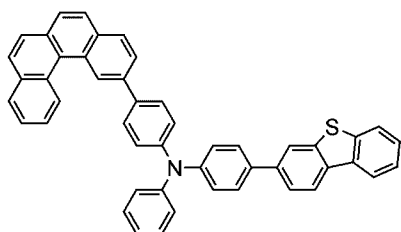
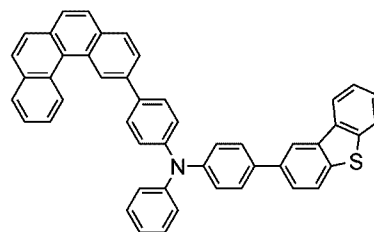
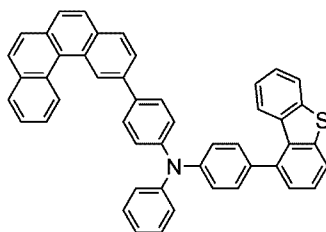
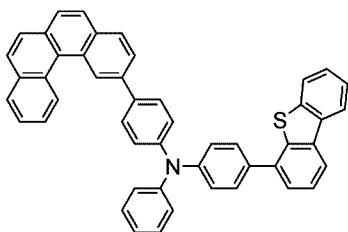
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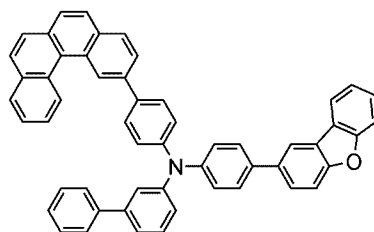
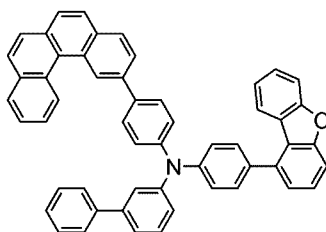
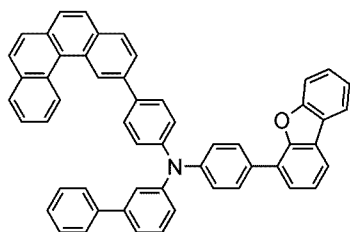
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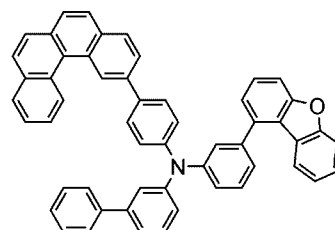
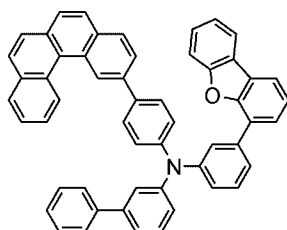
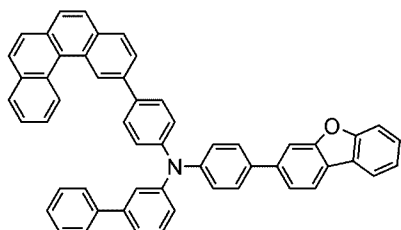
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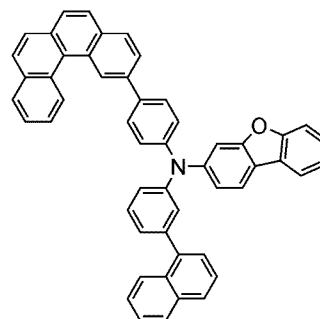
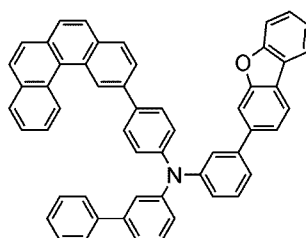
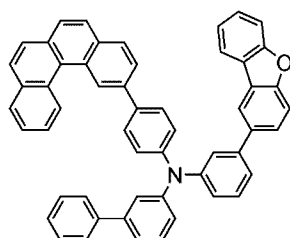
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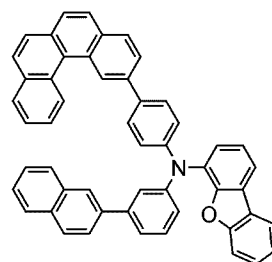
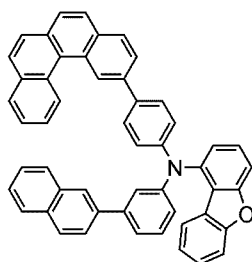
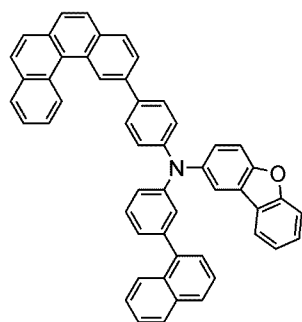
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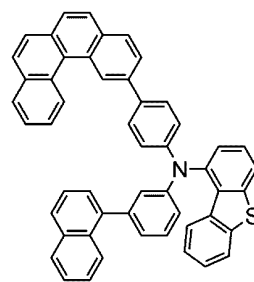
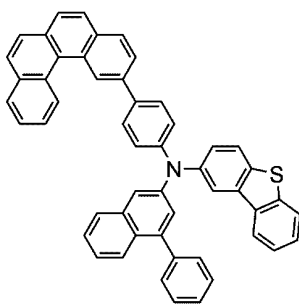
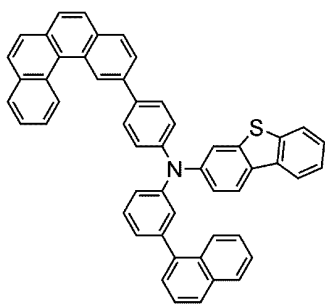
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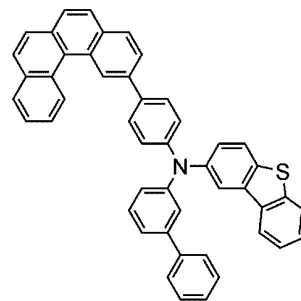
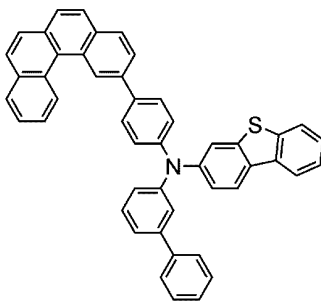
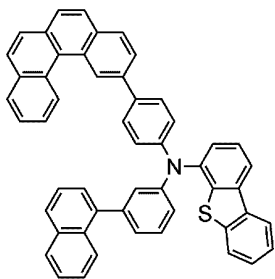
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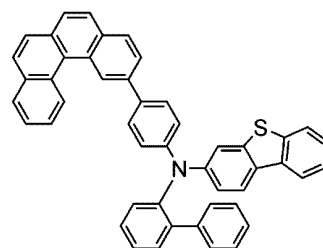
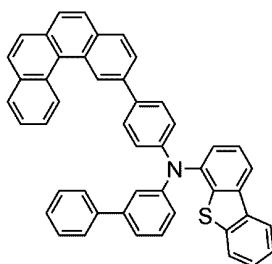
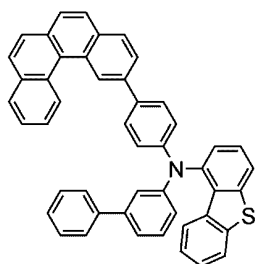
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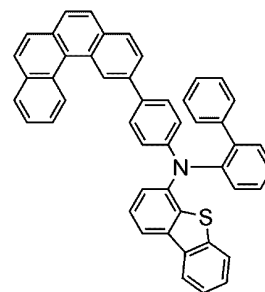
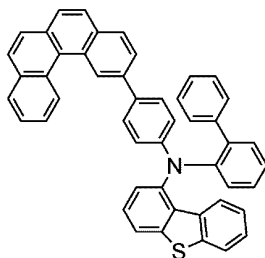
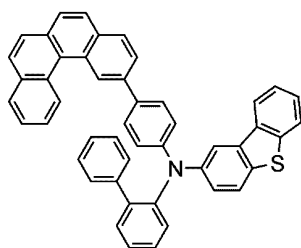
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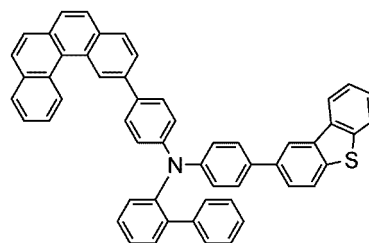
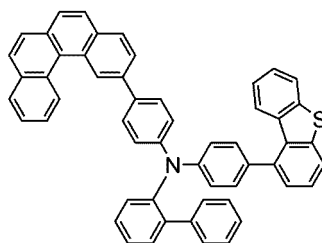
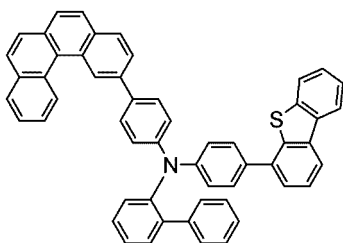
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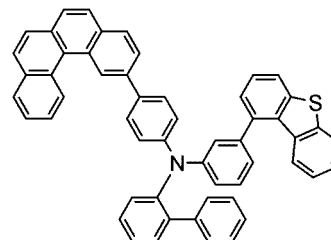
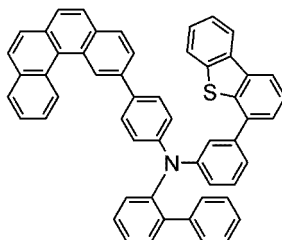
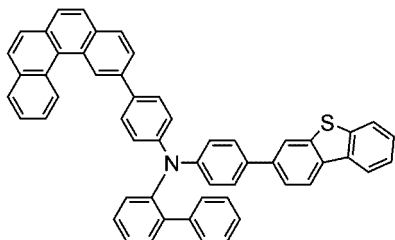
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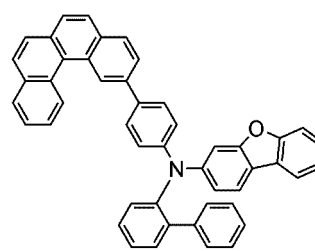
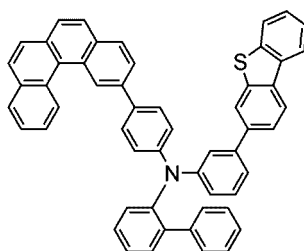
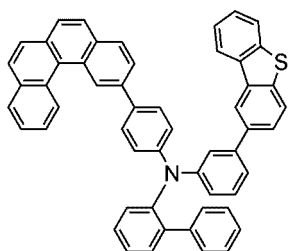
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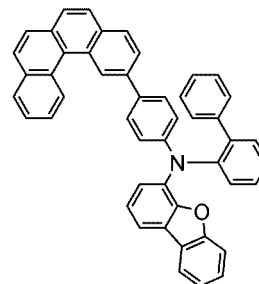
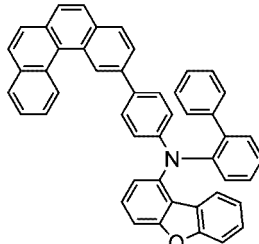
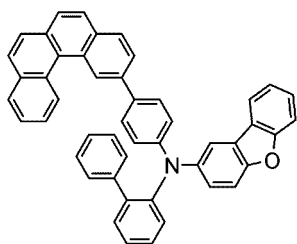
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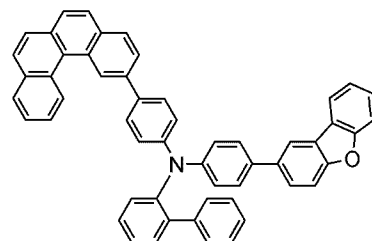
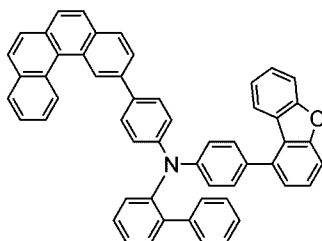
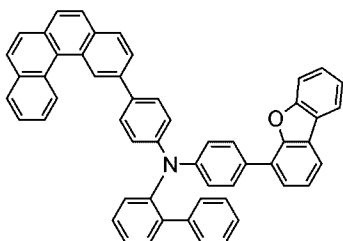
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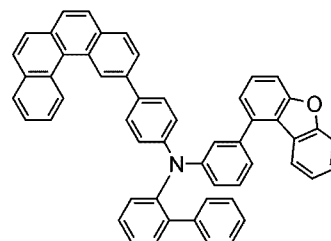
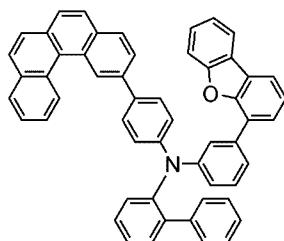
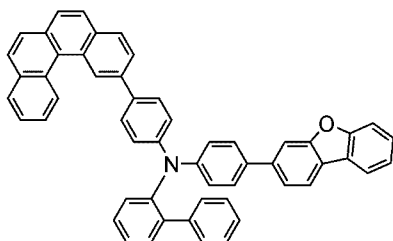
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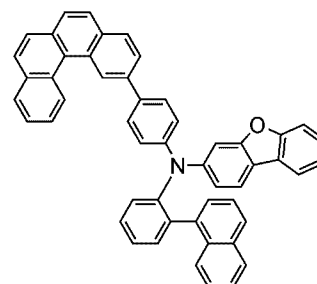
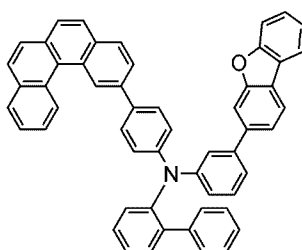
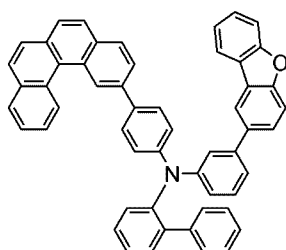
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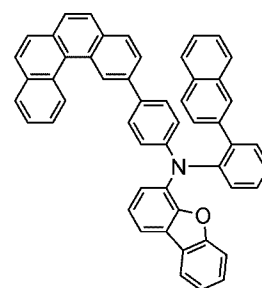
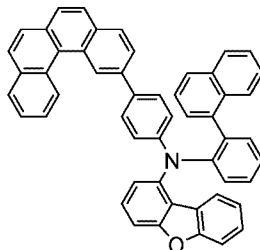
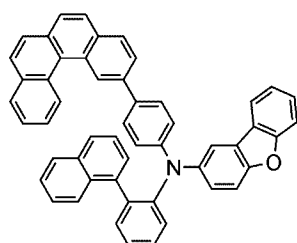
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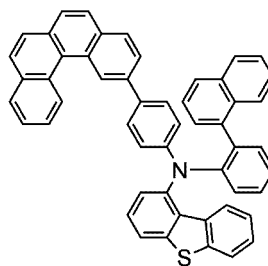
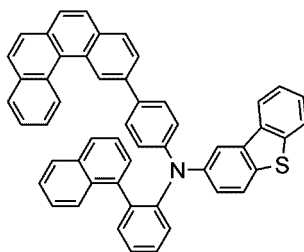
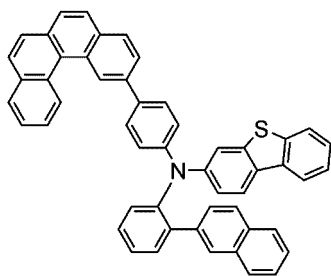
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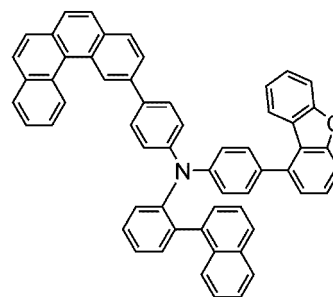
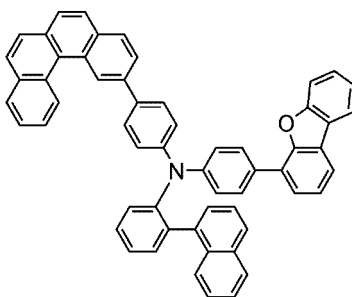
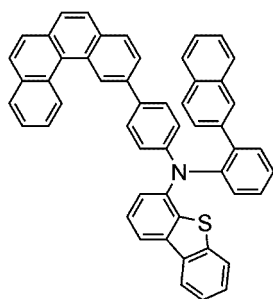
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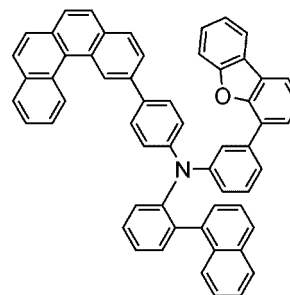
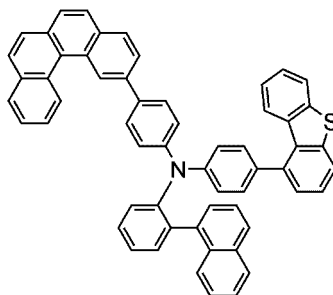
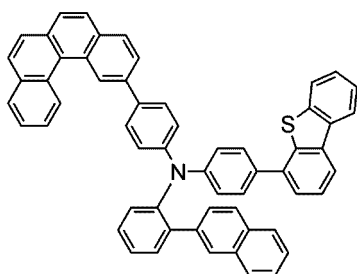
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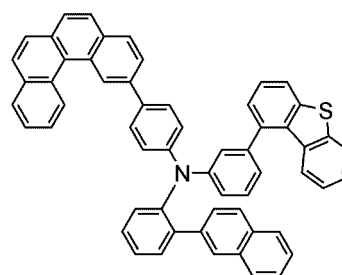
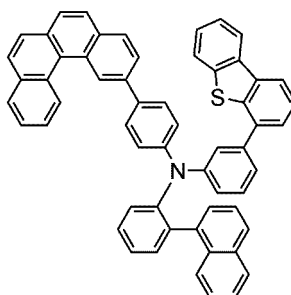
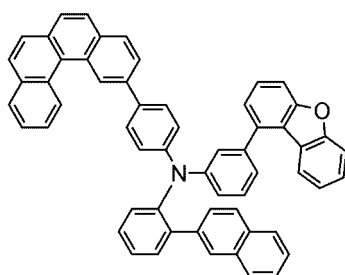
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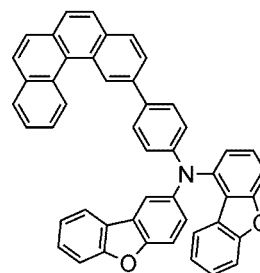
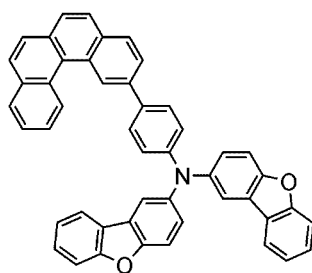
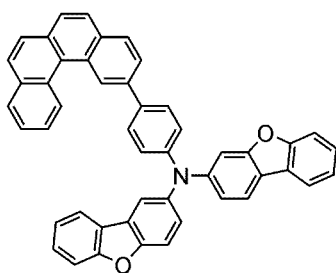
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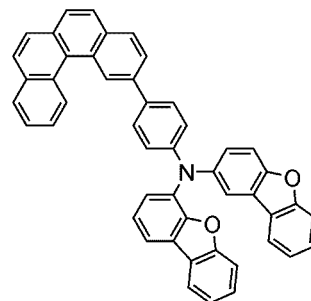
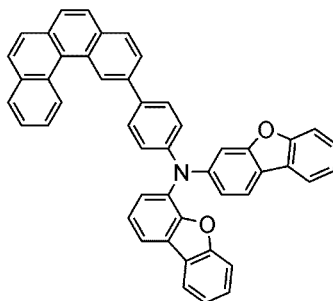
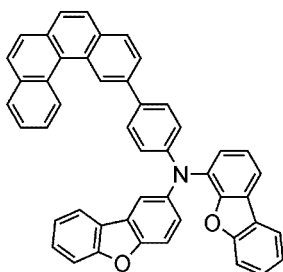
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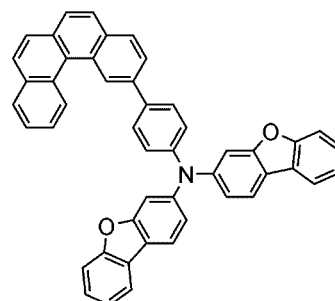
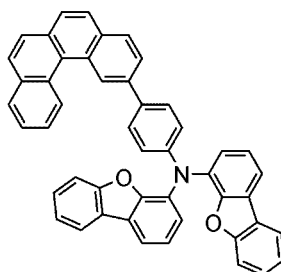
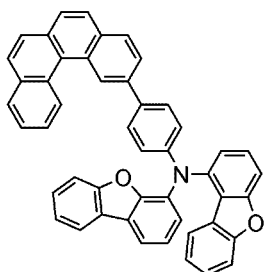
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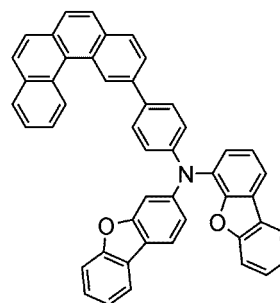
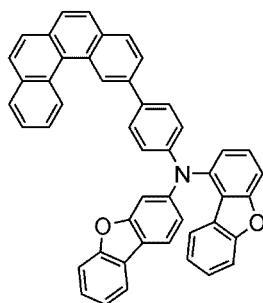
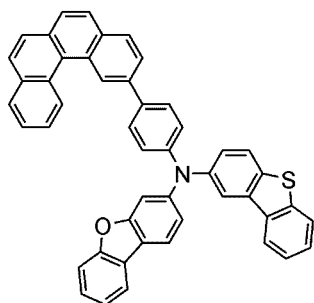
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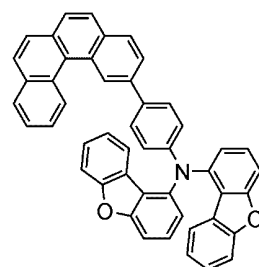
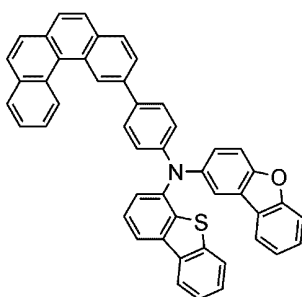
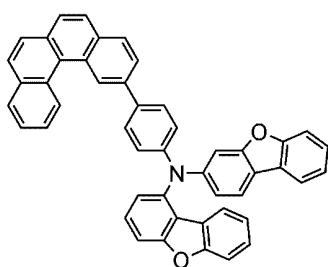
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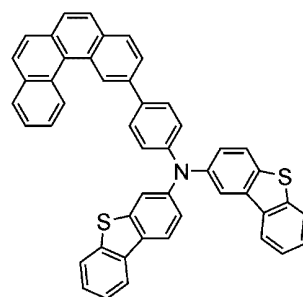
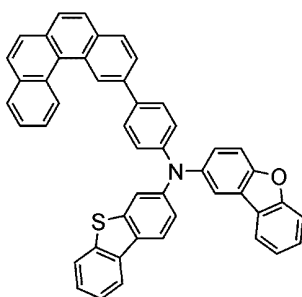
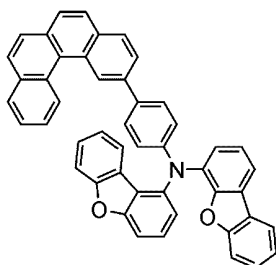
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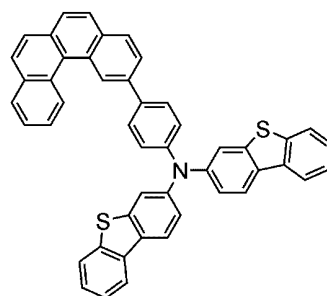
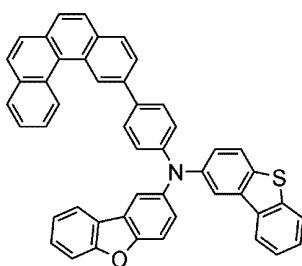
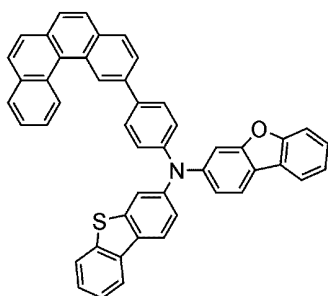
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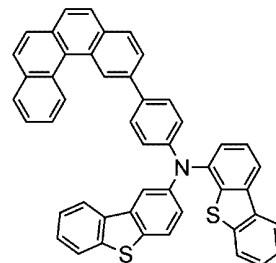
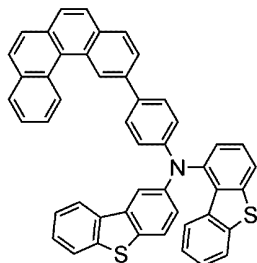
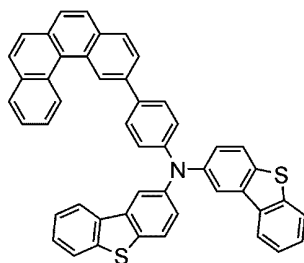
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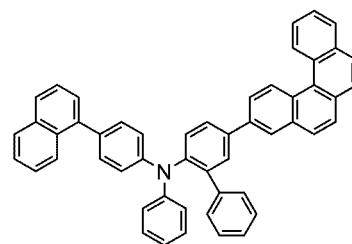
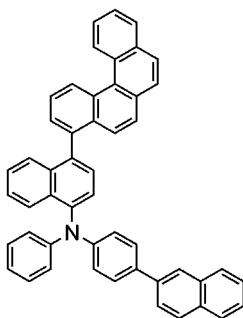
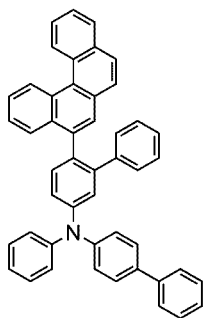
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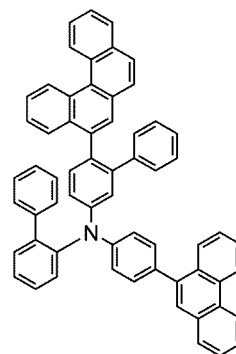
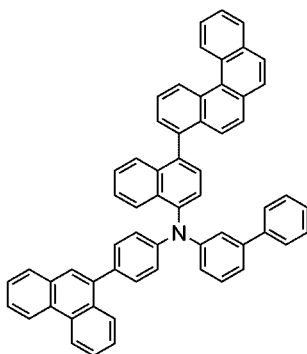
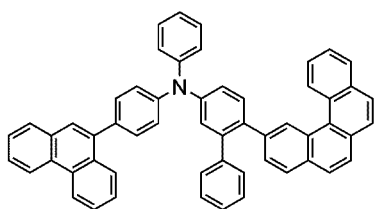
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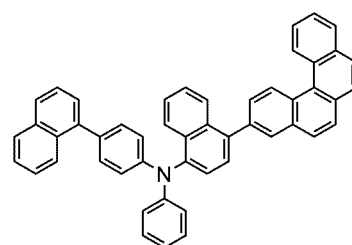
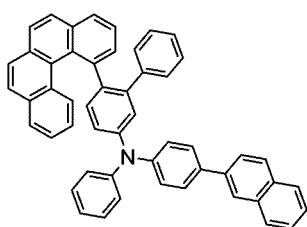
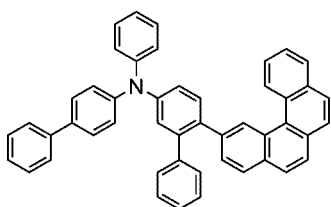
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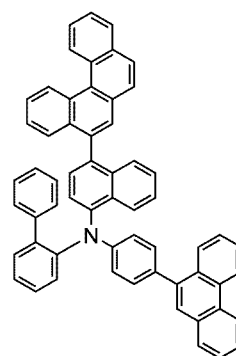
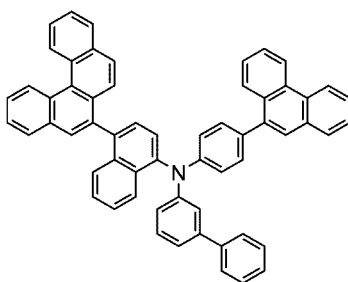
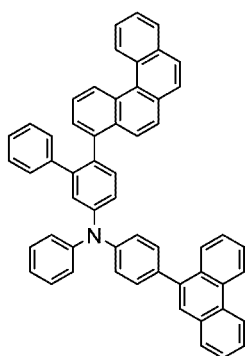
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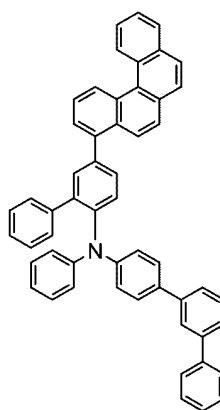
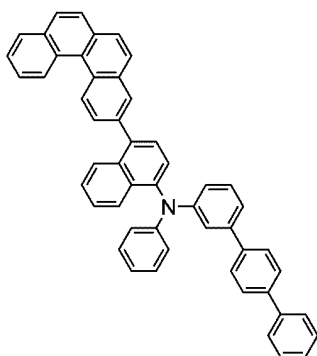
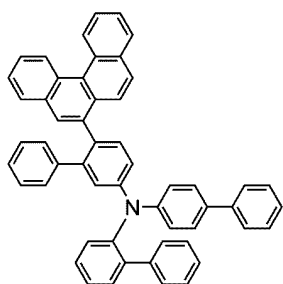
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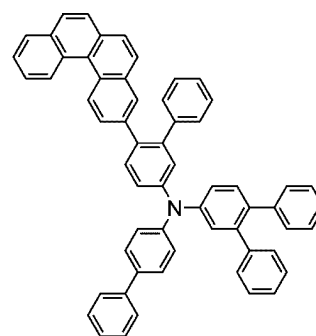
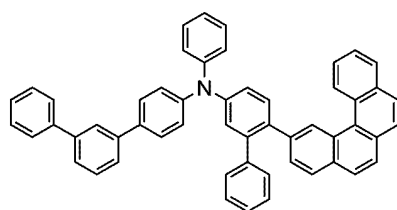
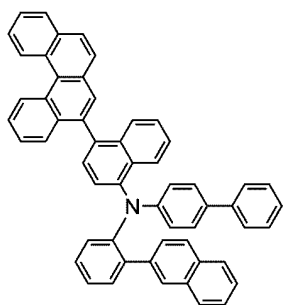
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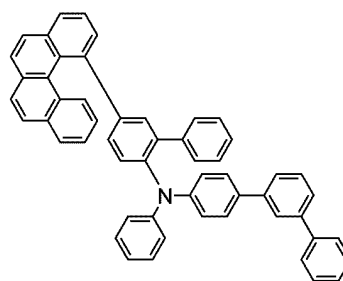
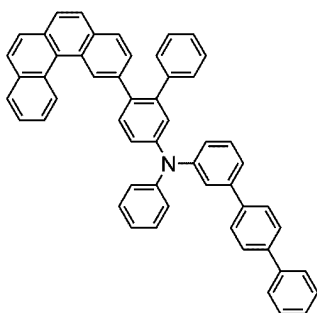
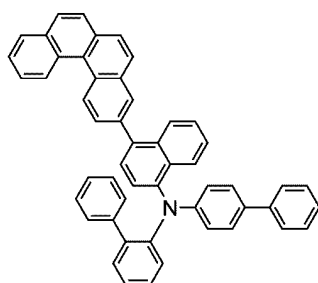
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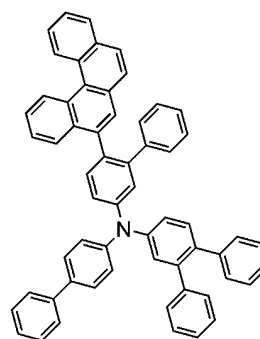
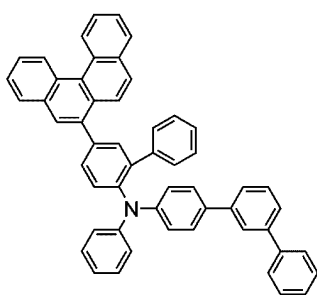
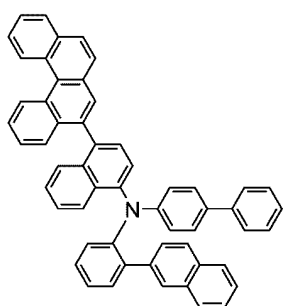
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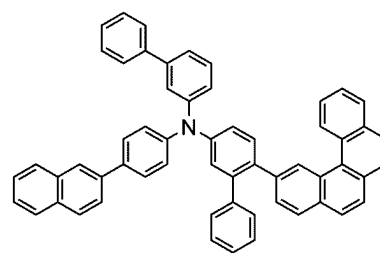
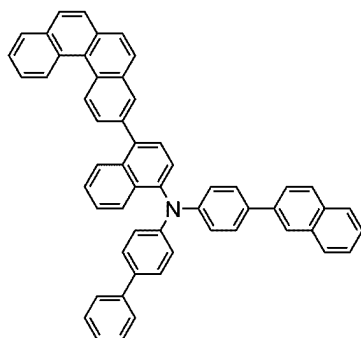
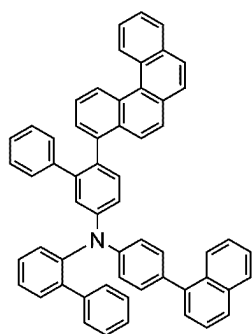
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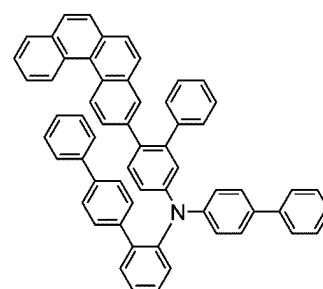
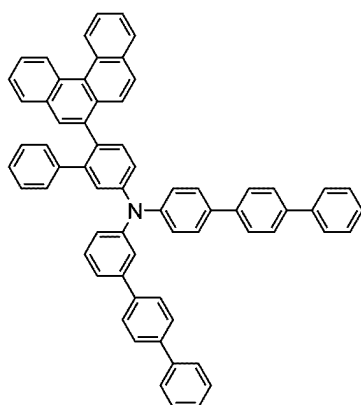
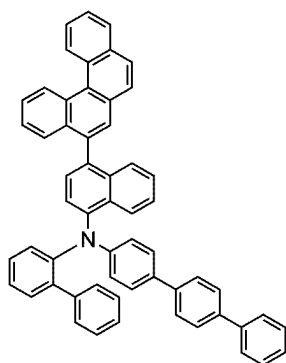
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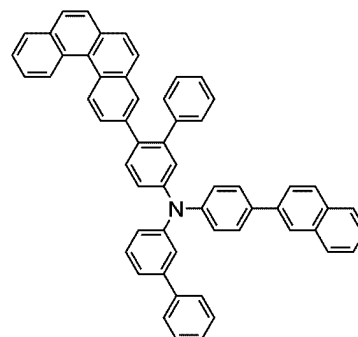
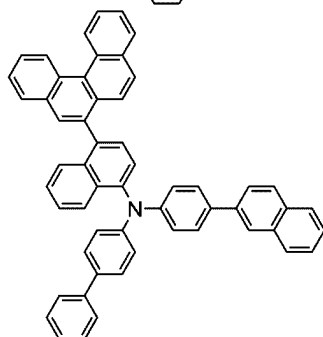
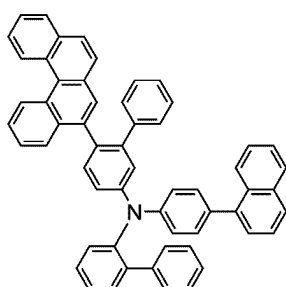
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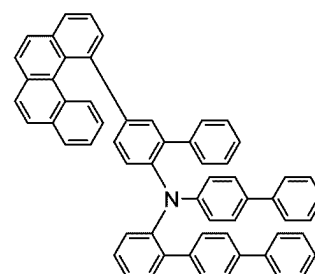
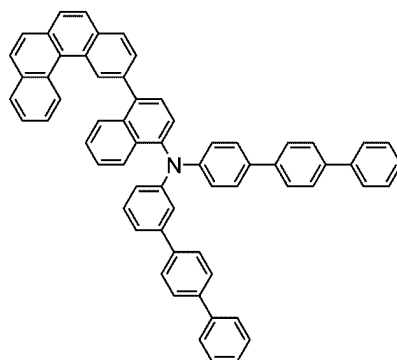
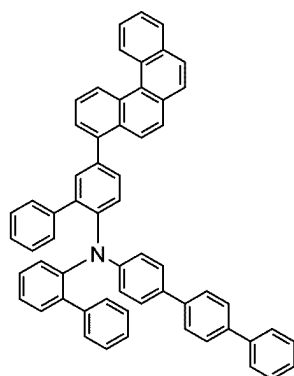
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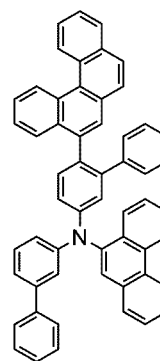
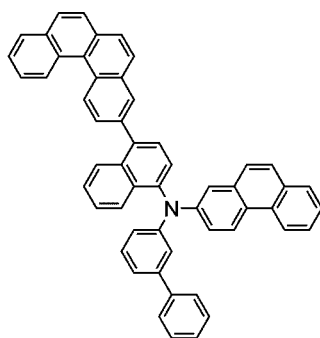
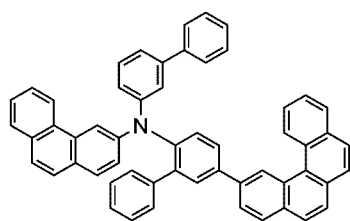
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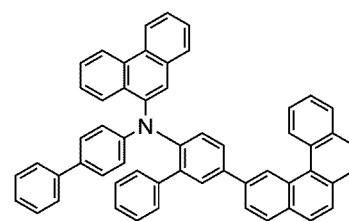
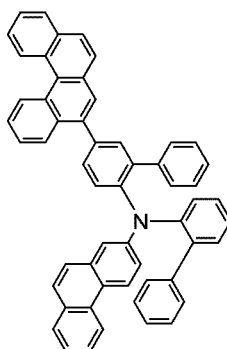
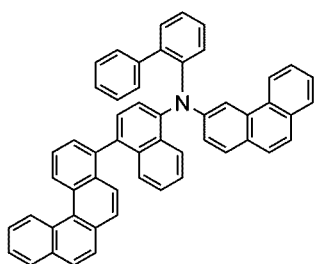
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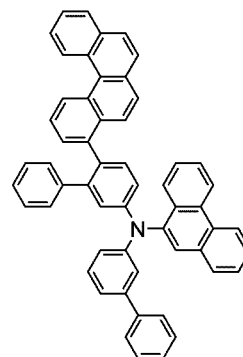
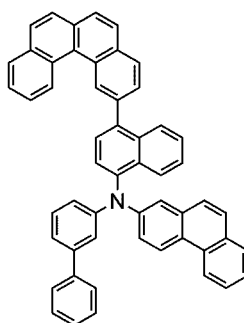
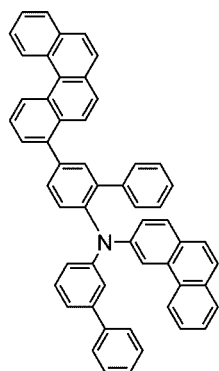
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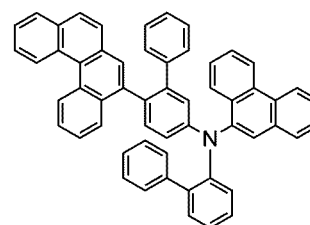
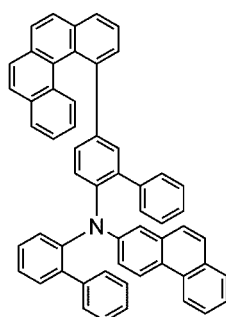
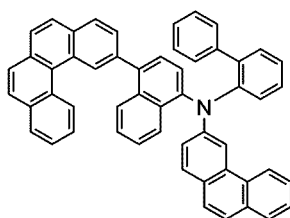
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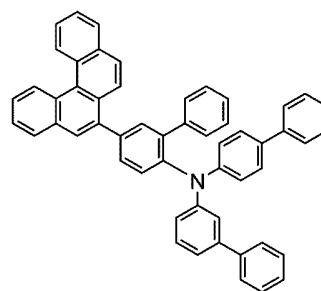
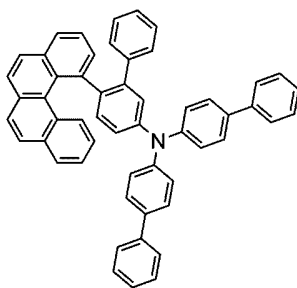
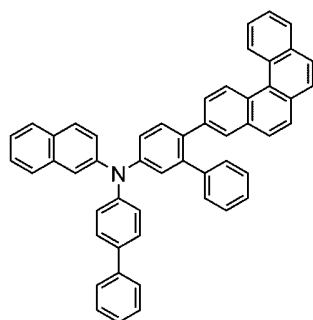
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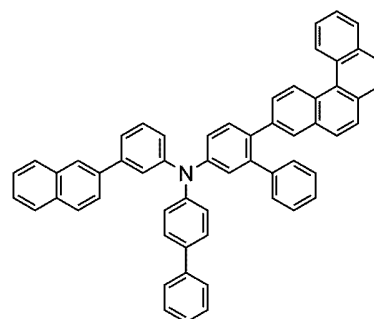
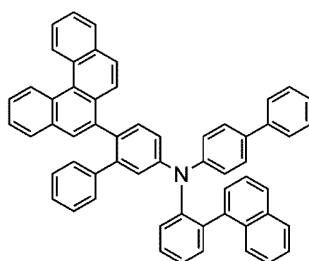
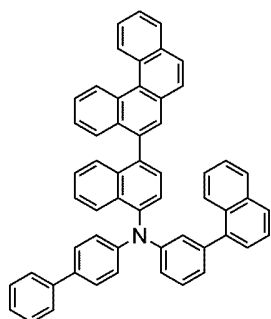
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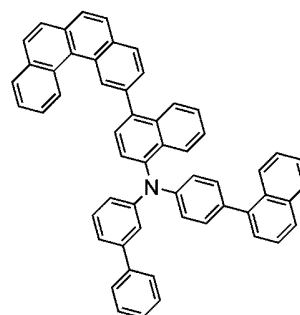
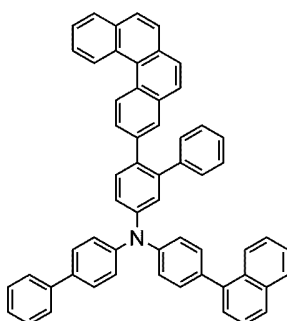
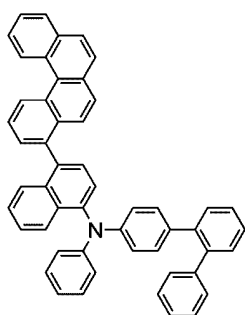
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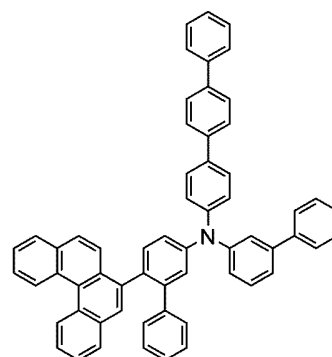
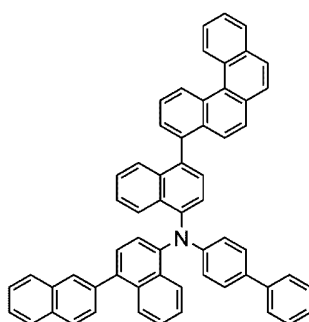
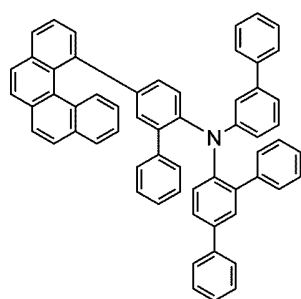
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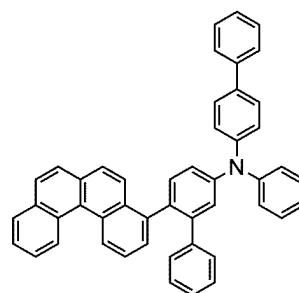
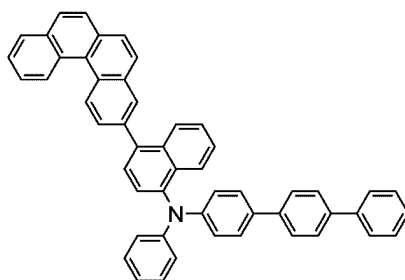
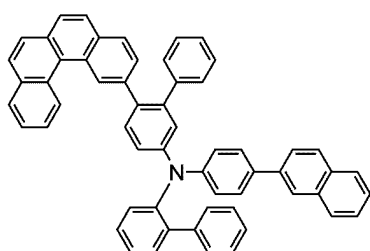
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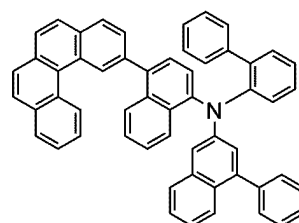
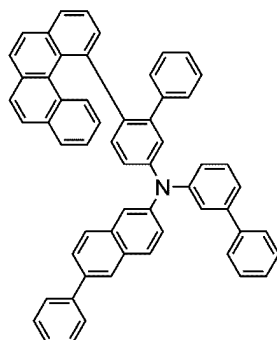
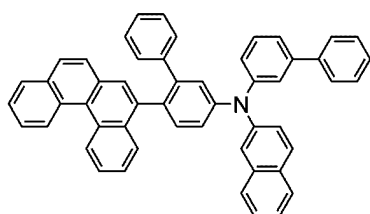
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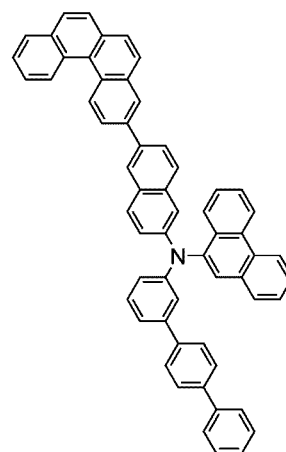
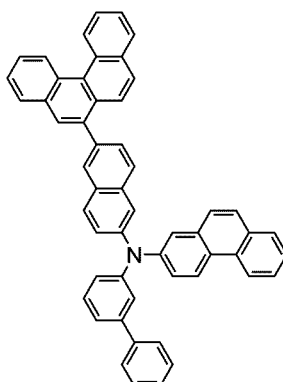
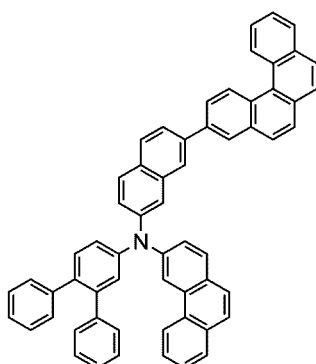


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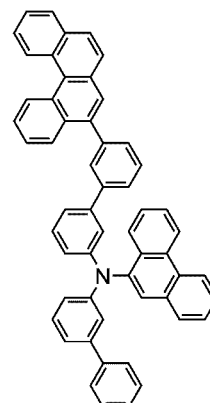
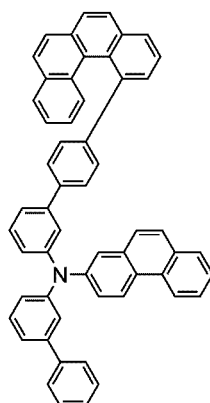
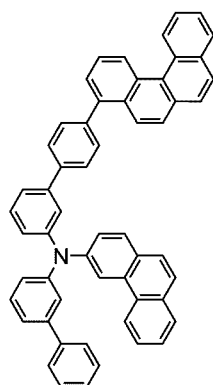


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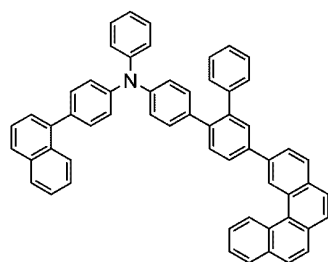
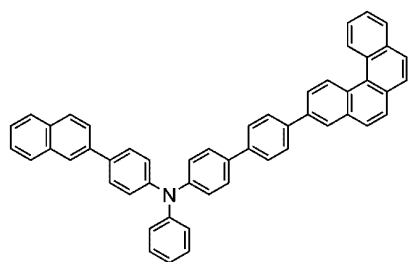
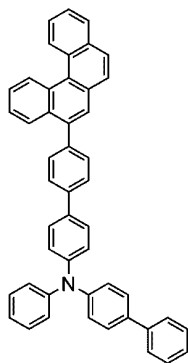
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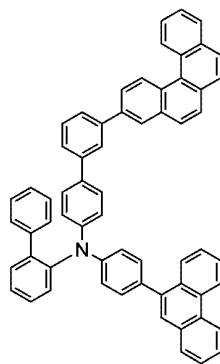
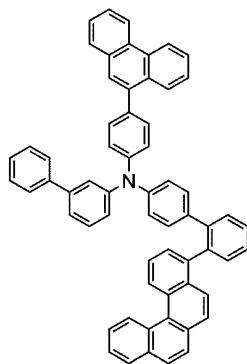
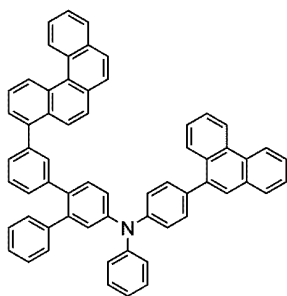
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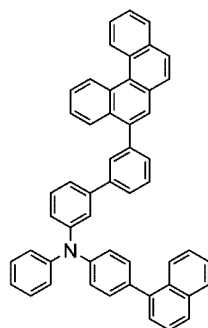
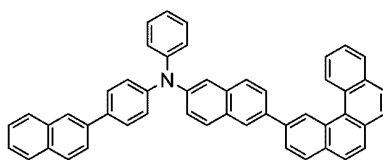
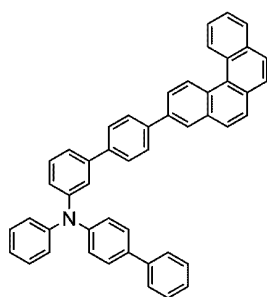
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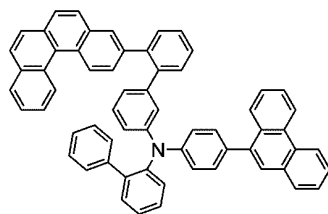
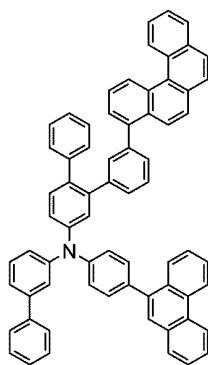
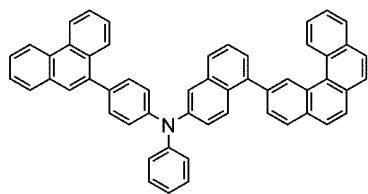
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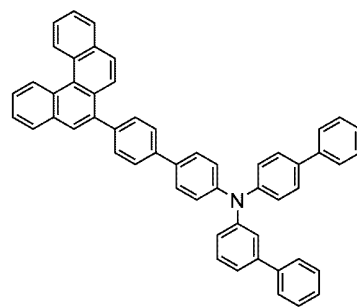
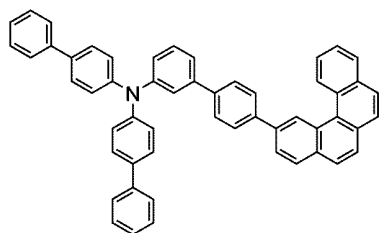
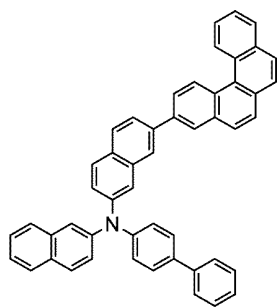
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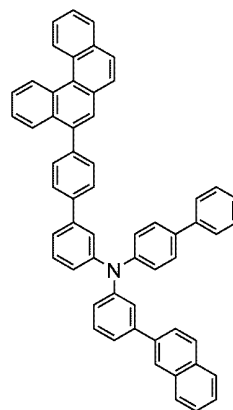
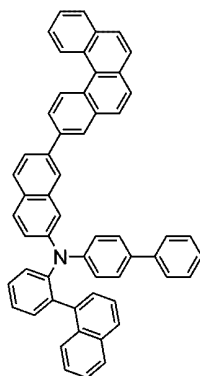
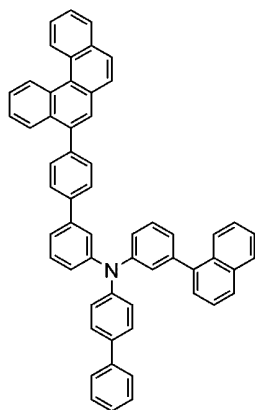
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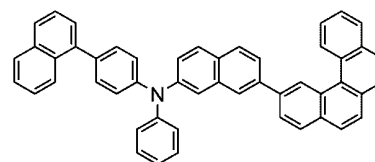
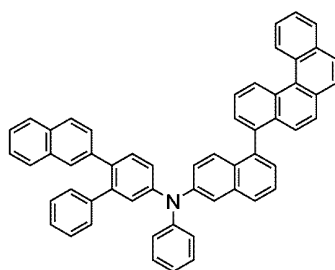
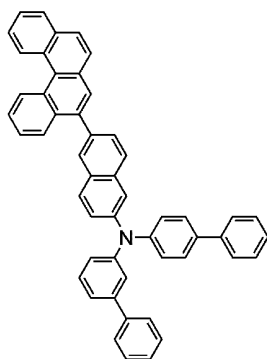
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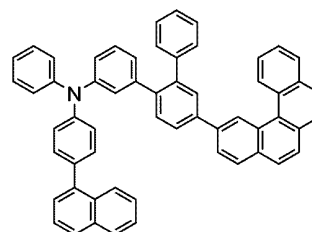
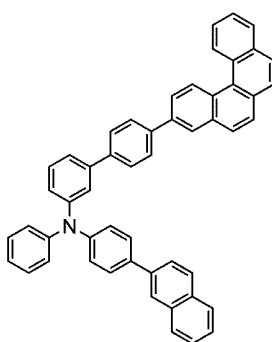
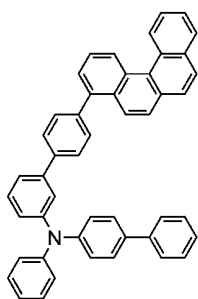
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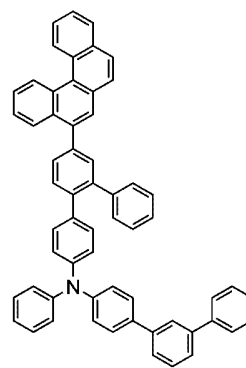
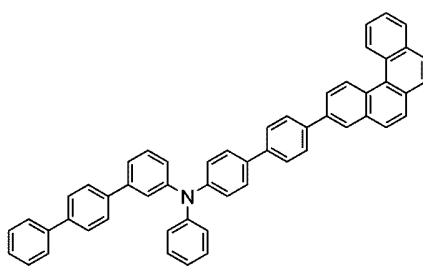
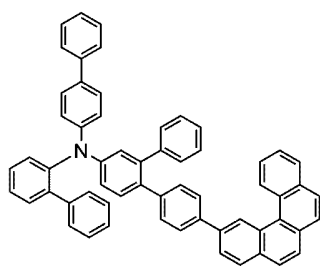


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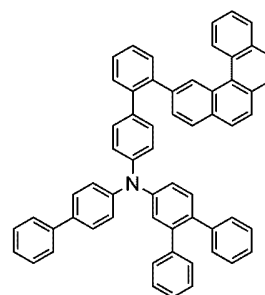
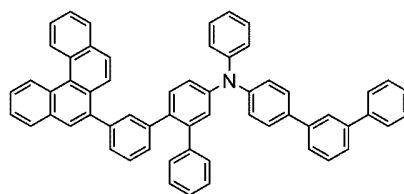
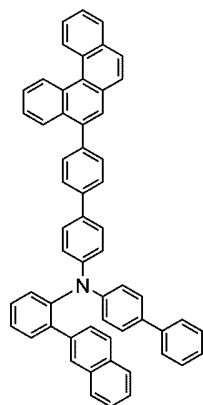


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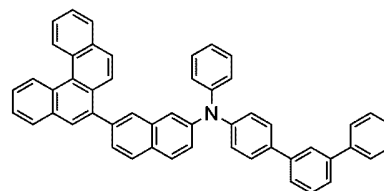
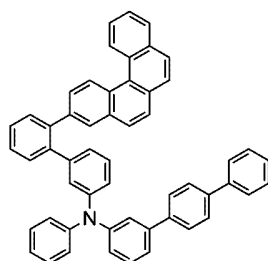
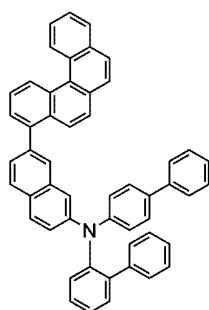
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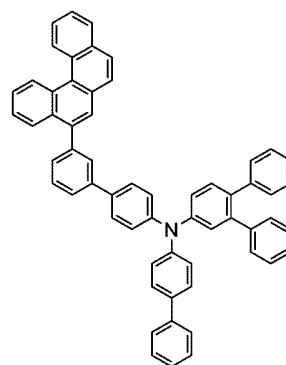
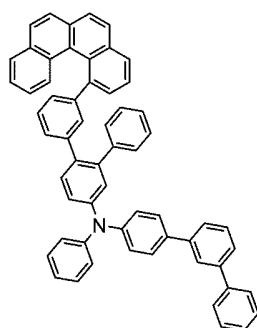
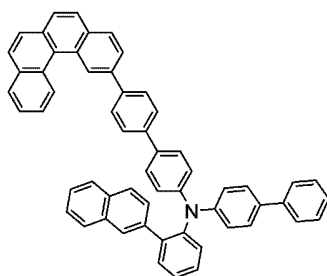
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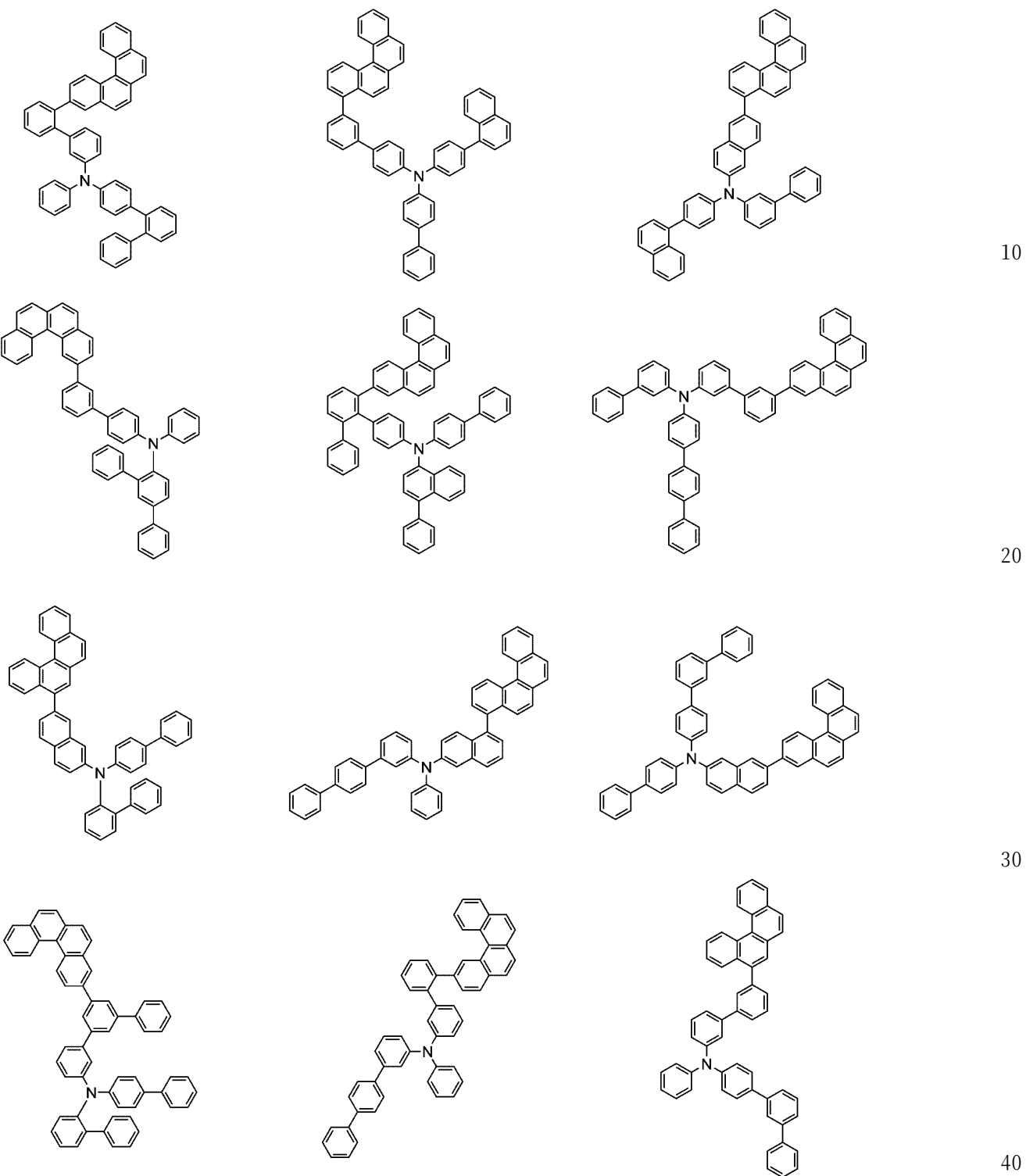
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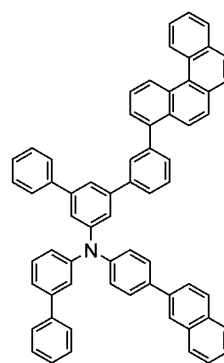
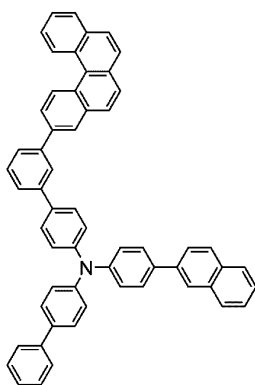
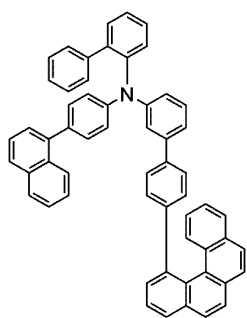
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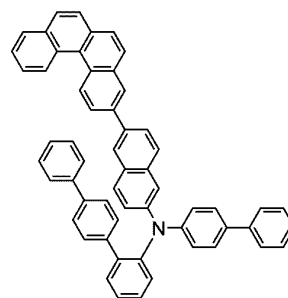
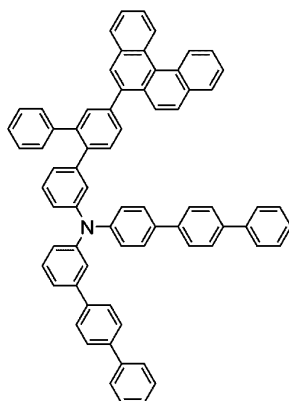
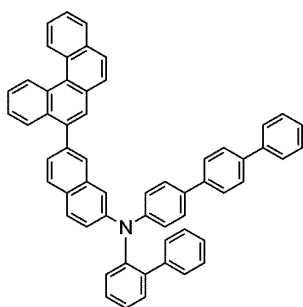
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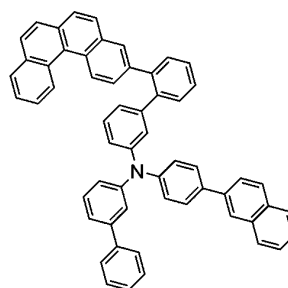
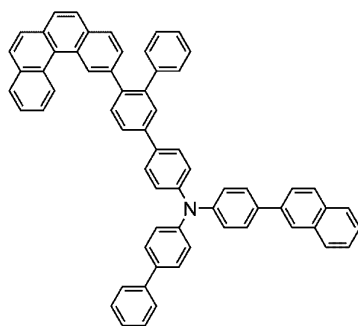
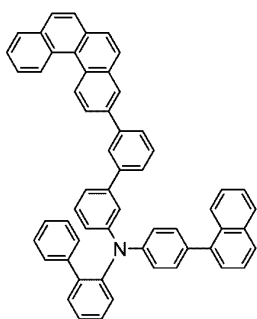
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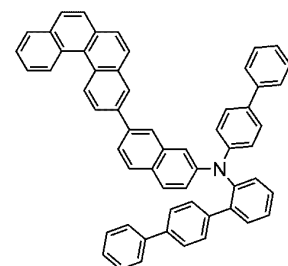
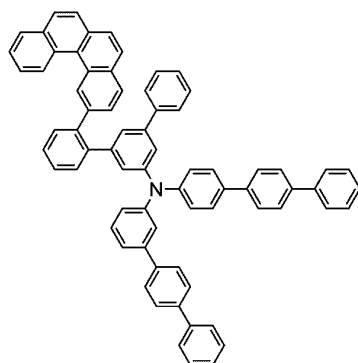
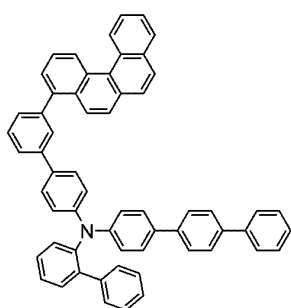
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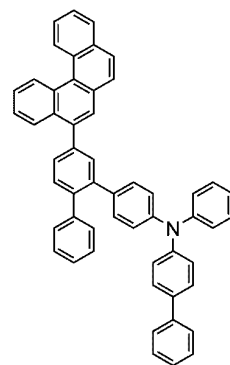
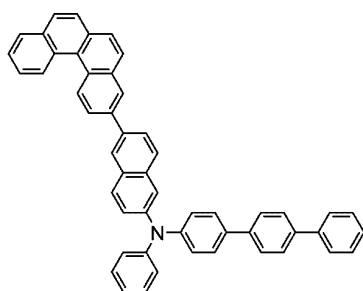
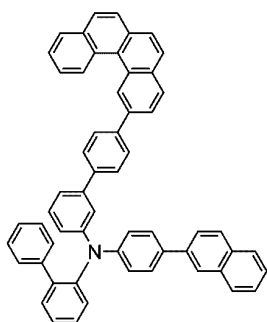
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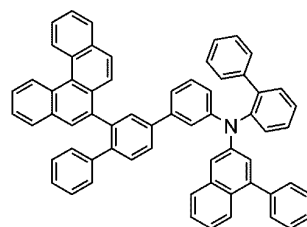
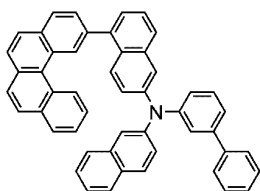
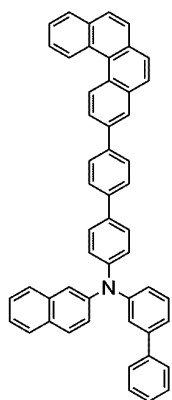
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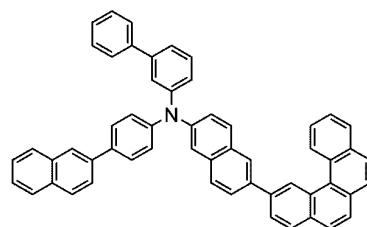
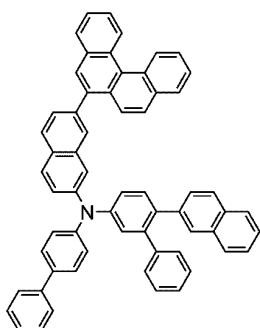
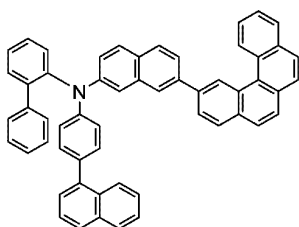
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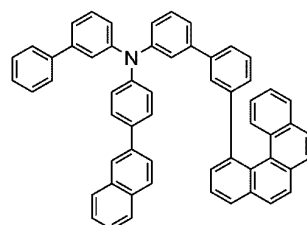
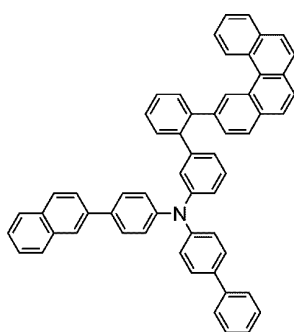
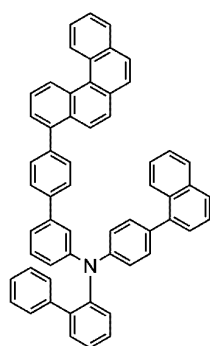
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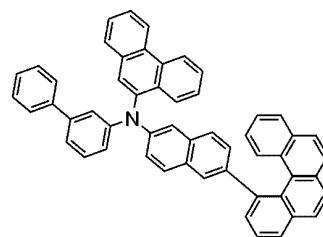
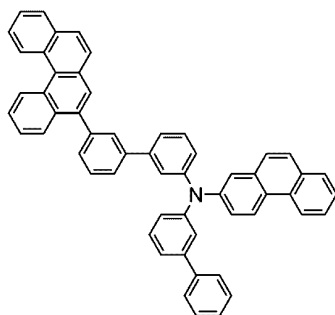
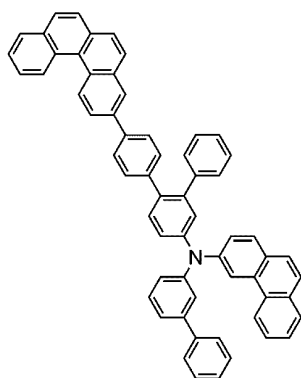
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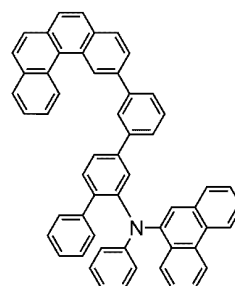
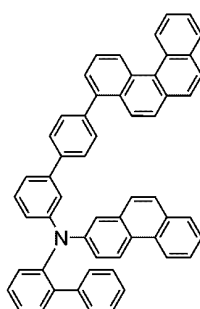
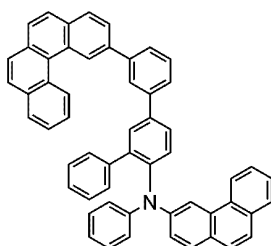
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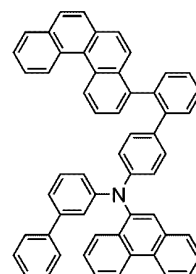
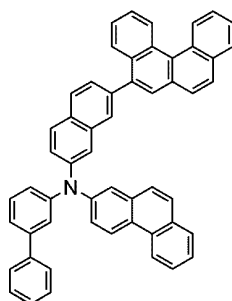
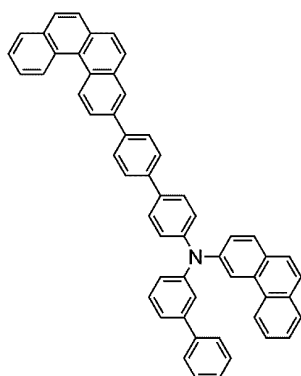
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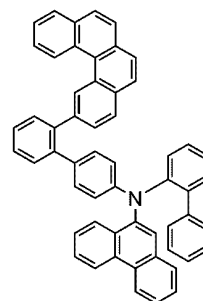
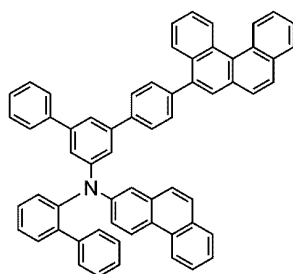
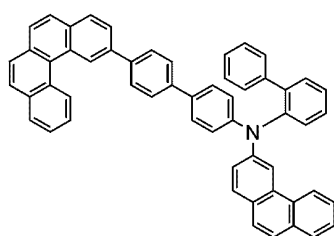
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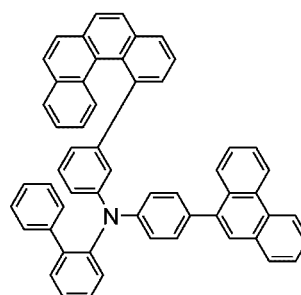
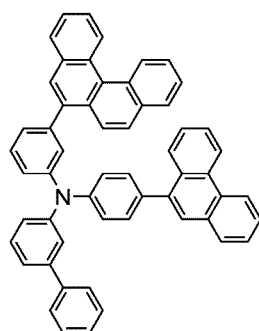
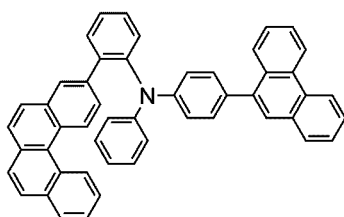
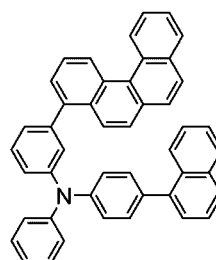
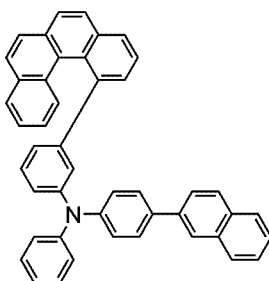
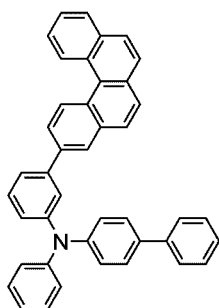
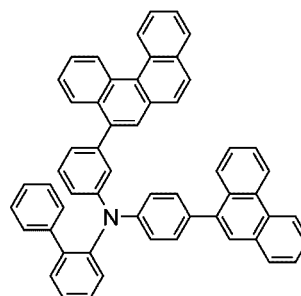
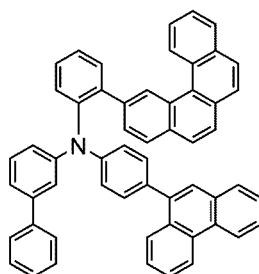
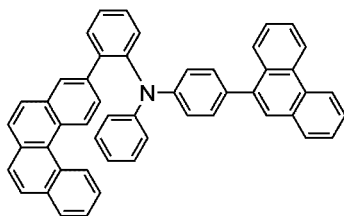
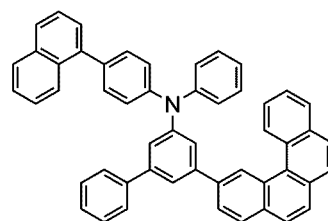
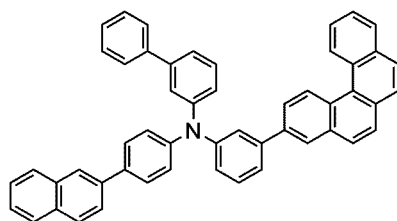
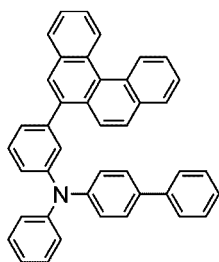
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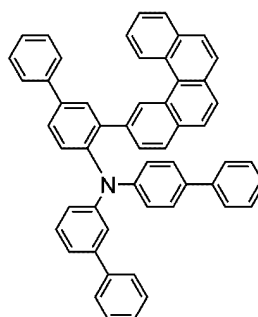
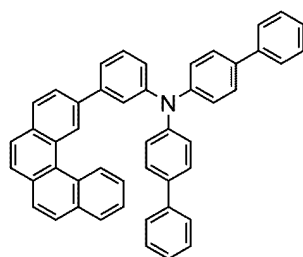
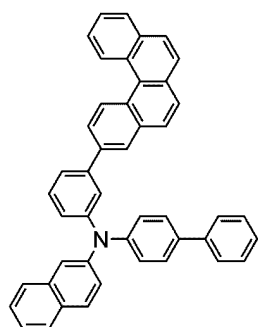
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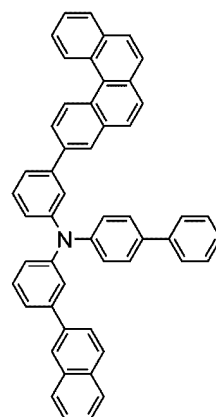
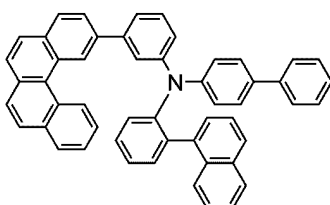
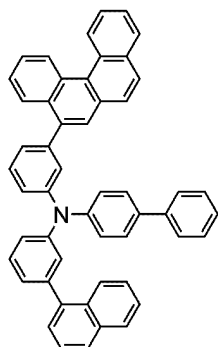
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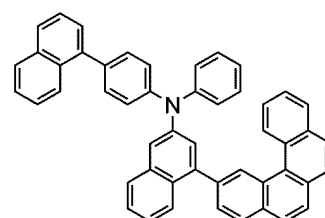
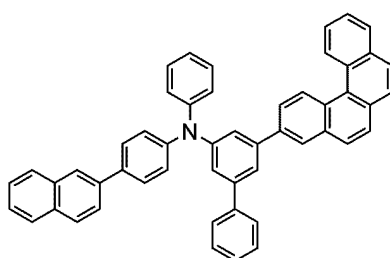
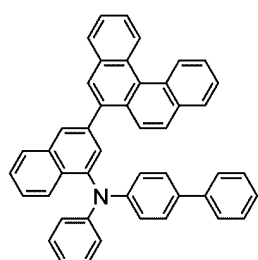
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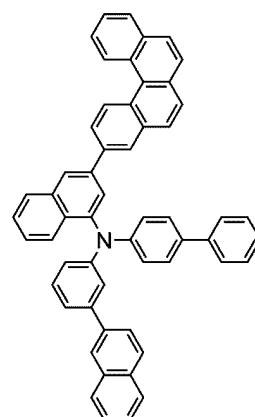
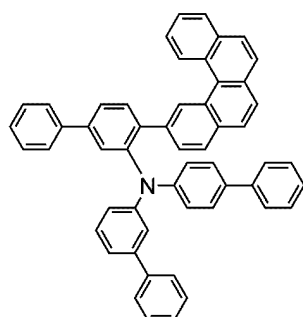
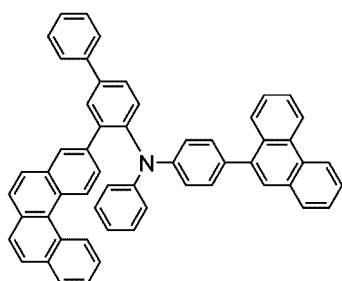
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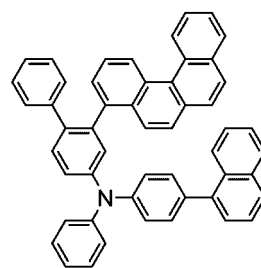
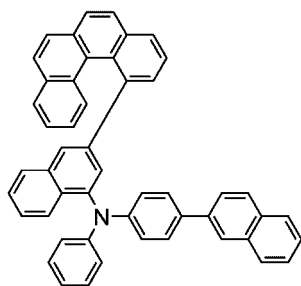
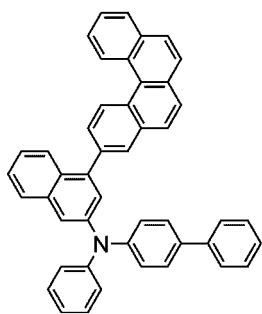
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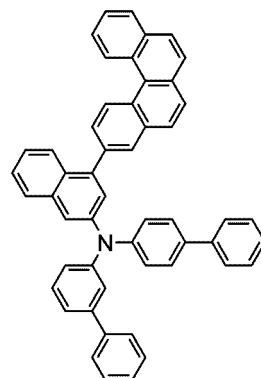
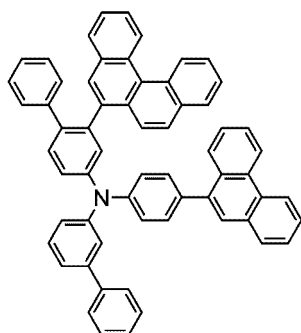
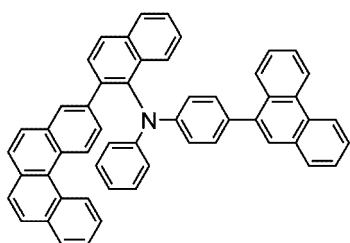
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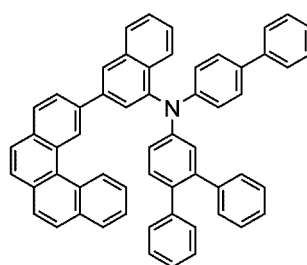
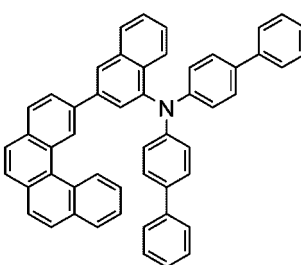
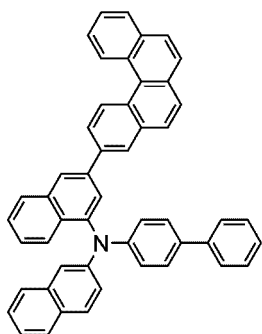
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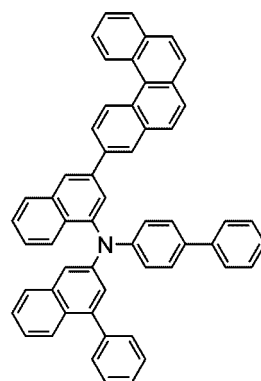
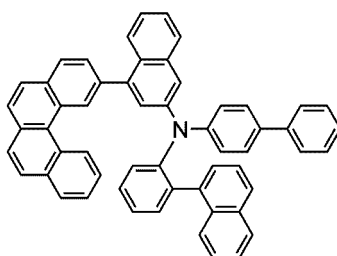
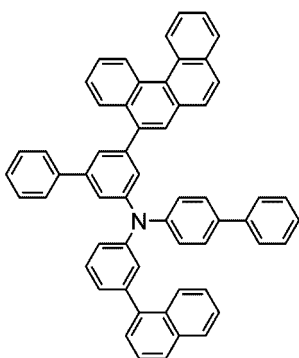
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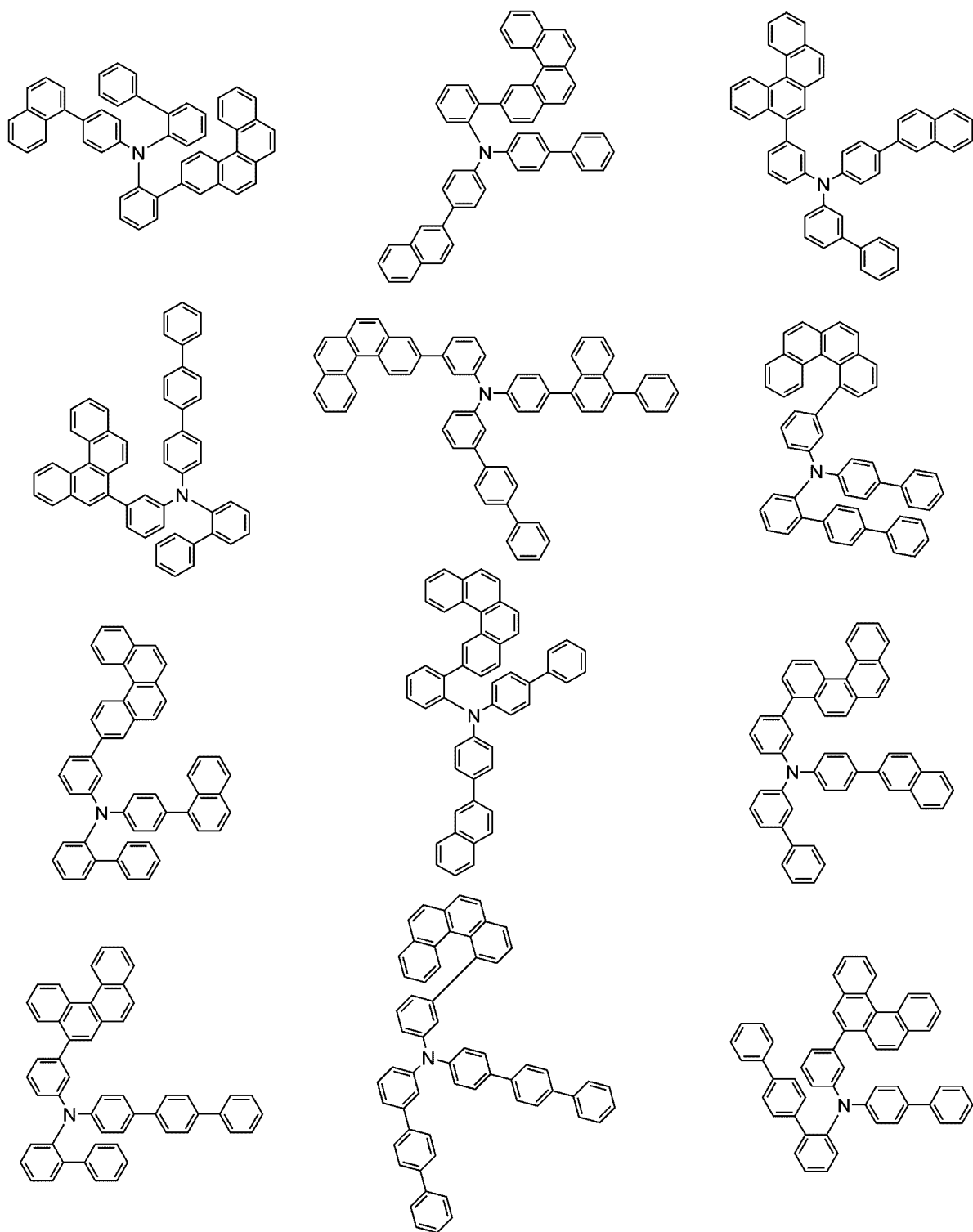
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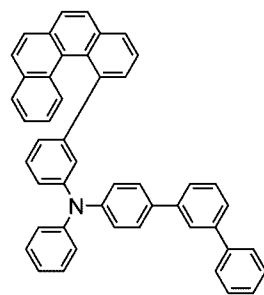
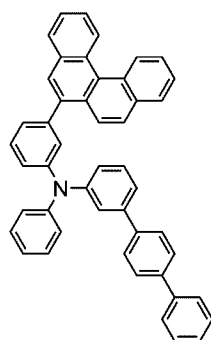
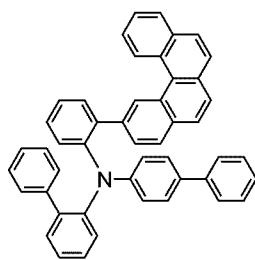
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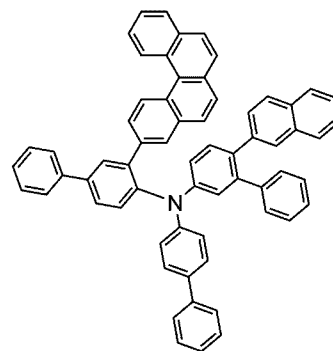
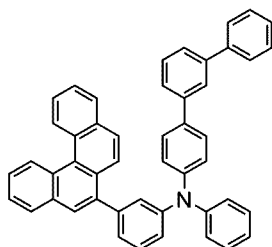
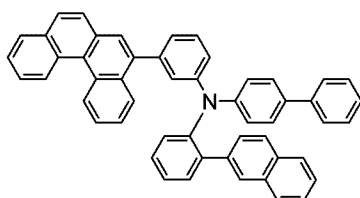
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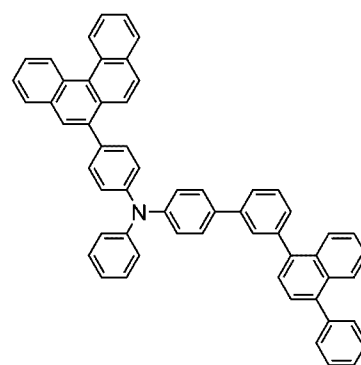
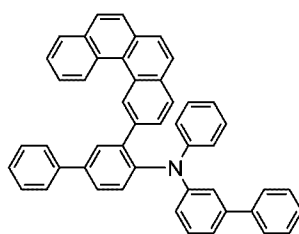
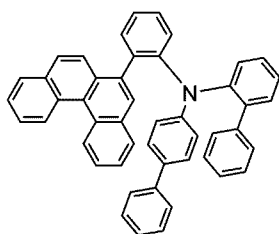
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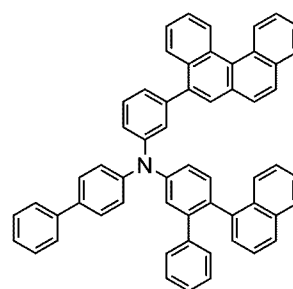
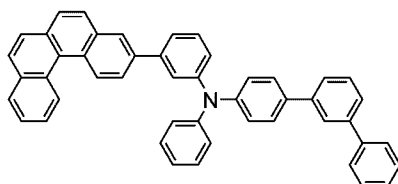
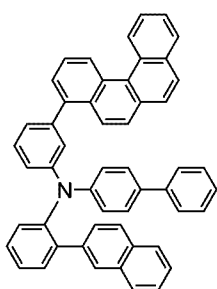
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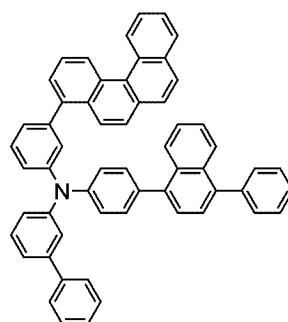
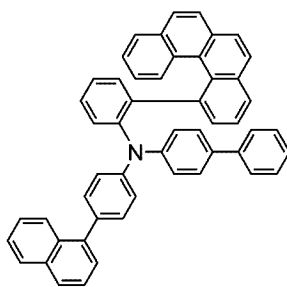
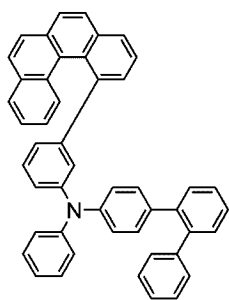
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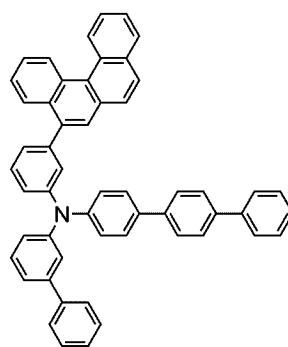
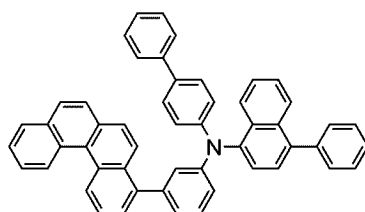
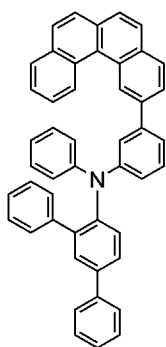
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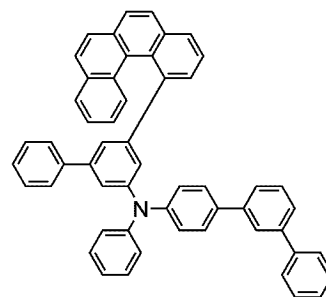
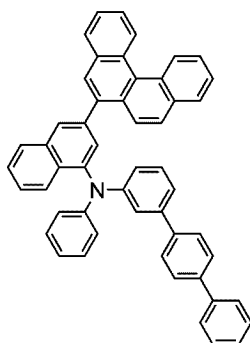
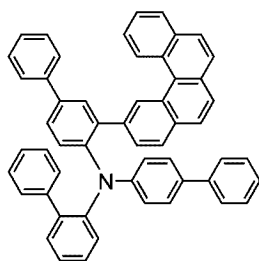
【化 3 7 5】



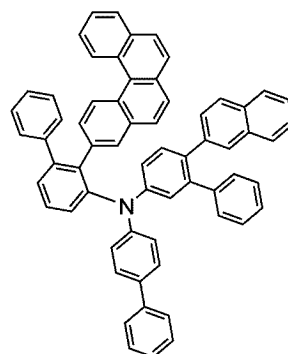
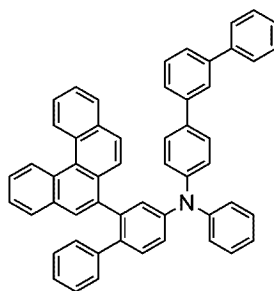
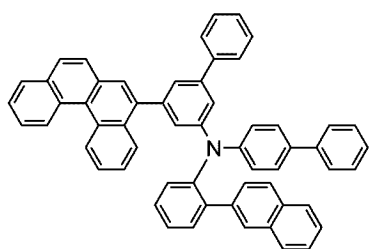
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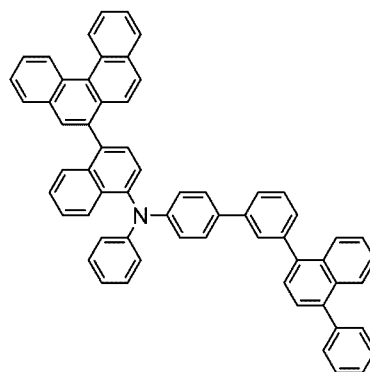
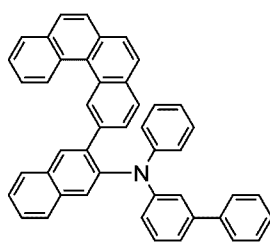
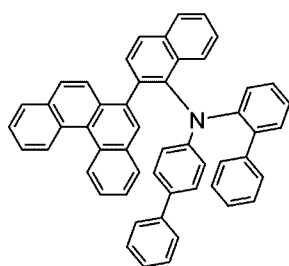
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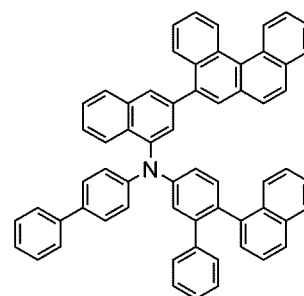
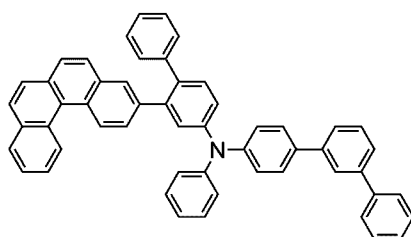
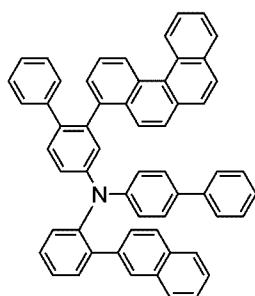
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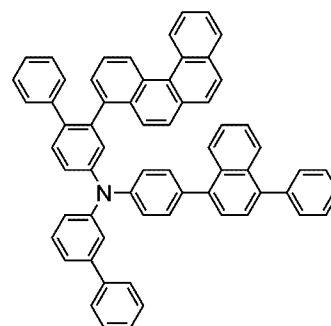
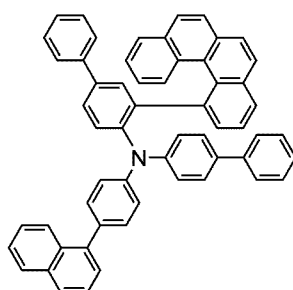
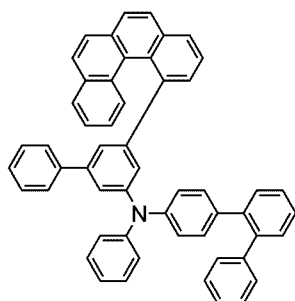
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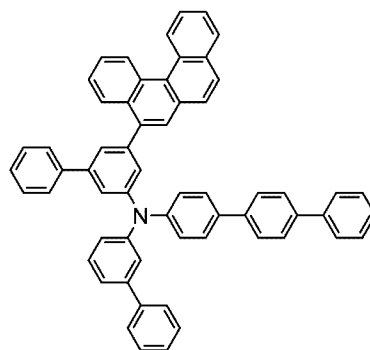
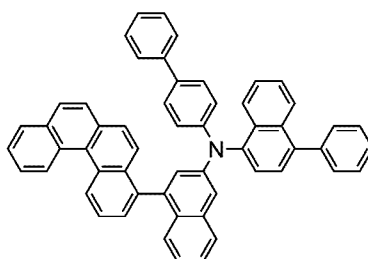
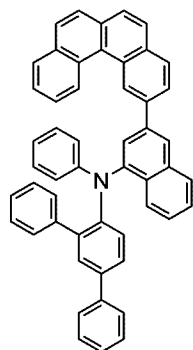
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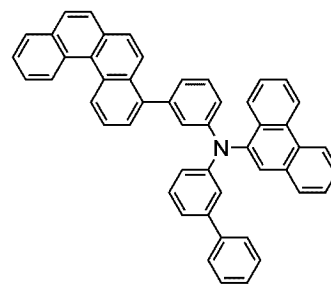
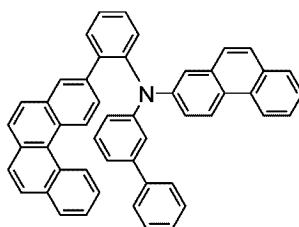
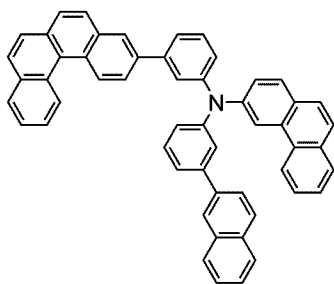
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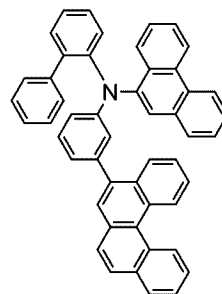
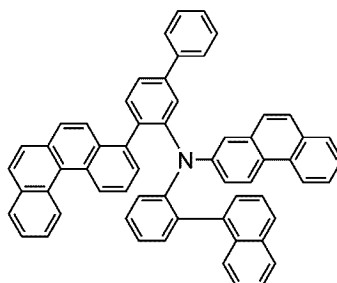
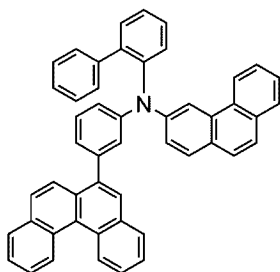
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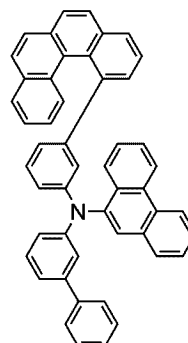
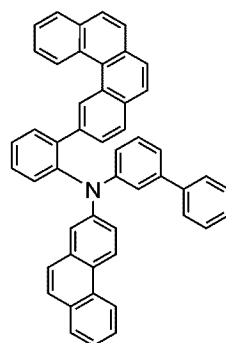
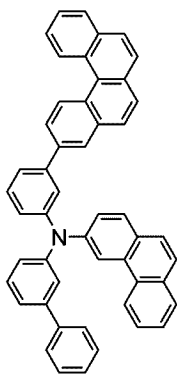
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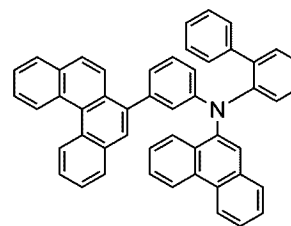
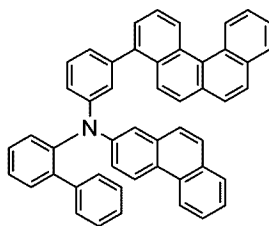
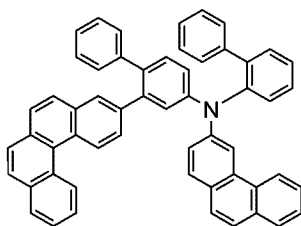
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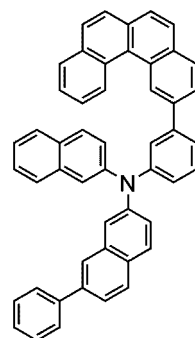
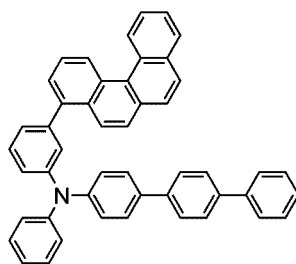
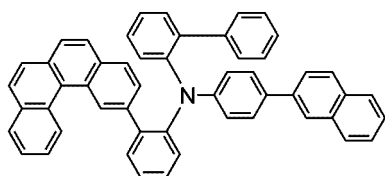
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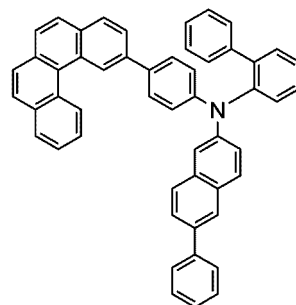
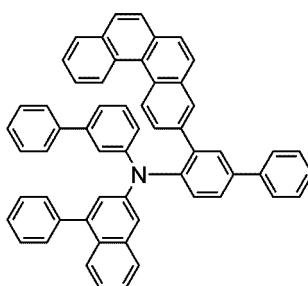
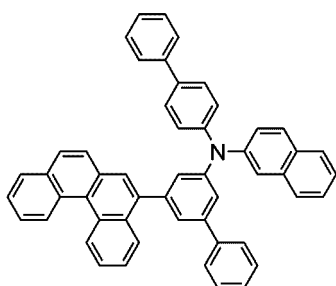
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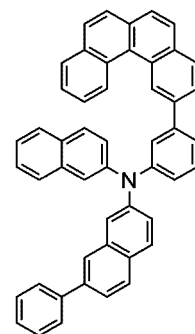
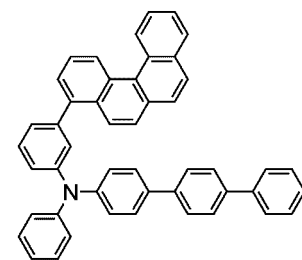
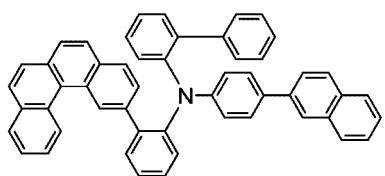


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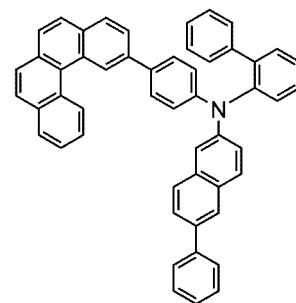
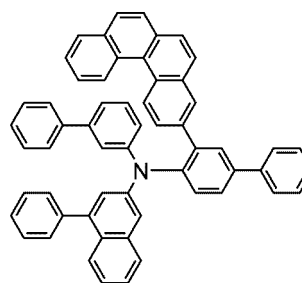
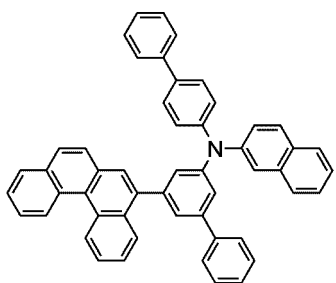


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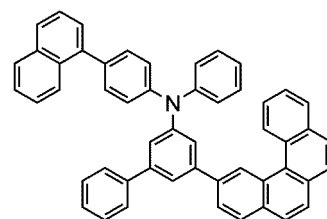
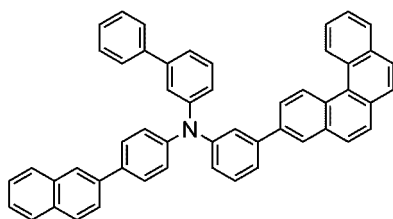
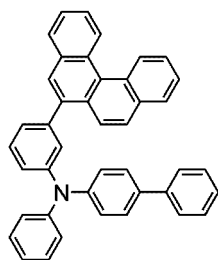


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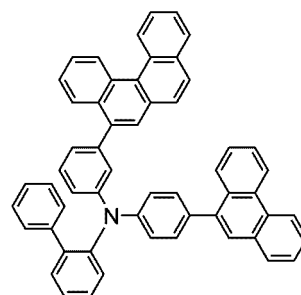
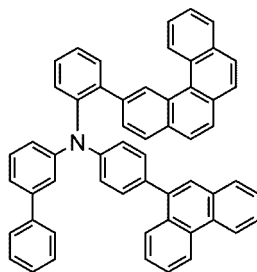
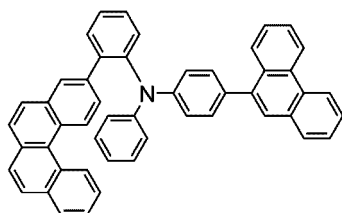


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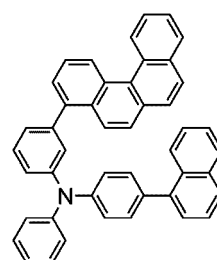
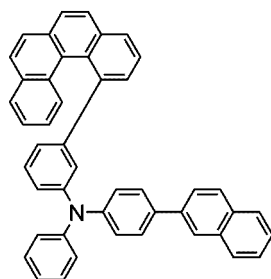
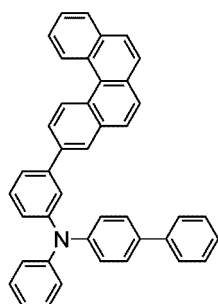
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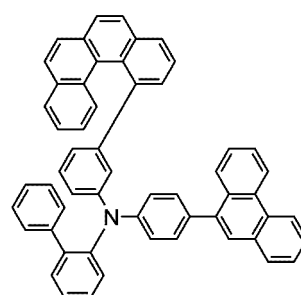
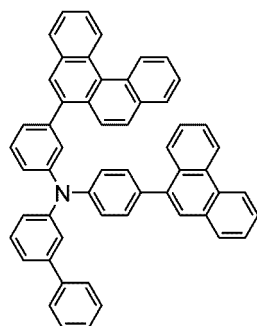
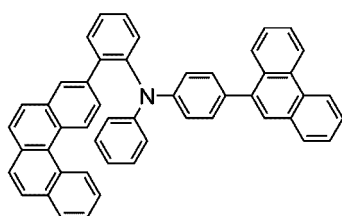
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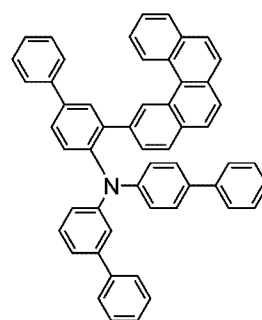
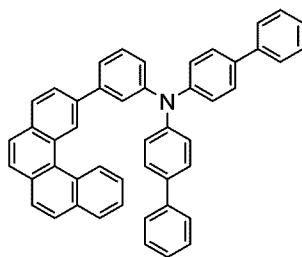
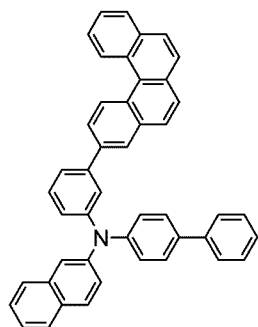
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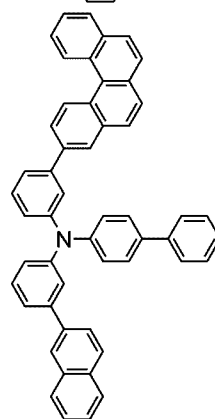
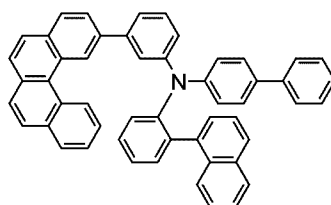
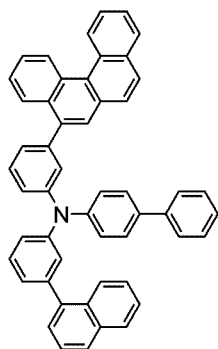
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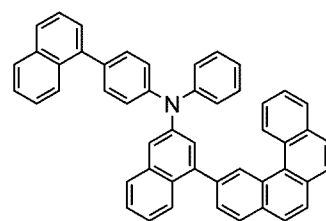
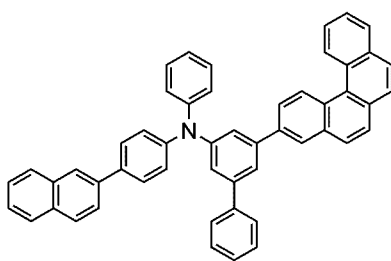
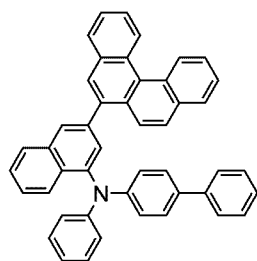
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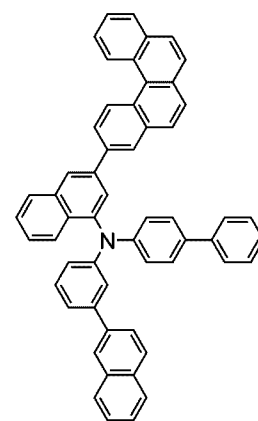
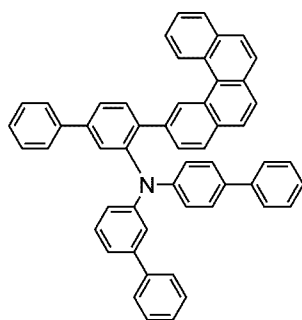
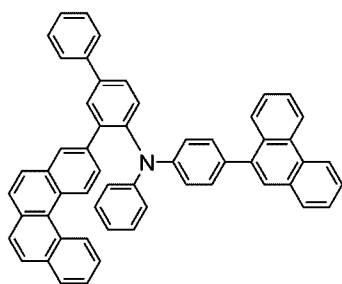
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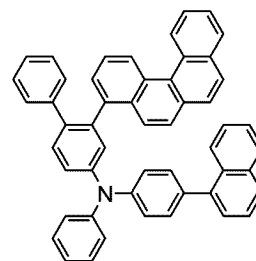
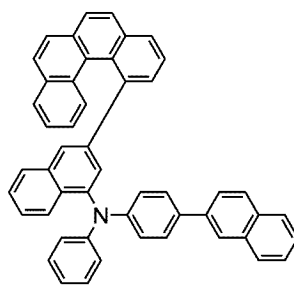
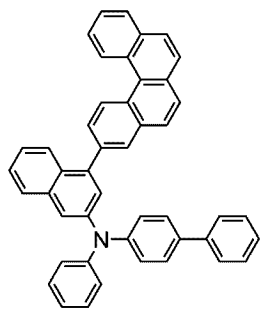
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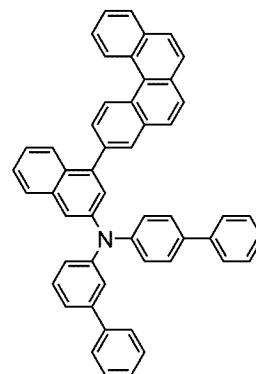
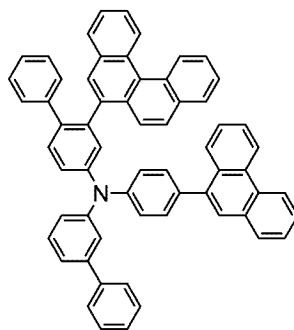
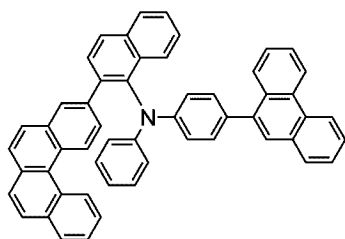
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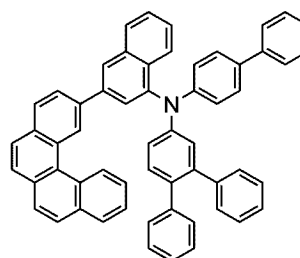
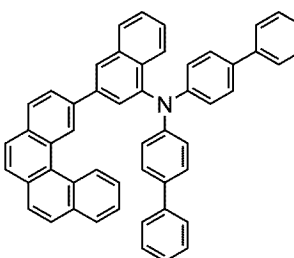
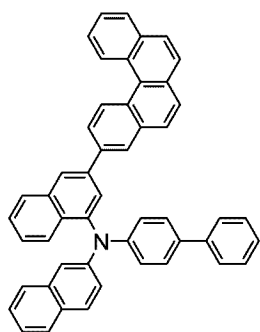
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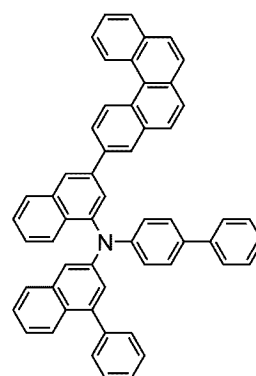
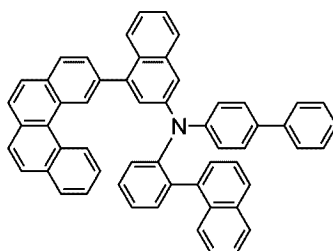
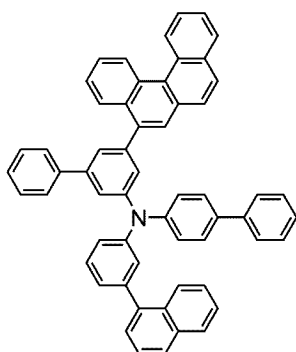
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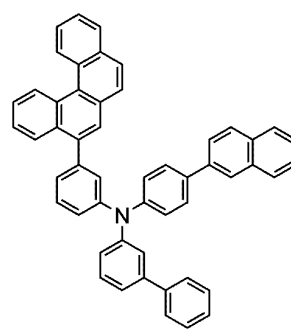
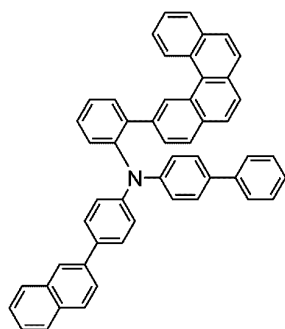
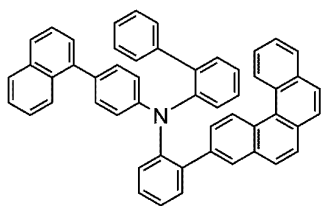
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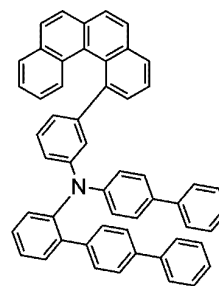
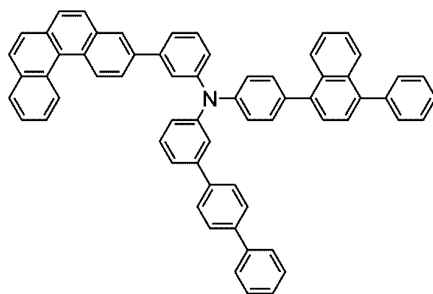
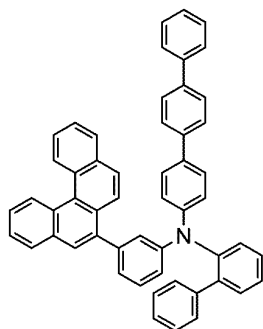
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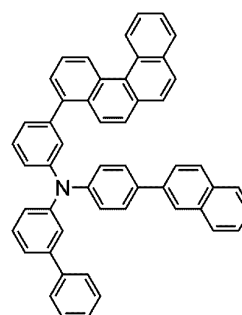
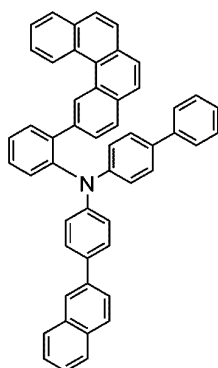
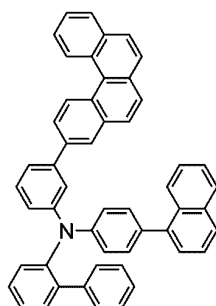
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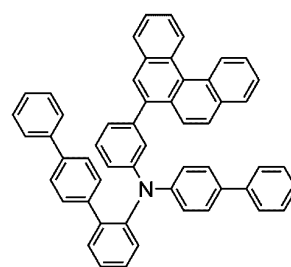
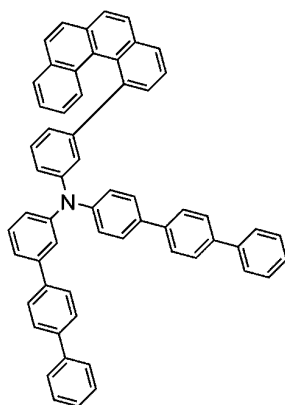
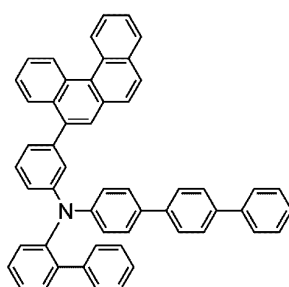
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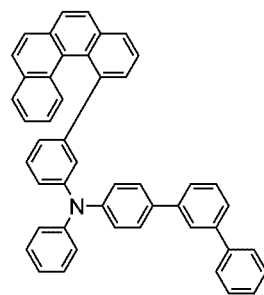
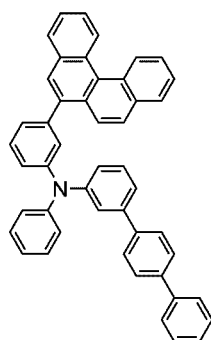
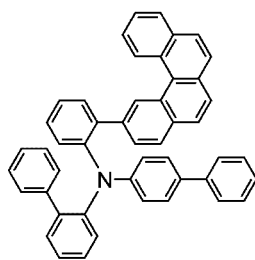
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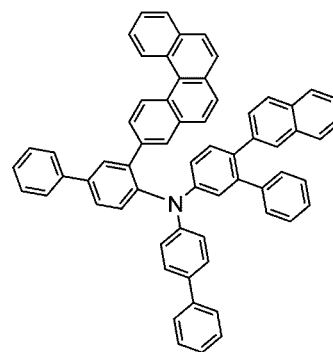
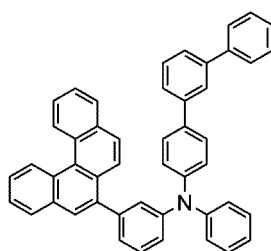
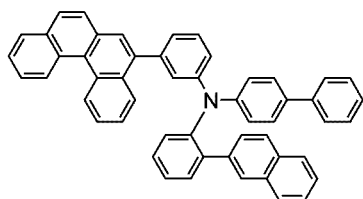
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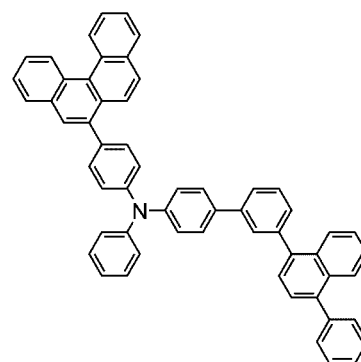
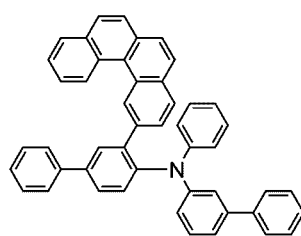
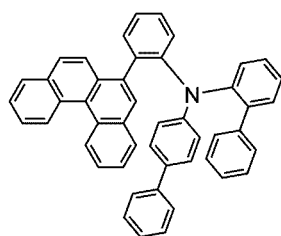
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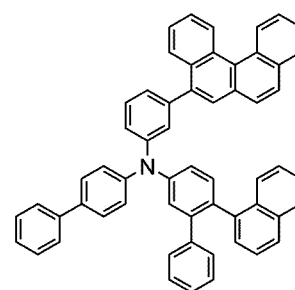
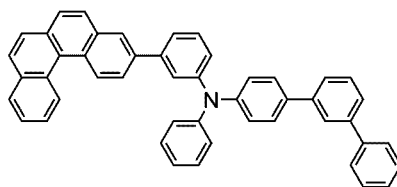
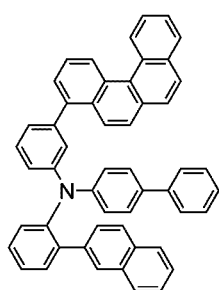
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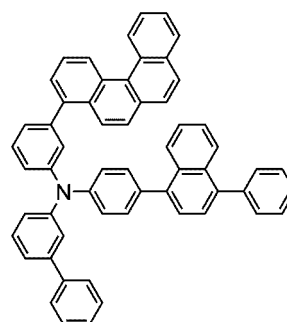
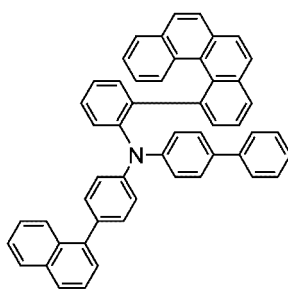
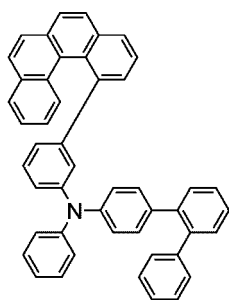
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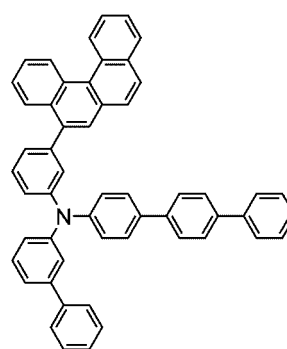
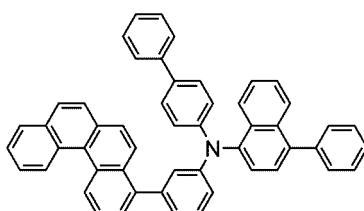
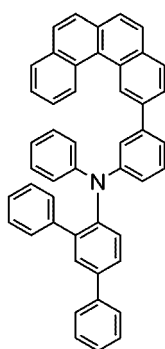
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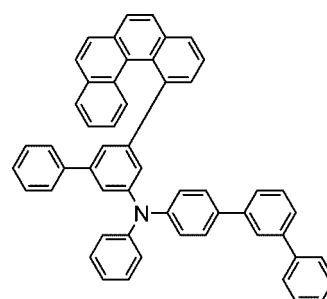
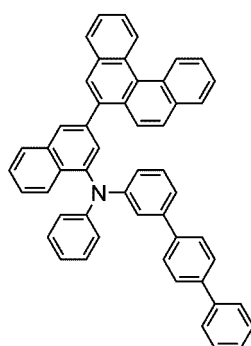
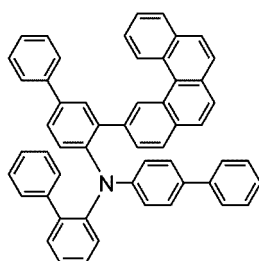
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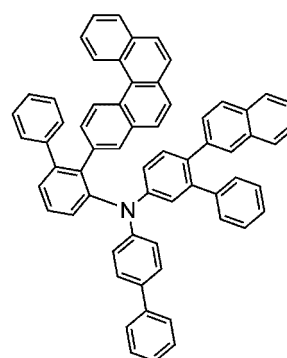
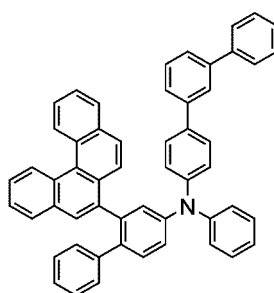
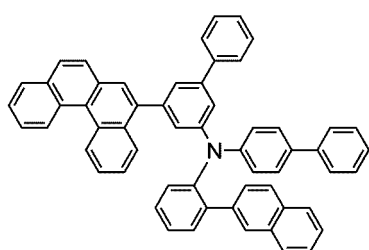
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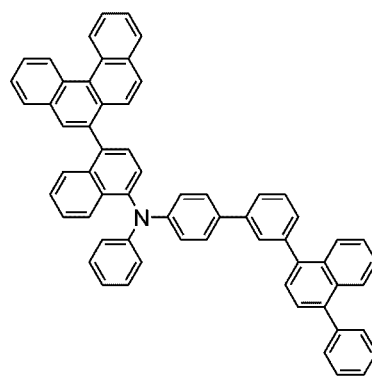
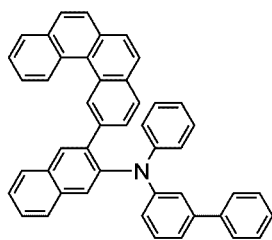


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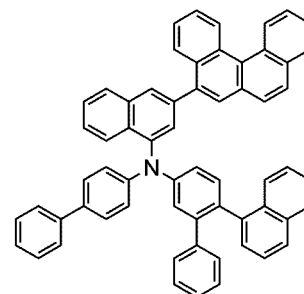
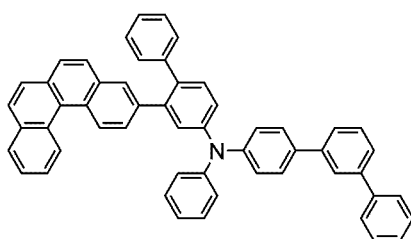
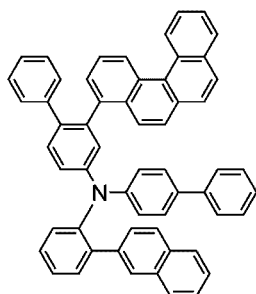


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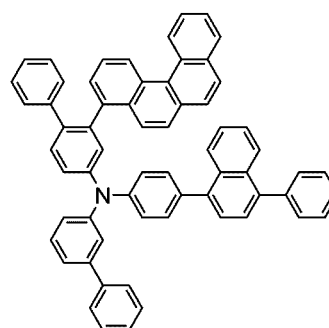
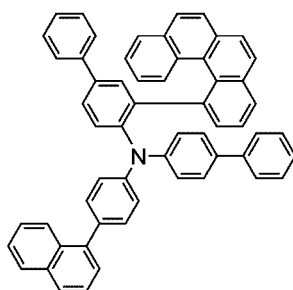
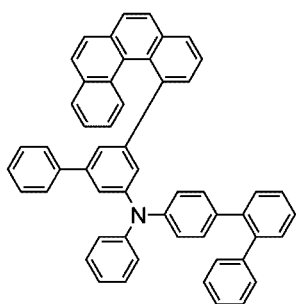
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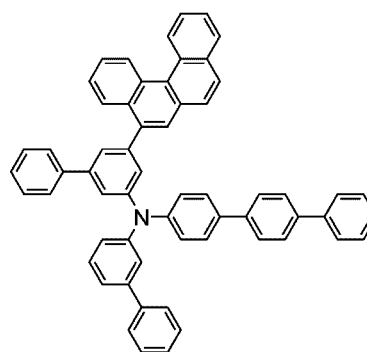
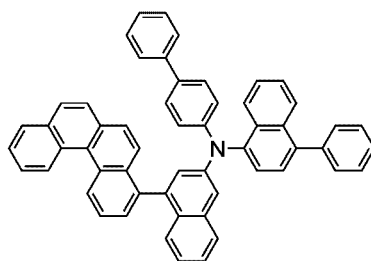
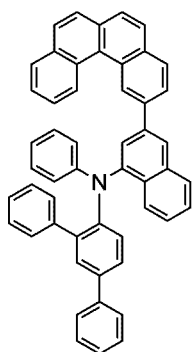
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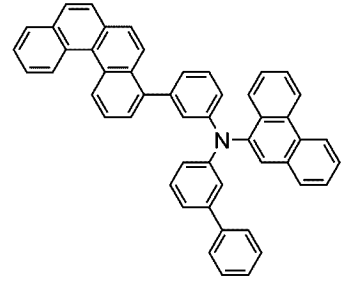
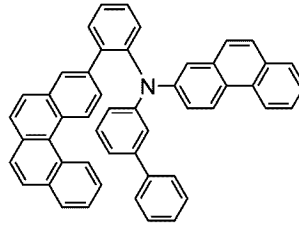
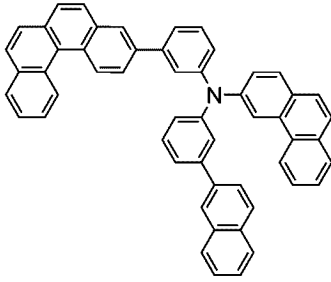


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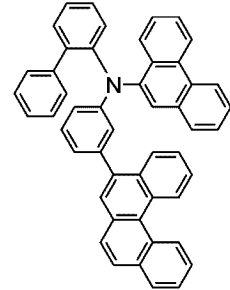
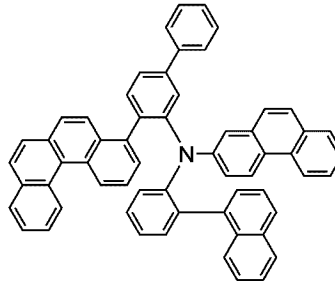
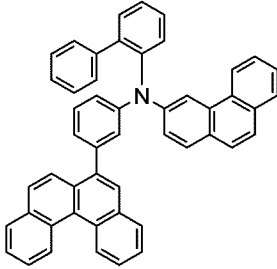


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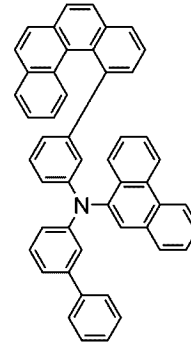
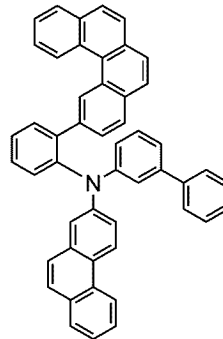
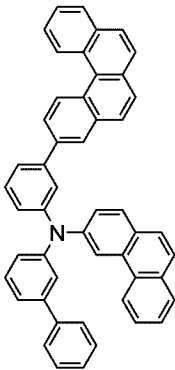
【化 7 1 2】



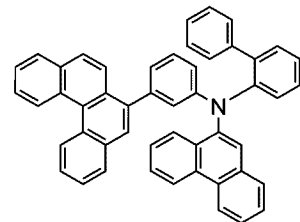
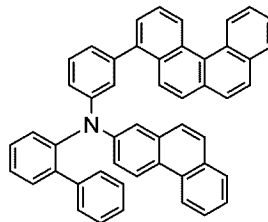
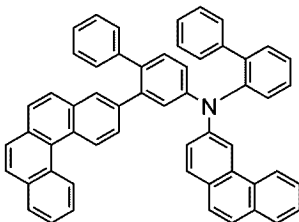
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【発明の詳細な説明】

【技術分野】

【0001】

【関連出願の相互参照】

本出願は、2021年2月18日付の韓国特許出願第10-2021-0022063号および2022年2月18日付の韓国特許出願第10-2022-0021610号に基づく優先権の利益を主張して、当該韓国特許出願の文献に開示されたすべての内容は本明細書の一部として含まれる。

【0002】

本発明は、駆動電圧、効率および寿命が改善された有機発光素子に関する。

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【背景技術】

【0003】

一般的に、有機発光現象とは、有機物質を利用して電気エネルギーを光エネルギーに転換させる現象をいう。有機発光現象を利用する有機発光素子は、広い視野角、優れたコントラスト、速い応答時間を有し、輝度、駆動電圧および応答速度特性に優れて多くの研究が進められている。

【0004】

有機発光素子は、一般的に正極と負極および前記正極と負極との間に有機物層を含む構造を有する。前記有機物層は、有機発光素子の効率と安全性を高めるために、それぞれ異なる物質から構成された多層の構造からなる場合が多く、例えば、正孔注入層、正孔輸送層、発光層、電子輸送層、電子注入層などからなる。このような有機発光素子の構造において、2つの電極の間に電圧をかけると、正極からは正孔が、負極からは電子が有機物層に注入され、注入された正孔と電子が接した時、エキシトン (exciton) が形成され、このエキシトンが再び基底状態に落ちる時、光が出るようになる。

【0005】

前記のような有機発光素子において、駆動電圧、効率および寿命が改善された有機発光素子の開発が要求され続けている。

【先行技術文献】

【特許文献】

【0006】

【文献】韓国特許公開番号第10-2000-0051826号

【発明の概要】

【発明が解決しようとする課題】

【0007】

本発明は、駆動電圧、効率および寿命が改善された有機発光素子に関する。

【課題を解決するための手段】

【0008】

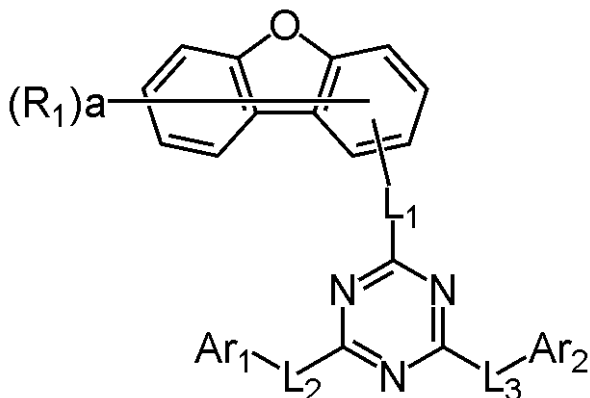
本発明は、下記有機発光素子を提供する：

正極；負極；および前記正極と負極との間の発光層を含み、

前記発光層は、下記化学式1で表される化合物および下記化学式2で表される化合物を含む、有機発光素子：

【化学式1】

【化1】



前記化学式1中、

Ar_1 および Ar_2 はそれぞれ独立して、置換または非置換の炭素数6～60のアリール；または置換または非置換のN、OおよびSで構成される群より選択されるいずれか1つ以上を含む炭素数2～60のヘテロアリールであり、

$L_1 \sim L_3$ はそれぞれ独立して、単結合；または置換または非置換の炭素数6～60の

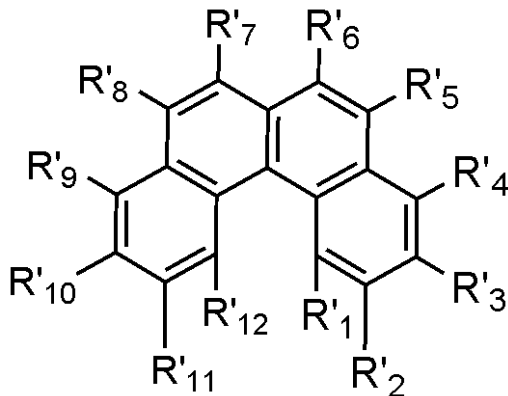
アリーレンであり、

R_1 は、水素；重水素；置換または非置換の炭素数 6 ～ 60 のアリール；または置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ～ 60 のヘテロアリールであり、

a は 0 ～ 7 の整数であり、

〔化学式 2〕

〔化 2〕



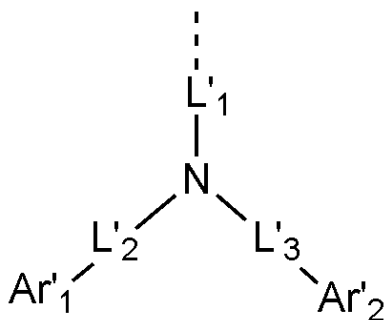
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前記化学式 2 中、

$R'1 \sim R'12$ のうちいずれか 1 つは、下記化学式 3 であり、残りは水素または重水素であり、

〔化学式 3〕

〔化 3〕



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前記化学式 3 中、

$L'1$ は、単結合；置換または非置換の炭素数 6 ～ 60 のアリーレンであり、

$L'2$ および $L'3$ はそれぞれ独立して、単結合；置換または非置換の炭素数 6 ～ 60 のアリーレン；または置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ～ 60 のヘテロアリーレンであり、

$Ar'1$ および $Ar'2$ はそれぞれ独立して、置換または非置換の炭素数 6 ～ 60 のアリール；または置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ～ 60 のヘテロアリールである。

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〔発明の効果〕

〔0009〕

上述した有機発光素子は、発光層に前記化学式 1 で表される化合物および前記化学式 2 で表される化合物を含むことによって、有機発光素子において効率の向上、低い駆動電圧および／または寿命特性を向上させることができる。

〔図面の簡単な説明〕

〔0010〕

〔図 1〕基板 1、正極 2、発光層 3 および負極 4 からなる有機発光素子の例を示した図で

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ある。

【図 2】基板 1、正極 2、正孔注入層 5、正孔輸送層 6、電子遮断層 7、発光層 3、正孔阻止層 8、電子注入および輸送層 9、および負極 4 からなる有機発光素子の例を示した図である。

【発明を実施するための形態】

【0011】

以下、本発明の理解を助けるためにより詳しく説明する。

【0012】

本明細書において、

【化 4】



または

【化 5】



は、他の置換基に連結される結合を意味する。

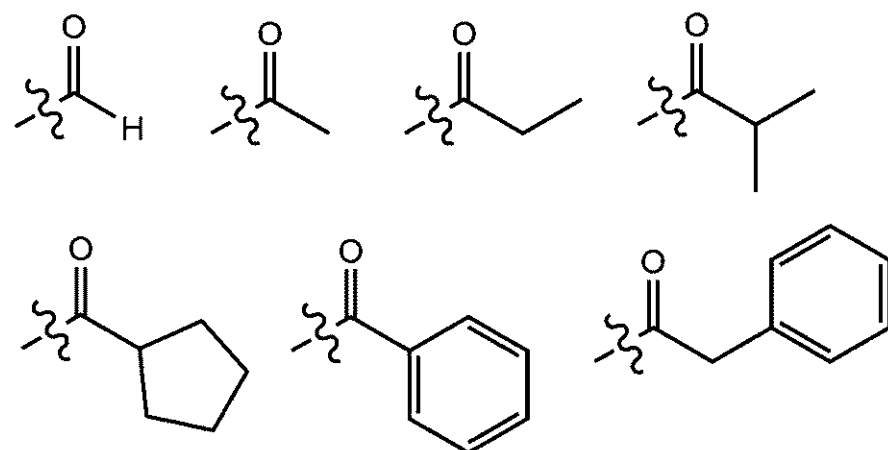
【0013】

本明細書において、「置換または非置換の」という用語は、重水素；ハロゲン基；ニトリル基；ニトロ基；ヒドロキシ基；カルボニル基；エステル基；イミド基；アミノ基；ホスフィンオキシド基；アルコキシ基；アリールオキシ基；アルキルチオキシ基；アリールチオキシ基；アルキルスルホキシ基；アリールスルホキシ基；シリル基；ホウ素基；アルキル基；シクロアルキル基；アルケニル基；アリール基；アラルキル基；アラルケニル基；アルキルアリール基；アルキルアミン基；アラルキルアミン基；ヘテロアリールアミン基；アリールアミン基；アリールホスフィン基；または N、O および S 原子のうち 1 個以上を含む複素環基からなる群より選択された 1 個以上の置換基で置換または非置換されるか、前記例示された置換基のうち 2 以上の置換基が連結された置換または非置換されることを意味する。例えば、「2 以上の置換基が連結された置換基」は、ビフェニル基であってもよい。即ち、ビフェニル基は、アリール基であってもよく、2 個のフェニル基が連結された置換基と解釈されてもよい。

【0014】

本明細書において、カルボニル基の炭素数は特に限定されないが、炭素数 1～40 であることが好ましい。具体的には、下記のような構造の化合物であってもよいが、これらに限定されるものではない。

【化 6】



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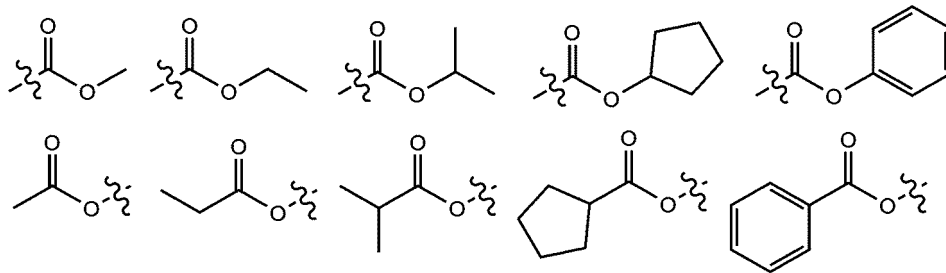
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【0015】

本明細書において、エステル基は、エステル基の酸素が炭素数1～25の直鎖、分枝鎖もしくは環状アルキル基、または炭素数6～25のアリール基で置換されてもよい。具体的には、下記構造式の化合物であってもよいが、これらに限定されるものではない。

【化7】



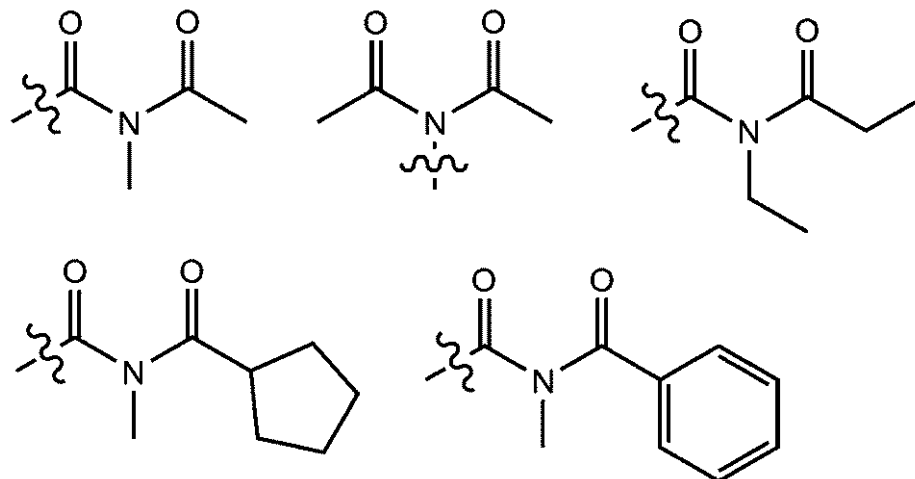
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【0016】

本明細書において、イミド基の炭素数は特に限定されないが、炭素数1～25であることが好ましい。具体的には、下記のような構造の化合物であってもよいが、これらに限定されるものではない。

【0017】

【化8】



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【0018】

本明細書において、シリル基は、具体的には、トリメチルシリル基、トリエチルシリル基、ｾｰﾌﾞチルジメチルシリル基、ビニルジメチルシリル基、プロピルジメチルシリル基、トリフェニルシリル基、ジフェニルシリル基、フェニルシリル基などがあるが、これらに限定されるものではない。

【0019】

本明細書において、ハウ素基は、具体的には、トリメチルハウ素基、トリエチルハウ素基、ｾｰﾌﾞチルジメチルハウ素基、トリフェニルハウ素基、フェニルハウ素基などがあるが、これらに限定されるものではない。

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【0020】

本明細書において、ハロゲン基の例としては、フッ素、塩素、臭素、またはヨウ素がある。

【0021】

本明細書において、前記アルキル基は、直鎖または分枝鎖であってもよく、炭素数は特に限定されないが、1～40であることが好ましい。一実施状態によれば、前記アルキル基の炭素数は1～20である。さらに一つの実施状態によれば、前記アルキル基の炭素数は1～10である。さらに一つの実施状態によれば、前記アルキル基の炭素数は1～6で

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ある。アルキル基の具体的な例としては、メチル、エチル、プロピル、*n*-プロピル、イソプロピル、ブチル、*n*-ブチル、イソブチル、*tert*-ブチル、*sec*-ブチル、1-メチルブチル、1-エチルブチル、ペンチル、*n*-ペンチル、イソペンチル、ネオペンチル、*tert*-ペンチル、ヘキシル、*n*-ヘキシル、1-メチルペンチル、2-メチルペンチル、4-メチル-2-ペンチル、3, 3-ジメチルブチル、2-エチルブチル、ヘプチル、*n*-ヘプチル、1-メチルヘキシル、シクロペンチルメチル、シクロヘキシルメチル、オクチル、*n*-オクチル、*tert*-オクチル、1-メチルヘプチル、2-エチルヘキシル、2-プロピルペンチル、*n*-ノニル、2, 2-ジメチルヘプチル、1-エチル-プロピル、1, 1-ジメチル-プロピル、イソヘキシル、2-メチルペンチル、4-メチルヘキシル、5-メチルヘキシルなどがあるが、これらに限定されるものではない。
【0022】

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本明細書において、前記アルケニル基は、直鎖または分枝鎖であってもよく、炭素数は特に限定されないが、2~40であることが好ましい。一実施状態によれば、前記アルケニル基の炭素数は2~20である。さらに一つの実施状態によれば、前記アルケニル基の炭素数は2~10である。さらに一つの実施状態によれば、前記アルケニル基の炭素数は2~6である。具体的な例としては、ビニル、1-プロフェニル、イソプロフェニル、1-ブテニル、2-ブテニル、3-ブテニル、1-ペンテニル、2-ペンテニル、3-ペンテニル、3-メチル-1-ブテニル、1, 3-ブタジエニル、アリル、1-フェニルビニル-1-イル、2-フェニルビニル-1-イル、2, 2-ジフェニルビニル-1-イル、2-フェニル-2-(ナフチル-1-イル)ビニル-1-イル、2, 2-ビス(ジフェニル-1-イル)ビニル-1-イル、スチルベニル基、スチレニル基などがあるが、これらに限定されるものではない。

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【0023】

本明細書において、シクロアルキル基は特に限定されないが、炭素数3~60であることが好ましく、一実施状態によれば、前記シクロアルキル基の炭素数は3~30である。さらに一つの実施状態によれば、前記シクロアルキル基の炭素数は3~20である。さらに一つの実施状態によれば、前記シクロアルキル基の炭素数は3~6である。具体的には、シクロプロピル、シクロブチル、シクロペンチル、3-メチルシクロペンチル、2, 3-ジメチルシクロペンチル、シクロヘキシル、3-メチルシクロヘキシル、4-メチルシクロヘキシル、2, 3-ジメチルシクロヘキシル、3, 4, 5-トリメチルシクロヘキシル、4-*tert*-ブチルシクロヘキシル、シクロヘプチル、シクロオクチルなどがあるが、これらに限定されるものではない。

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【0024】

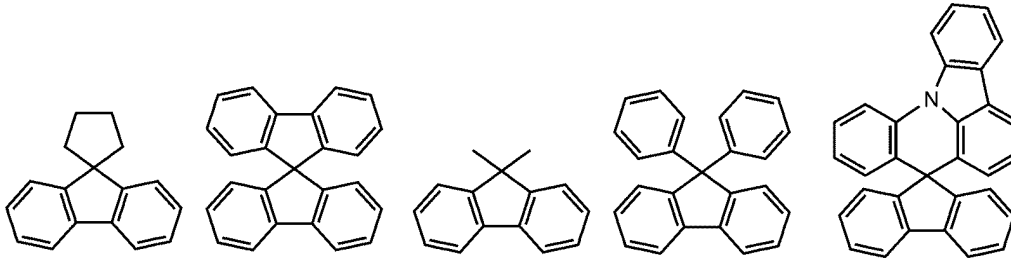
本明細書において、アリール基は特に限定されないが、炭素数6~60であることが好ましく、単環式アリール基または多環式アリール基であってもよい。一実施状態によれば、前記アリール基の炭素数は6~30である。一実施状態によれば、前記アリール基の炭素数は6~20である。前記アリール基が単環式アリール基としては、フェニル基、ビフェニル基、ターフェニル基などであってもよいが、これらに限定されるものではない。前記多環式アリール基としては、ナフチル基、アントラセニル基、フェナントリル基、ピレニル基、ペリレニル基、クリセニル基、フルオレニル基などであってもよいが、これらに限定されるものではない。

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【0025】

本明細書において、フルオレニル基は置換されてもよく、置換基2つが互いに結合してスピロ構造を形成することができる。前記フルオレニル基が置換される場合、

【化 9】



などであってもよい。但し、これらに限定されるものではない。

【0026】

本明細書において、複素環基は異種元素としてO、N、SiおよびSのうち1個以上を含む複素環基であって、炭素数は特に限定されないが、炭素数2～60であることが好ましい。複素環基の例としては、チオフェン基、フラニル基、ピロール基、イミダゾール基、チアゾール基、オキサゾール基、オキサジアゾール基、トリアゾール基、ピリジル基、ビピリジル基、ピリミジル基、トリアジン基、アクリジル基、ピリダジン基、ピラジニル基、キノリニル基、キナゾリン基、キノキサリニル基、フタラジニル基、ピリドピリミジニル基、ピリドピラジニル基、ピラジノピラジニル基、イソキノリン基、インドール基、カルバゾール基、ベンゾオキサゾール基、ベンゾイミダゾール基、ベンゾチアゾール基、ベンゾカルバゾール基、ベンゾチオフェン基、ジベンゾチオフェン基、ベンゾフラニル基、フェナントロリン基（phenanthroline）、イソオキサゾリル基、チアジアゾリル基、フェノチアジニル基、およびジベンゾフラニル基などがあるが、これらにだけ限定されるのではない。

【0027】

本明細書において、アラルキル基、アラルケニル基、アルキルアリール基、アリールアミンのうちアリール基は、上述したアリール基に関する説明が適用可能である。本明細書において、アラルキル基、アルキルアリール基、アルキルアミン基のうちアルキル基は、前述したアルキル基に関する説明が適用可能である。本明細書において、ヘテロアリールアミンのうちヘテロアリールは、前述した複素環基に関する説明が適用可能である。本明細書において、アラルケニル基のうちアルケニル基は、上述したアルケニル基に関する説明が適用可能である。本明細書において、アリーレンは、2価の基であることを除けば、上述したアリール基に関する説明が適用可能である。本明細書において、ヘテロアリーレンは、2価の基であることを除けば、上述した複素環基に関する説明が適用可能である。本明細書において、炭化水素環は、1価の基ではなく、2個の置換基が結合して形成したことを除けば、上述したアリール基またはシクロアルキル基に関する説明が適用可能である。本明細書において、ヘテロ環は、1価の基ではなく、2個の置換基が結合して形成したことを除けば、上述した複素環基に関する説明が適用可能である。

【0028】

以下、各構成別に本発明を詳細に説明する。

【0029】

正極および負極

本発明で用いられる正極および負極は、有機発光素子で用いられる電極を意味する。

【0030】

前記正極物質としては、通常有機物層への正孔注入が円滑となるように仕事関数が高い物質が好ましい。前記正極物質の具体的な例としては、バナジウム、クロム、銅、亜鉛、金などの金属またはこれらの合金；亜鉛酸化物、インジウム酸化物、インジウムスズ酸化物（ITO）、インジウム亜鉛酸化物（IZO）などの金属酸化物；ZnO：AlまたはSnO₂：Sbなどの金属と酸化物との組み合わせ；ポリ（3-メチルチオフェン）、ポリ〔3,4-（エチレン-1,2-ジオキシ）チオフェン〕（PEDOT）、ポリピロールおよびポリアニリンなどの導電性高分子などがあるが、これらにのみ限定されるもの

ではない。

【0031】

前記負極物質としては、通常有機物層への電子注入が容易となるように仕事関数が小さい物質であることが好ましい。前記負極物質の具体的な例としては、マグネシウム、カルシウム、ナトリウム、カリウム、チタニウム、インジウム、イットリウム、リチウム、ガドリニウム、アルミニウム、銀、スズおよび鉛などの金属、またはこれらの合金；LiF／AlまたはLiO₂／Alなどの多層構造物質などがあるが、これらにのみ限定されるものではない。

【0032】

正孔注入層

本発明に係る有機発光素子は、必要に応じて前記正極上に正孔注入層をさらに含んでもよい。

【0033】

前記正孔注入層は電極から正孔を注入する層で、正孔注入物質としては、正孔を輸送する能力を有し、正極からの正孔注入効果、発光層または発光材料に対して優れた正孔注入効果を有し、発光層で生成された励起子の電子注入層または電子注入材料への移動を防止し、また、薄膜形成能力に優れた化合物が好ましい。また、正孔注入物質のHOMO (highest occupied molecular orbital) が正極物質の仕事関数と周辺有機物層のHOMOとの間であることが好ましい。

【0034】

正孔注入物質の具体的な例としては、金属ポルフィリン (porphyrin)、オリゴチオフエン、アリーールアミン系の有機物、ヘキサニトリルヘキサアザトリフェニレン系の有機物、キナクリドン (quinacridone) 系の有機物、ペリレン (perylene) 系の有機物、アントラキノンおよびポリアニリンとポリチオフエン系の導電性高分子などがあるが、これらにのみ限定されるものではない。

【0035】

正孔輸送層

本発明に係る有機発光素子は、必要に応じて前記正極上に（または正孔注入層が存在する場合、正孔注入層上に）正孔輸送層を含んでもよい。

【0036】

前記正孔輸送層は、正極または正孔注入層から正孔を受け取って発光層まで正孔を輸送する層で、正孔輸送物質としては、正極や正孔注入層から正孔の輸送を受けて発光層に移し得る物質で、正孔に対する移動性が大きい物質が好適である。

【0037】

前記正孔輸送物質の具体的な例としては、アリーールアミン系の有機物、導電性高分子、および共役部分と非共役部分が共に存在するブロック共重合体などがあるが、これらにのみ限定されるものではない。

【0038】

電子遮断層

本発明に係る有機発光素子は、必要に応じて前記正極上に（または正孔注入層が存在する場合、正孔注入層上に、電子輸送層が存在する場合、電子輸送層上に）電子遮断層を含んでもよい。

【0039】

前記電子遮断層は、負極から注入された電子が発光層で再結合されずに正孔輸送層へ渡るのを防止するために正孔輸送層と発光層との間に置く層で、電子抑制層、または電子阻止層とも呼ばれる。電子遮断層には電子輸送層より電子親和力が小さい物質が好ましい。

【0040】

発光層

本発明で用いられる発光層は、正極と負極から伝達された正孔と電子を結合させることによって可視光領域の光を出すことができる層を意味する。一般的に、発光層は、ホスト

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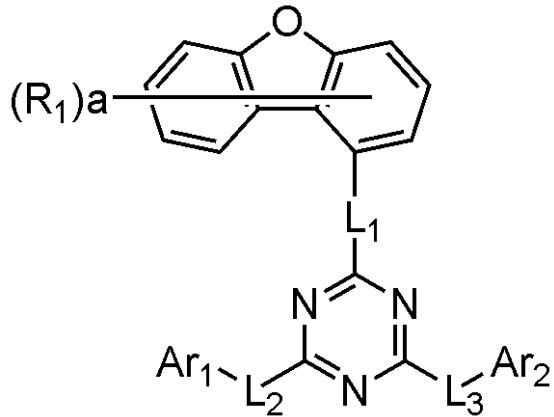
材料とドーパント材料を含み、本発明には前記化学式 1 で表される化合物および前記化学式 2 で表される化合物をホストで含む。

【0041】

好ましくは、前記化学式 1 で表される化合物は、下記化学式 1 A で表される：

〔化学式 1 A〕

〔化 1 0〕



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前記化学式 1 A 中、

Ar₁ および Ar₂、L₁ ~ L₃、R₁ および a は、前記化学式 1 で定義した通りである。

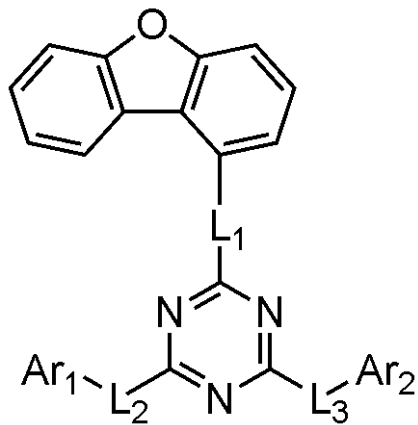
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【0042】

好ましくは、前記化学式 1 で表される化合物は、下記化学式 1-1 ~ 化学式 1-3 のうちいずれか 1 つで表される：

〔化学式 1-1〕

〔化 1 1〕



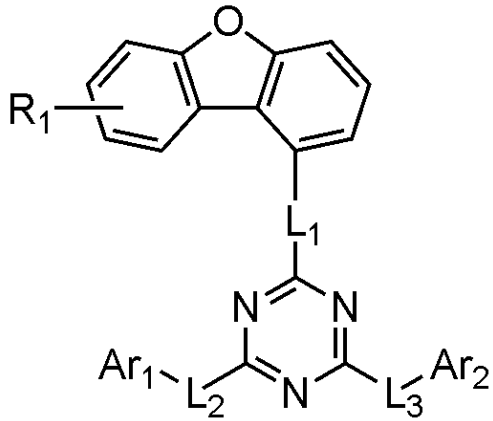
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〔化学式 1-2〕

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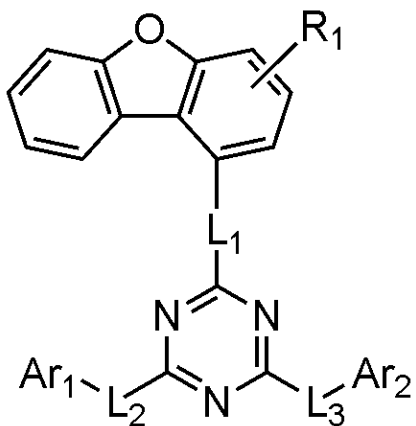
【化 1 2】



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【化学式 1 - 3】

【化 1 3】



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前記化学式 1 - 1 ~ 1 - 3 中、

Ar₁ および Ar₂、L₁ ~ L₃ および R₁ は化学式 1 で定義した通りである。

【0043】

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好ましくは、Ar₁ および Ar₂ はそれぞれ独立して、置換または非置換の炭素数 6 ~ 20 のアリール；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ~ 20 のヘテロアリールであってもよく、

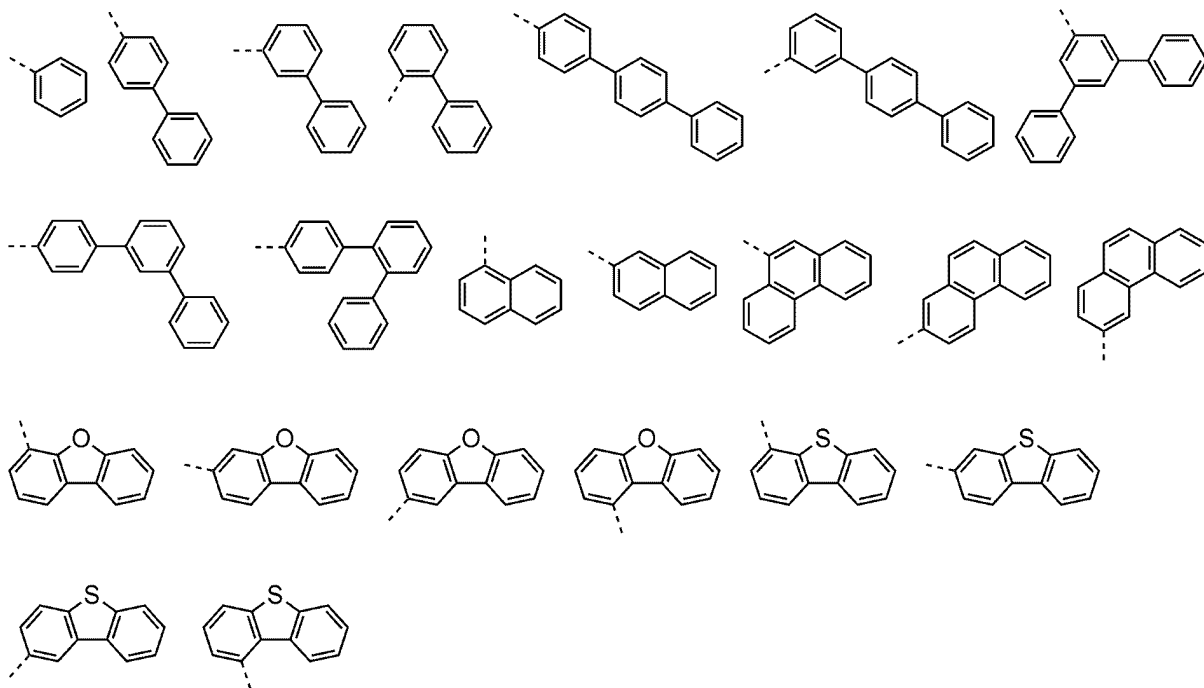
より好ましくは、Ar₁ および Ar₂ はそれぞれ独立して、フェニル、ビフェニル、ターフェニル、ナフチル、フェナントレニル、ジベンゾフラニル、またはジベンゾチオフェニルであってもよく、

最も好ましくは、Ar₁ および Ar₂ はそれぞれ独立して、下記で構成される群より選択されるいずれか 1 つであり得る：

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【化 1 4】



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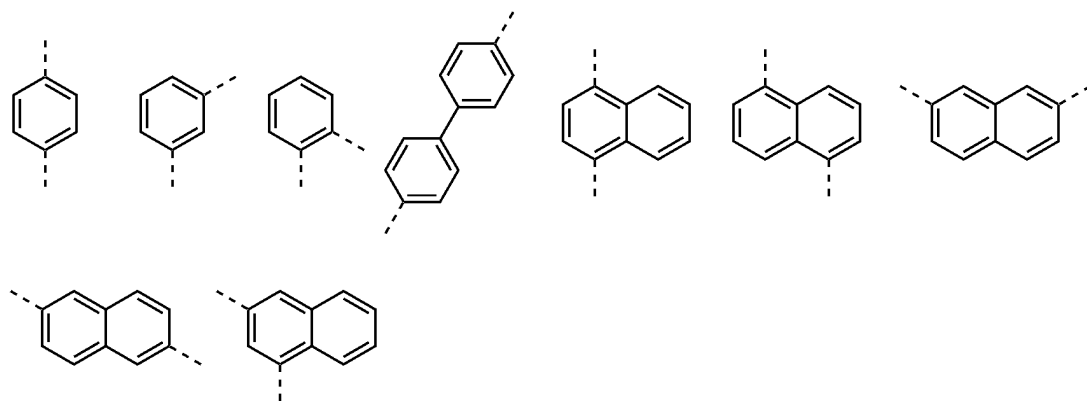
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好ましくは、 $L_1 \sim L_3$ はそれぞれ独立して、単結合；または、置換または非置換の炭素数 6 ～ 20 のアリーレンであってもよく、

より好ましくは、 $L_1 \sim L_3$ はそれぞれ独立して、単結合、フェニレン、ビフェニリレン、または、ナフチレンであってもよく、

最も好ましくは、 $L_1 \sim L_3$ はそれぞれ独立して、単結合または下記で構成される群より選択されるいずれか 1 つであり得る：

【化 1 5】



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好ましくは、 R_1 は、水素；重水素；置換または非置換の炭素数 6 ～ 20 のアリール；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ～ 20 のヘテロアリールであってもよく、

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より好ましくは、 R_1 は、水素、重水素、フェニル、ビフェニリル、ターフェニリル、ナフチル、フェナントレニル、トリフェニレニル、ナフチルフェニル、フェニルナフチル、フルオランテニル、ジヒドロインデニル、ジベンゾフラニル、ジベンゾチオフェニル、ベンゾナフトフラニル、またはベンゾナフトチオフェニルであり得る。

【0 0 4 4】

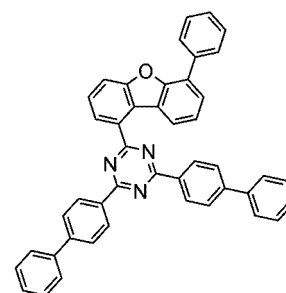
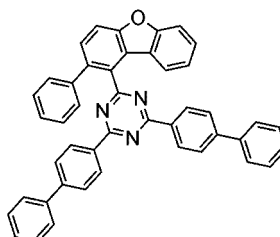
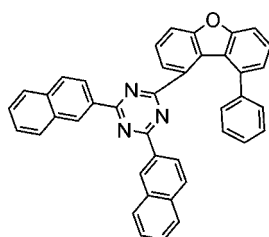
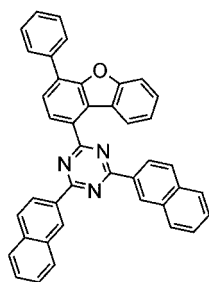
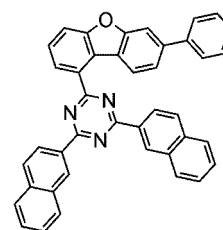
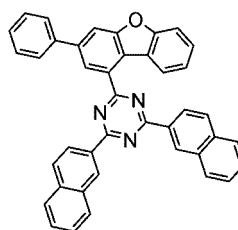
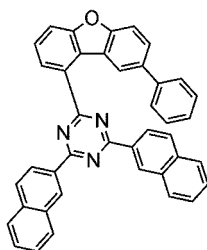
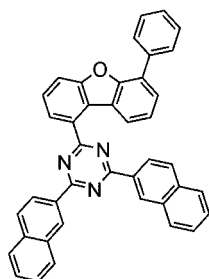
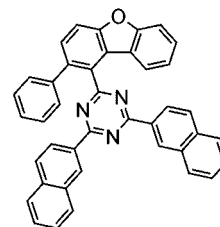
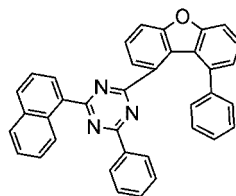
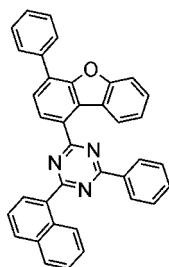
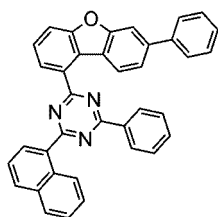
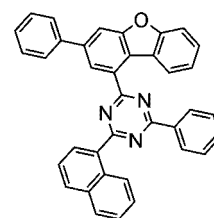
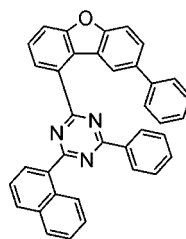
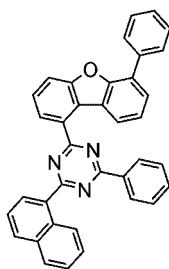
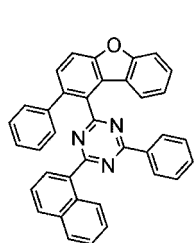
好ましくは、 a は 0 または 1 であってもよい。

【0 0 4 5】

前記化学式 1 で表される化合物の代表的な例は下記の通りである：

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【化 1 6】



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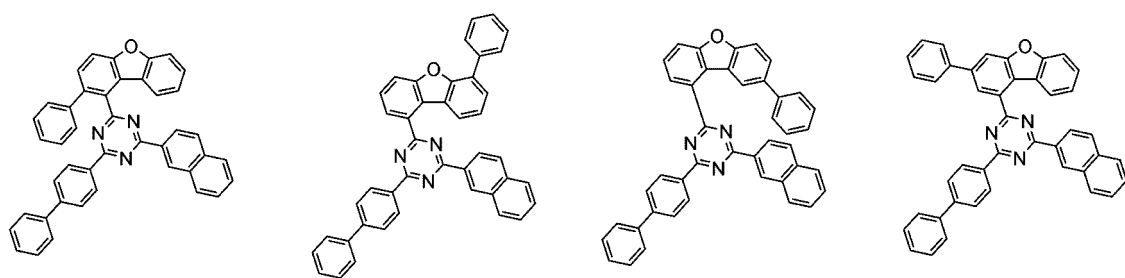
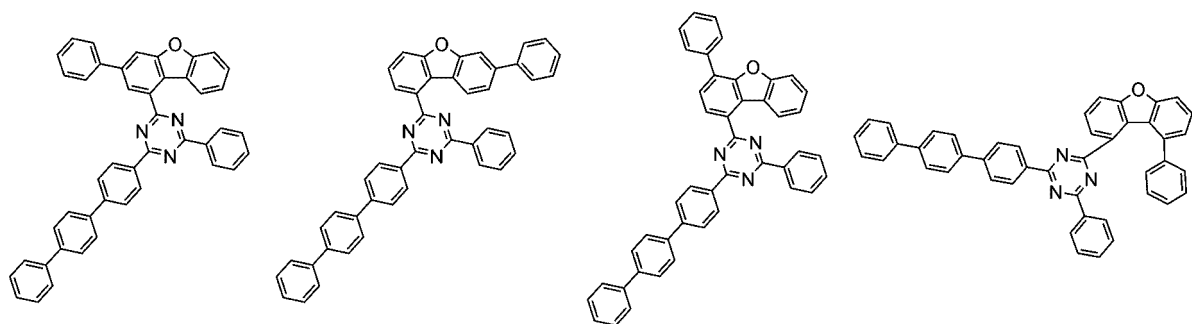
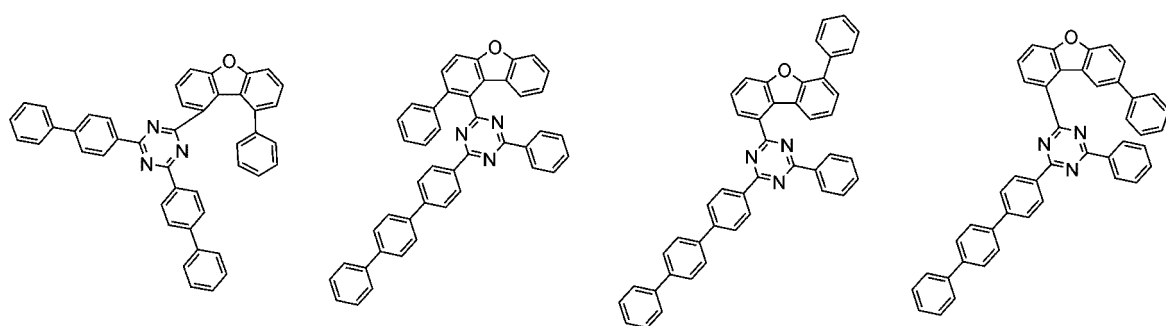
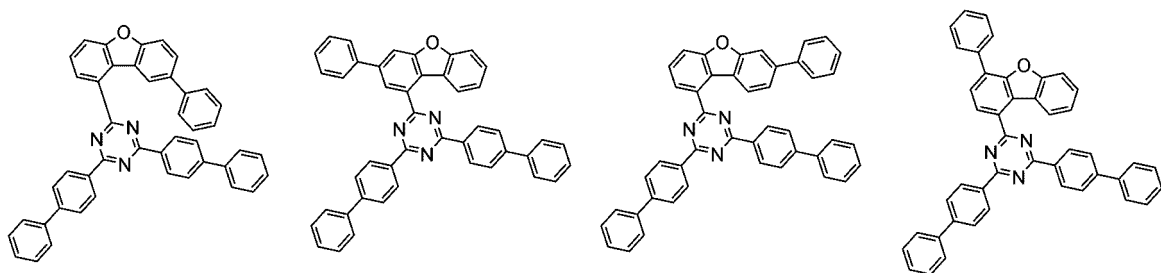
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【化 1 7】



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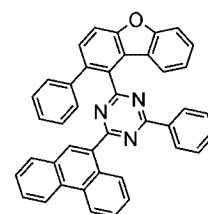
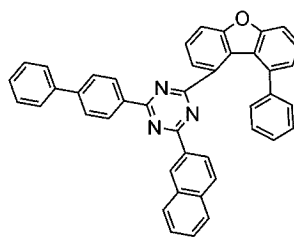
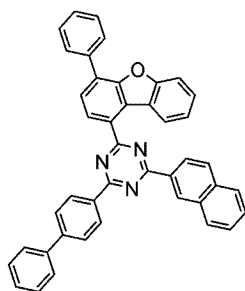
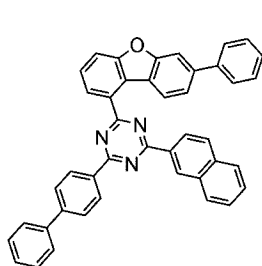
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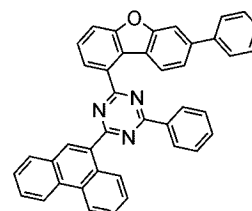
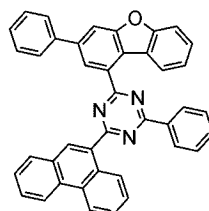
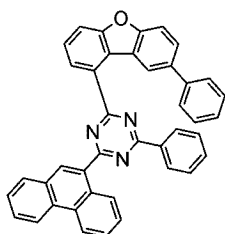
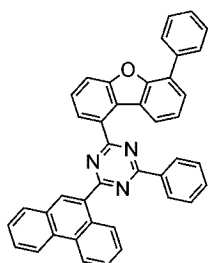
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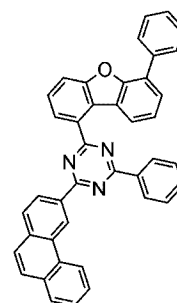
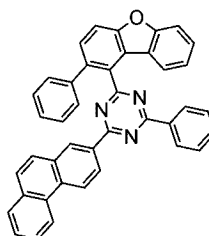
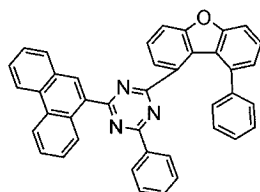
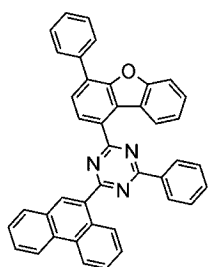
【化 18】



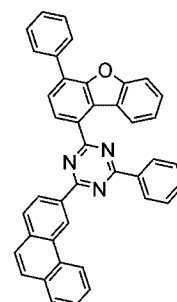
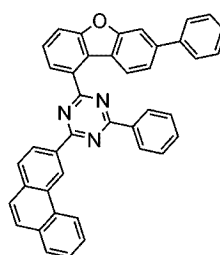
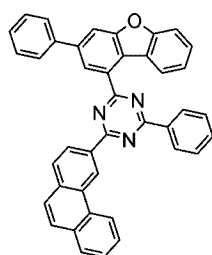
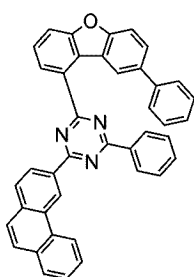
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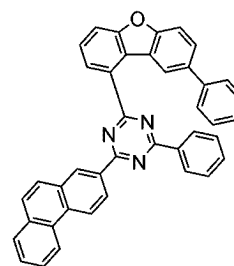
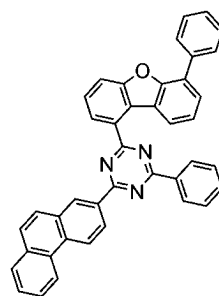
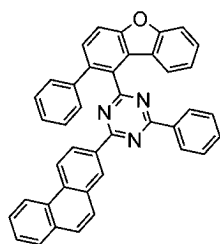
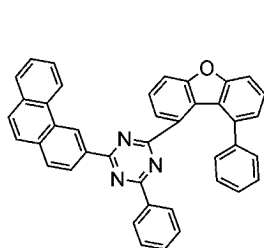
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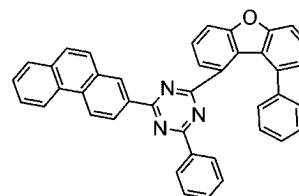
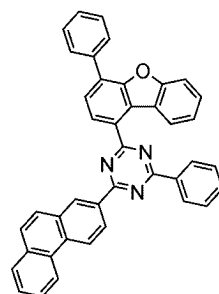
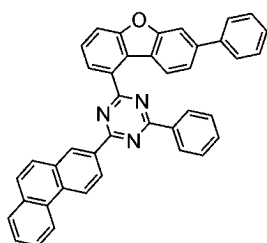
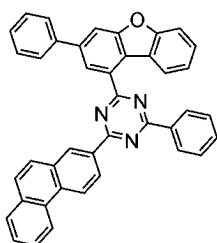
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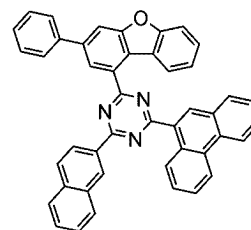
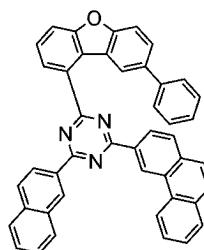
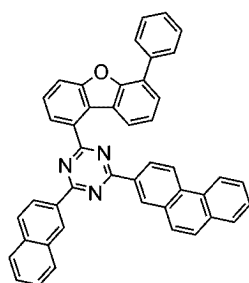
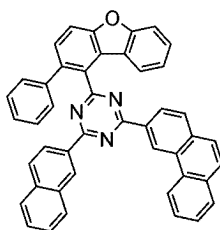
【化 19】



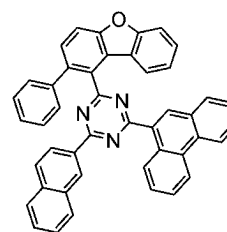
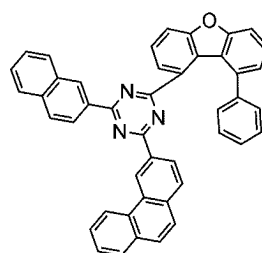
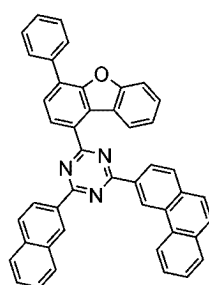
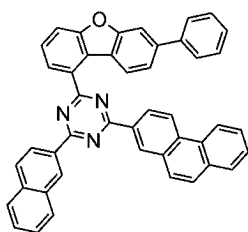
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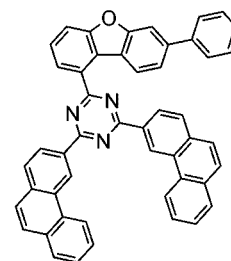
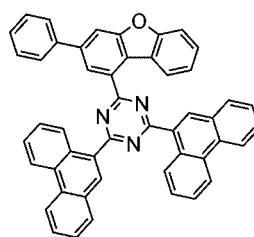
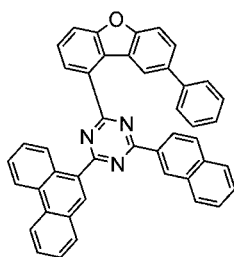
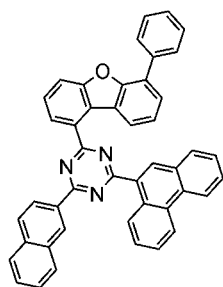
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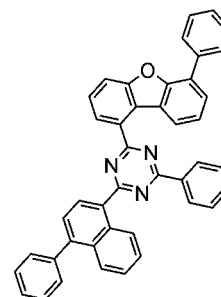
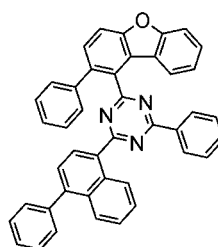
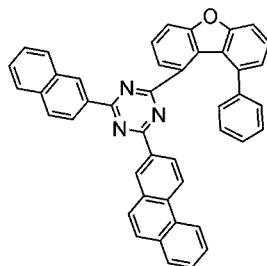
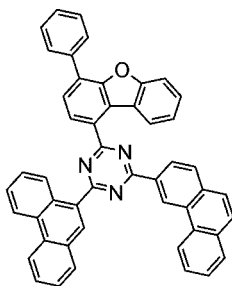
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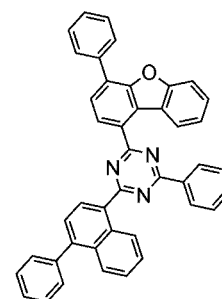
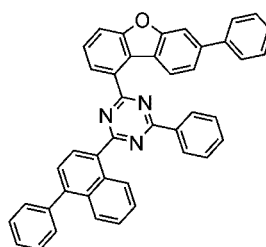
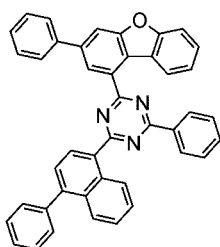
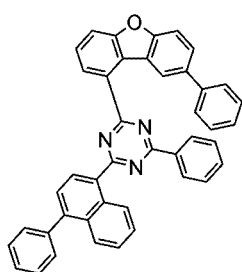
【化 2 0】



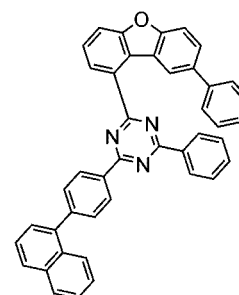
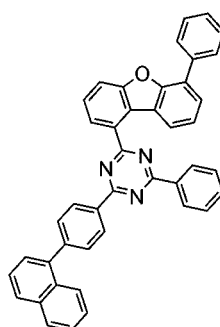
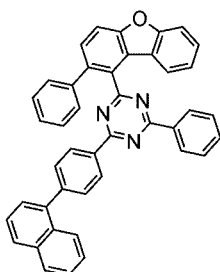
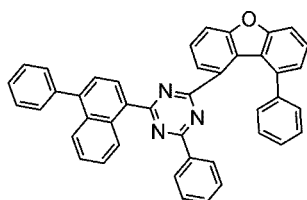
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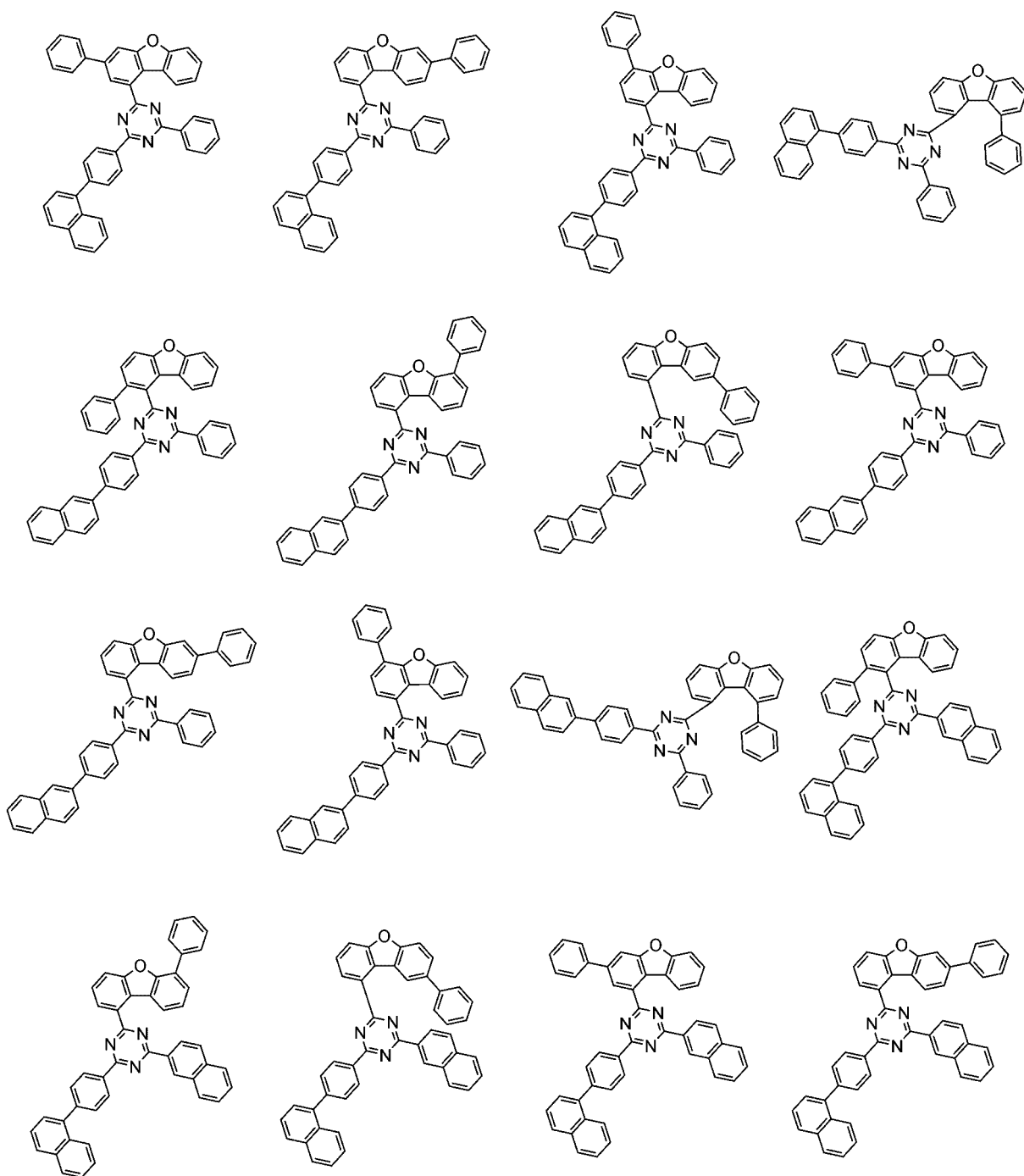
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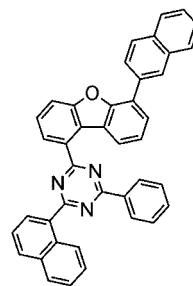
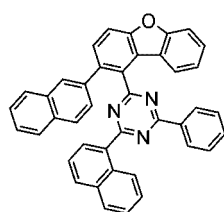
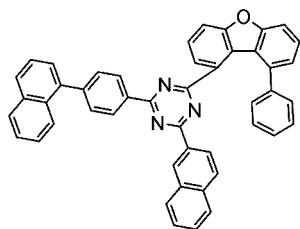
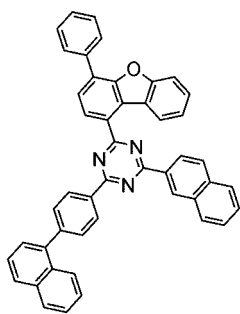
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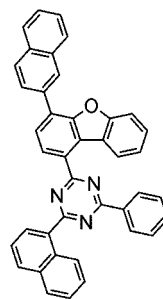
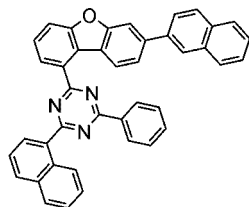
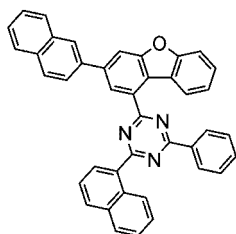
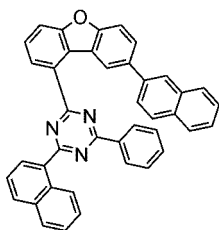
【化 2 1】



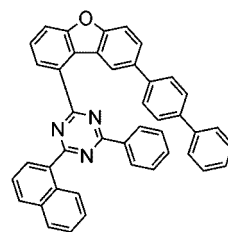
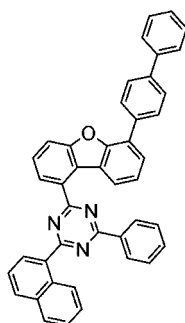
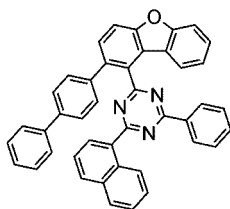
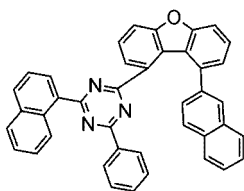
【化 2 2】



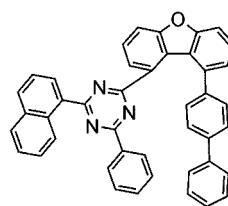
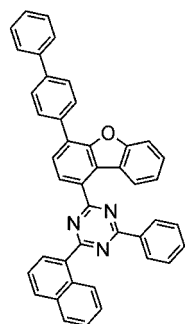
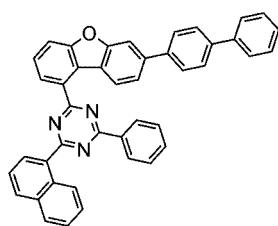
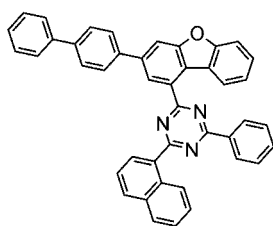
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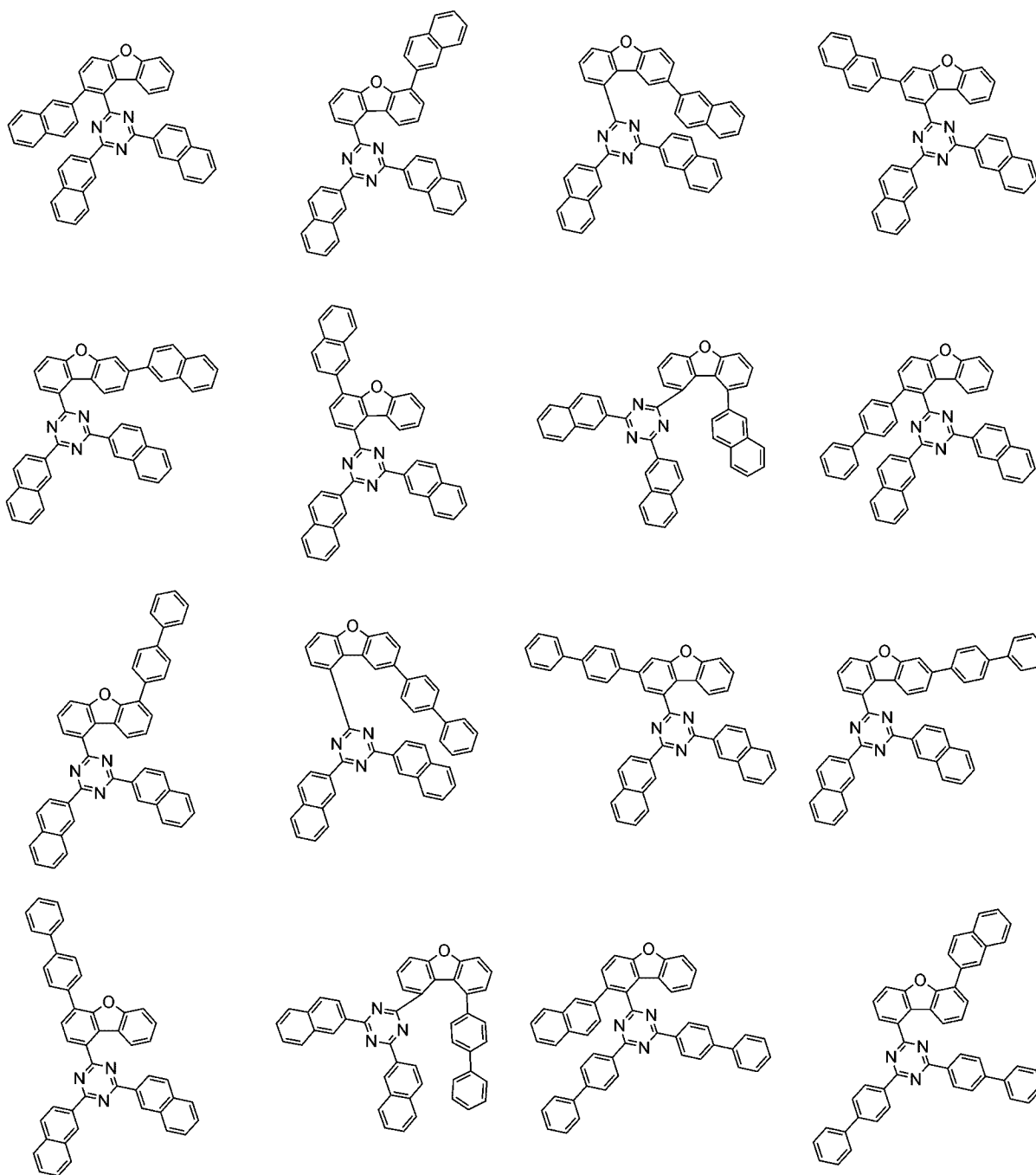
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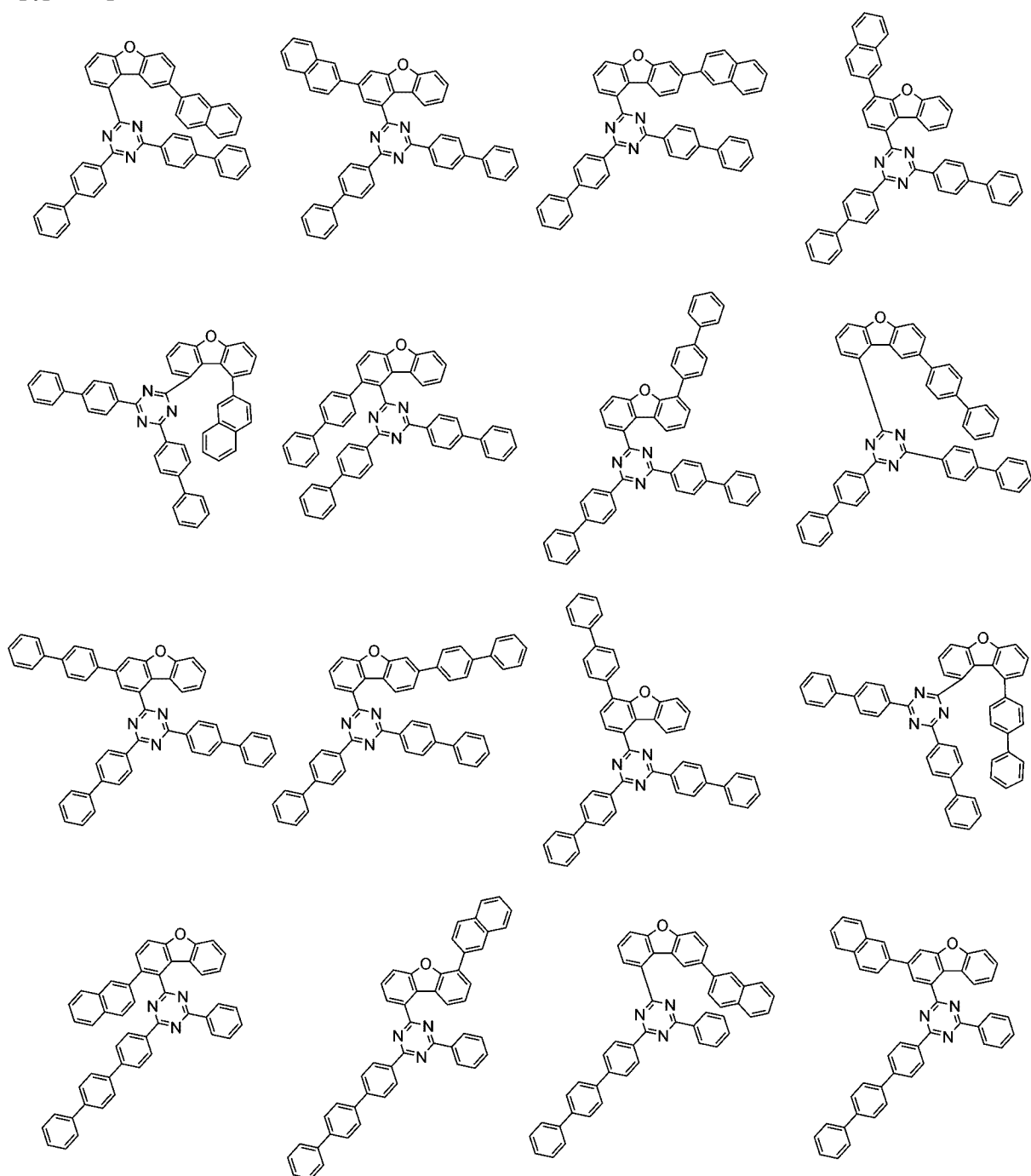
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【化 2 3】



【化 2 4】



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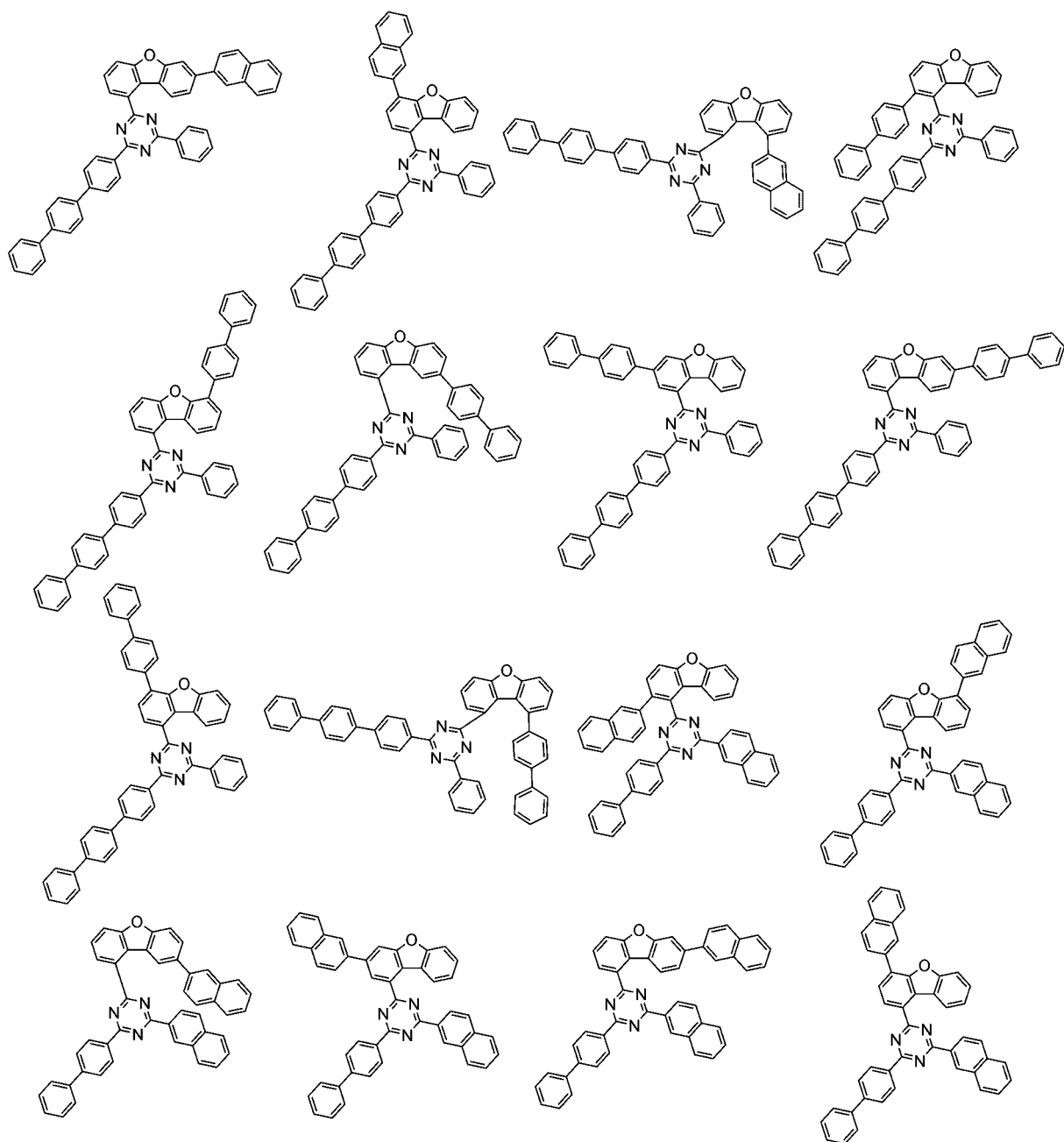
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【化 2 5】



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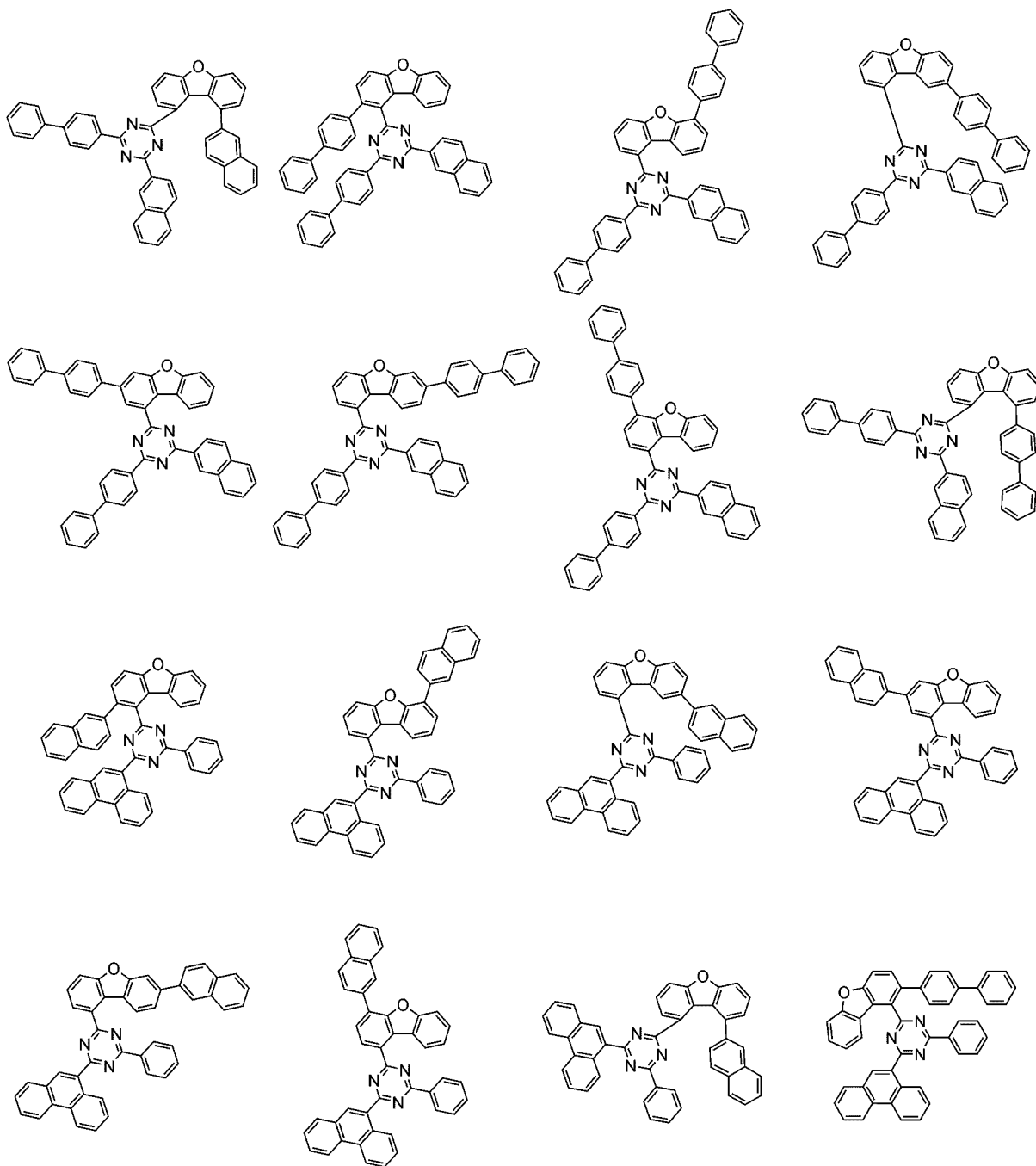
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【化 2 6】



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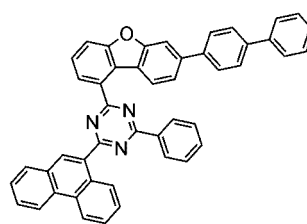
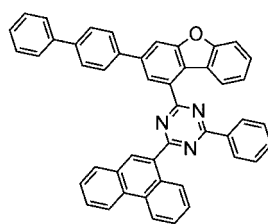
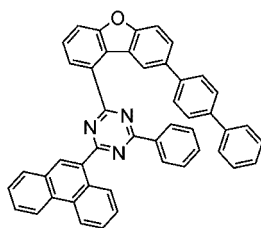
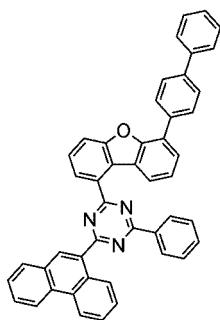
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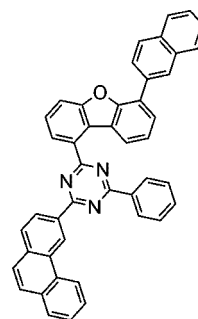
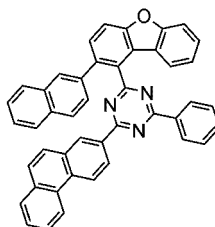
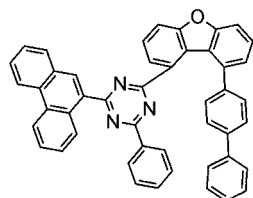
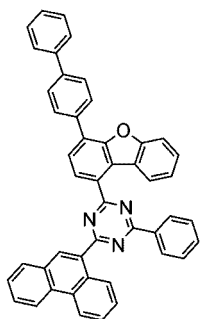
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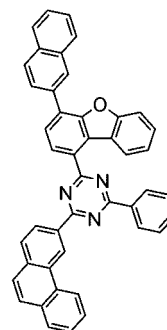
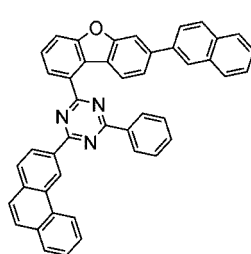
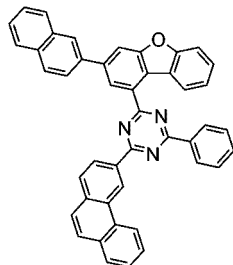
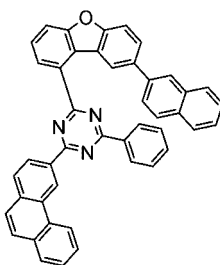
【化 2 7】



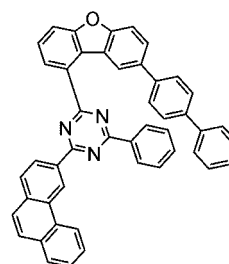
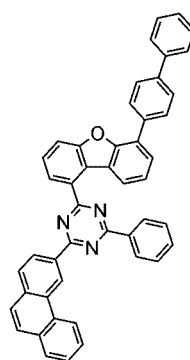
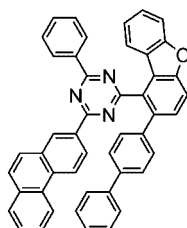
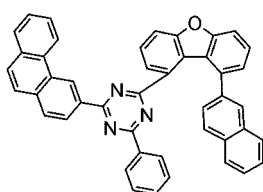
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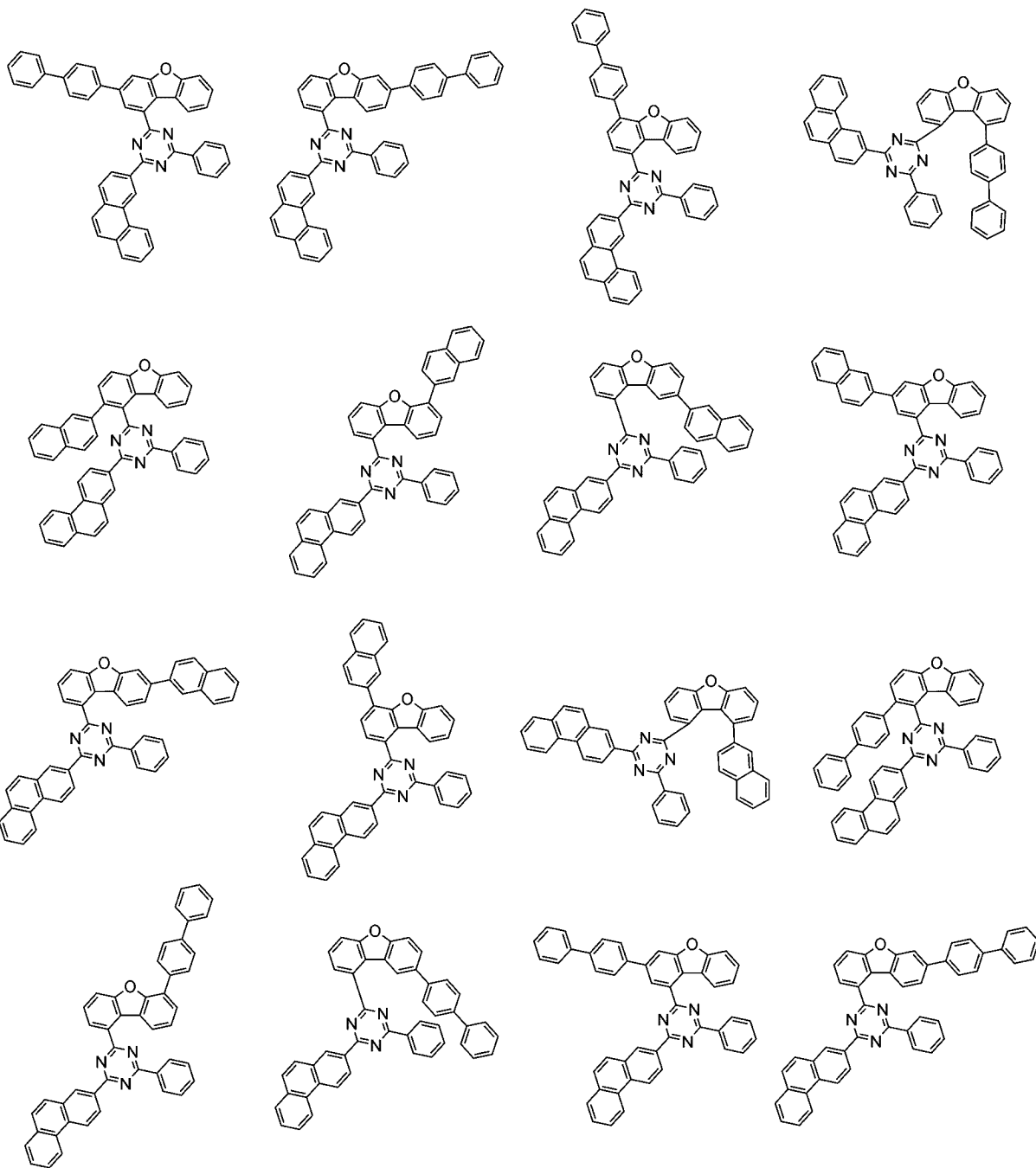
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【化 2 8】



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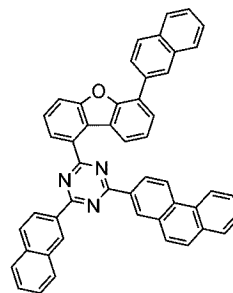
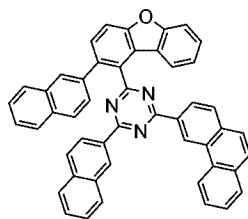
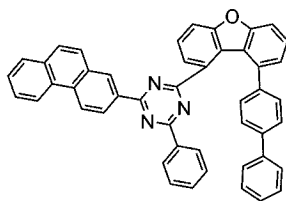
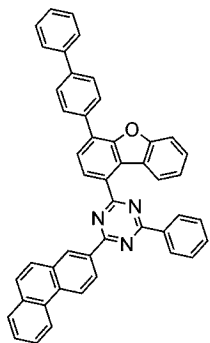
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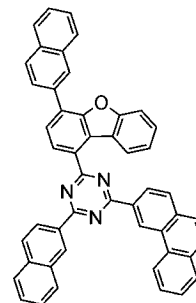
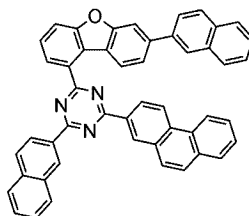
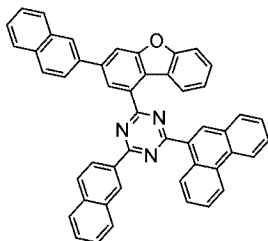
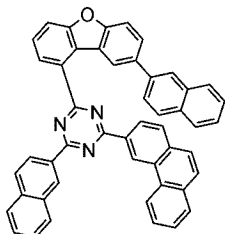
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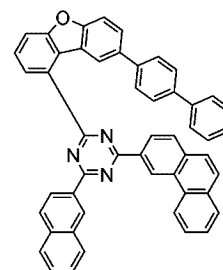
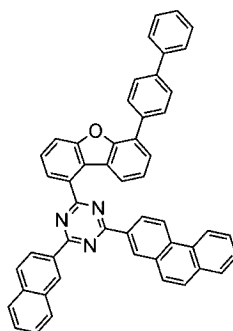
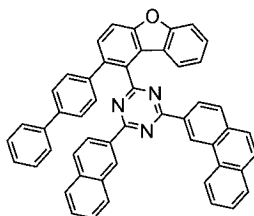
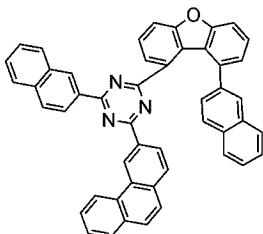
【化 2 9】



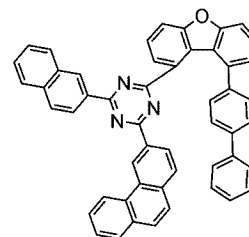
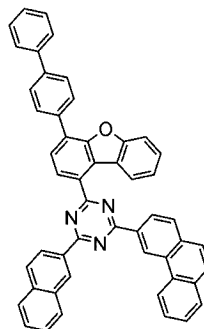
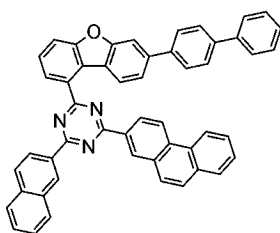
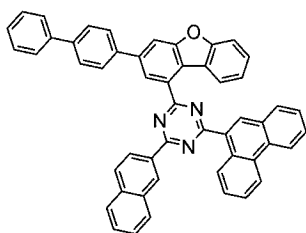
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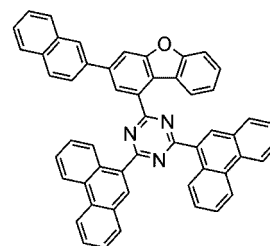
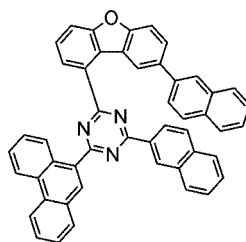
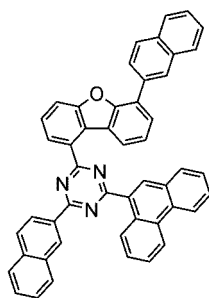
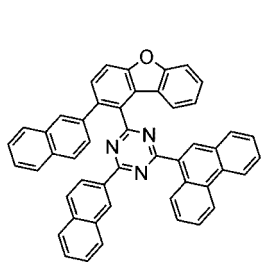
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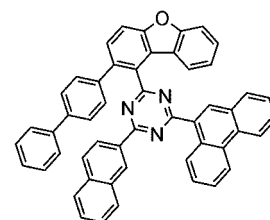
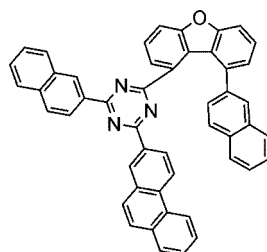
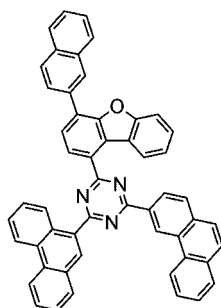
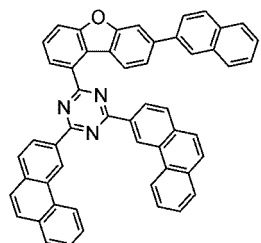
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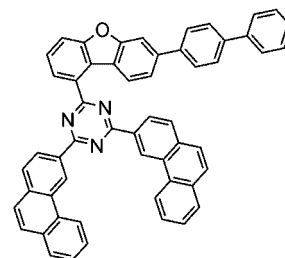
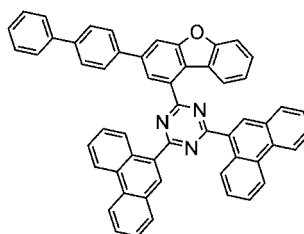
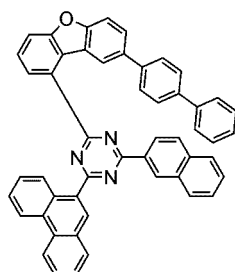
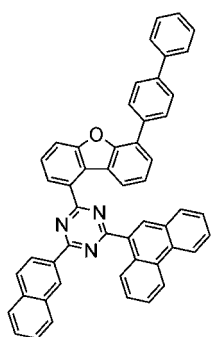
【化 3 0】



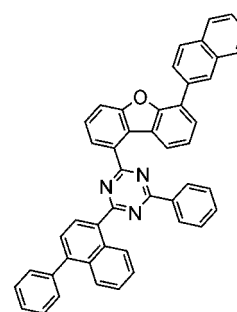
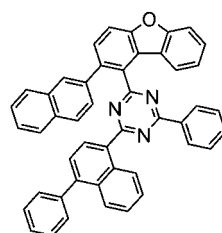
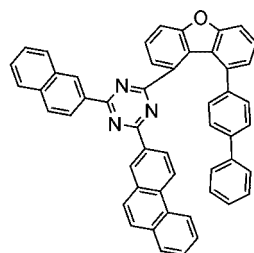
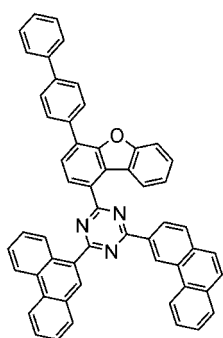
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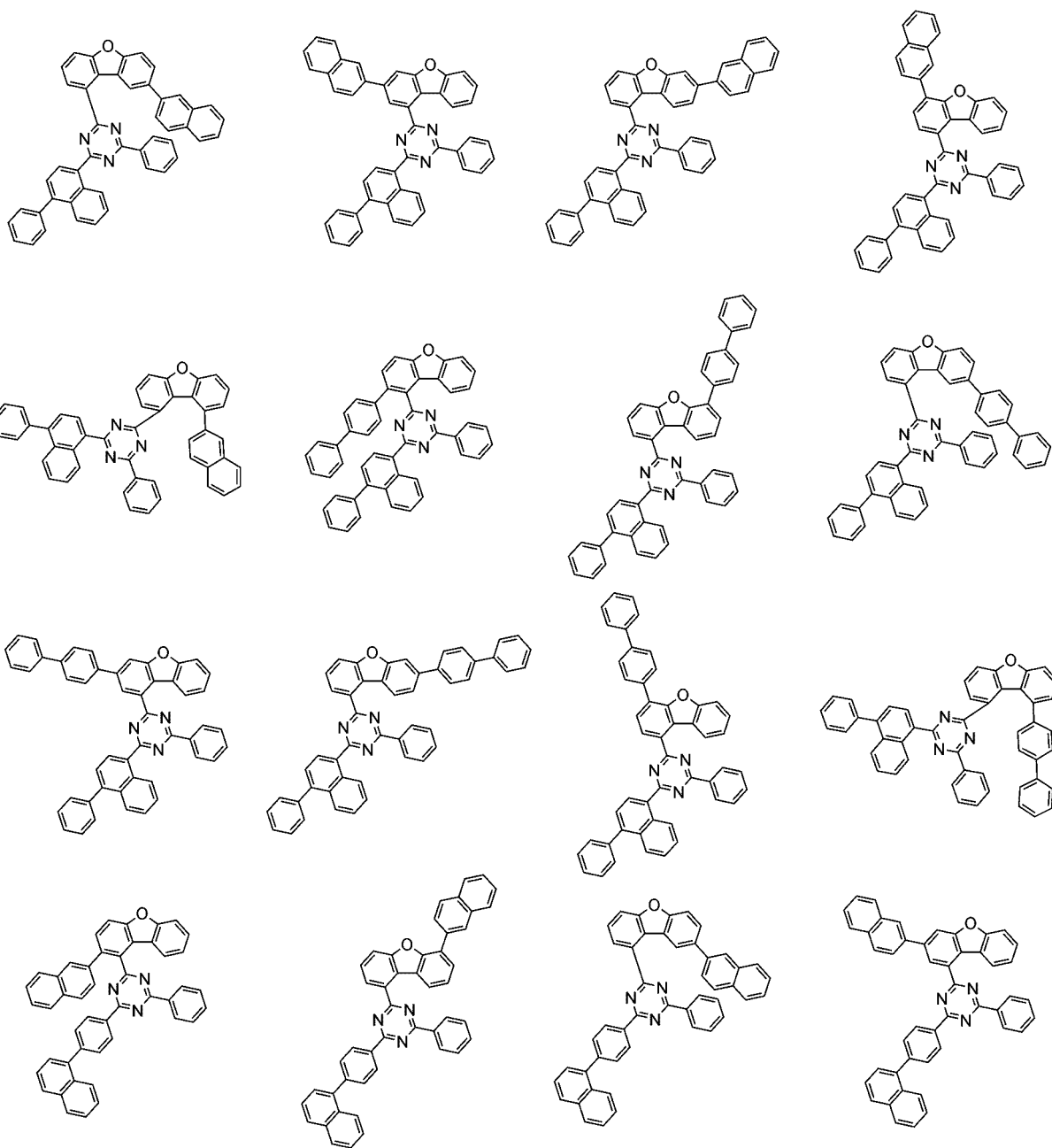
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【化 3 1】



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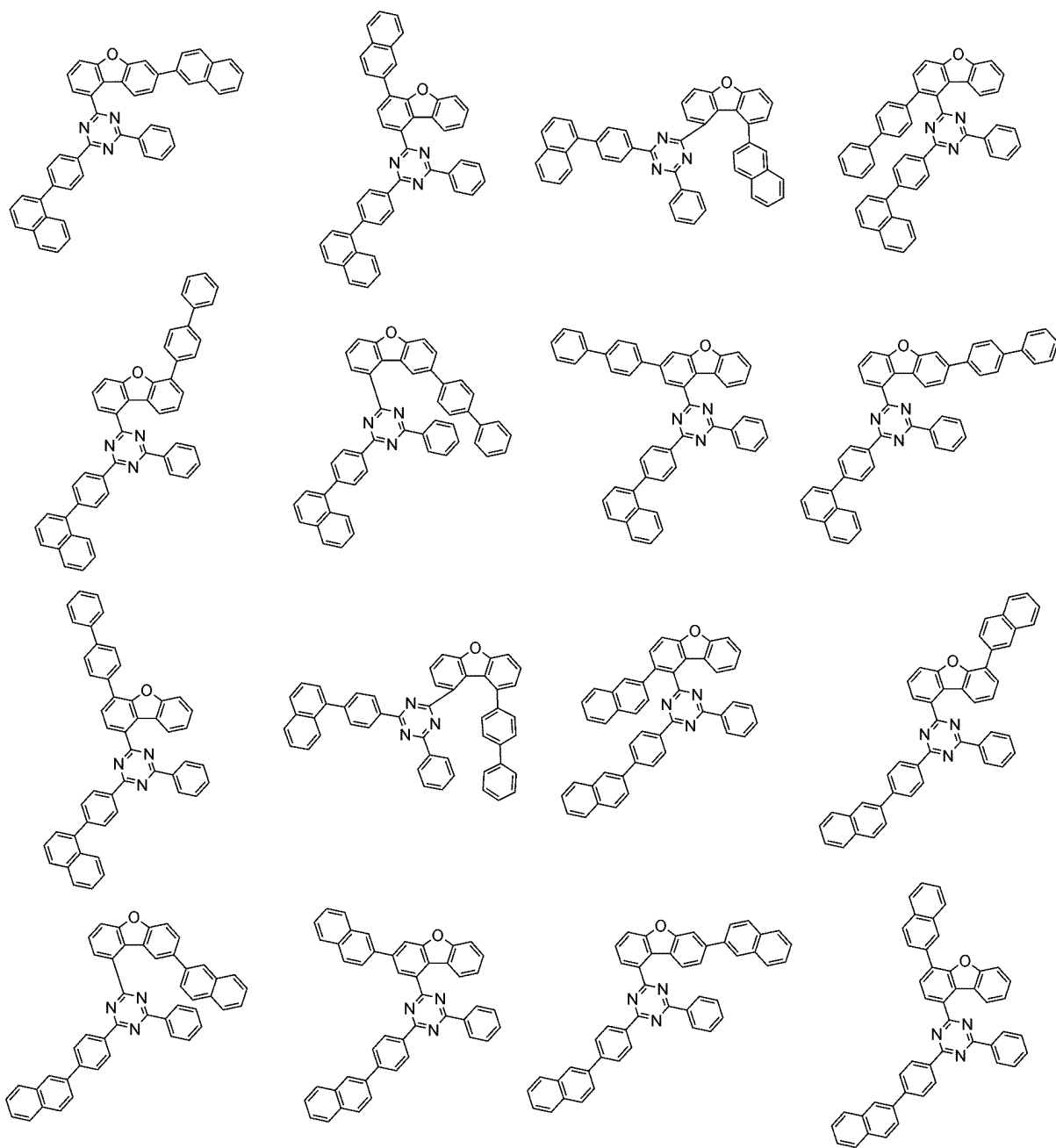
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【化 3 2】



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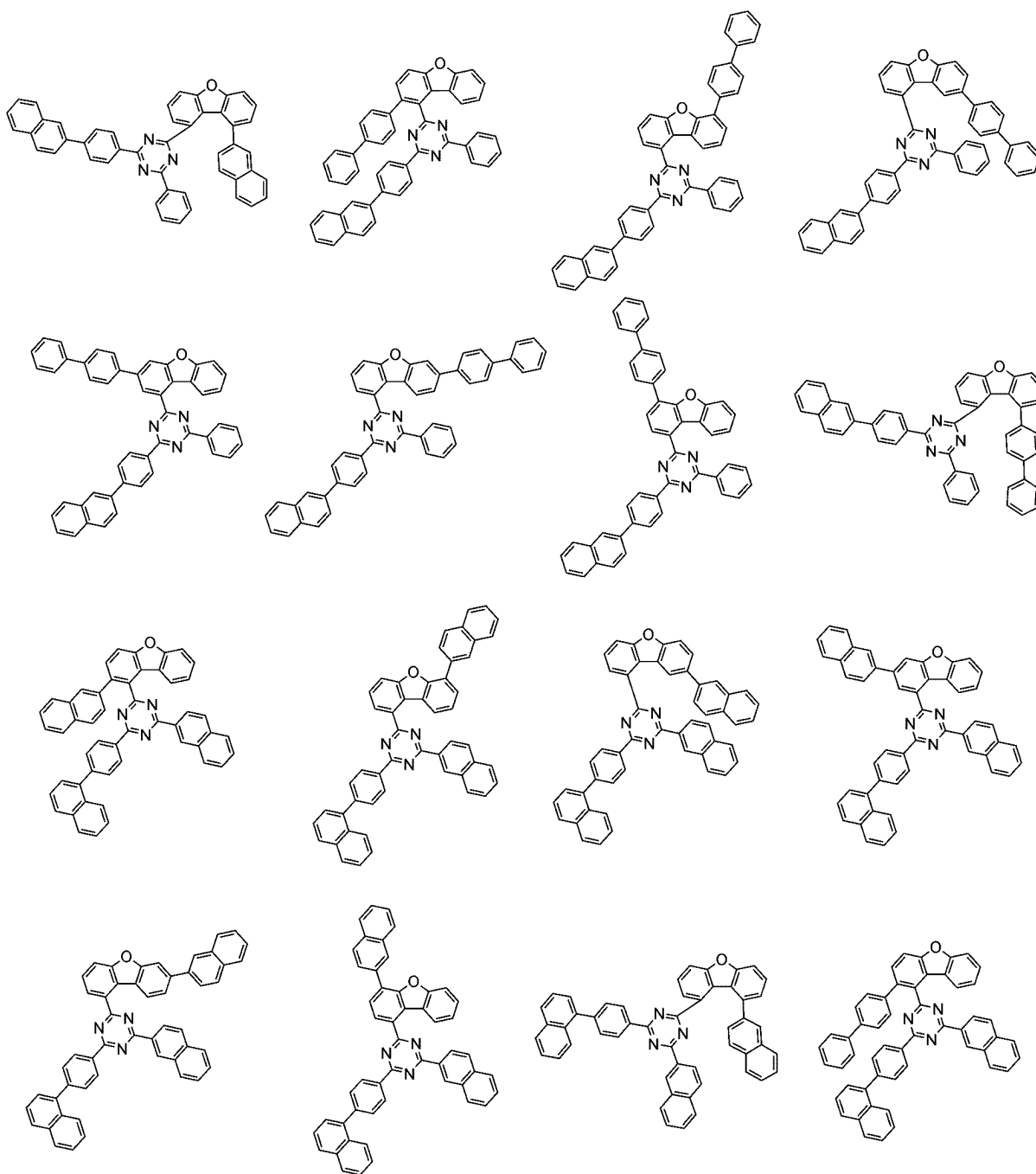
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【化 3 3】



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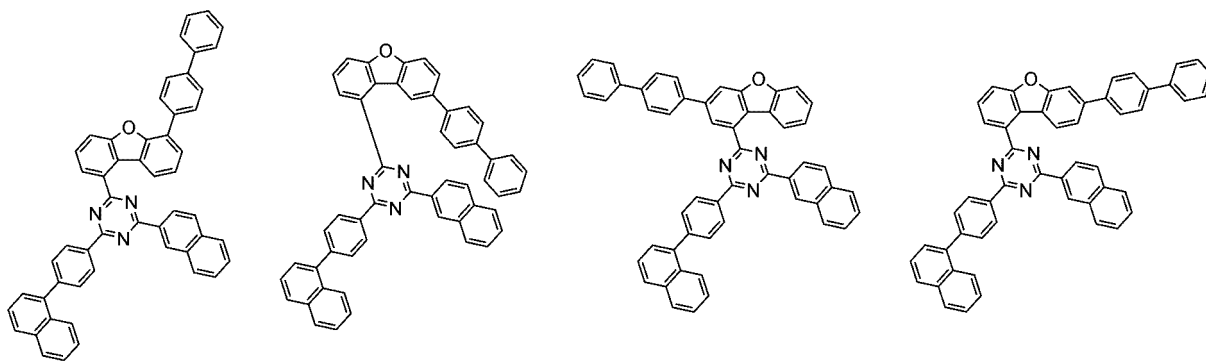
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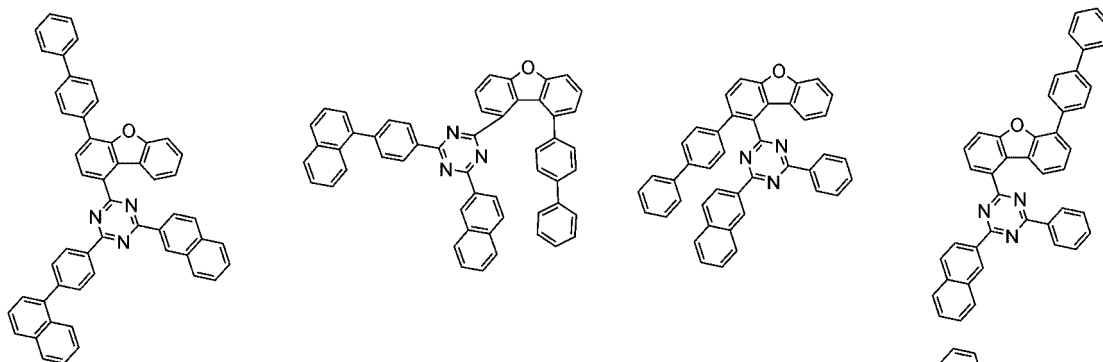
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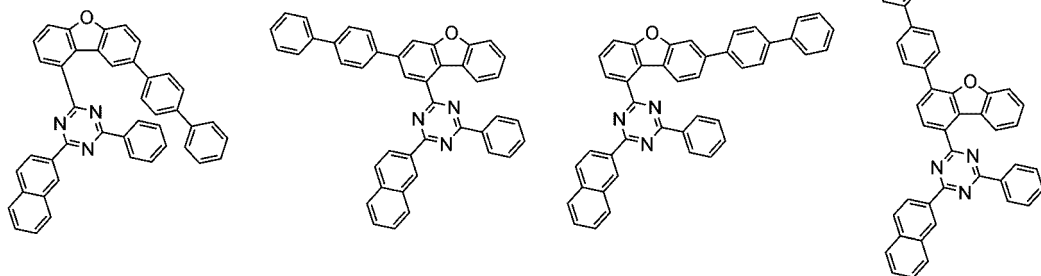
【化 3 4】



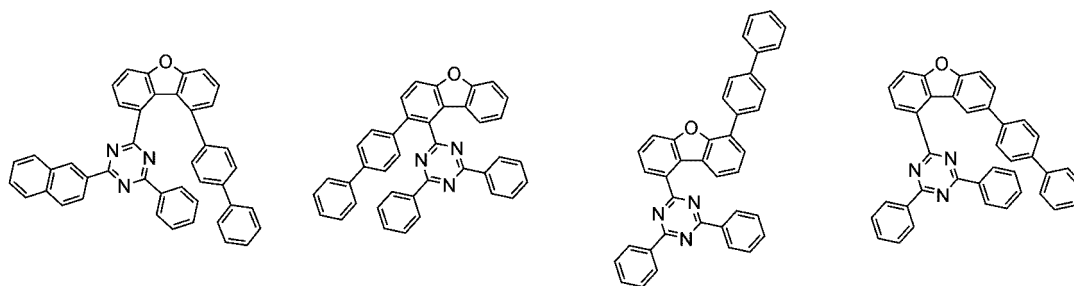
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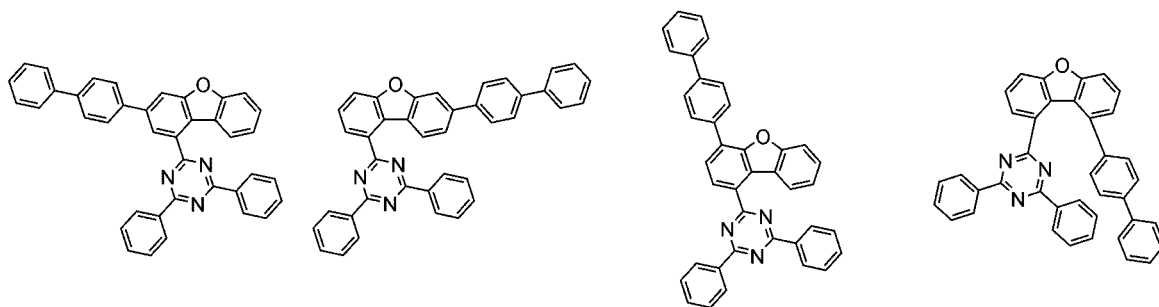
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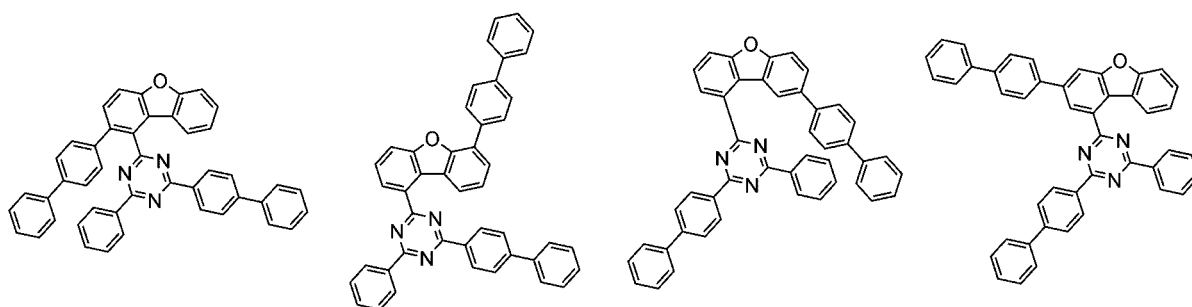
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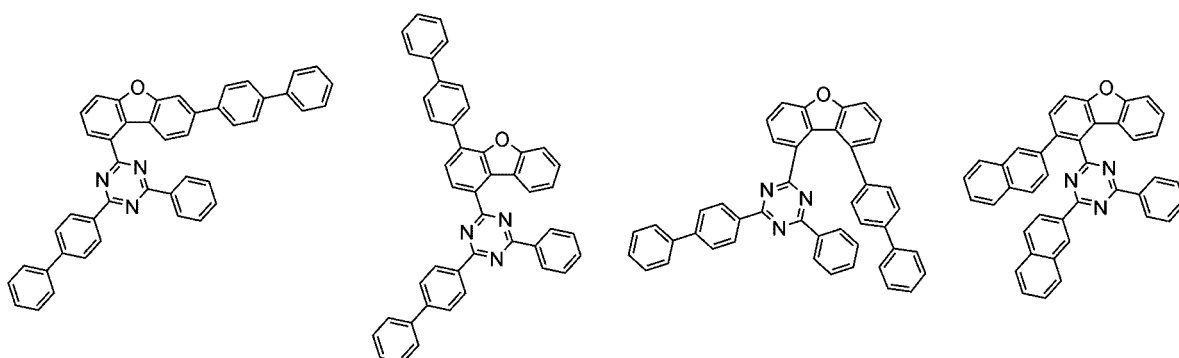
【化 3 5】



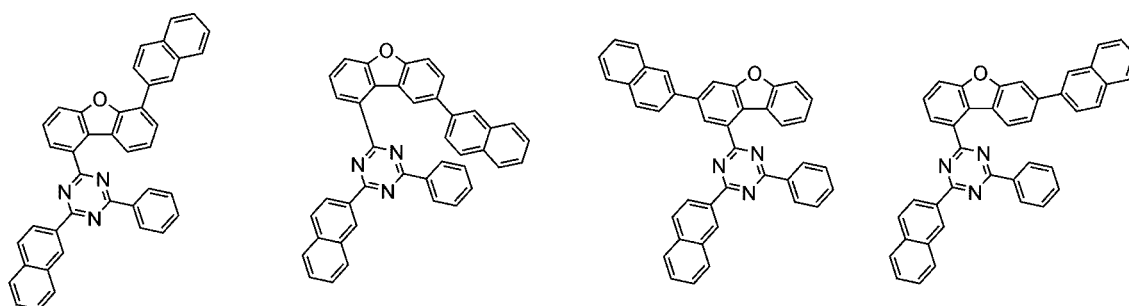
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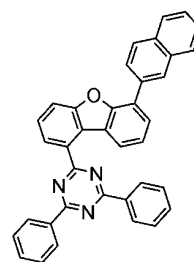
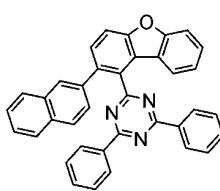
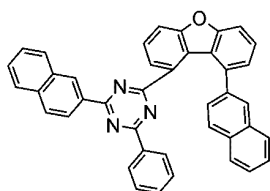
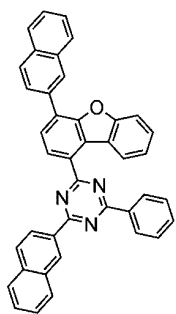
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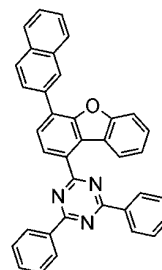
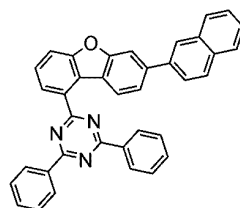
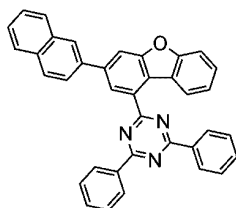
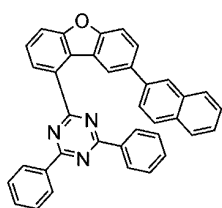
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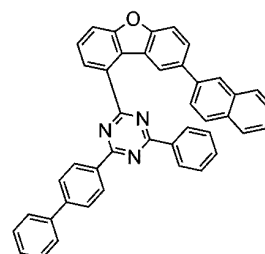
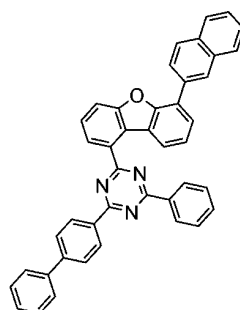
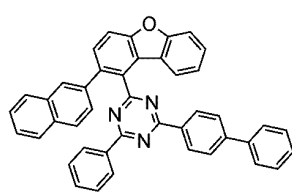
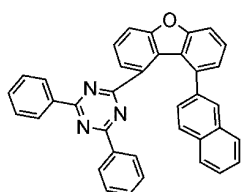
【化 3 6】



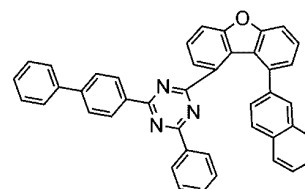
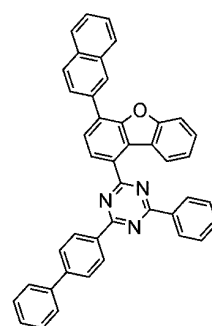
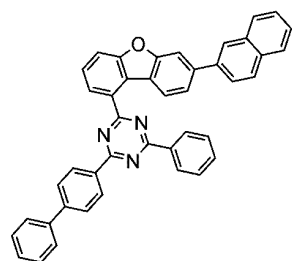
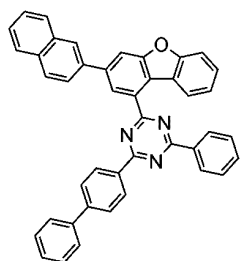
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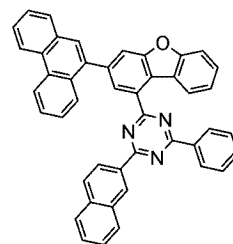
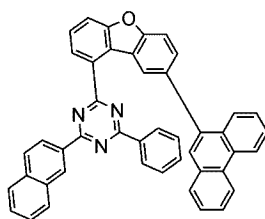
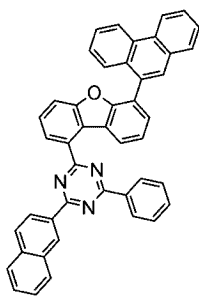
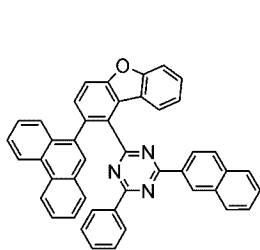
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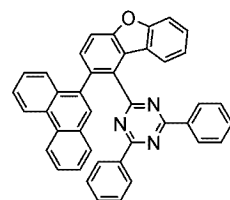
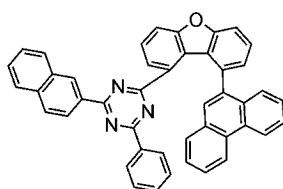
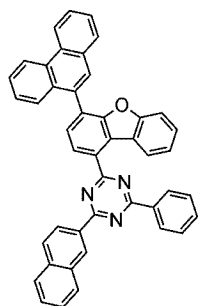
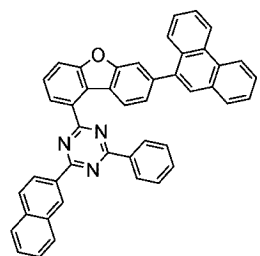
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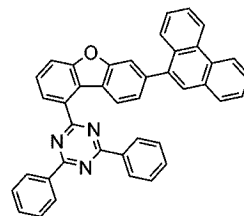
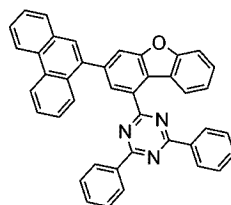
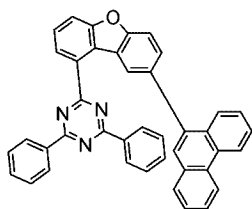
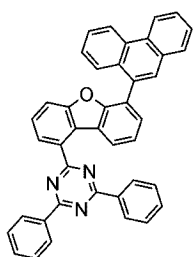
【化 3 7】



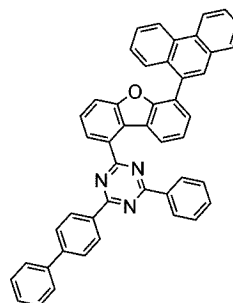
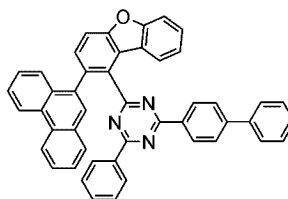
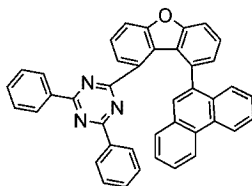
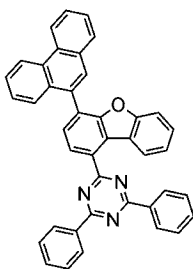
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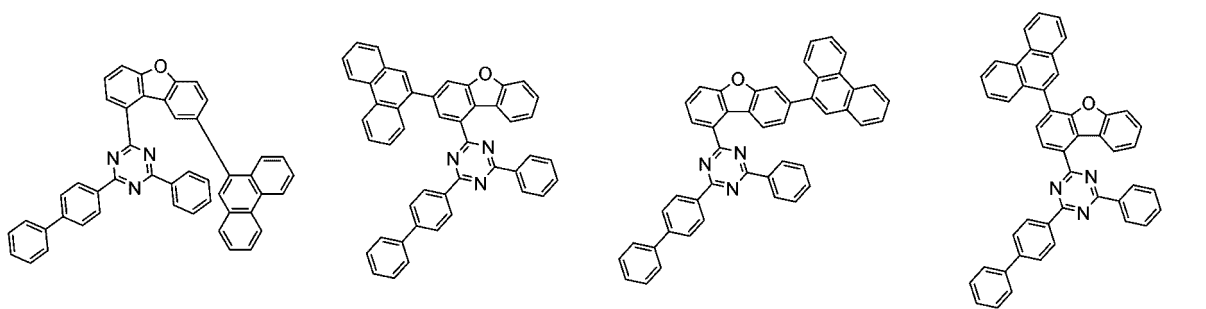
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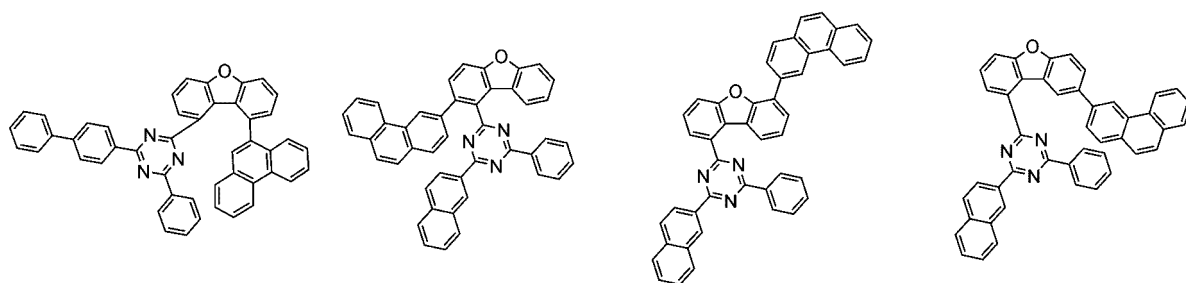
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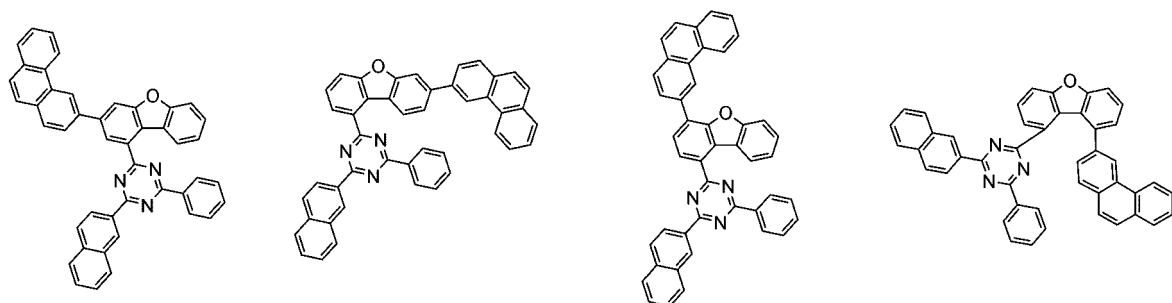
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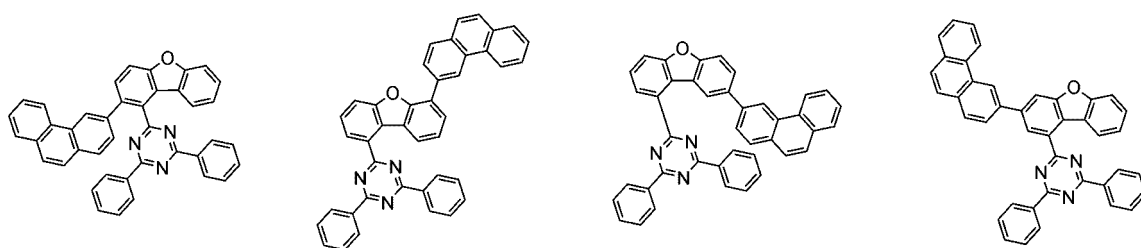
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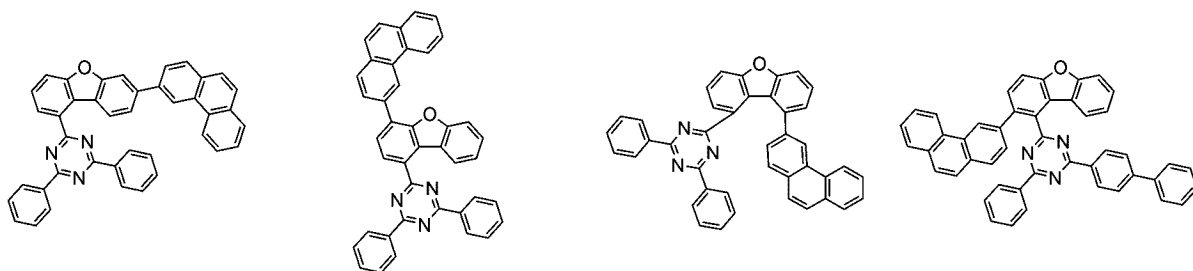
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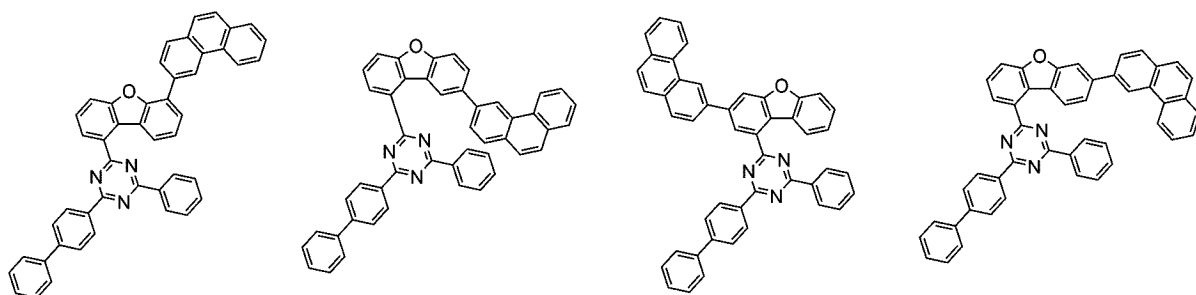
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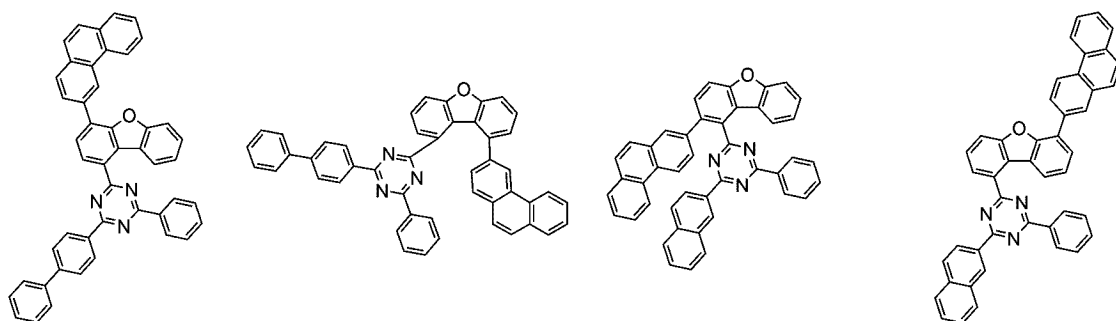
【化 3 9】



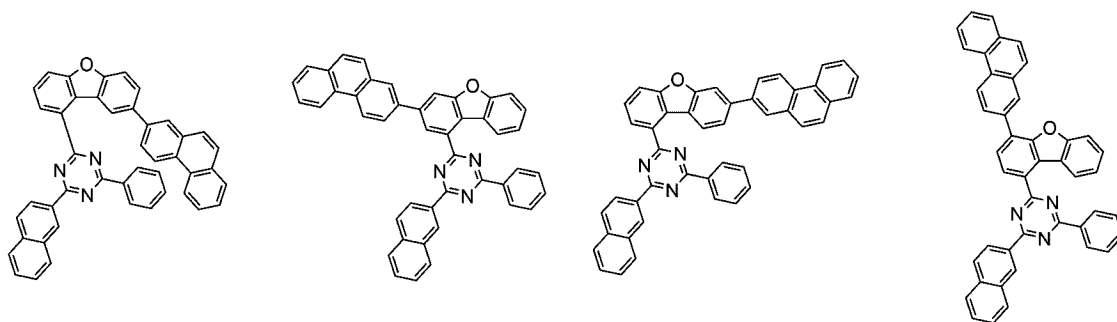
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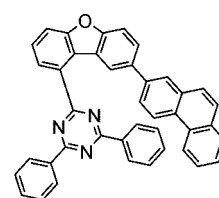
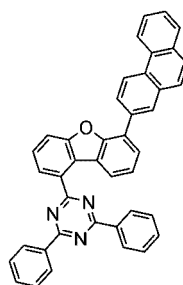
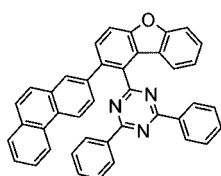
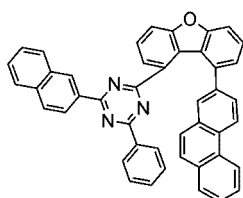
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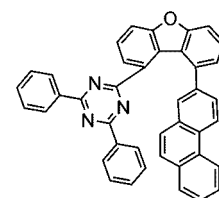
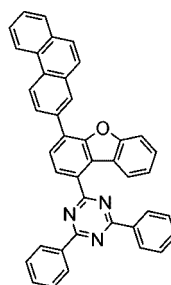
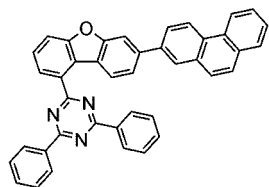
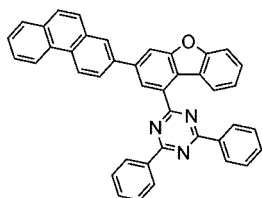
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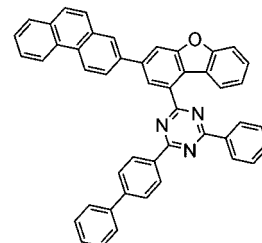
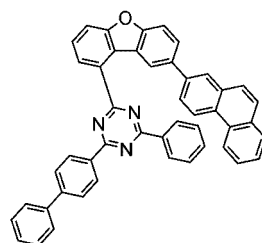
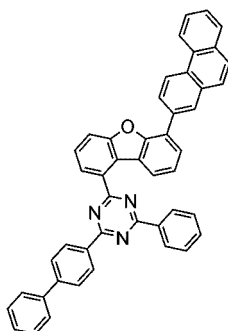
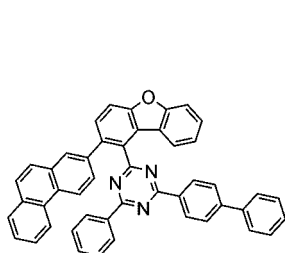
【化 4 0】



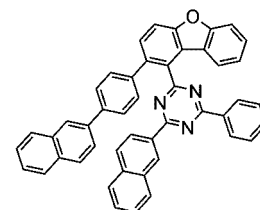
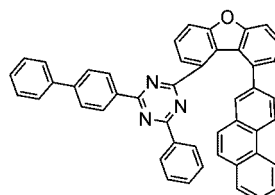
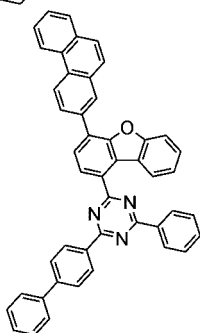
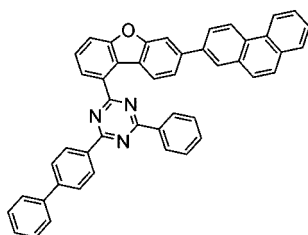
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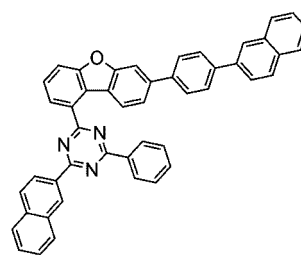
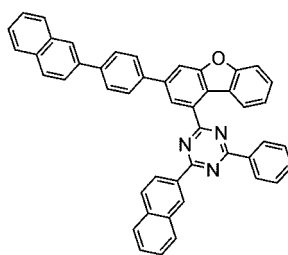
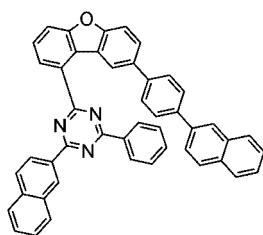
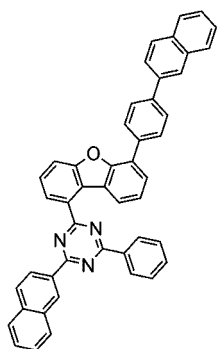
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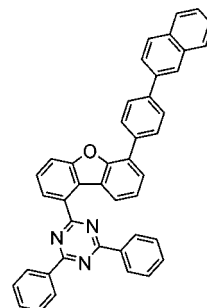
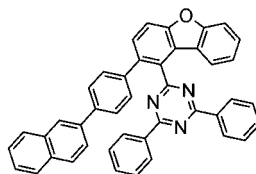
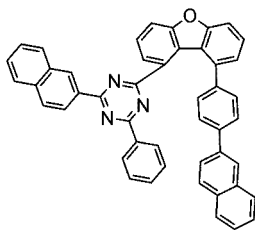
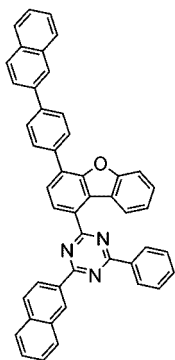
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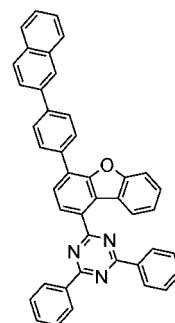
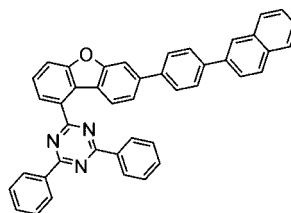
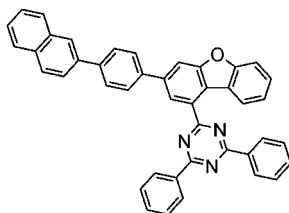
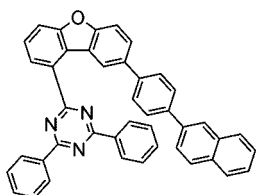
【化 4 1】



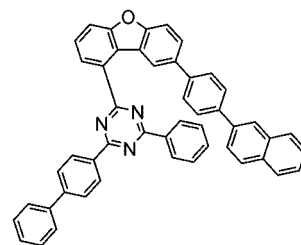
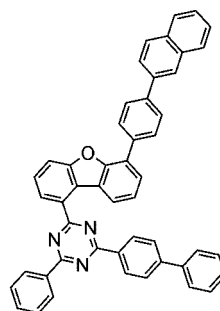
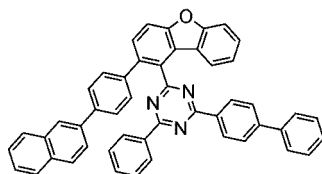
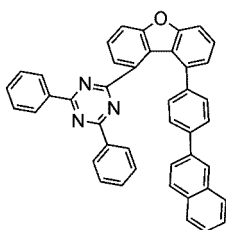
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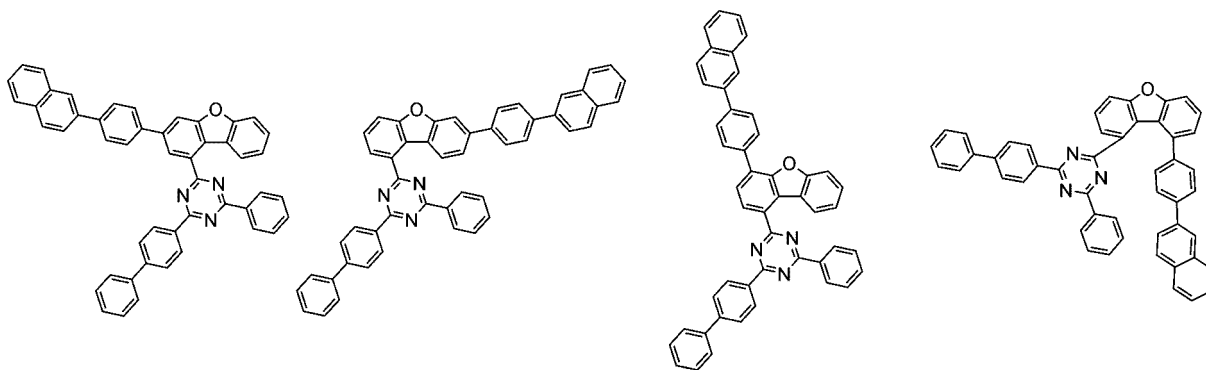
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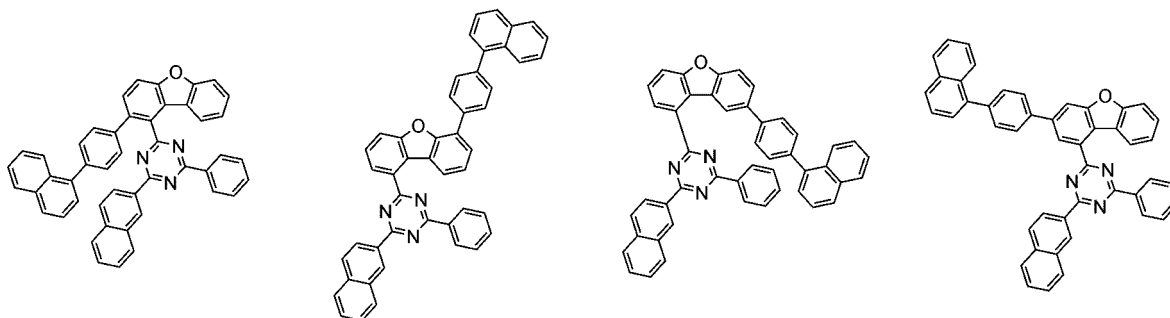
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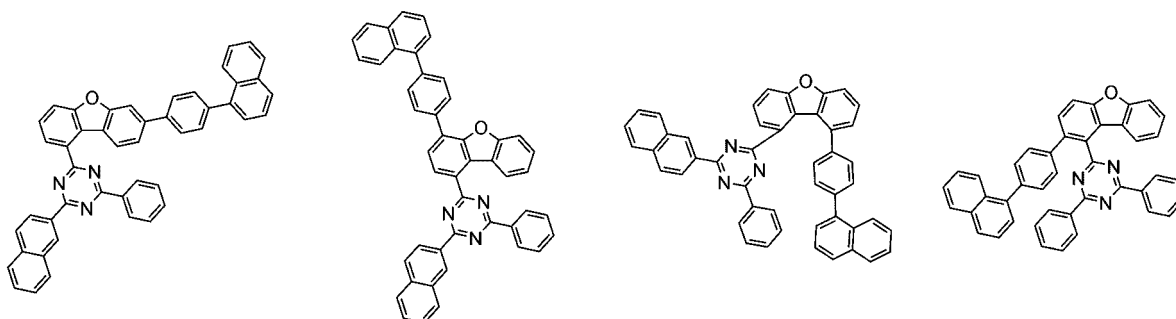
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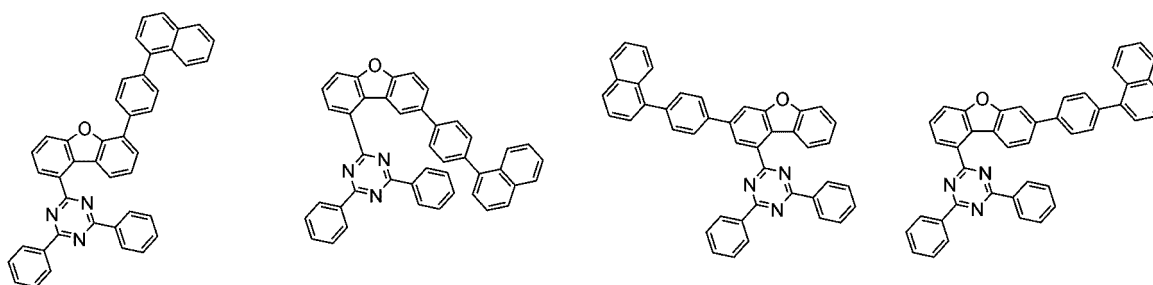
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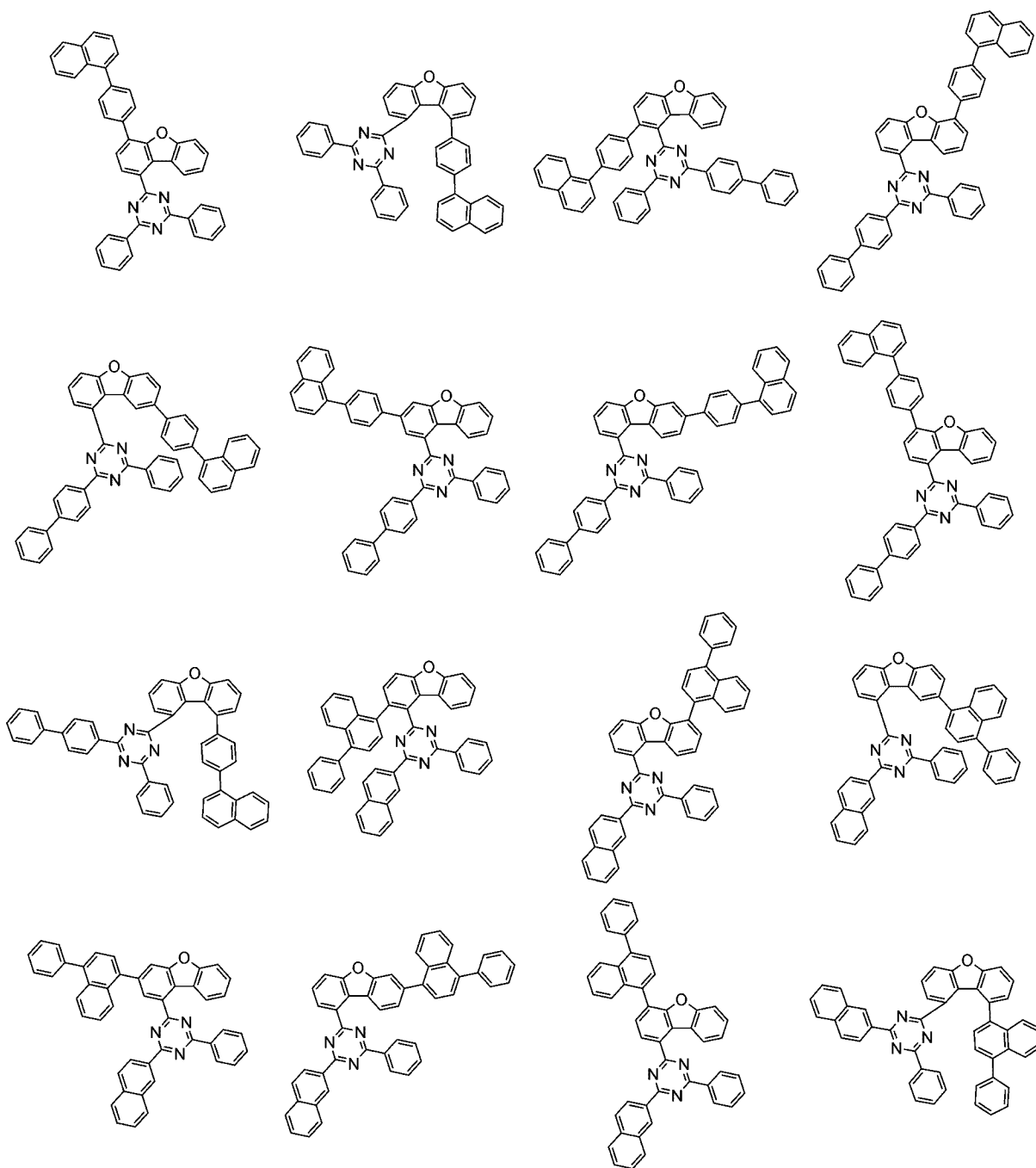
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【化 4 3】



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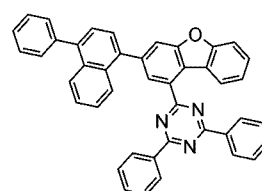
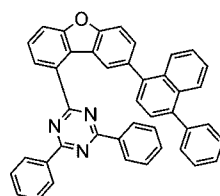
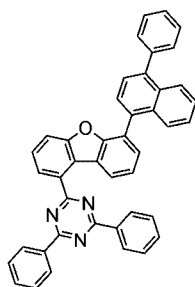
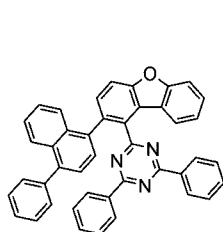
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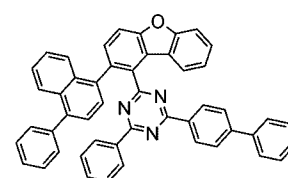
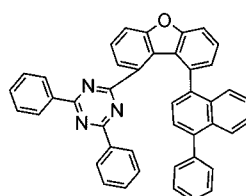
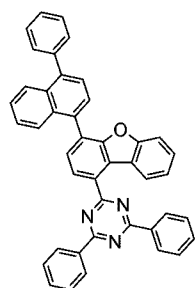
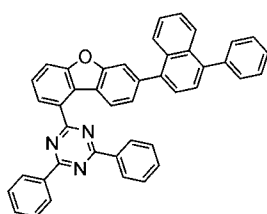
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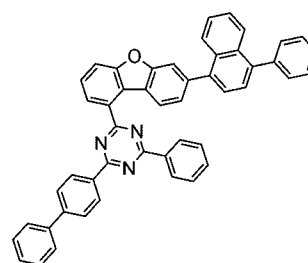
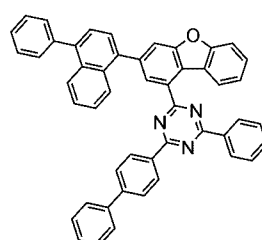
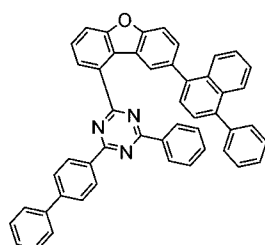
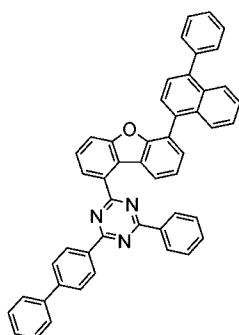
【化 4 4】



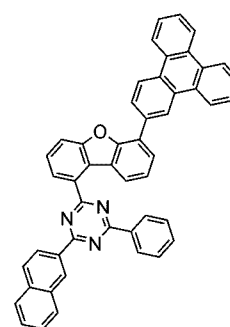
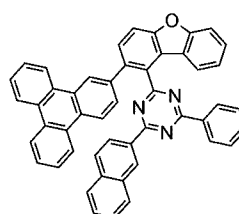
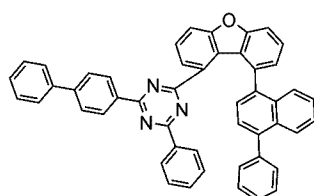
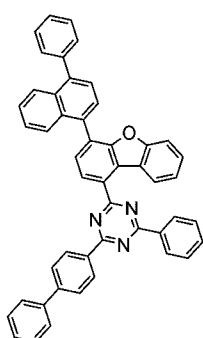
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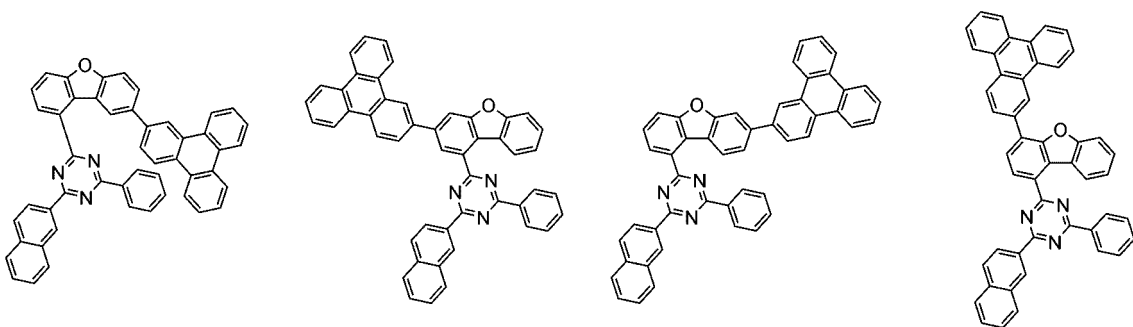
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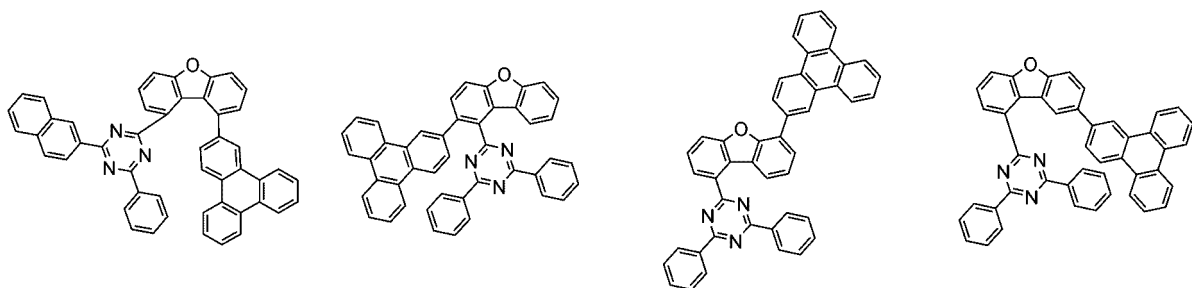
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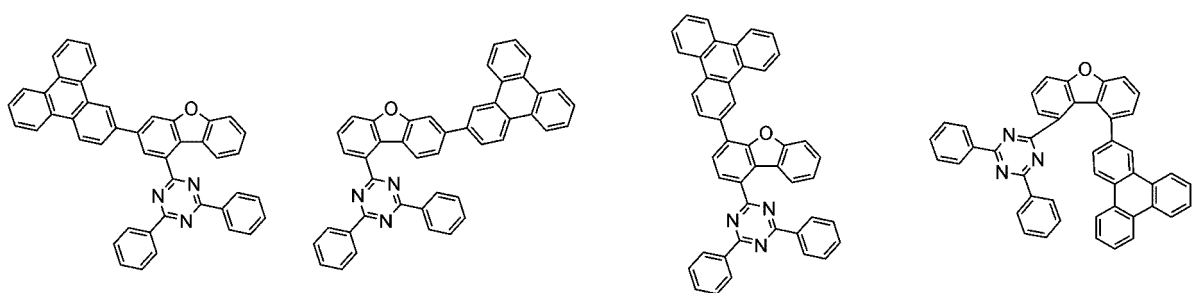
【化 4 5】



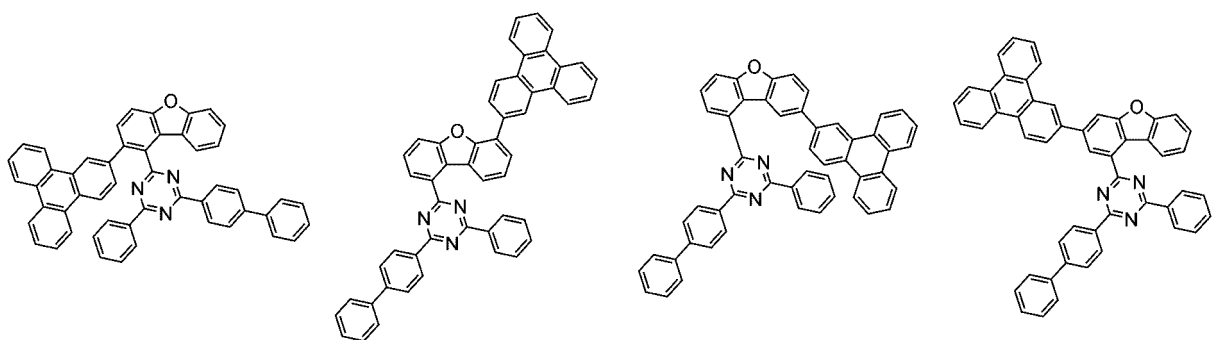
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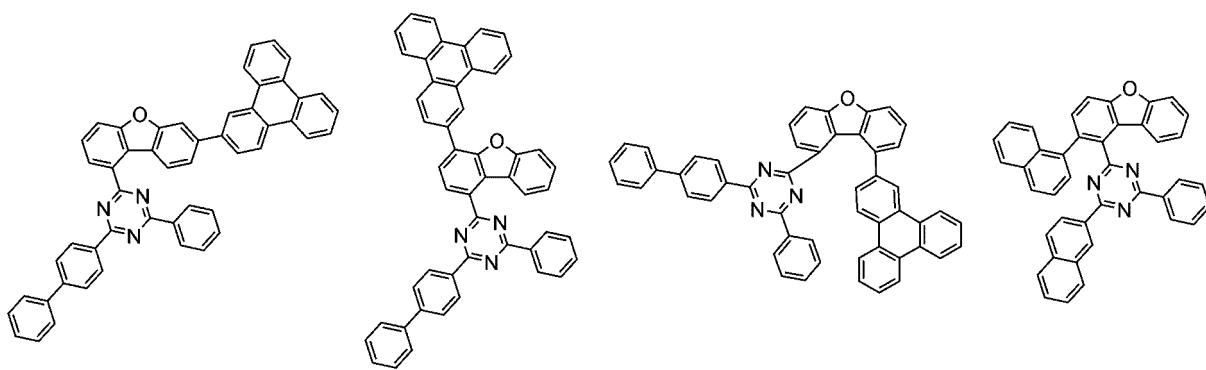
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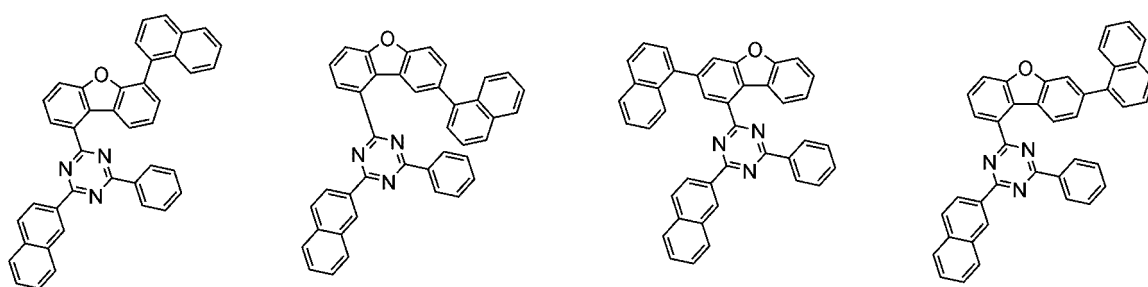
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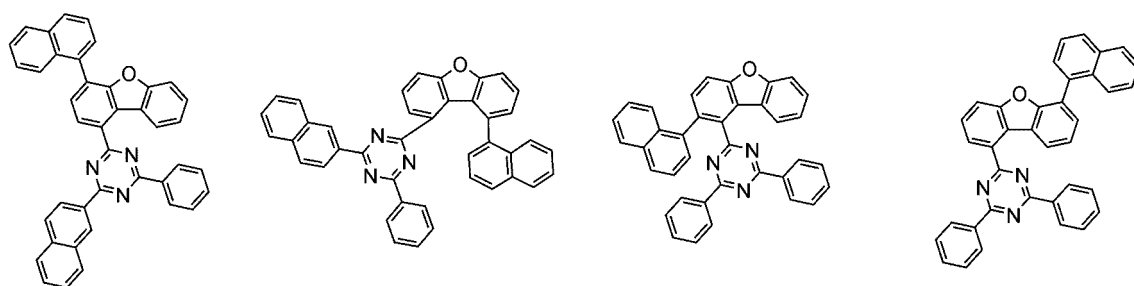
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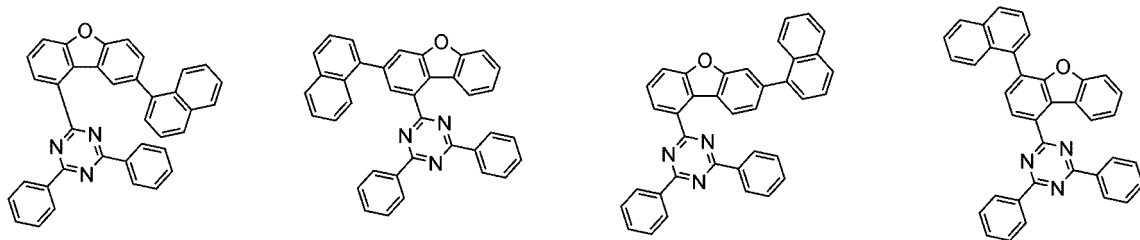
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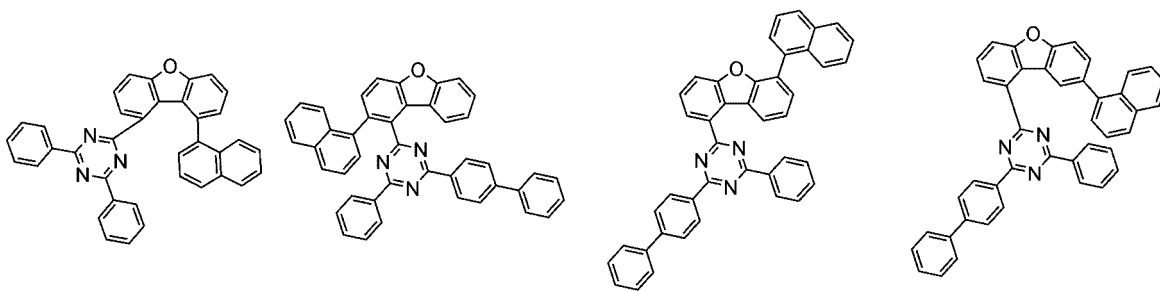
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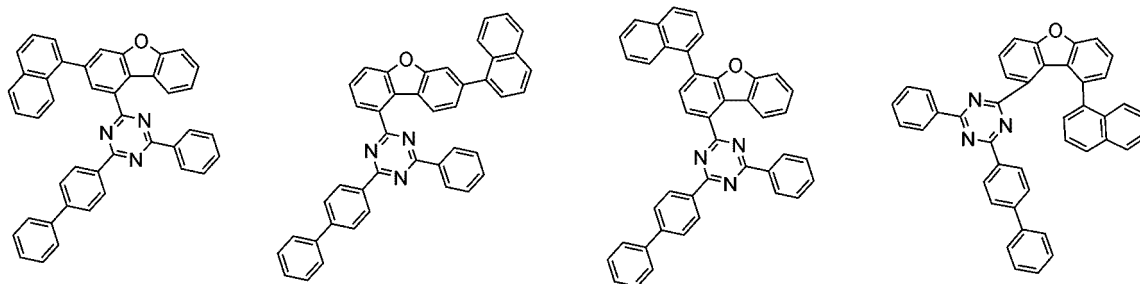
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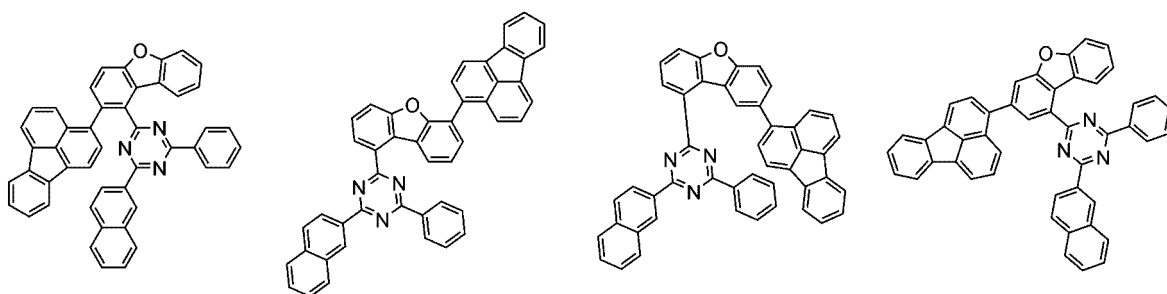
【化 4 7】



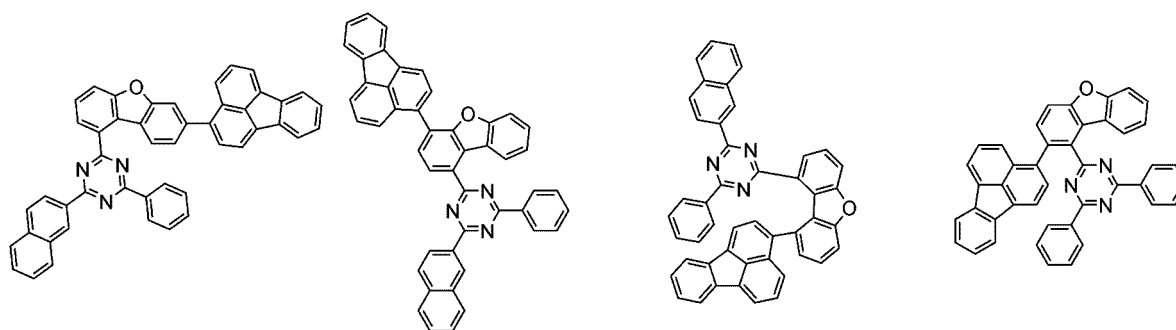
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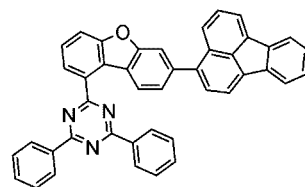
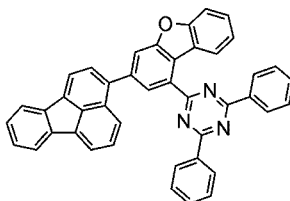
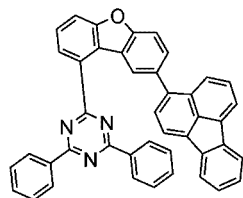
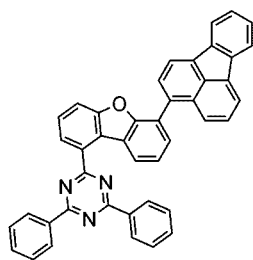
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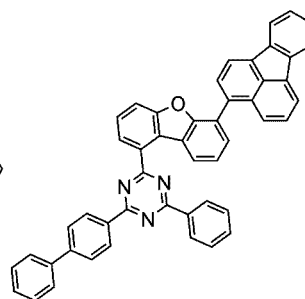
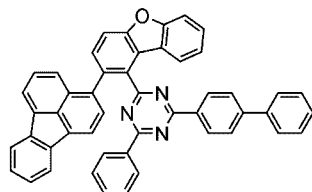
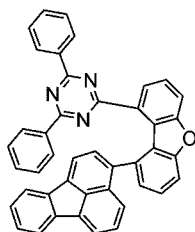
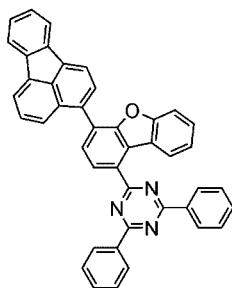
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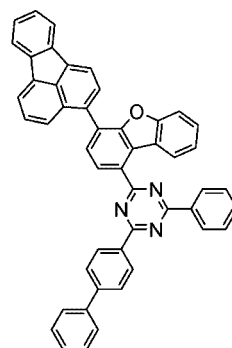
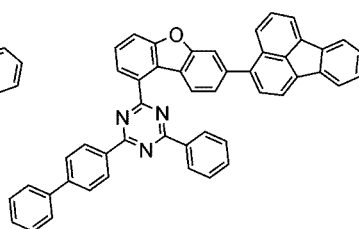
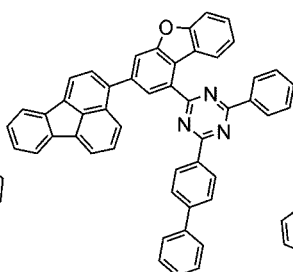
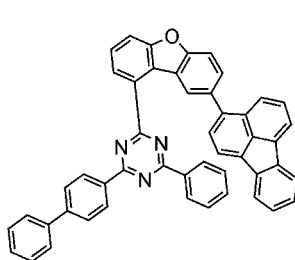
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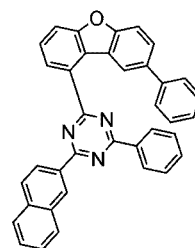
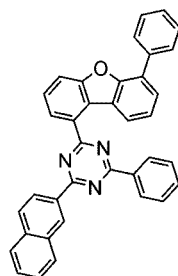
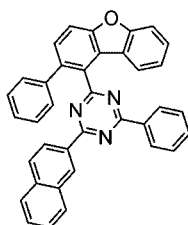
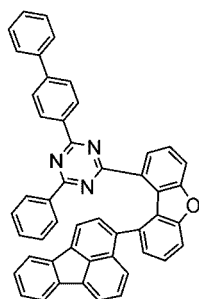
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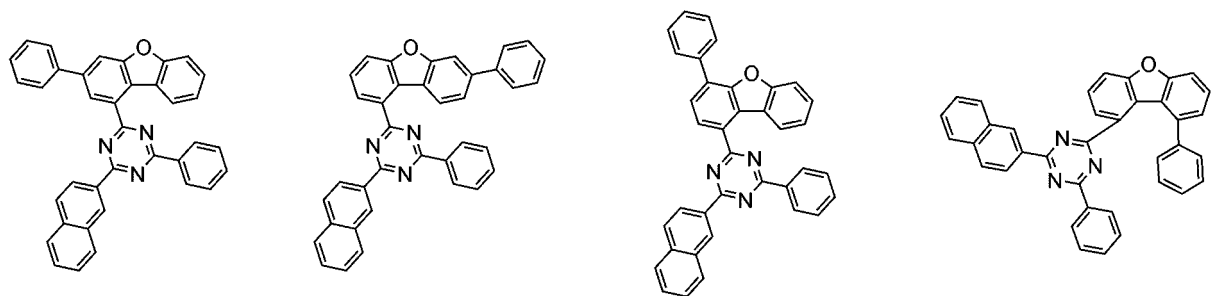
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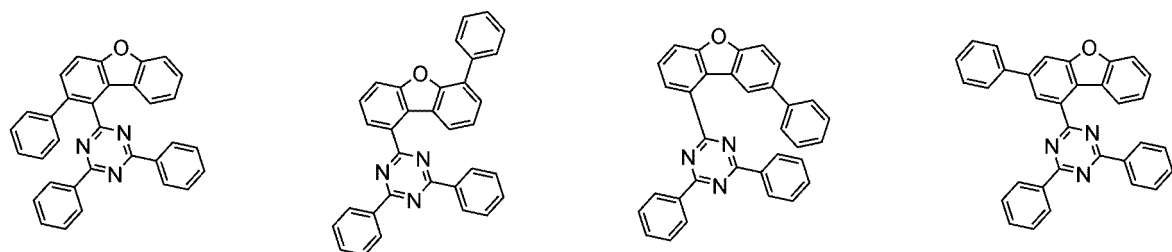
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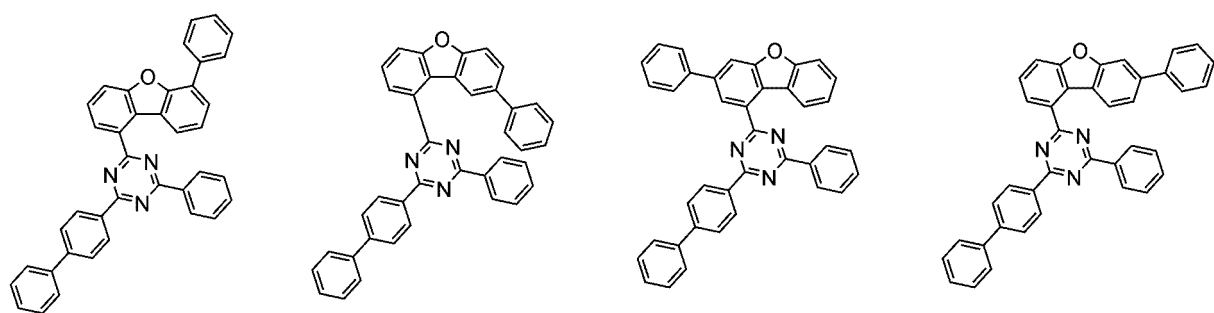
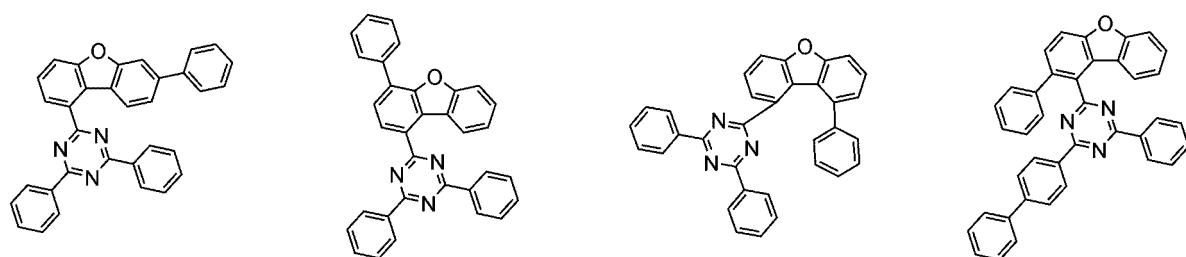
【化 4 9】



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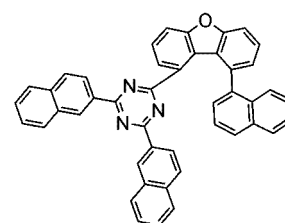
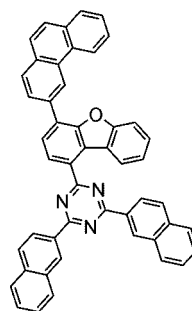
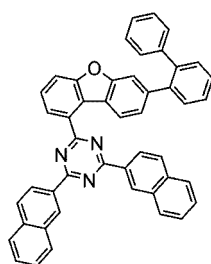
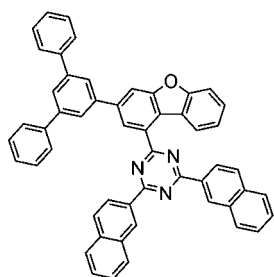
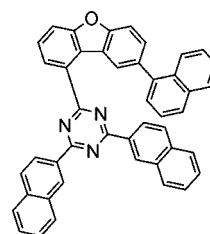
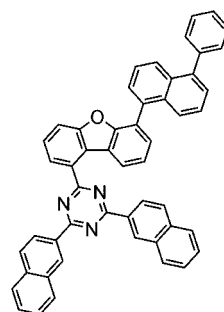
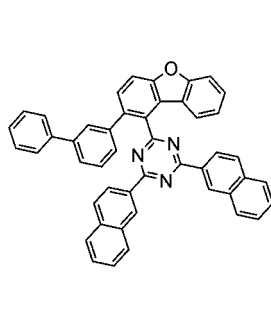
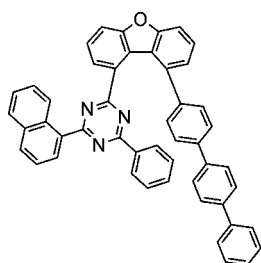
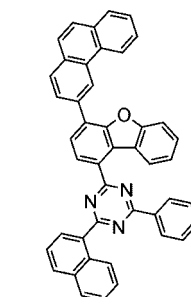
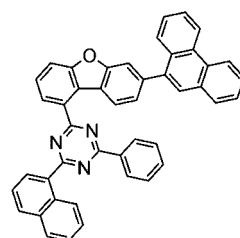
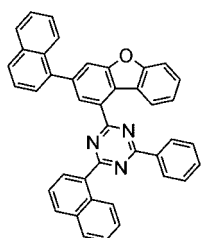
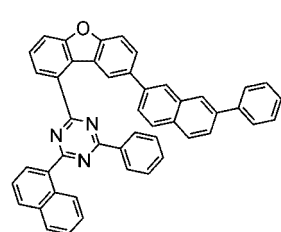
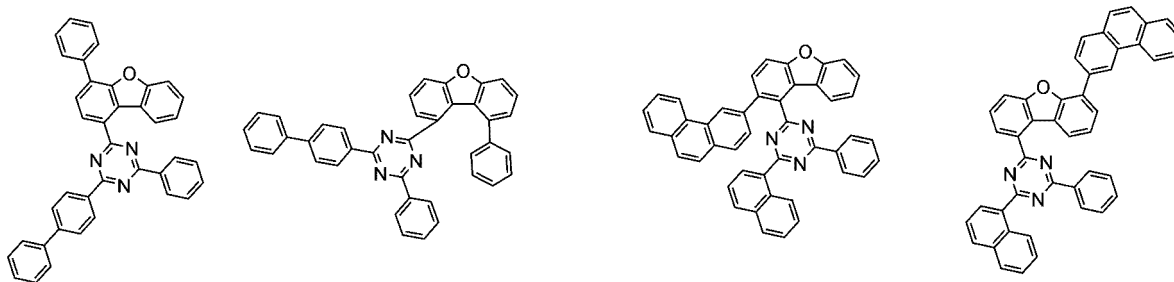


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【化 50】



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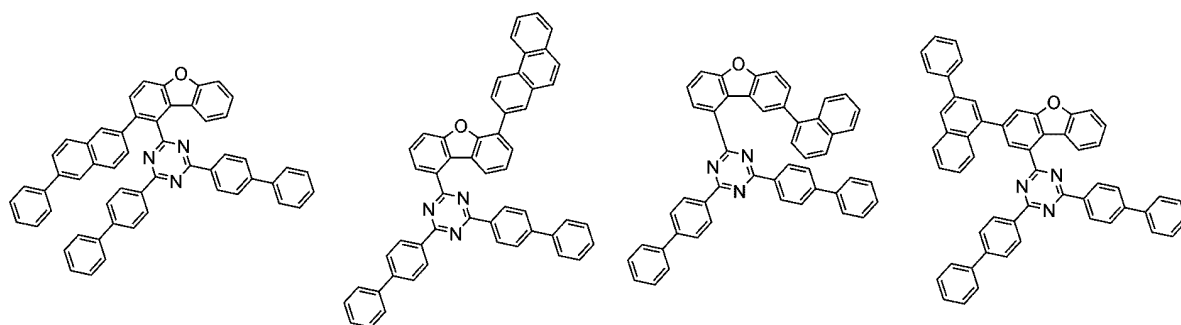
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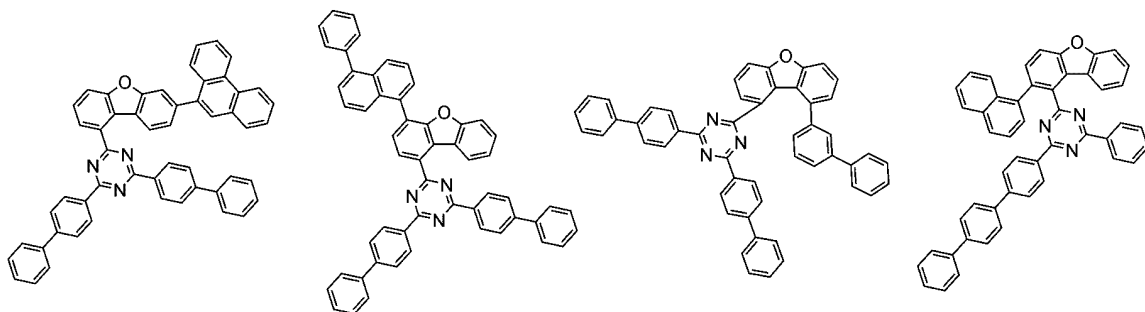
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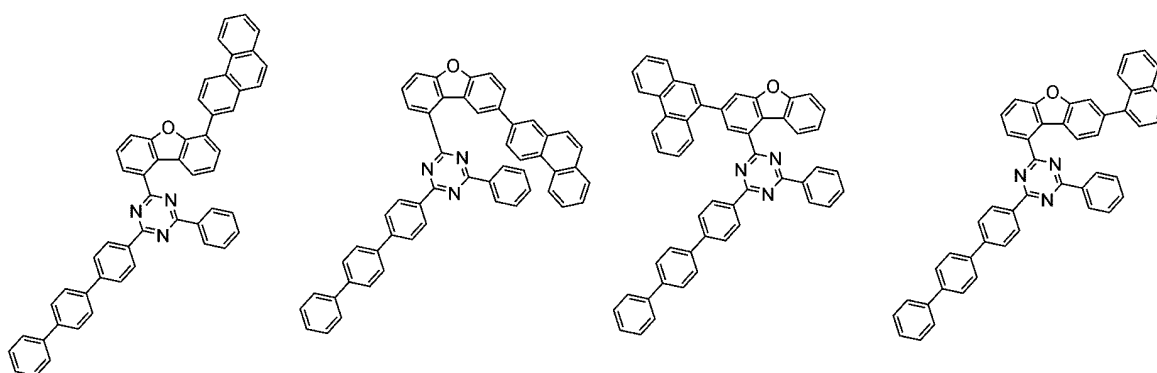
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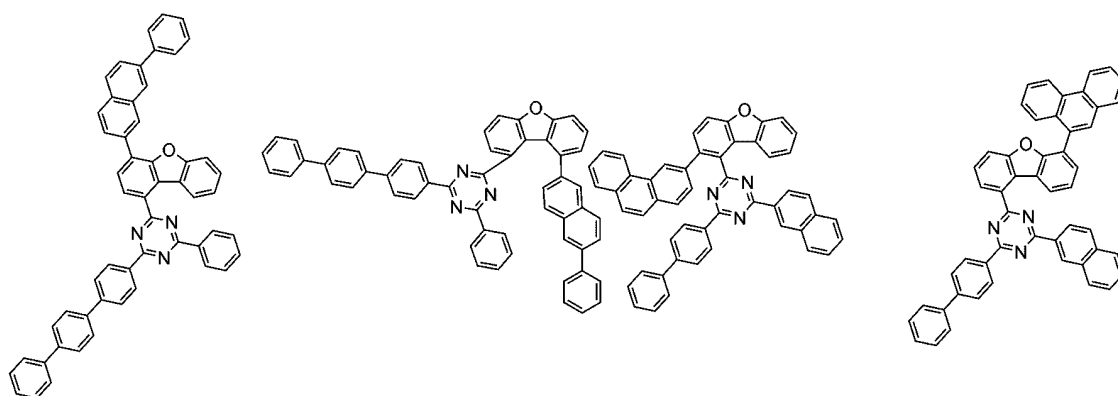
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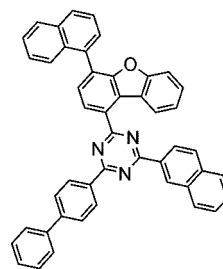
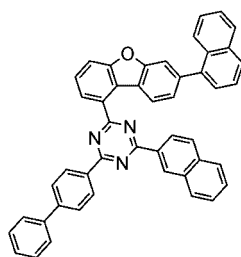
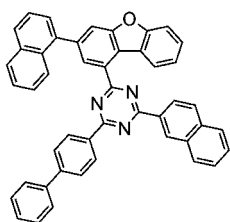
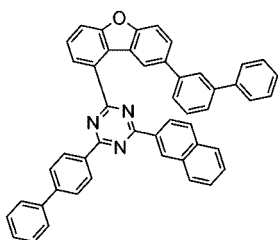
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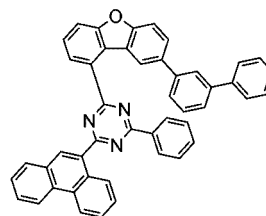
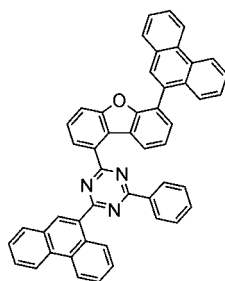
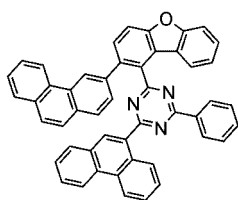
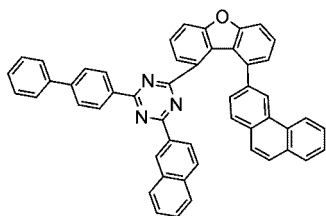
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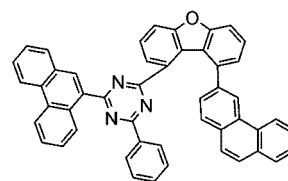
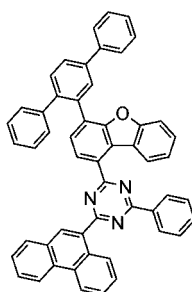
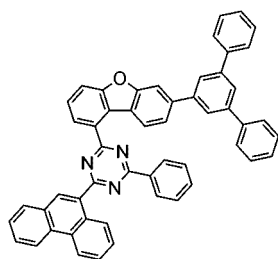
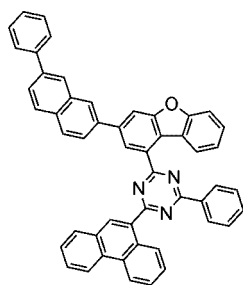
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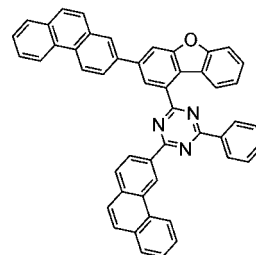
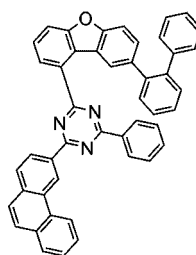
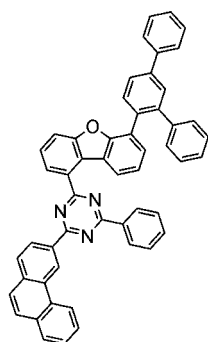
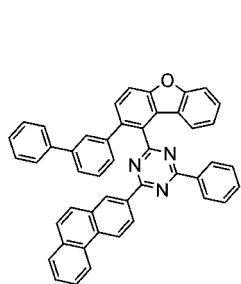
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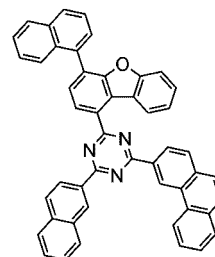
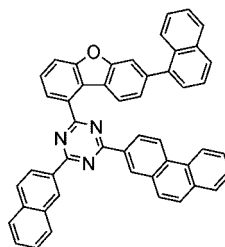
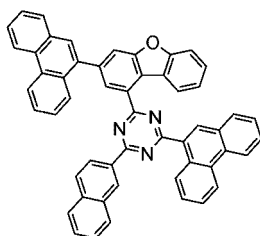
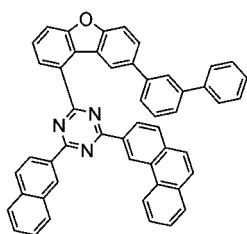
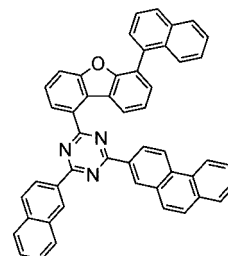
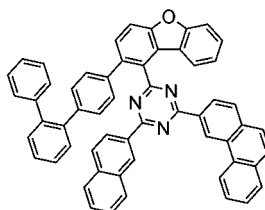
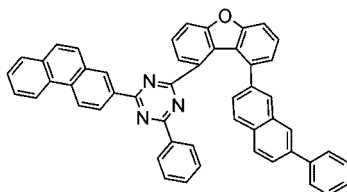
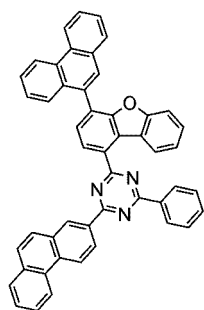
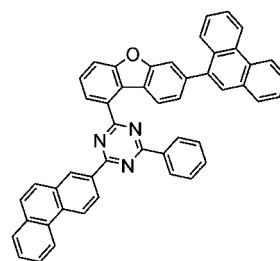
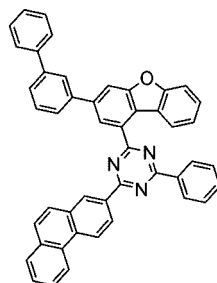
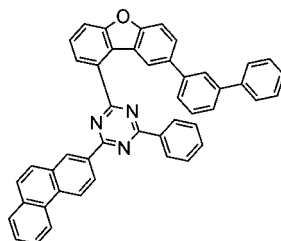
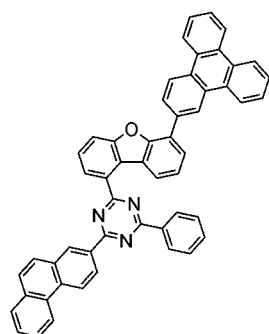
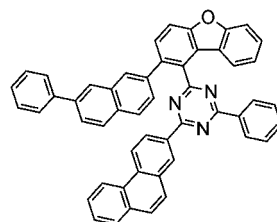
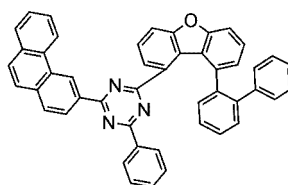
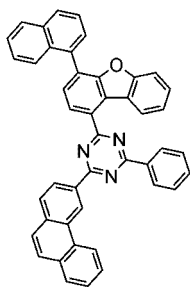
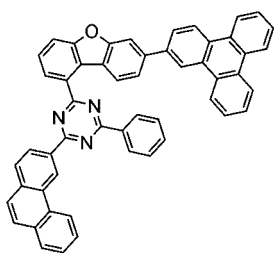
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【化 5 3】



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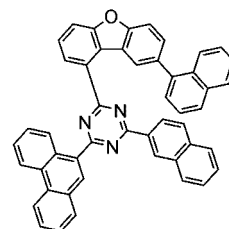
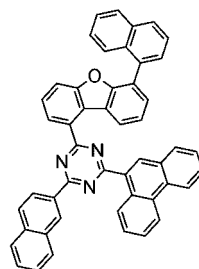
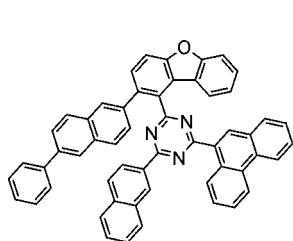
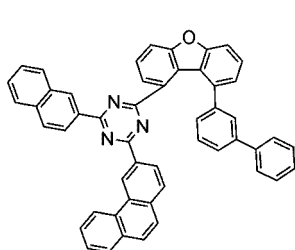
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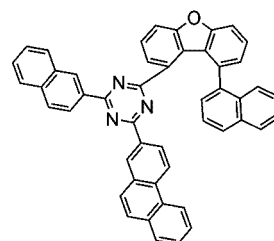
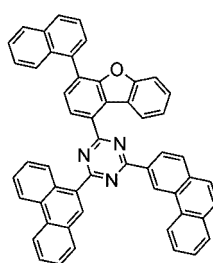
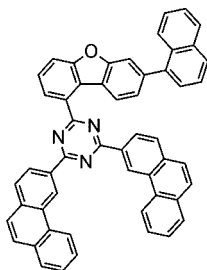
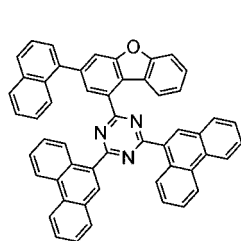
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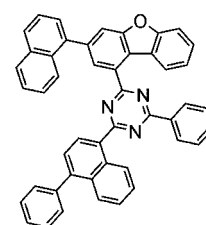
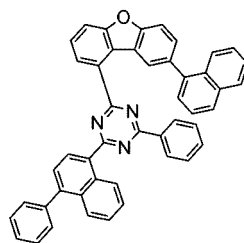
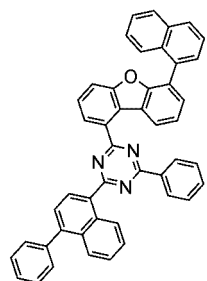
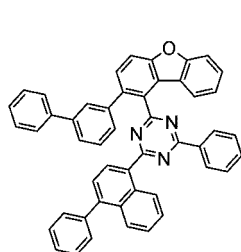
【化 5 4】



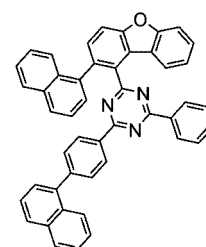
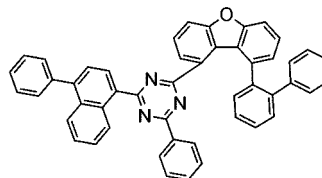
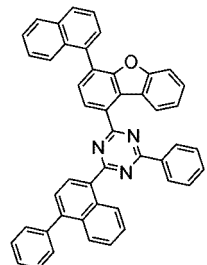
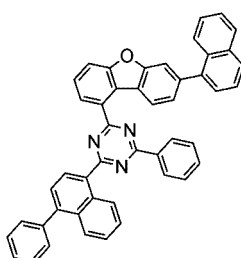
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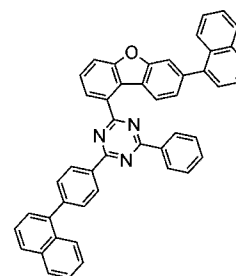
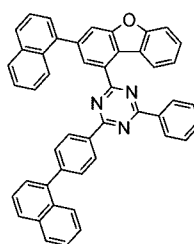
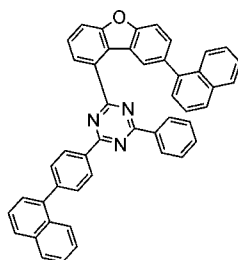
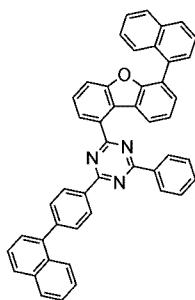
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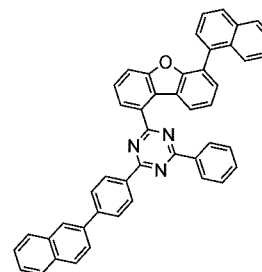
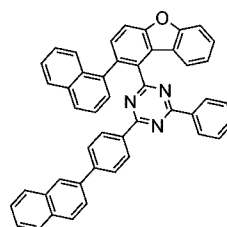
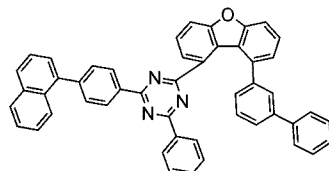
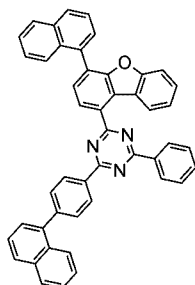
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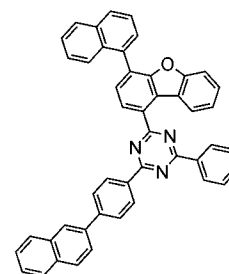
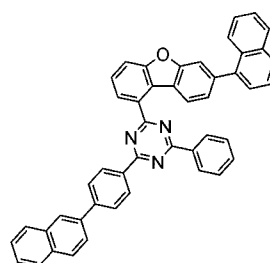
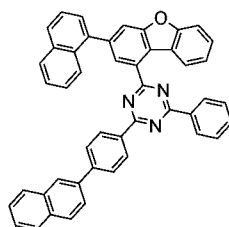
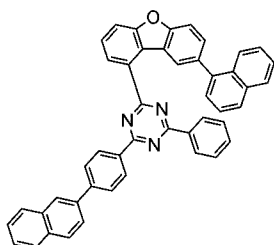
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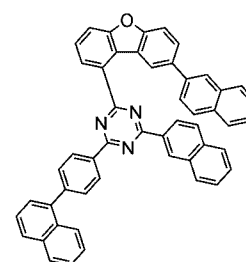
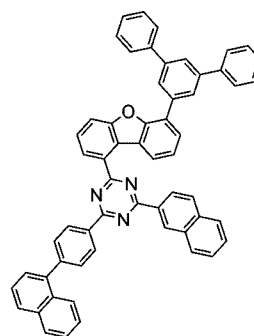
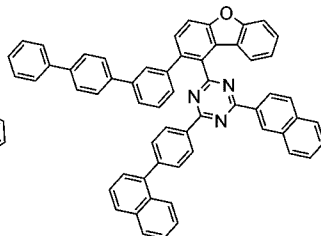
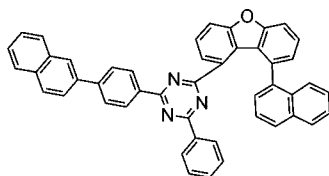
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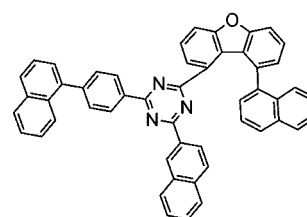
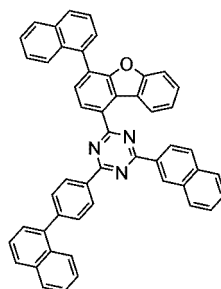
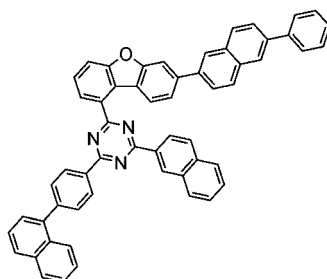
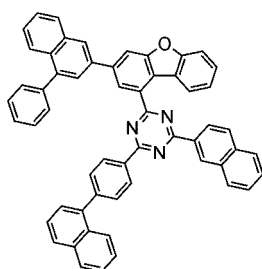


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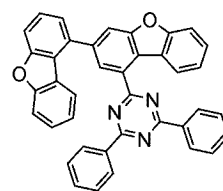
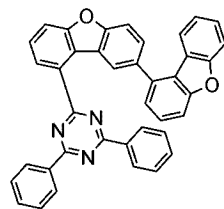
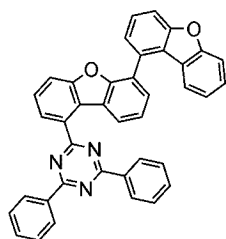
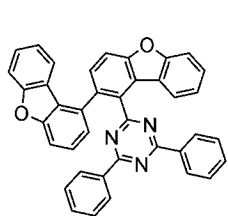
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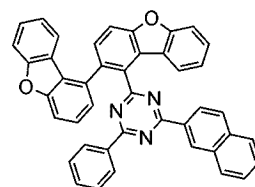
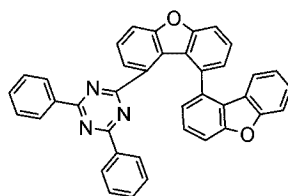
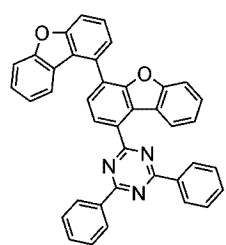
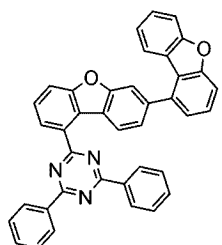


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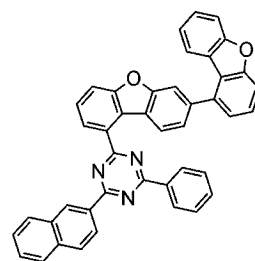
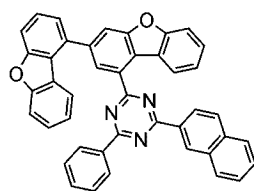
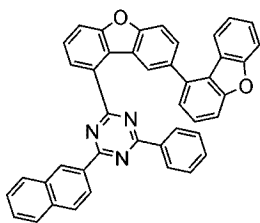
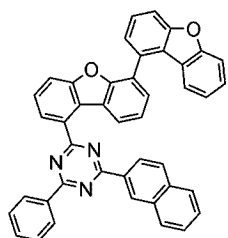
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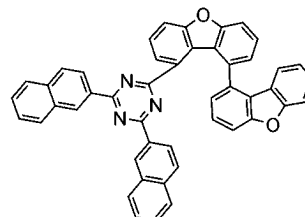
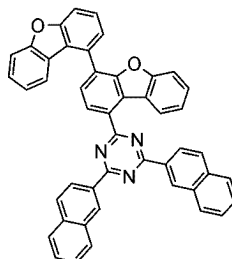
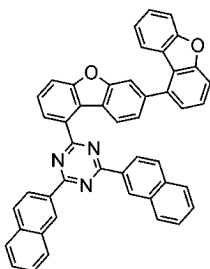
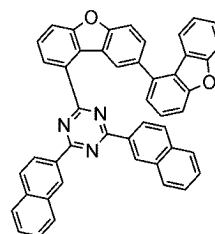
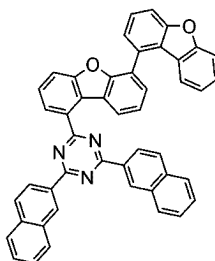
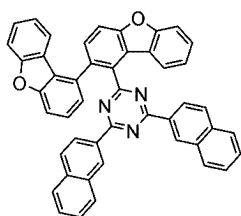
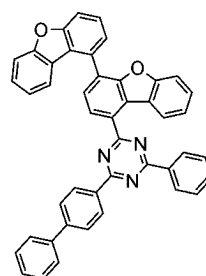
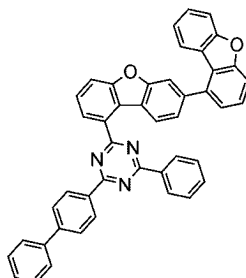
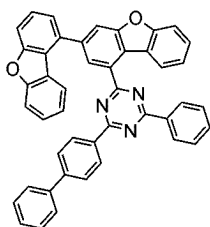
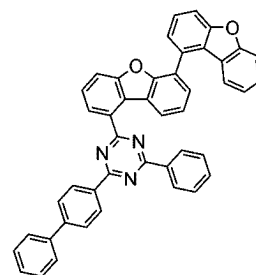
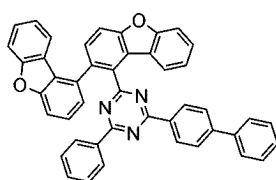
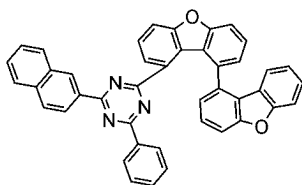
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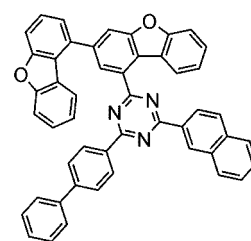
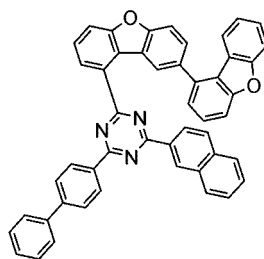
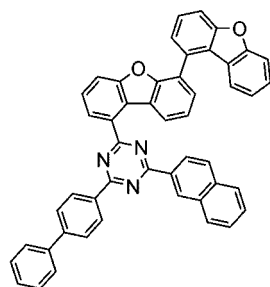
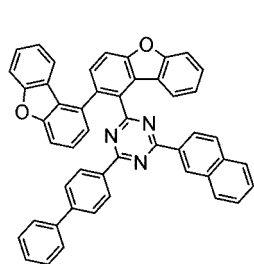
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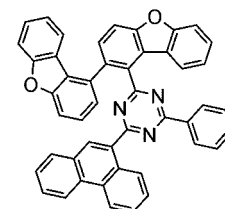
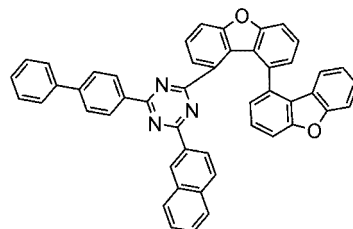
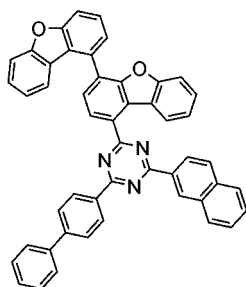
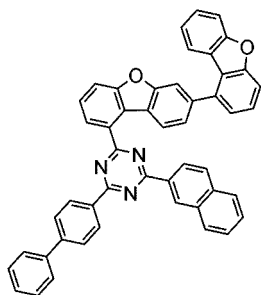
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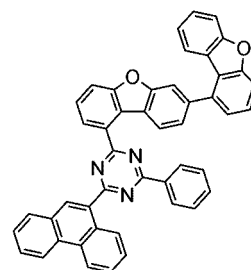
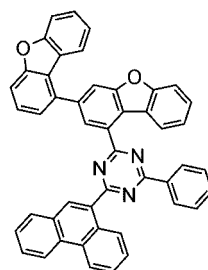
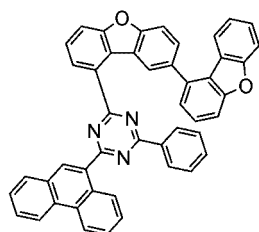
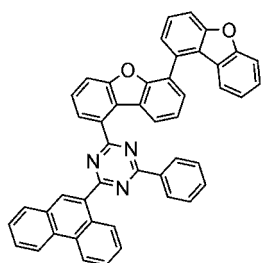
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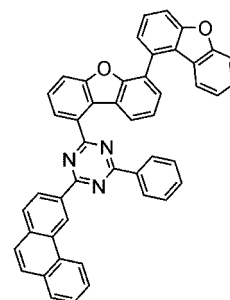
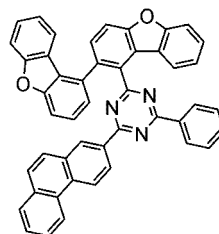
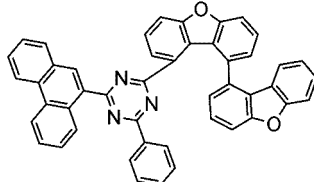
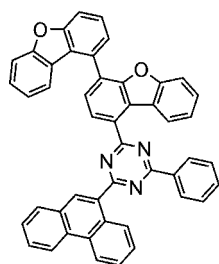
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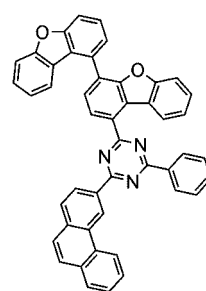
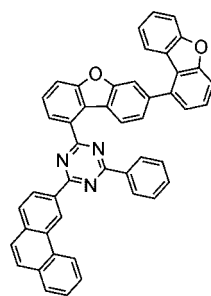
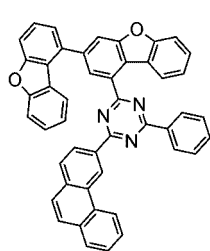
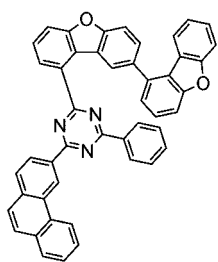
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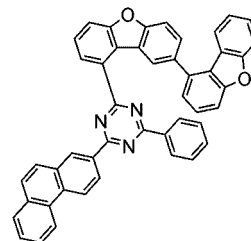
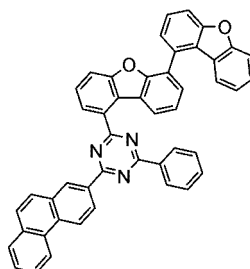
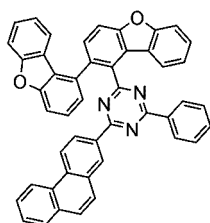
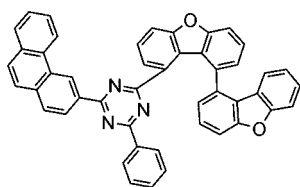
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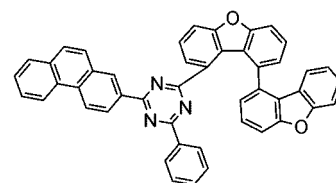
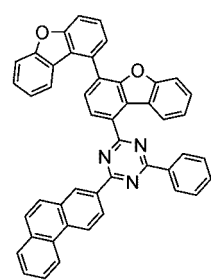
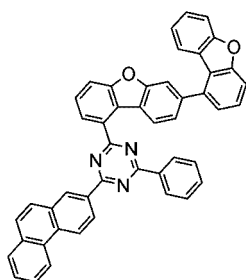
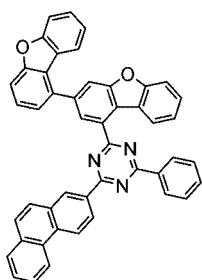
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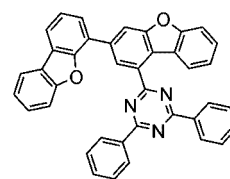
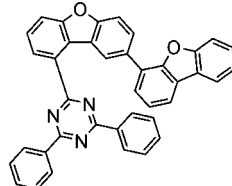
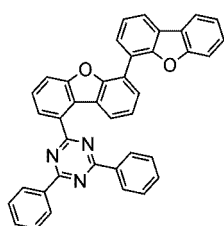
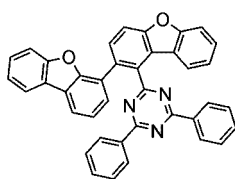
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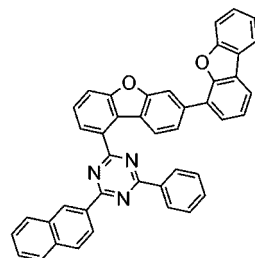
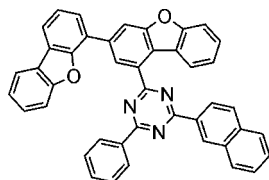
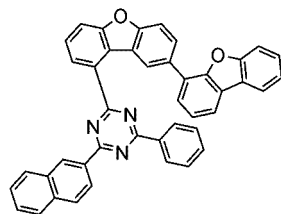
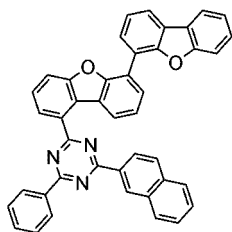
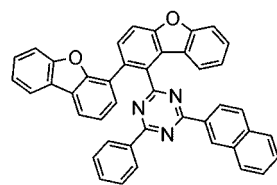
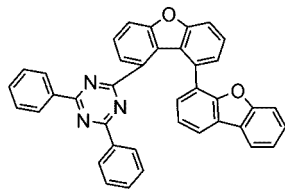
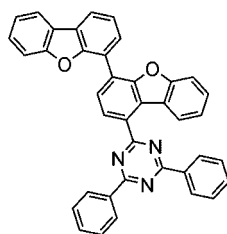
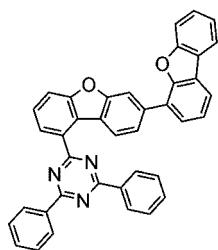
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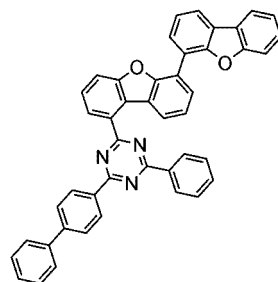
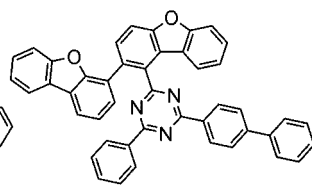
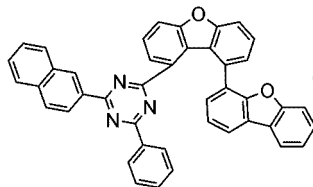
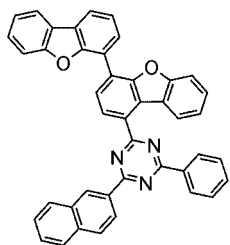
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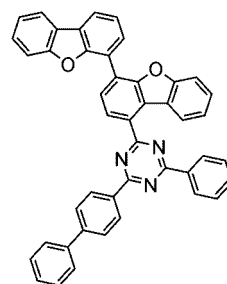
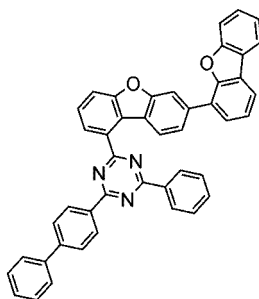
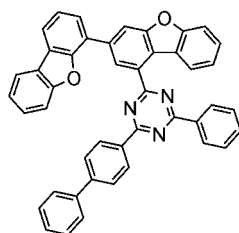
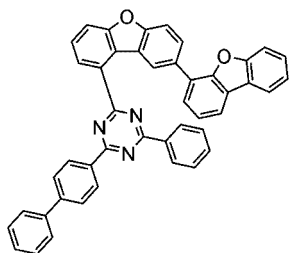
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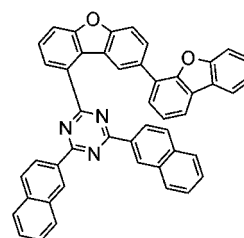
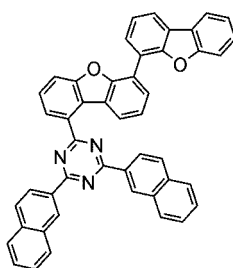
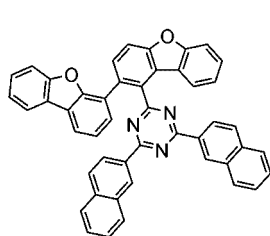
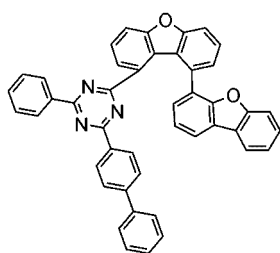


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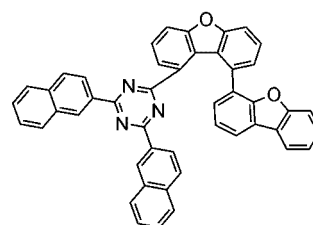
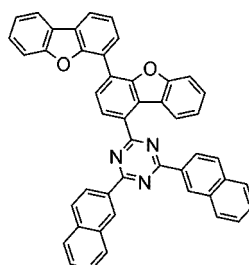
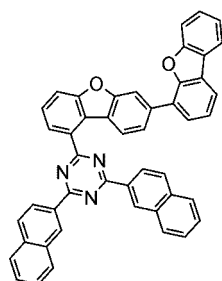
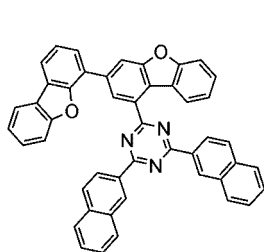
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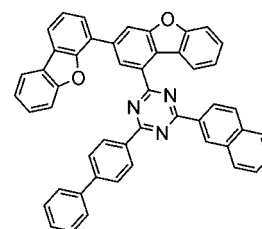
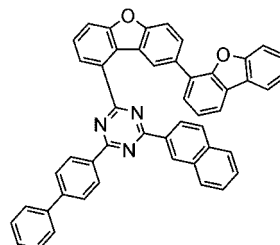
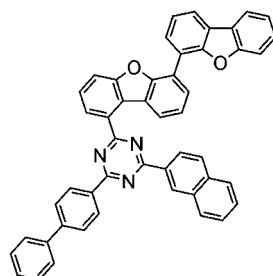
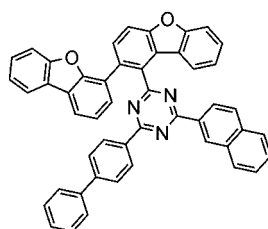
【化 6 2】



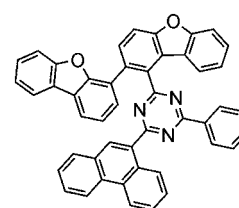
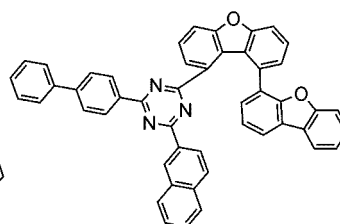
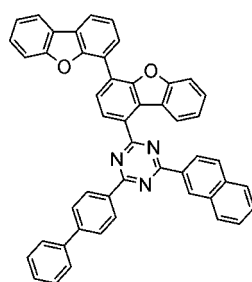
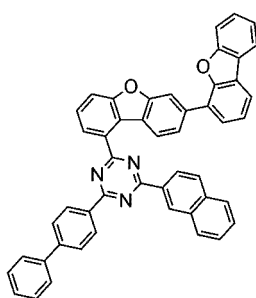
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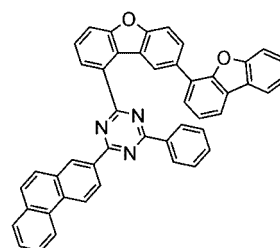
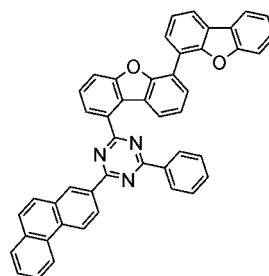
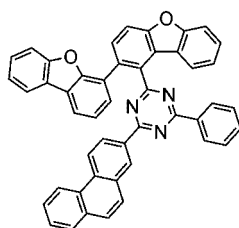
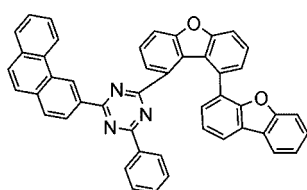
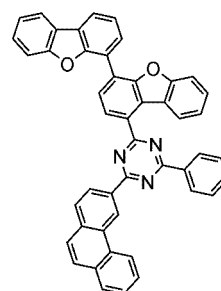
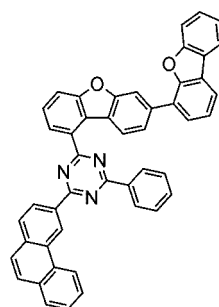
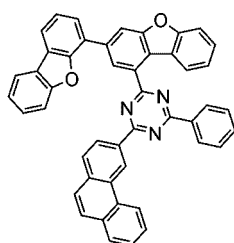
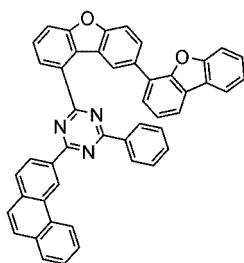
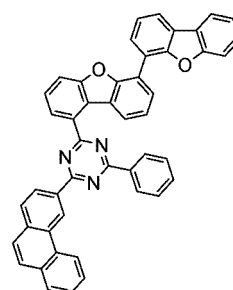
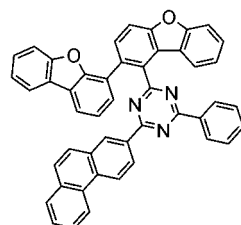
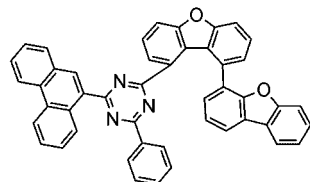
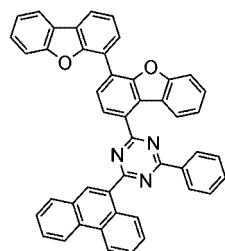
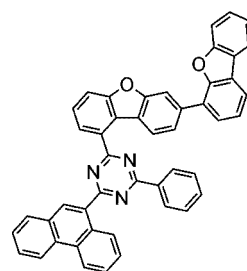
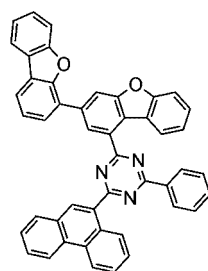
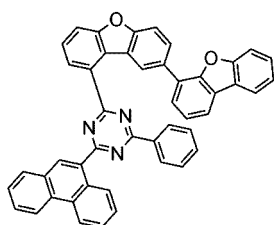
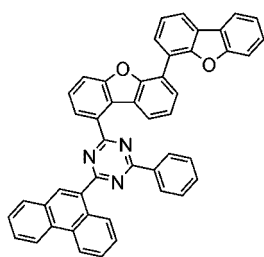
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【化 6 3】



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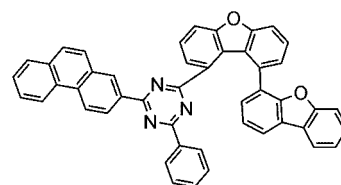
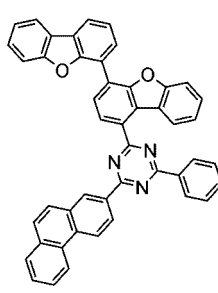
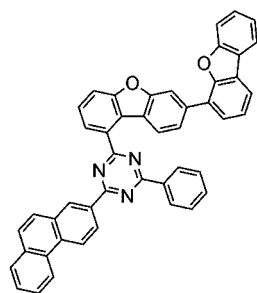
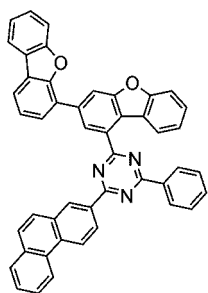
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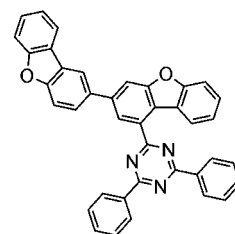
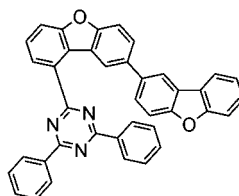
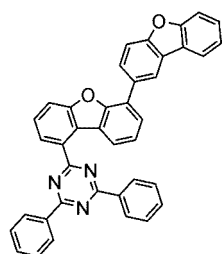
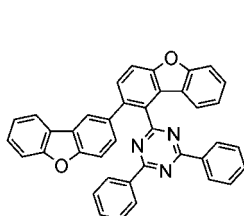
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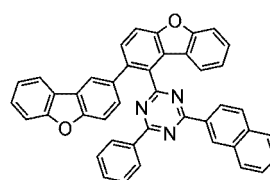
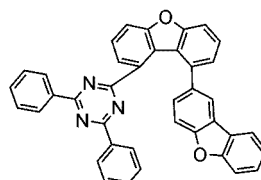
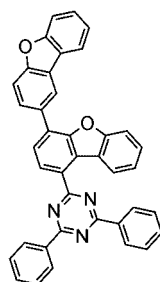
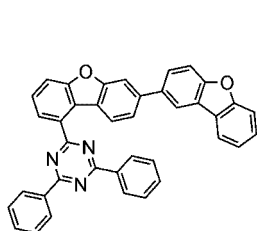
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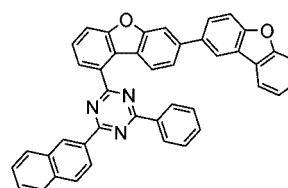
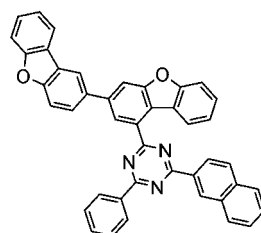
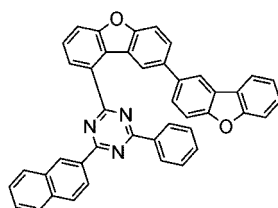
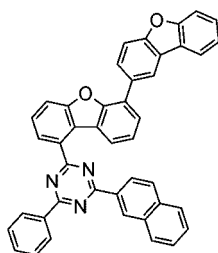
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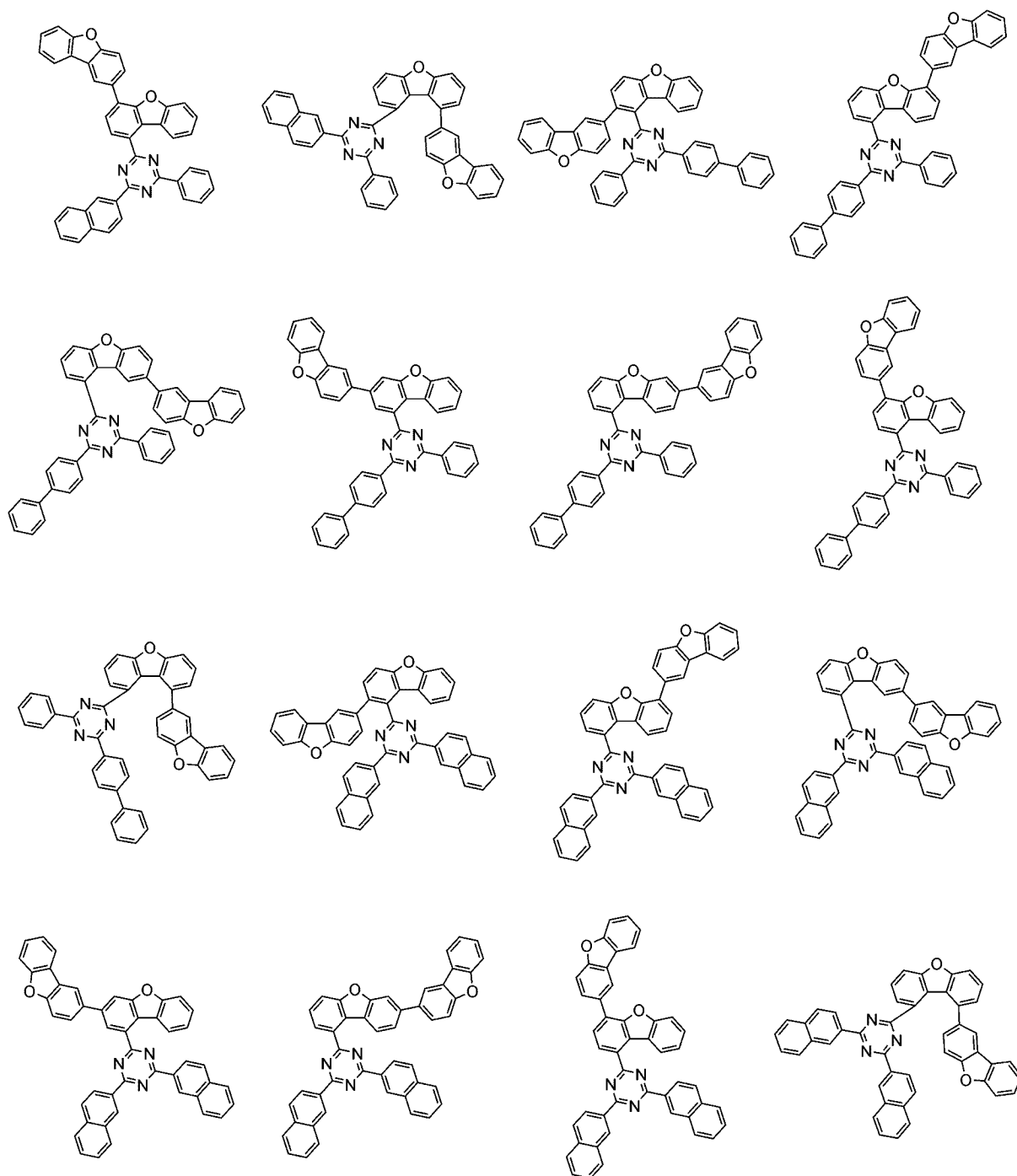
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【化 6 5】



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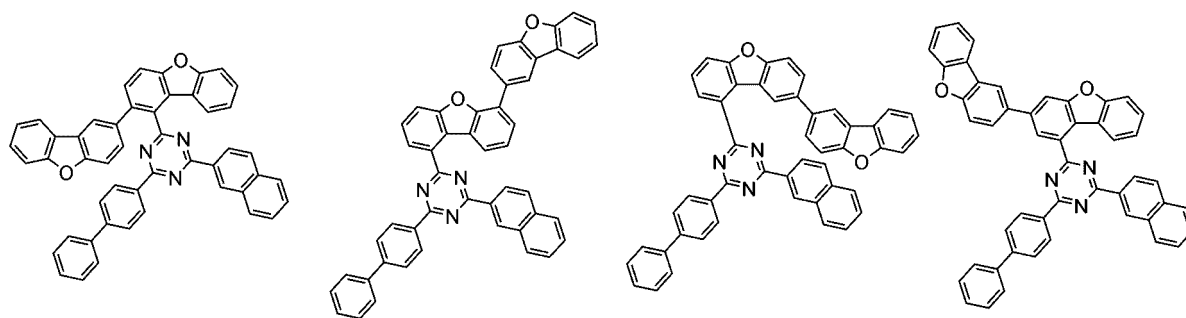
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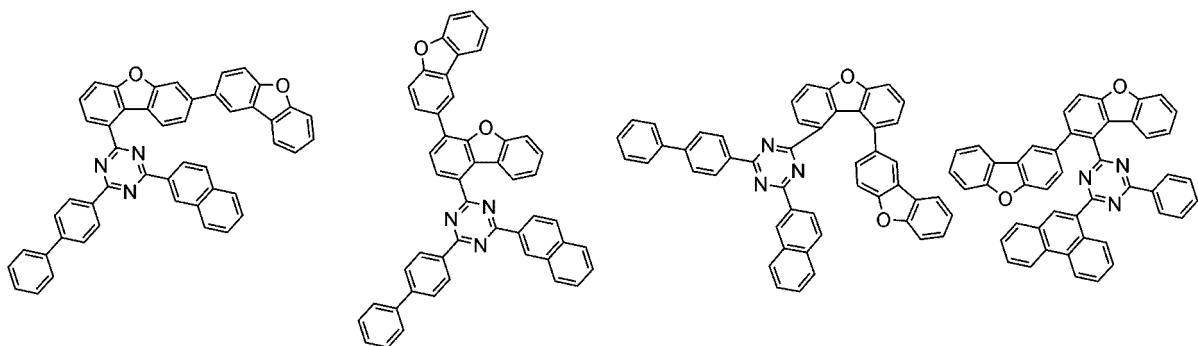
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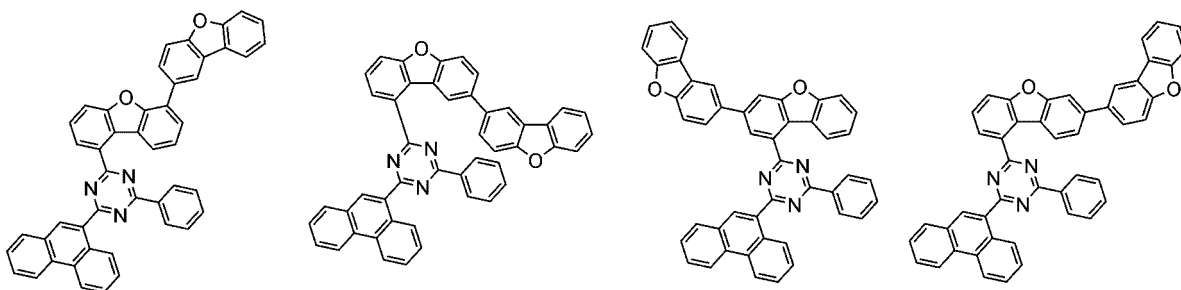
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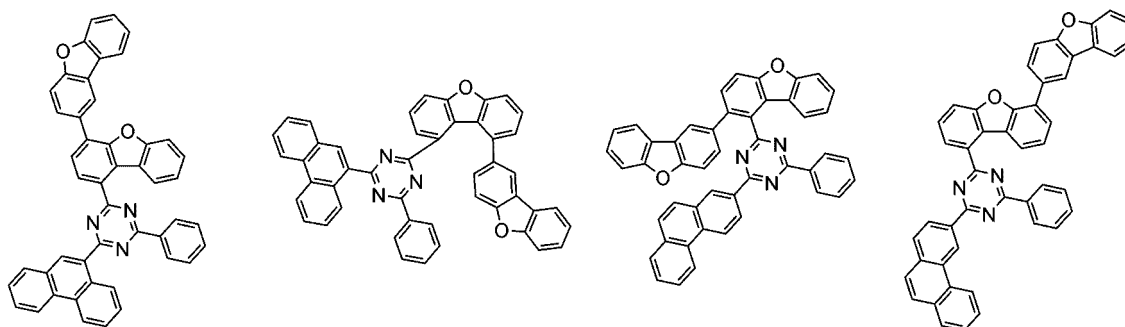
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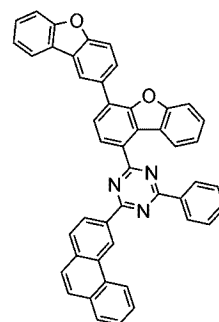
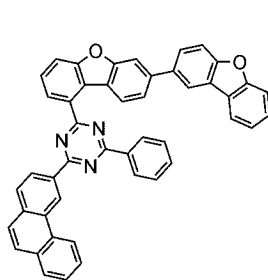
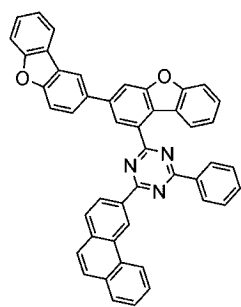
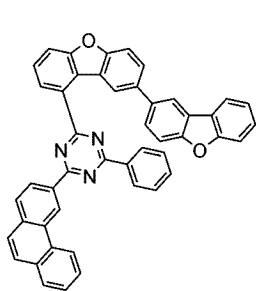
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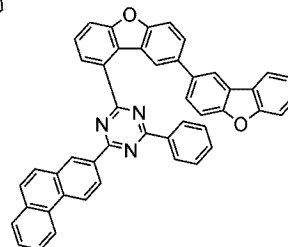
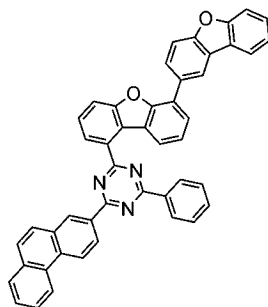
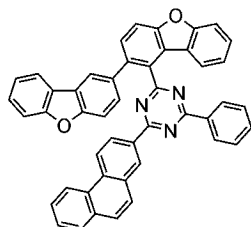
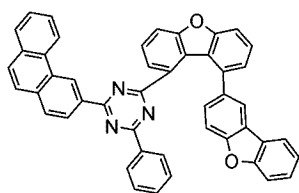
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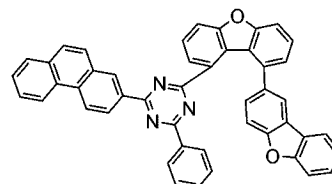
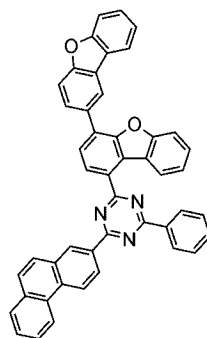
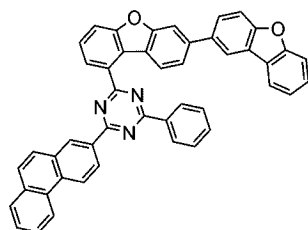
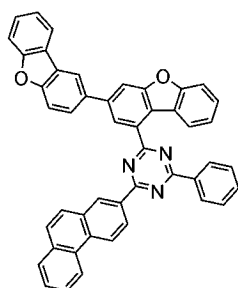
【化 6 7】



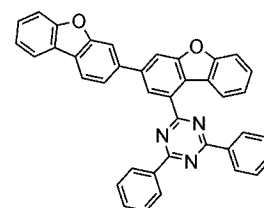
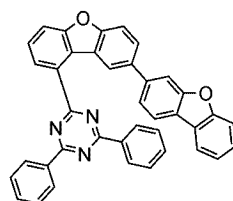
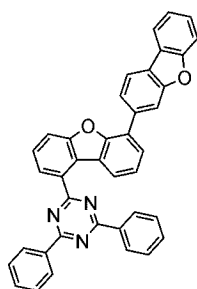
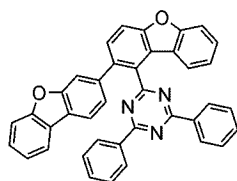
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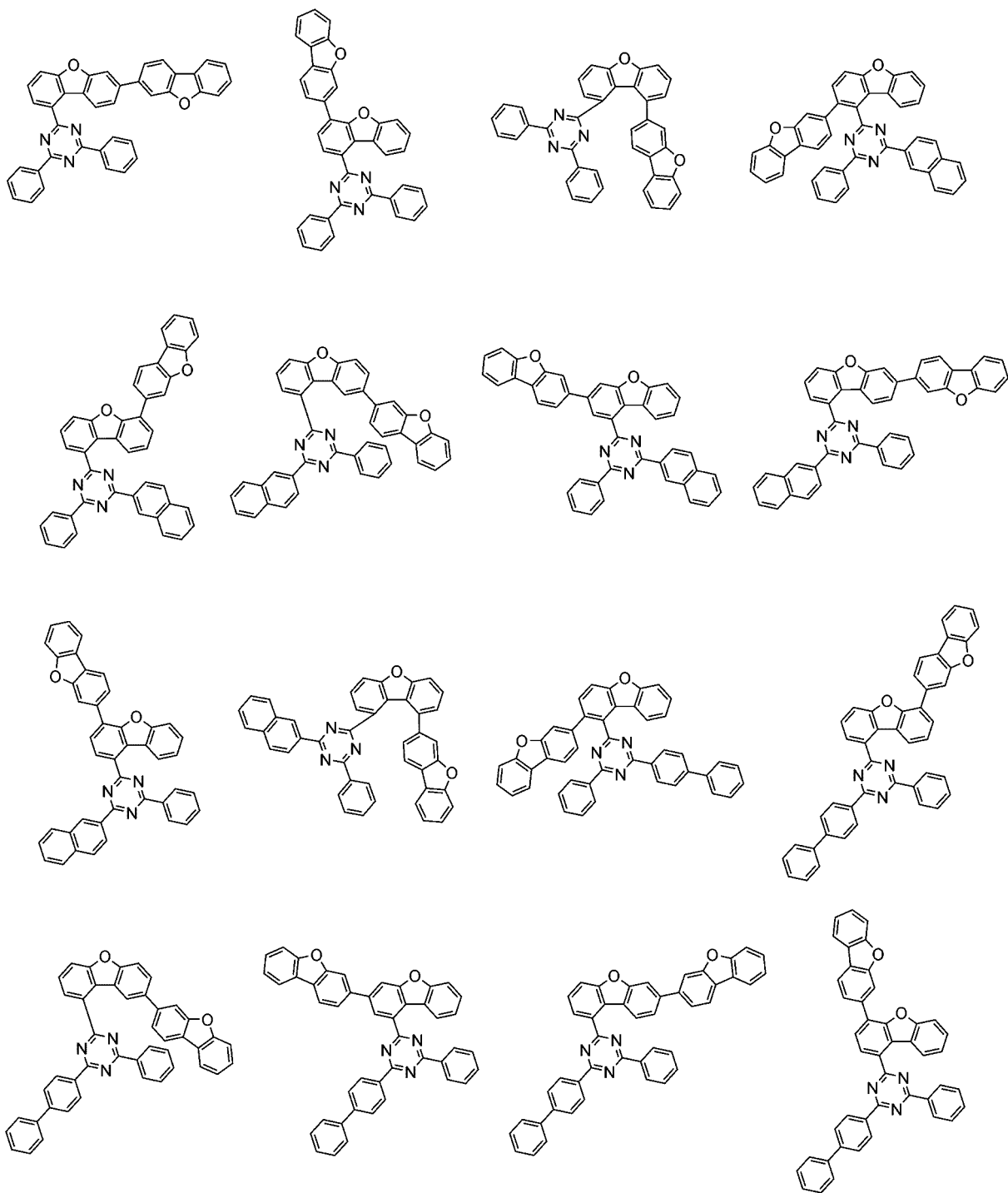
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【化 6 8】



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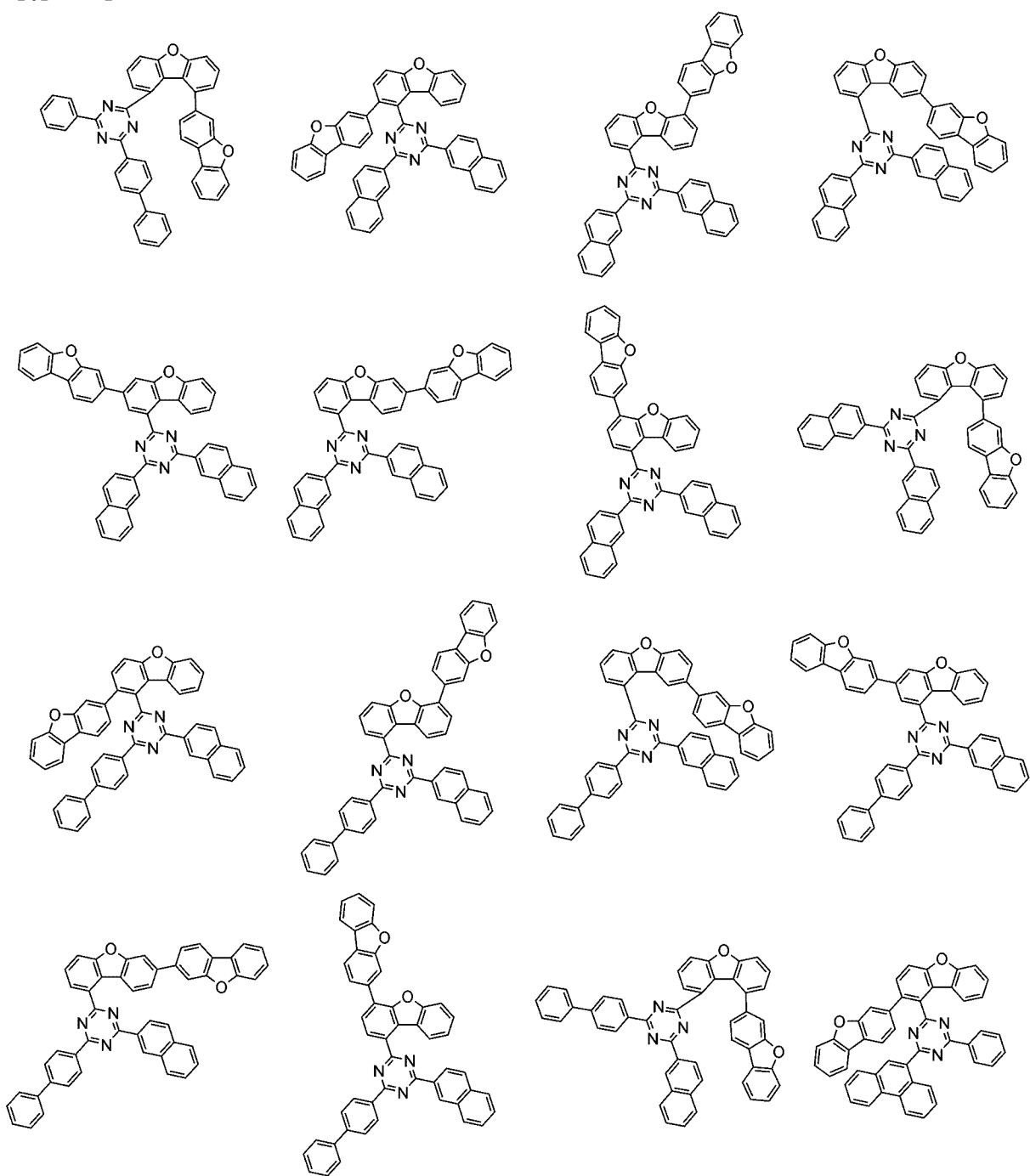
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【化 6 9】



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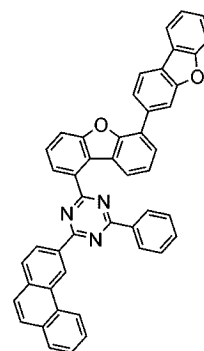
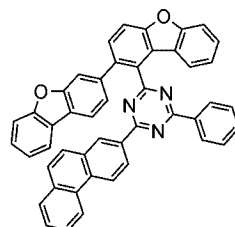
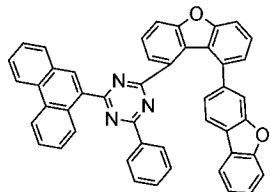
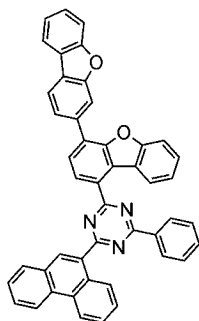
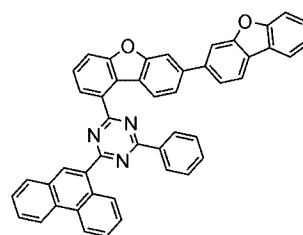
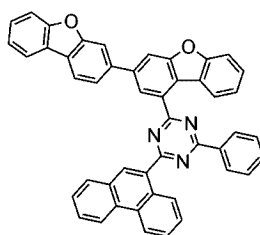
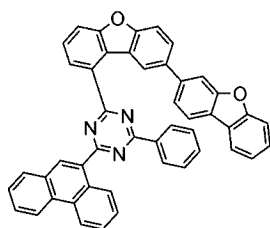
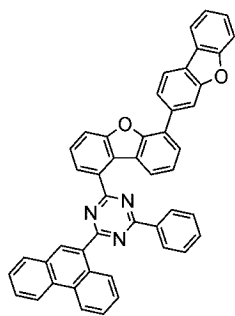
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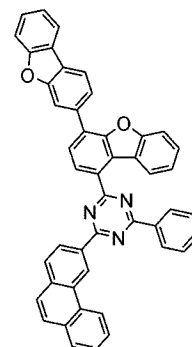
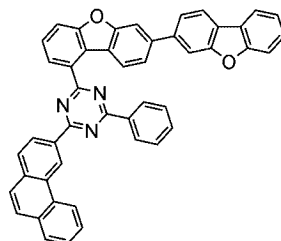
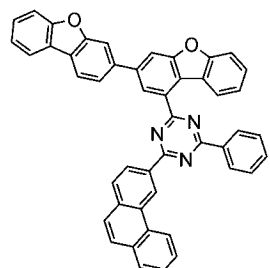
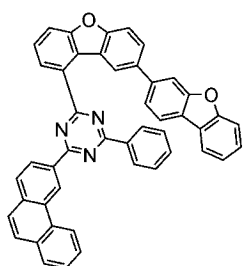
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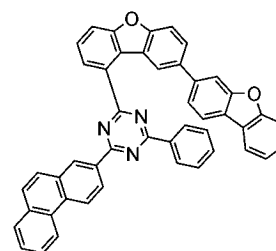
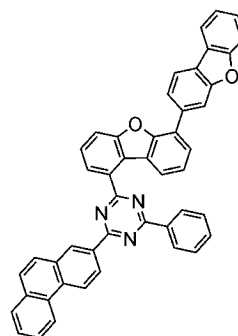
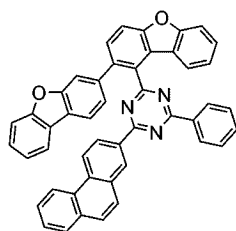
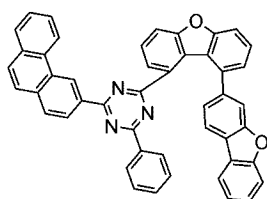
【化 7 0】



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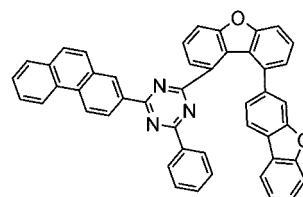
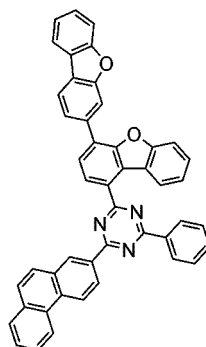
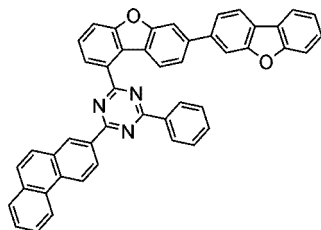
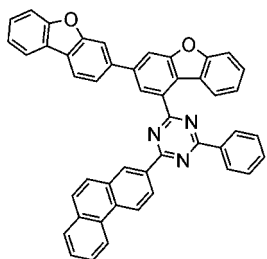


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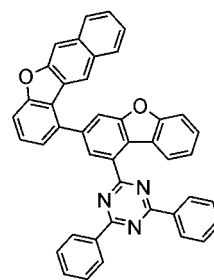
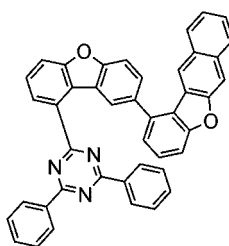
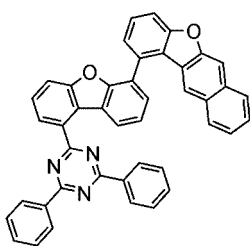
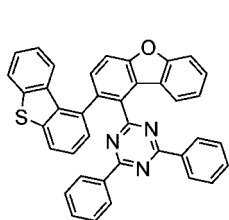
【化 7 1】



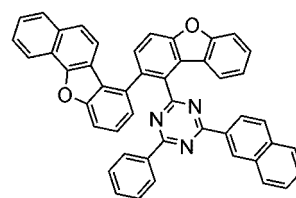
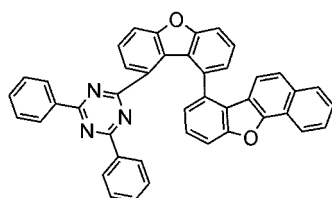
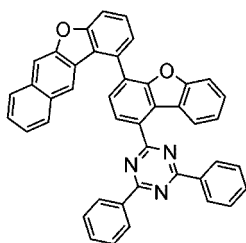
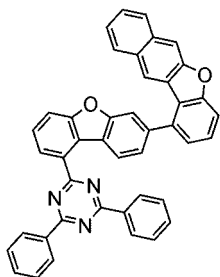
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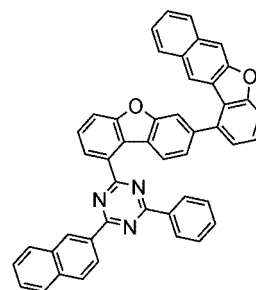
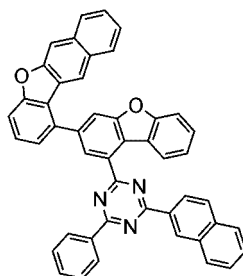
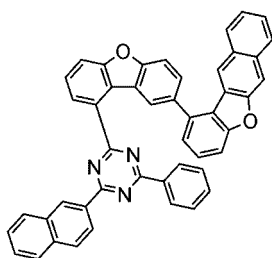
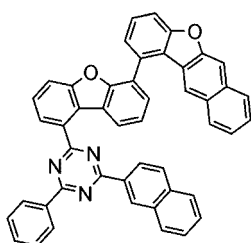
【化 7 2】



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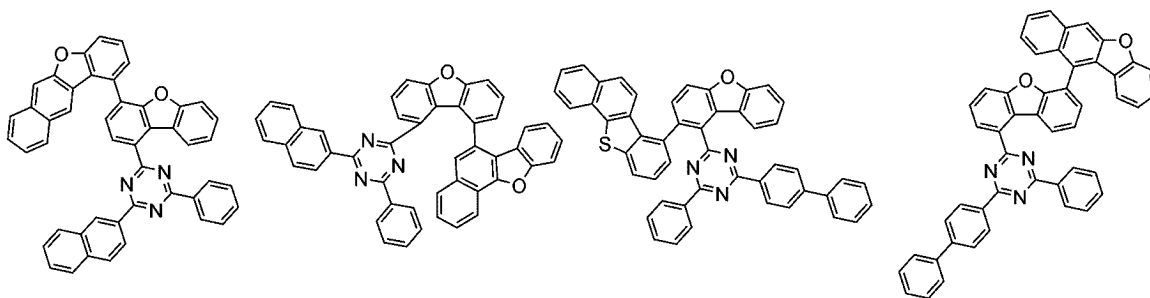


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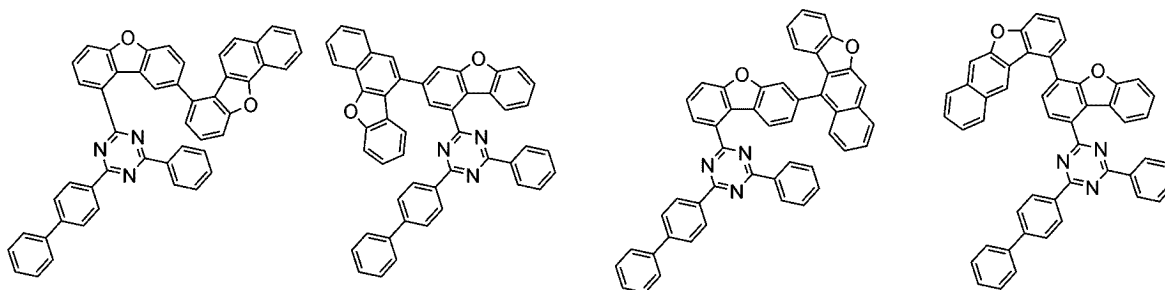
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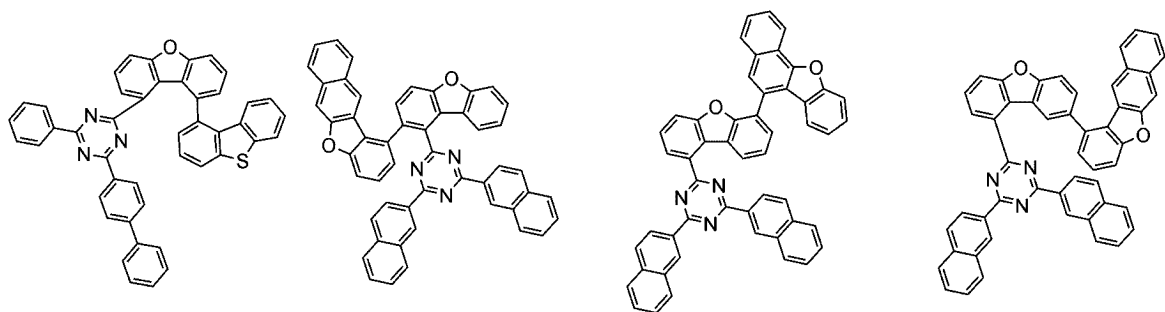
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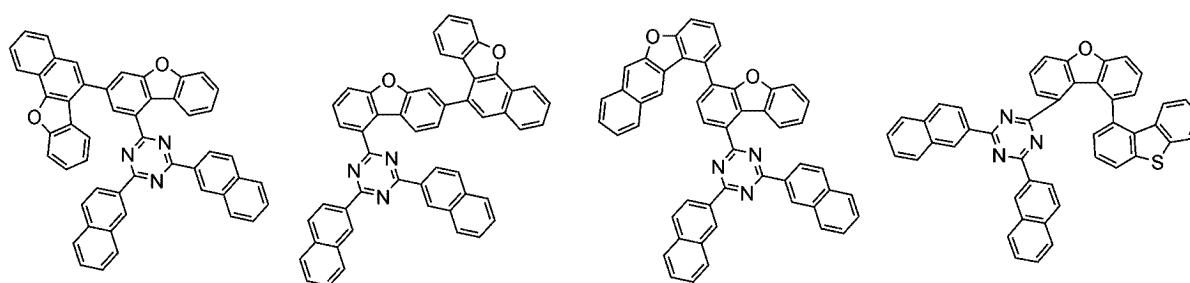
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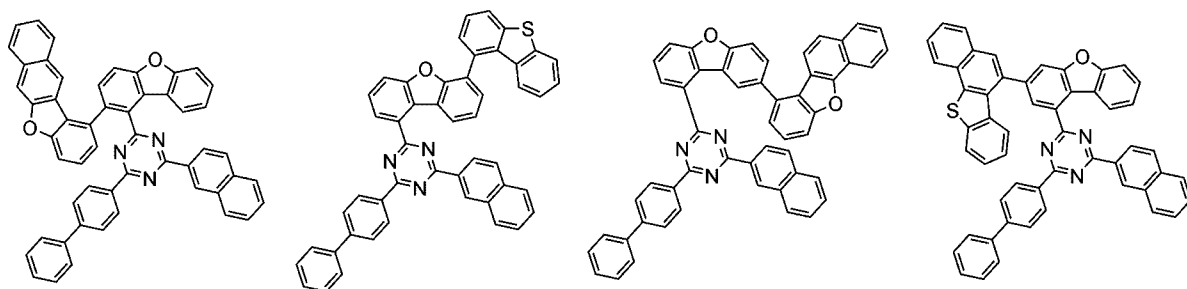
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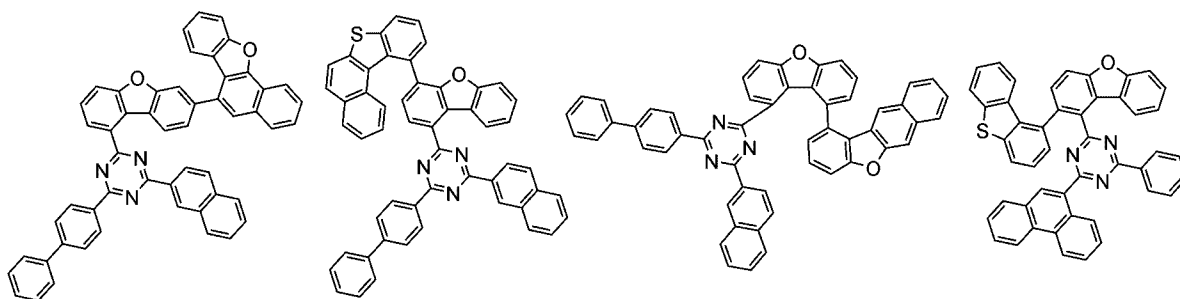
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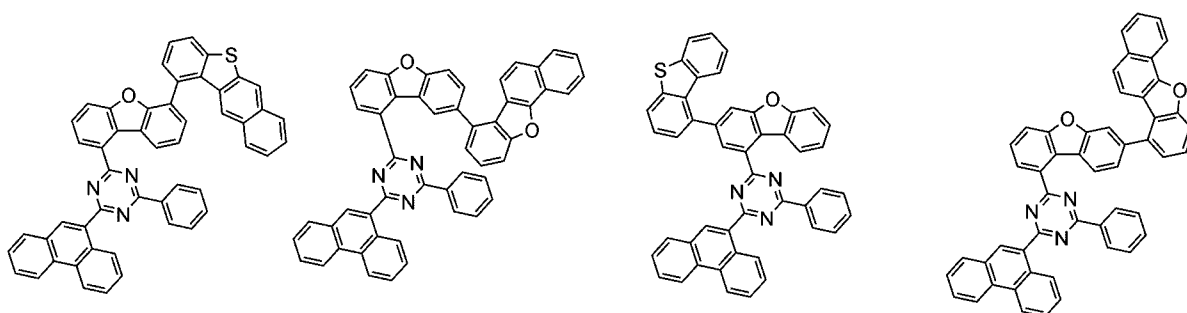
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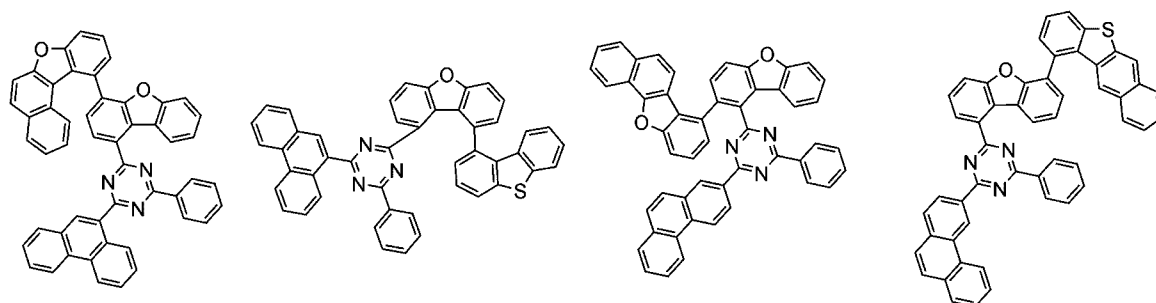
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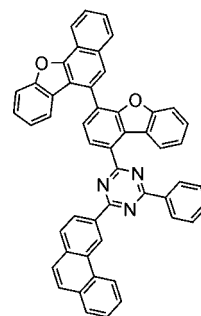
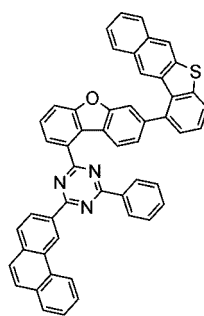
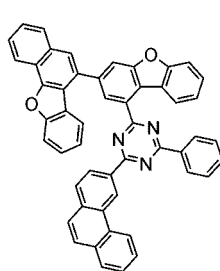
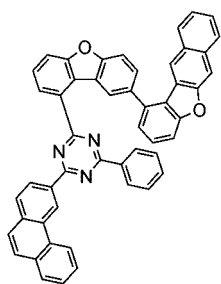
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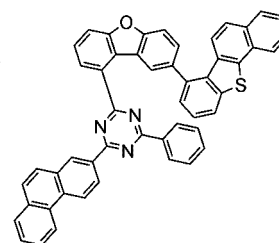
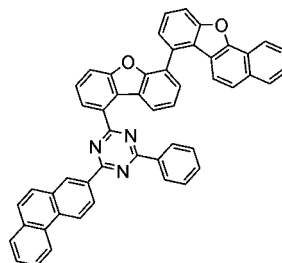
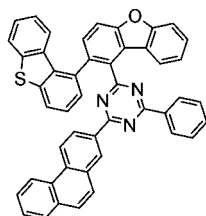
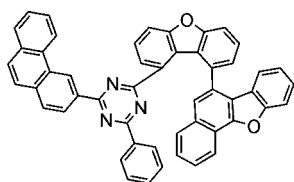
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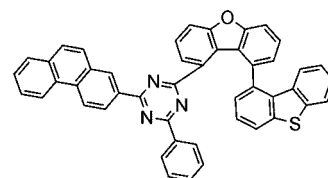
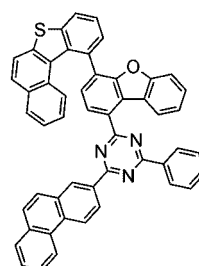
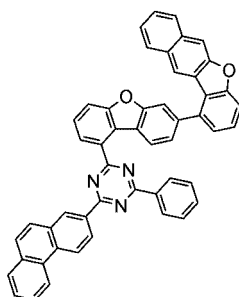
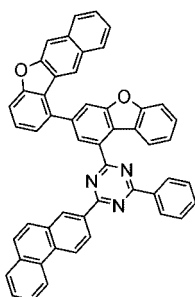
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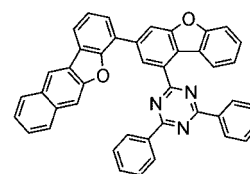
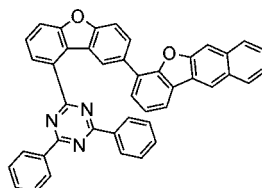
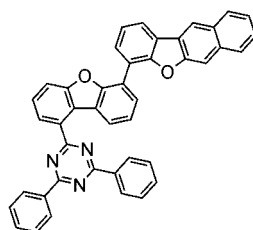
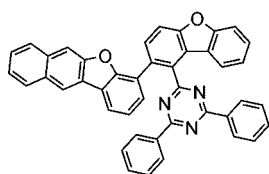
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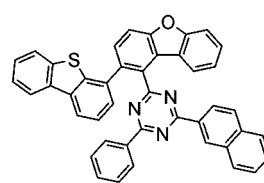
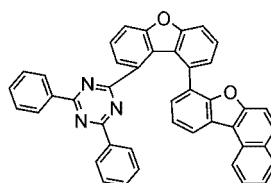
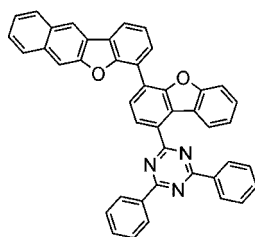
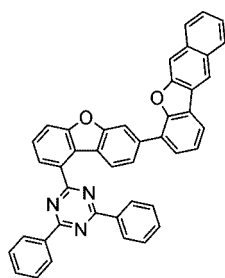
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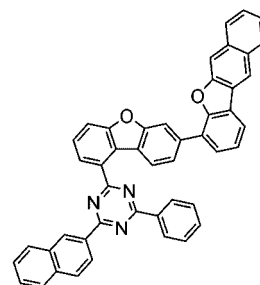
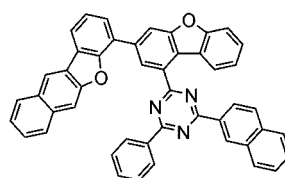
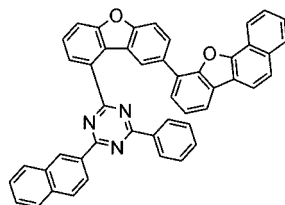
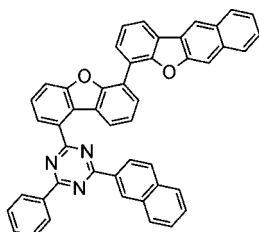
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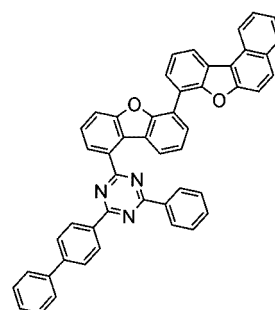
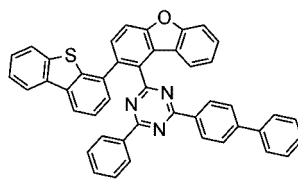
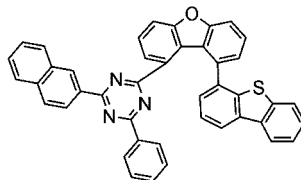
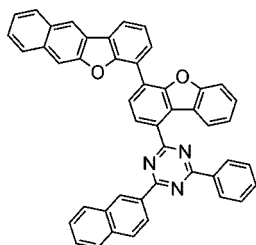
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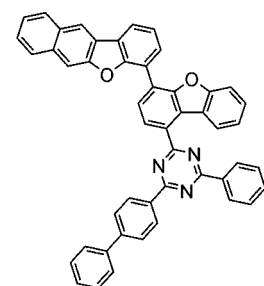
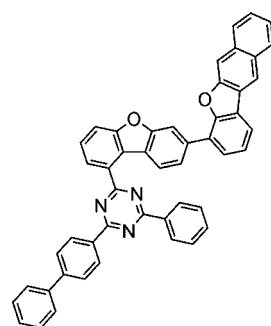
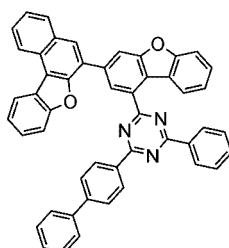
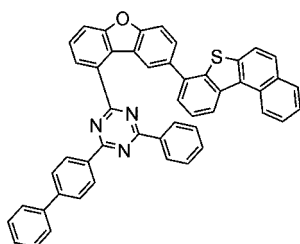
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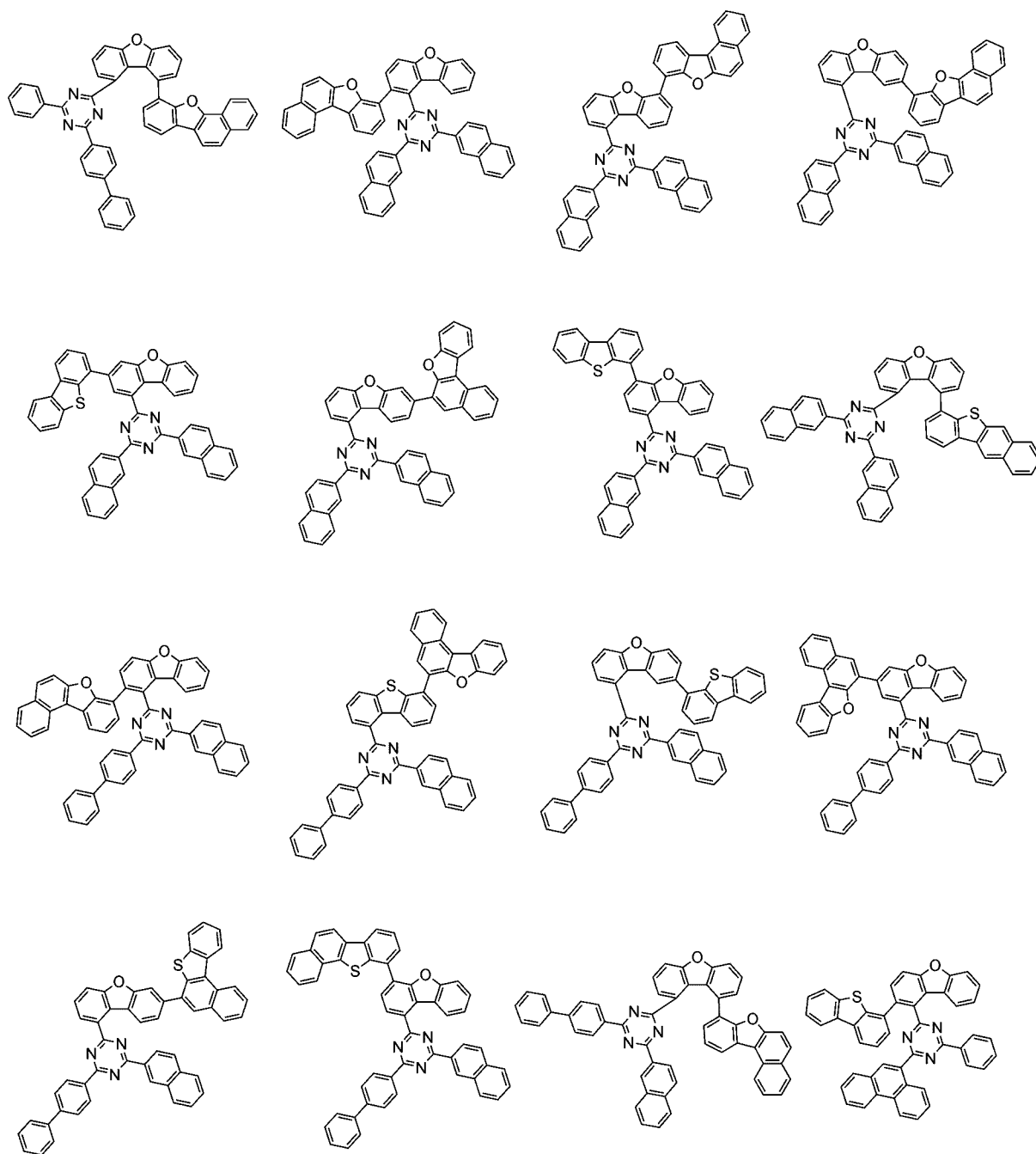
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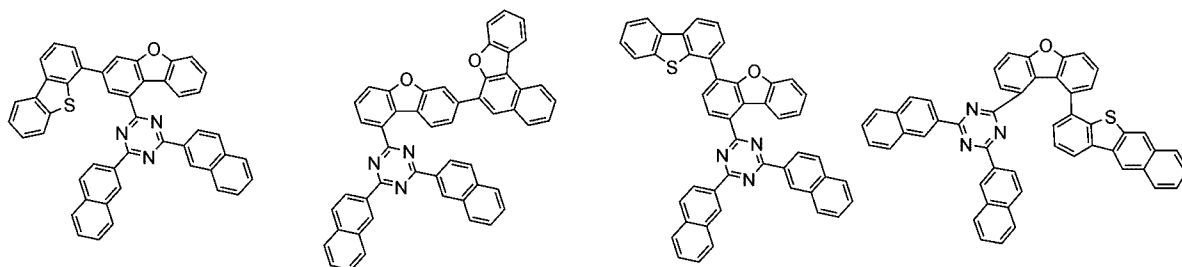
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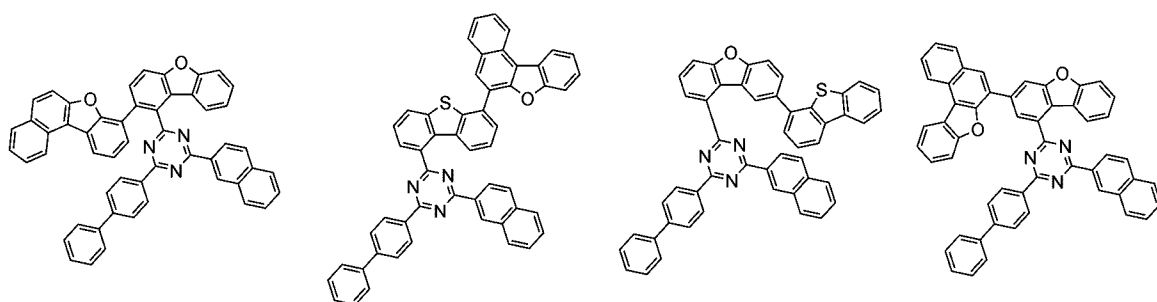
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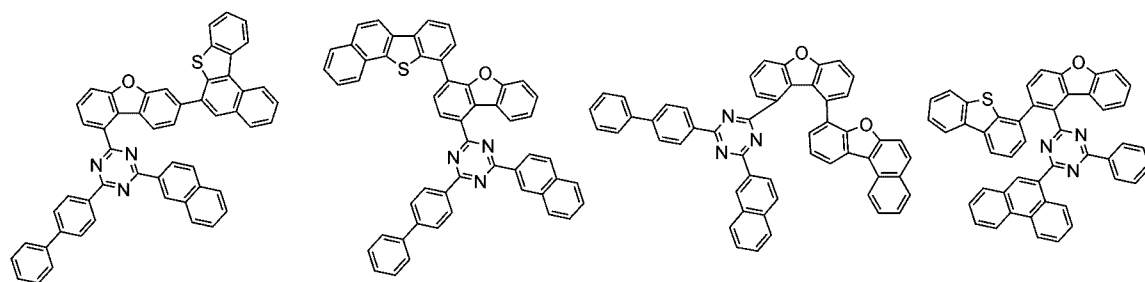
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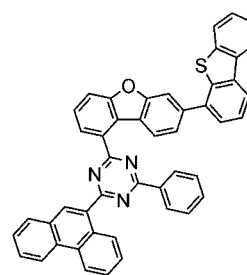
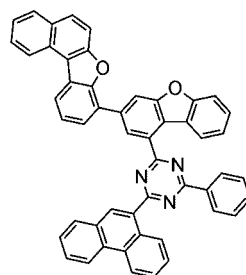
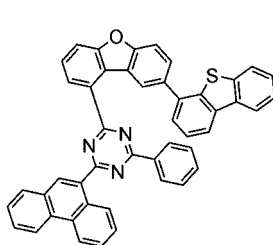
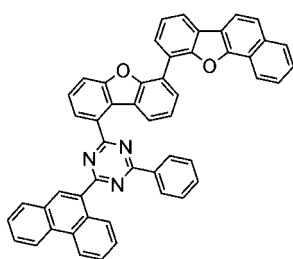
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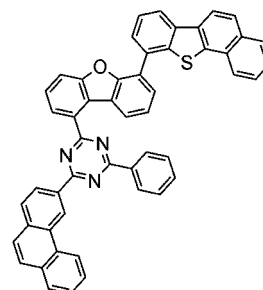
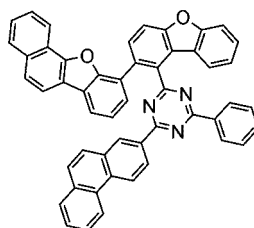
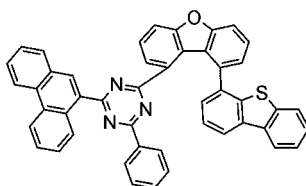
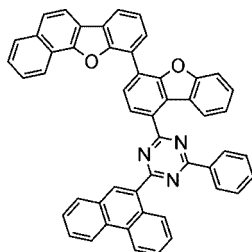
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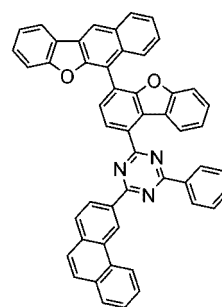
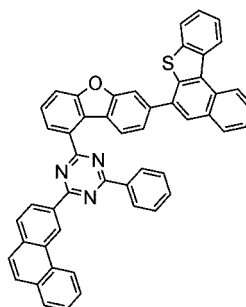
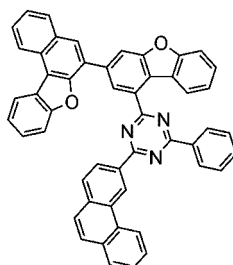
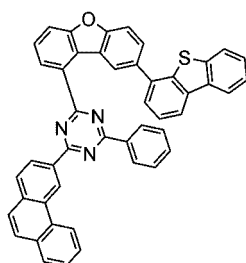
【化 7 8】



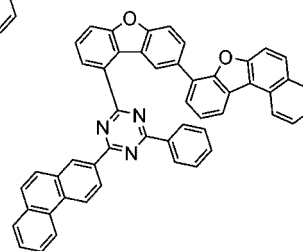
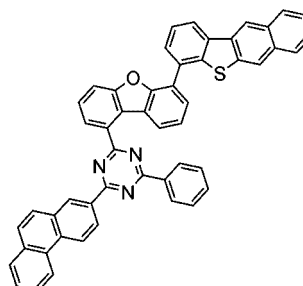
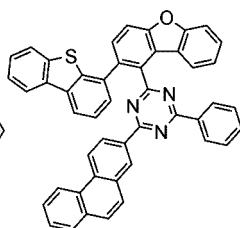
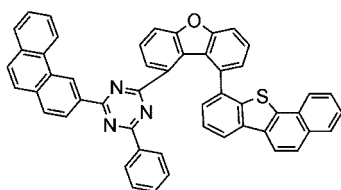
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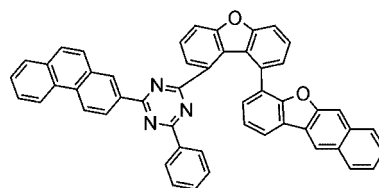
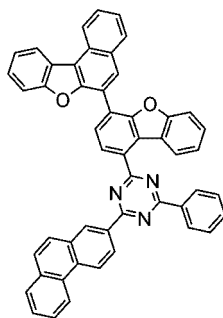
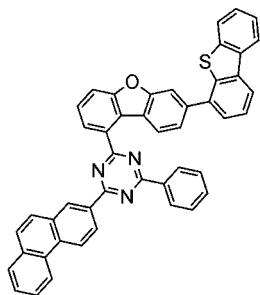
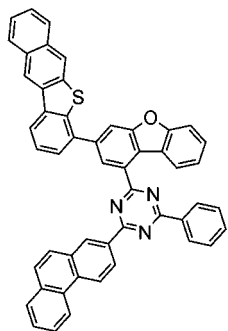
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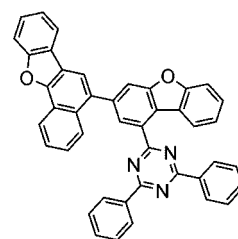
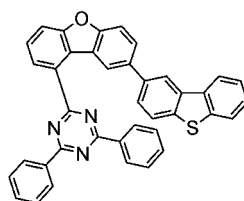
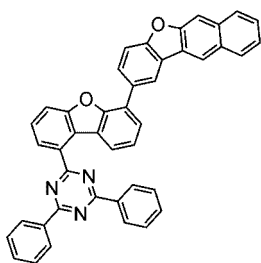
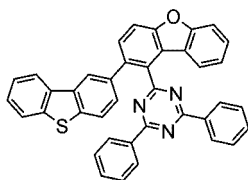
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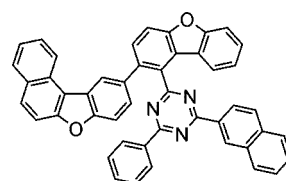
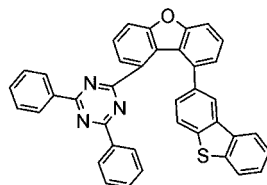
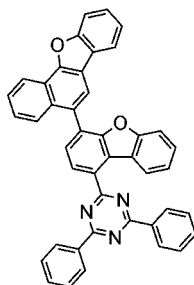
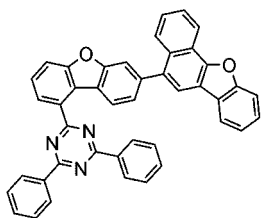
【化 7 9】



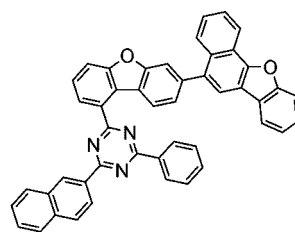
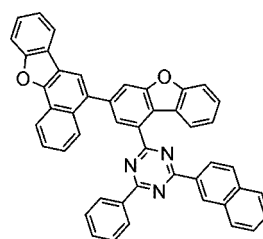
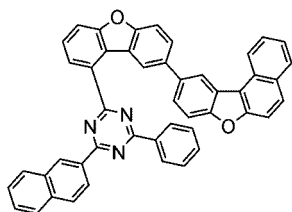
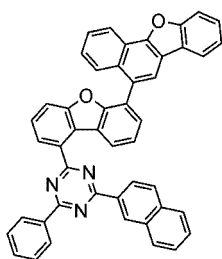
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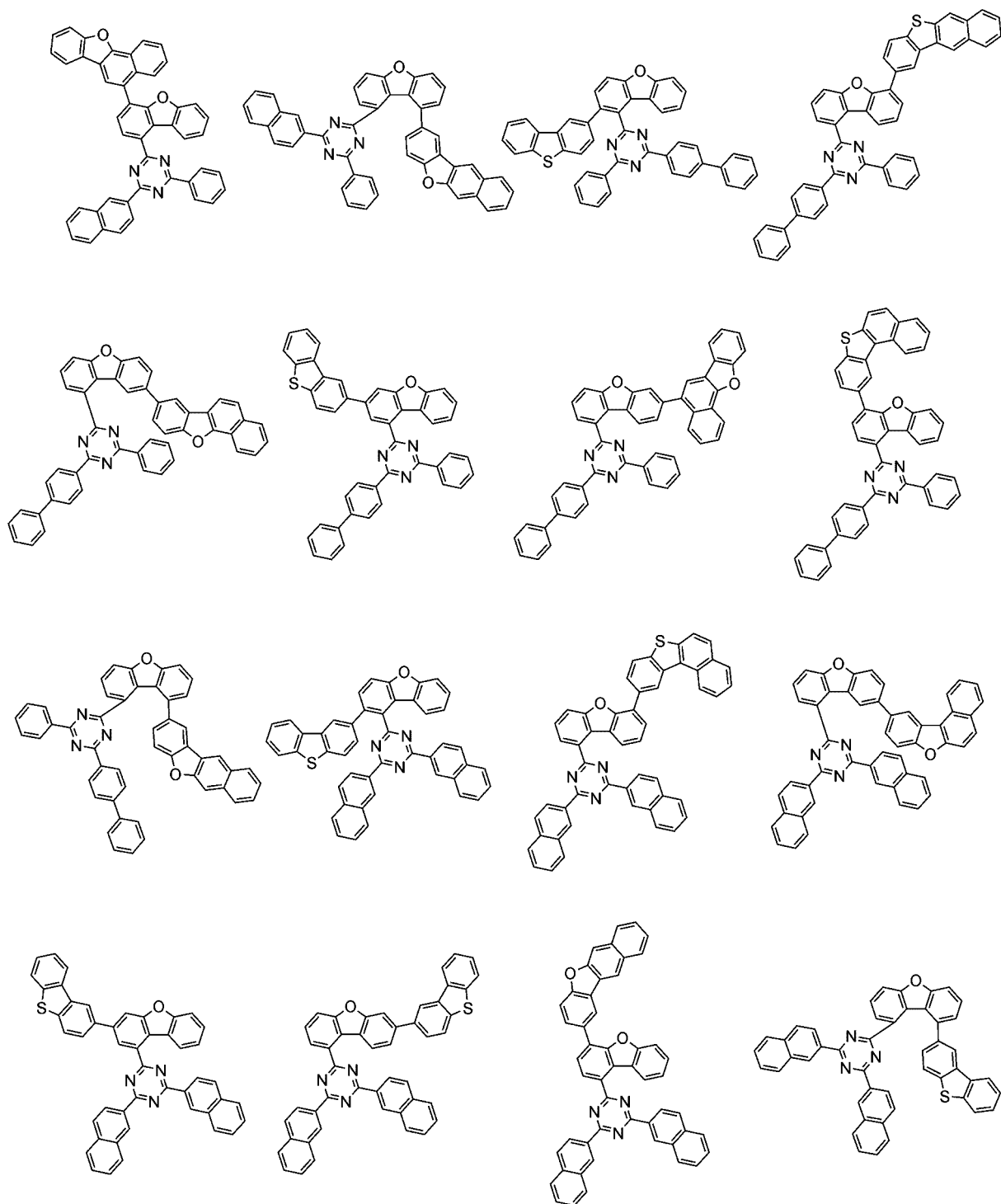
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【化 8 0】



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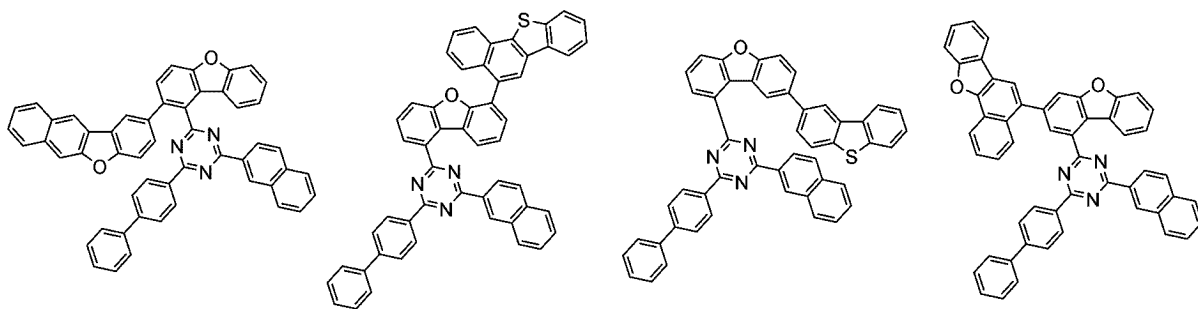
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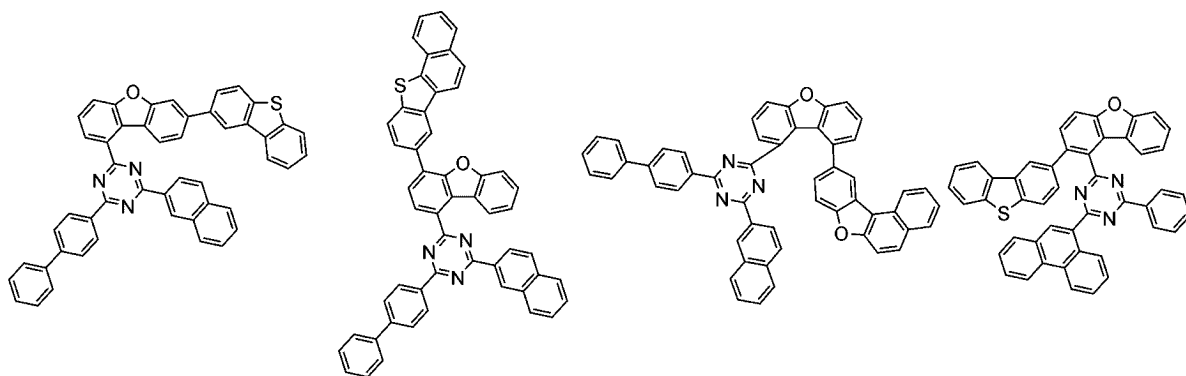
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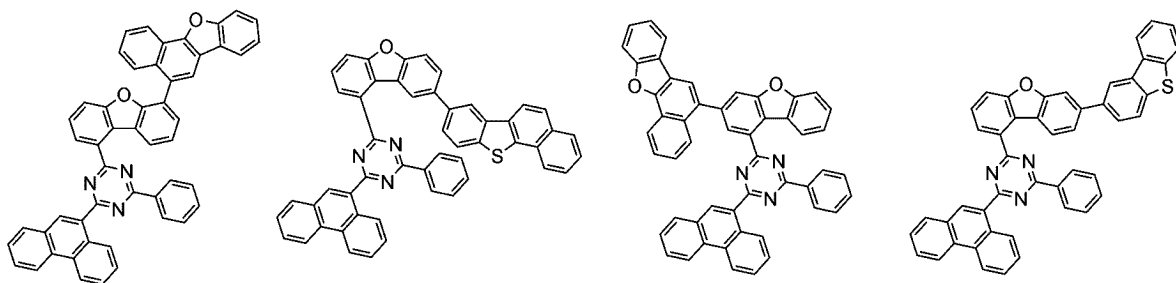
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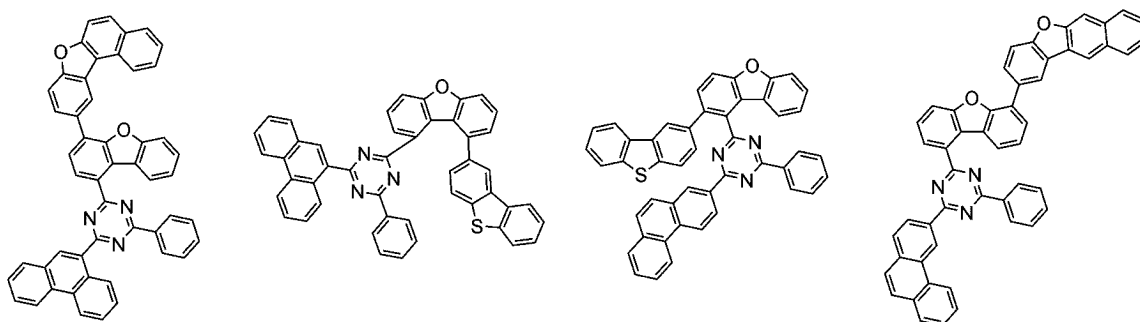
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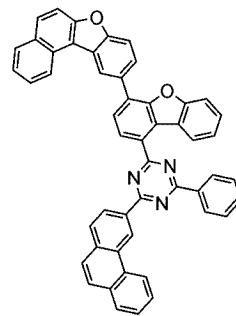
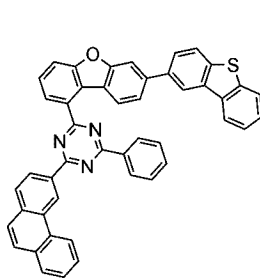
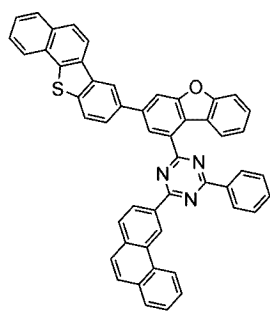
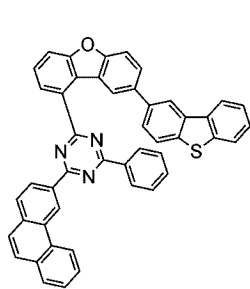
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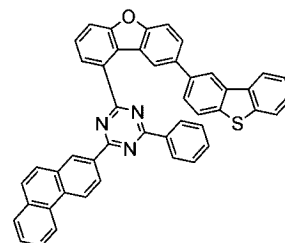
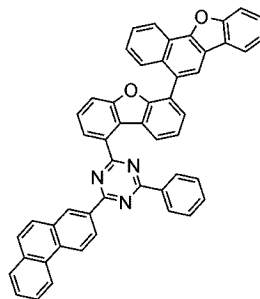
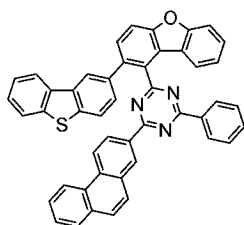
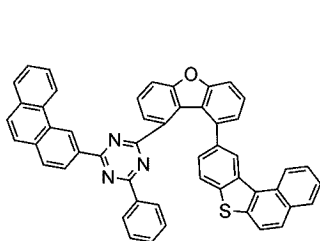
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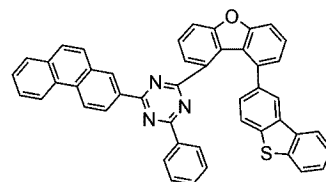
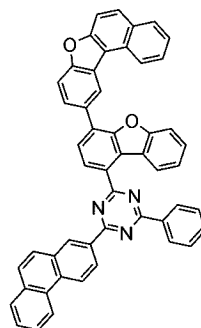
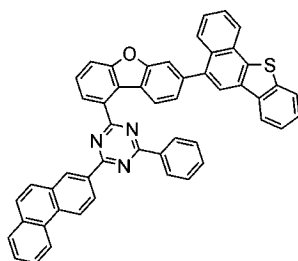
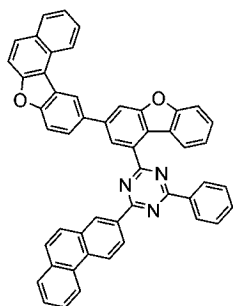
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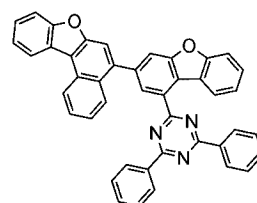
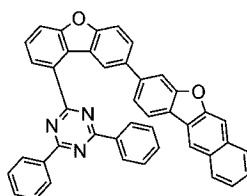
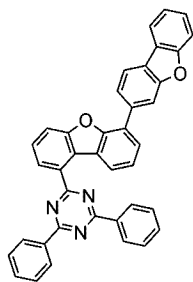
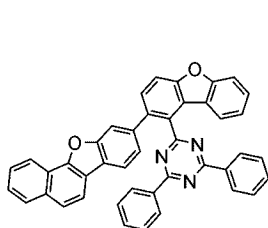
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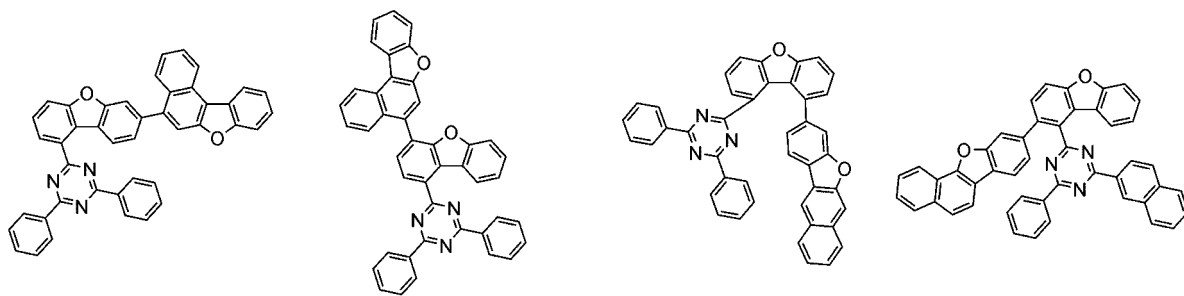
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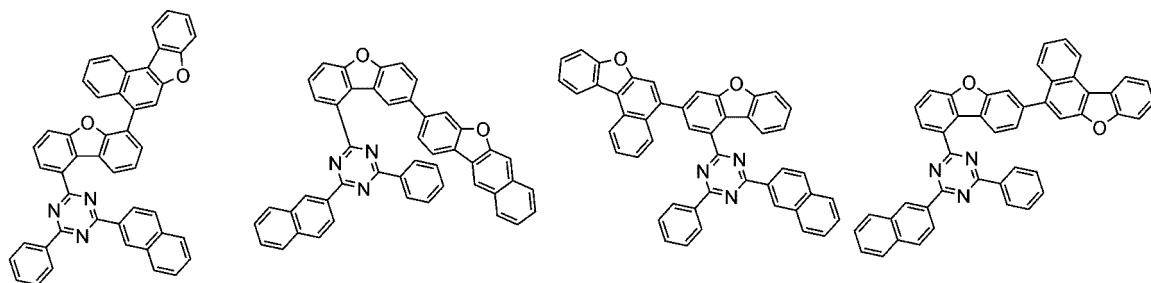
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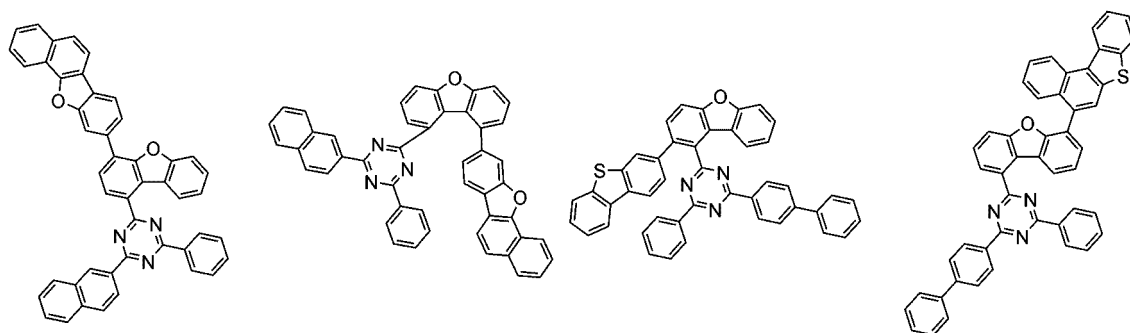
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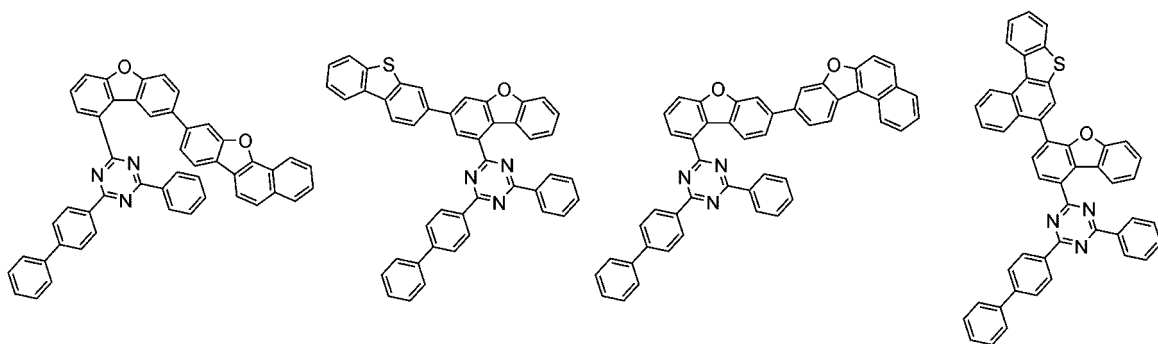
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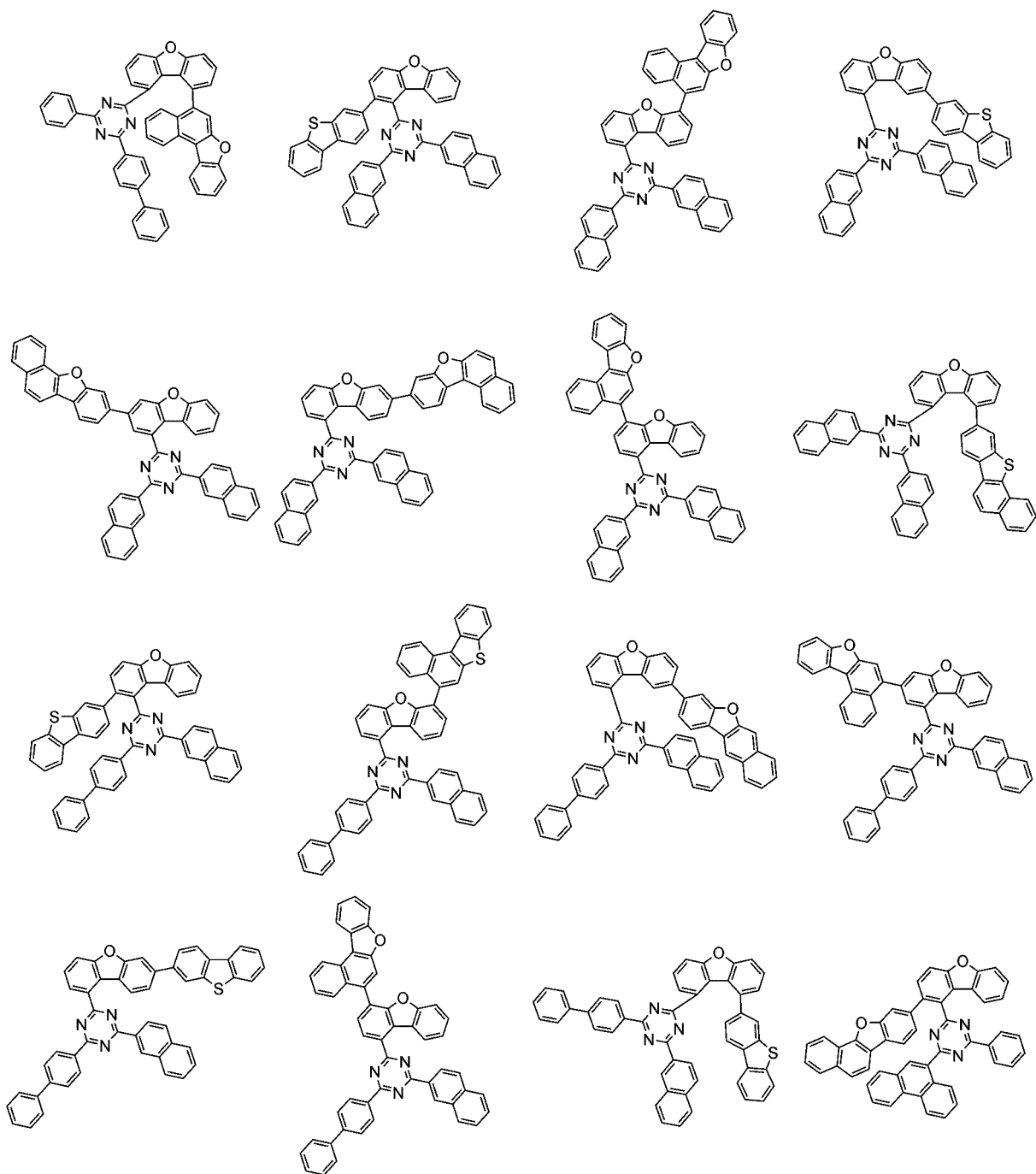
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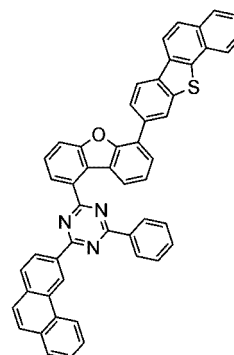
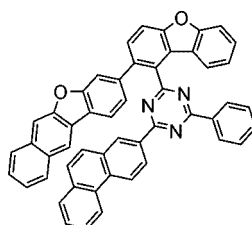
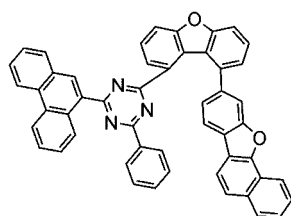
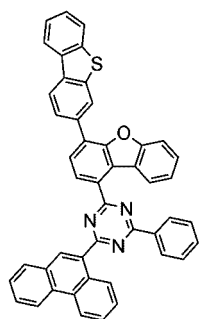
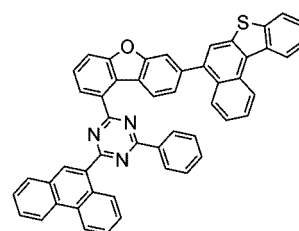
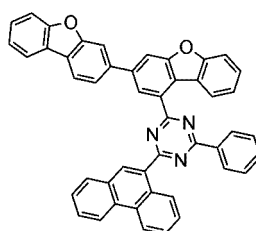
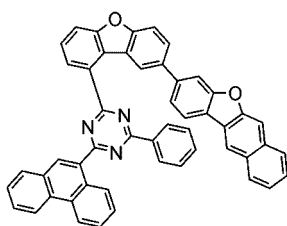
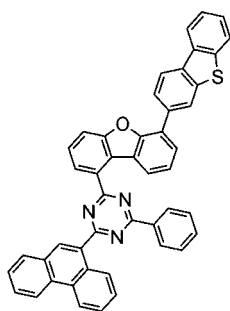
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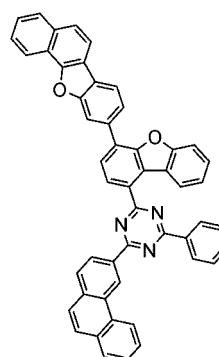
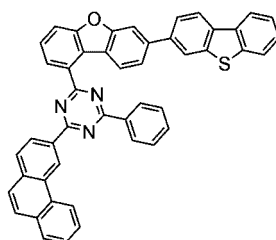
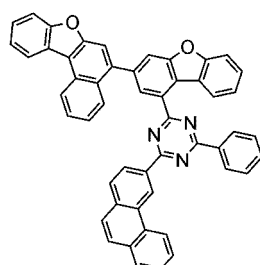
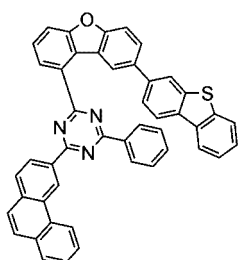
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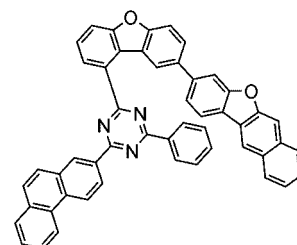
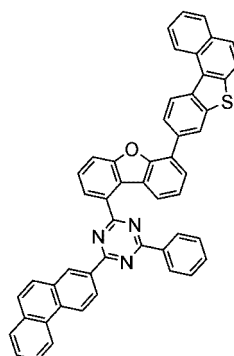
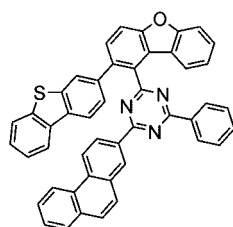
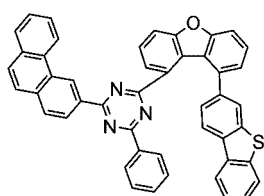
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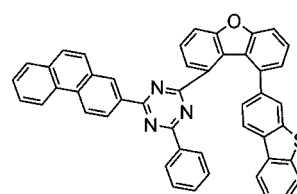
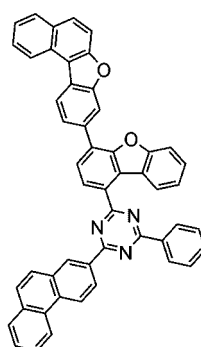
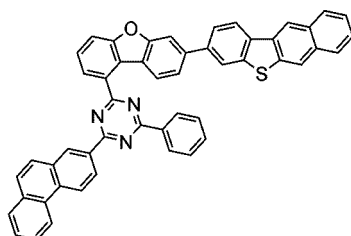
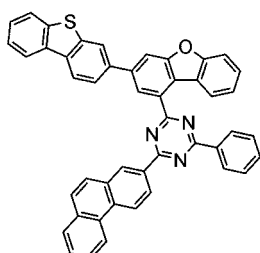


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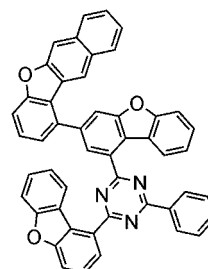
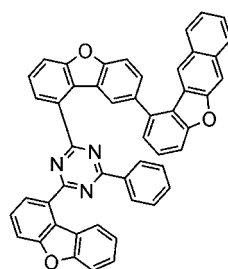
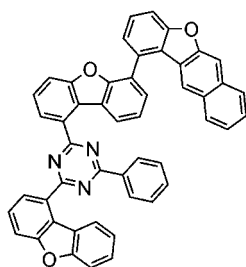
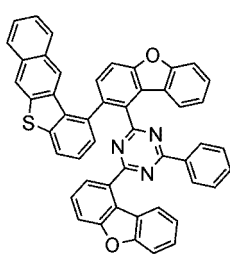
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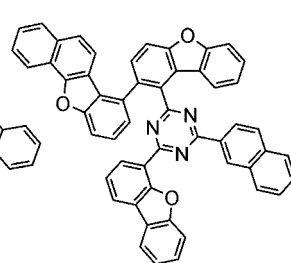
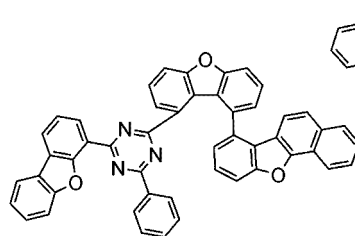
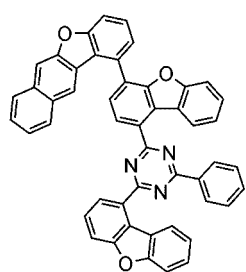
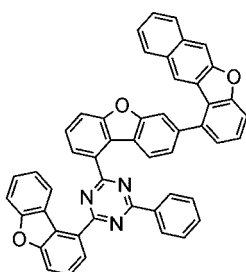
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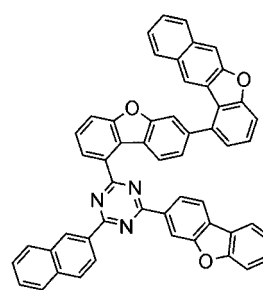
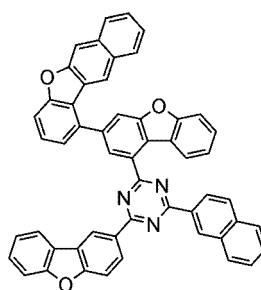
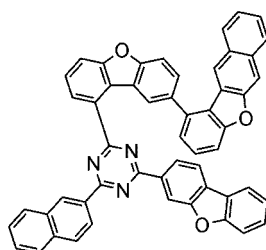
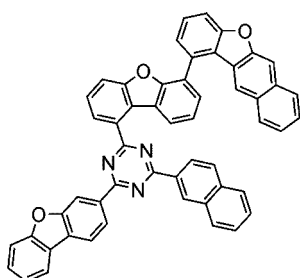
【化 8 7】



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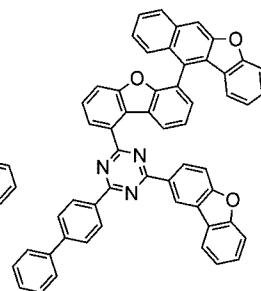
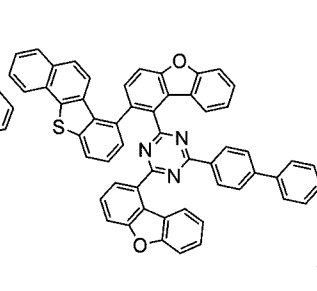
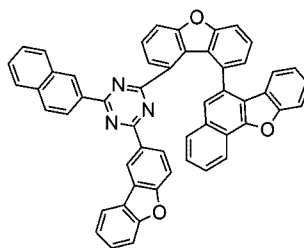
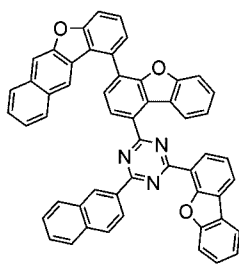


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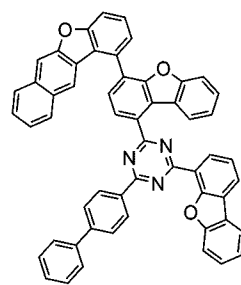
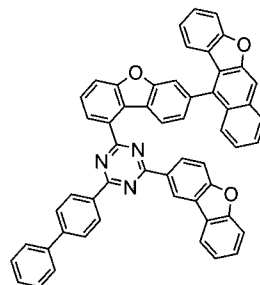
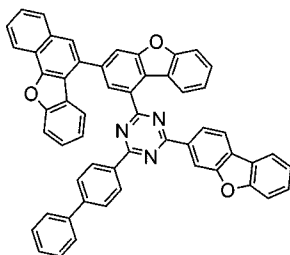
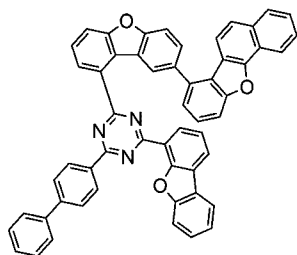
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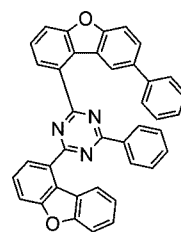
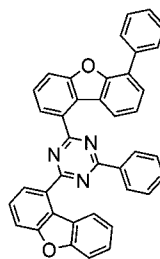
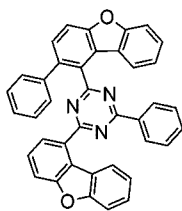
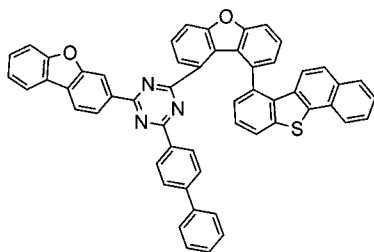
【化 8 8】



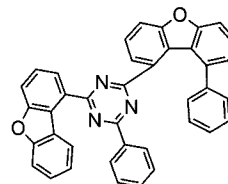
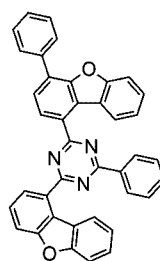
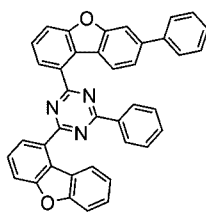
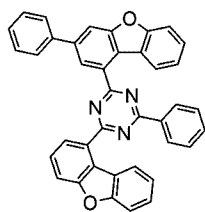
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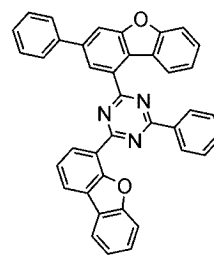
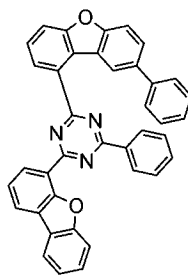
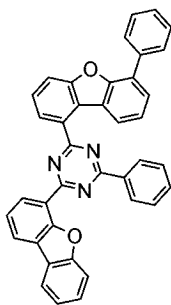
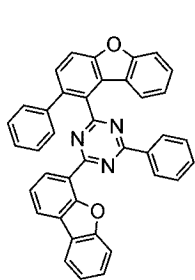
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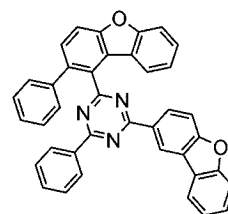
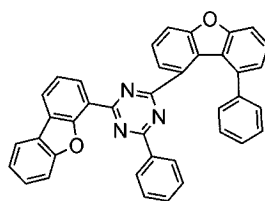
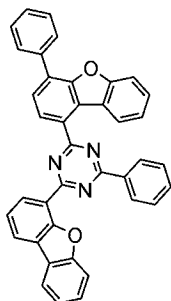
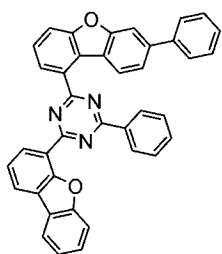
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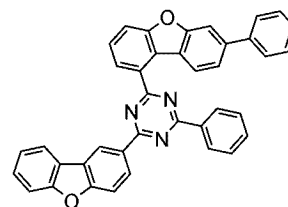
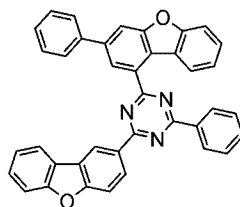
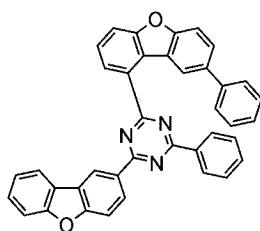
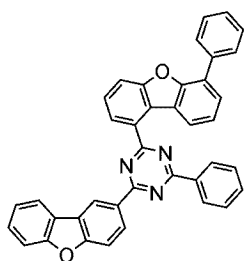
【化 8 9】



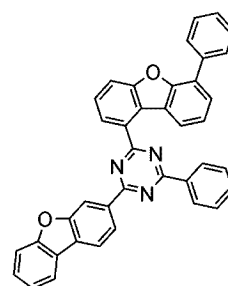
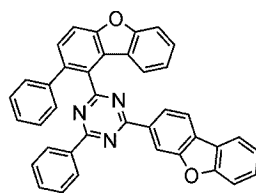
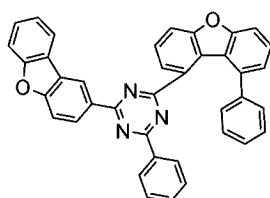
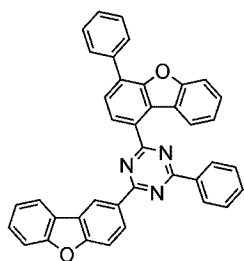
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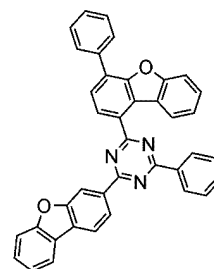
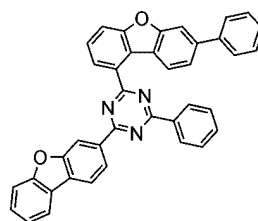
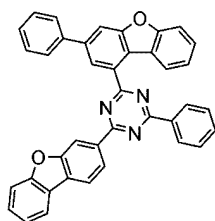
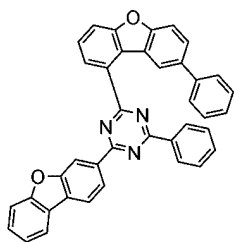
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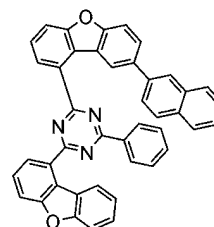
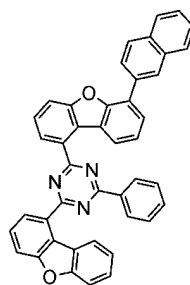
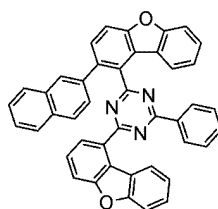
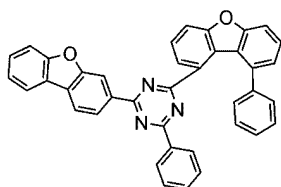
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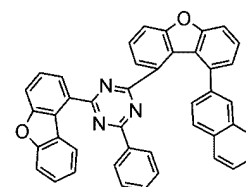
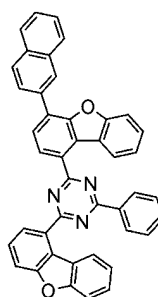
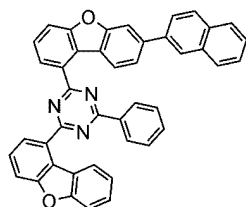
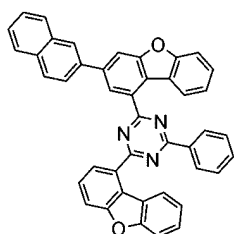
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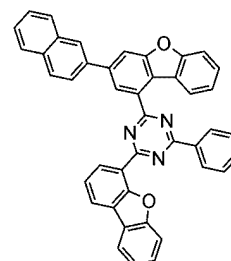
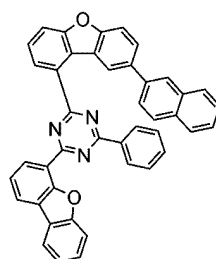
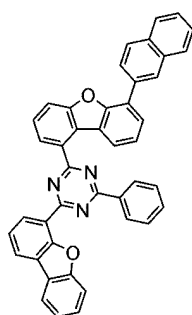
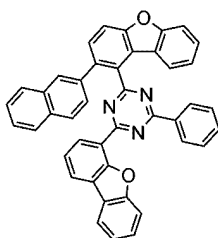
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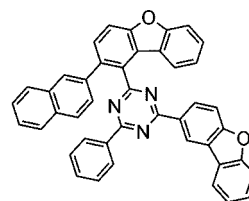
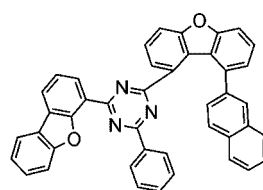
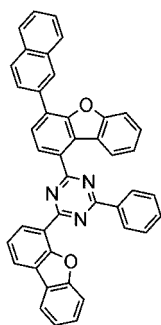
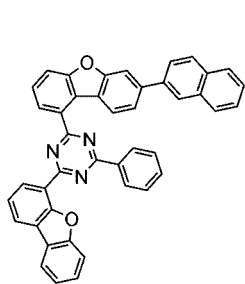
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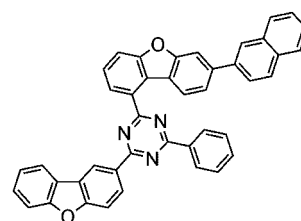
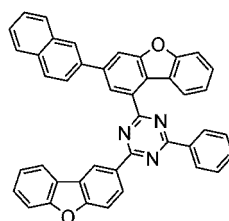
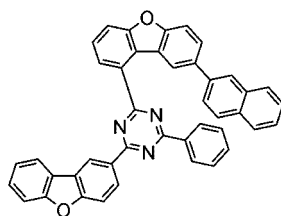
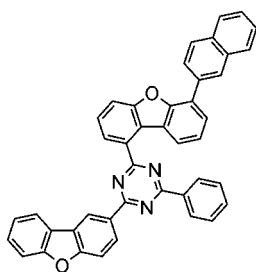
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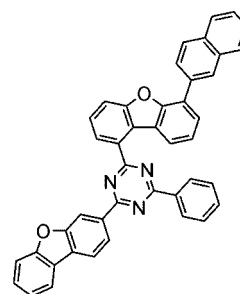
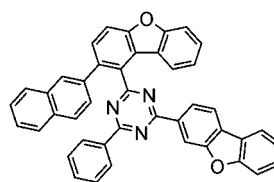
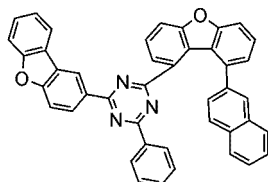
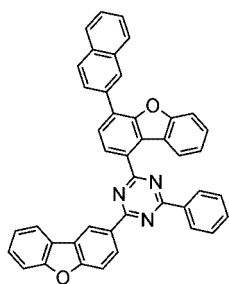
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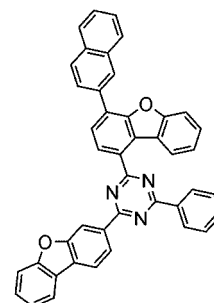
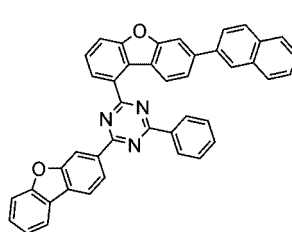
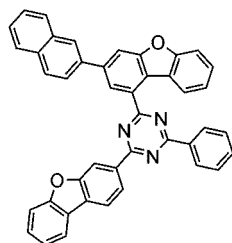
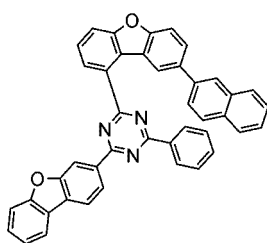
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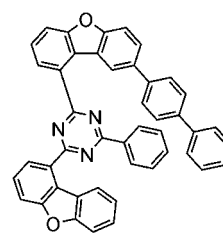
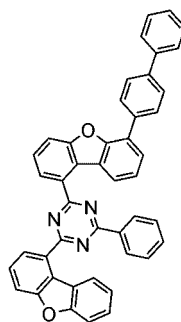
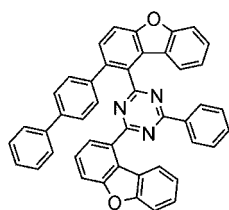
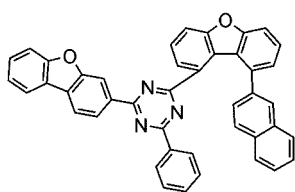
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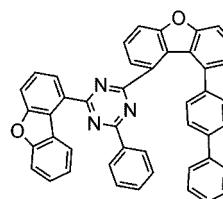
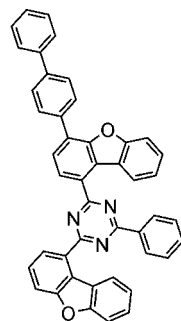
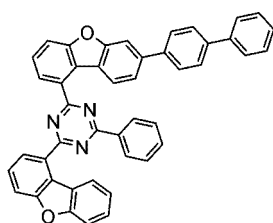
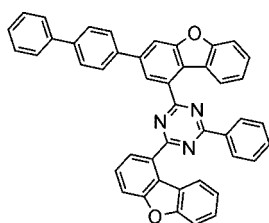
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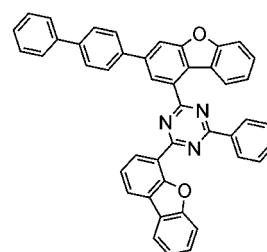
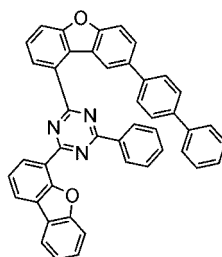
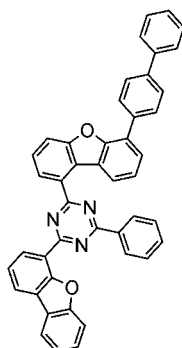
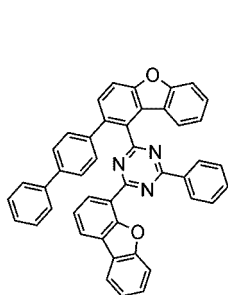
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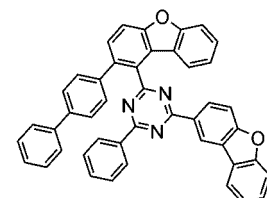
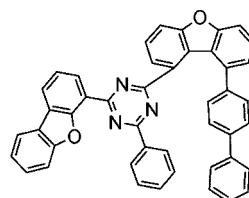
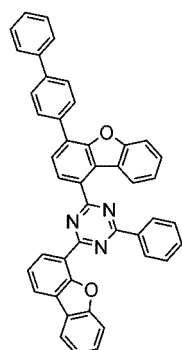
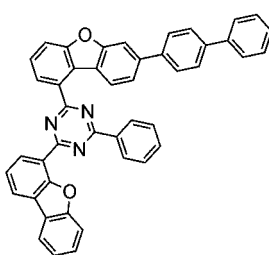
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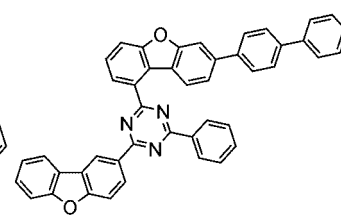
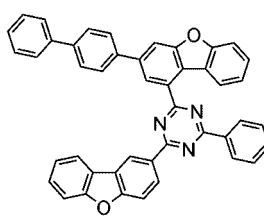
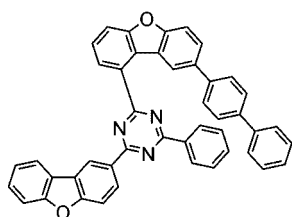
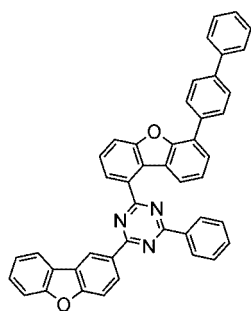
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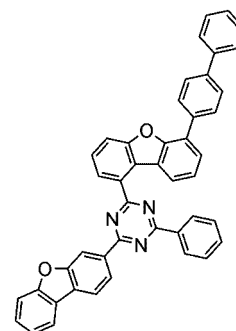
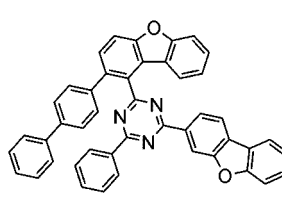
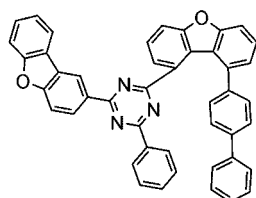
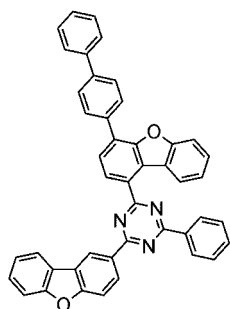
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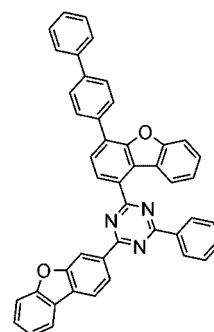
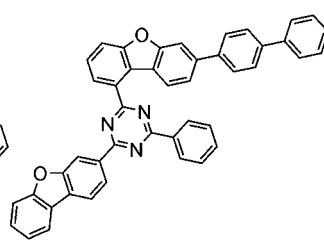
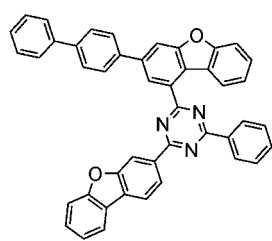
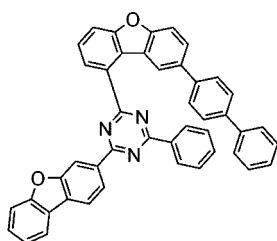
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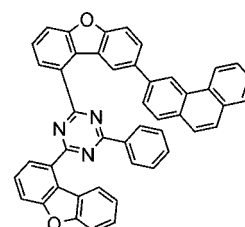
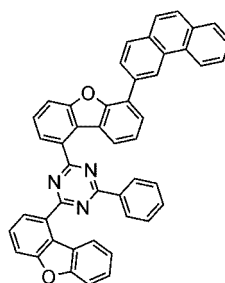
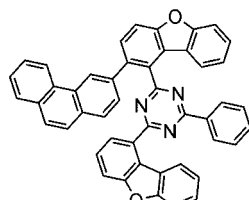
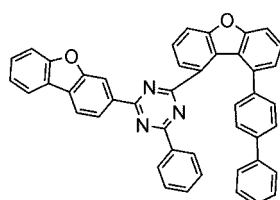
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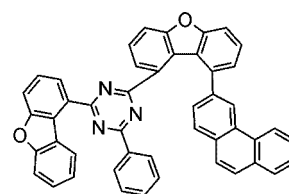
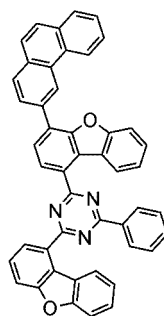
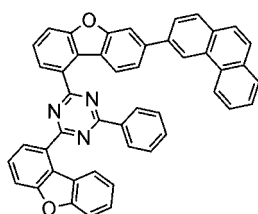
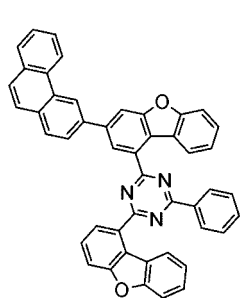
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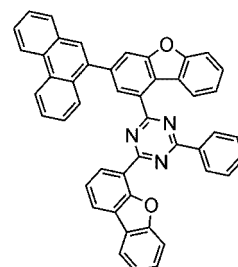
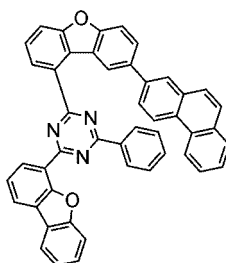
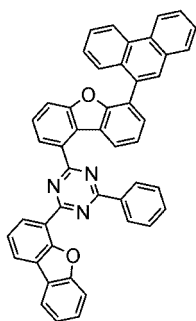
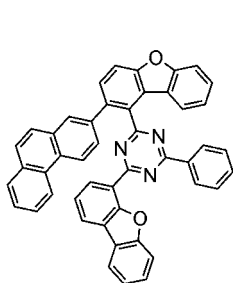
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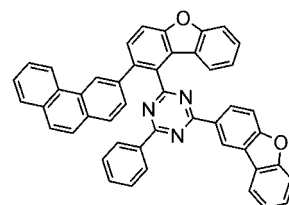
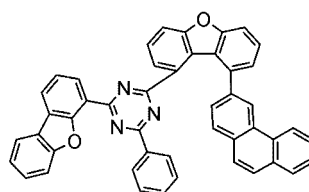
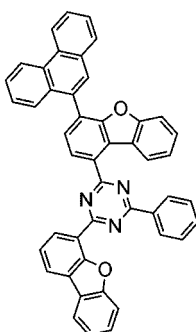
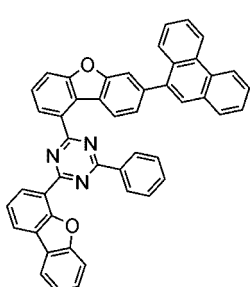
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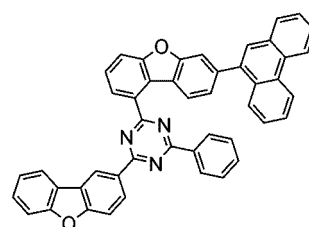
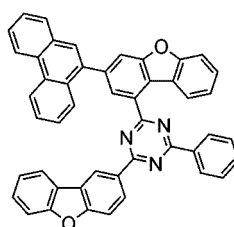
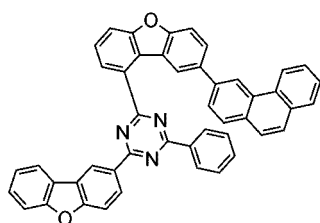
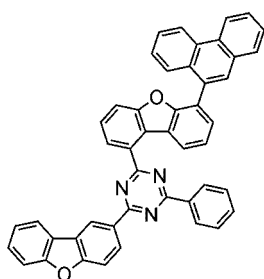
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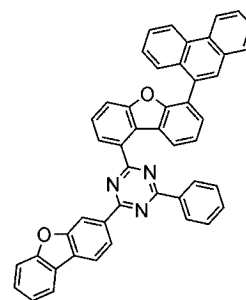
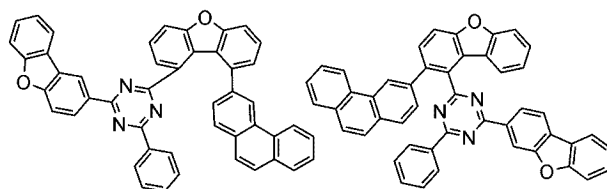
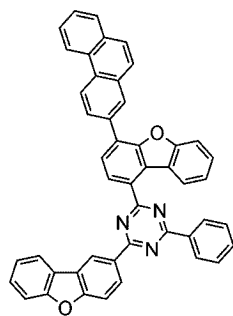
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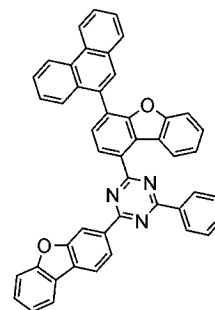
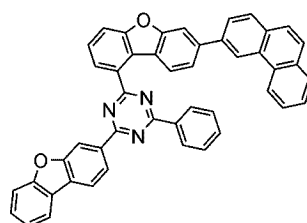
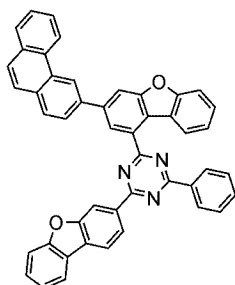
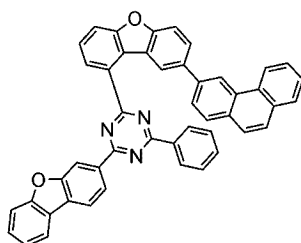
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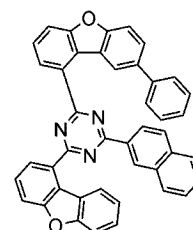
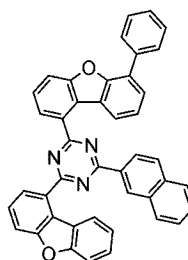
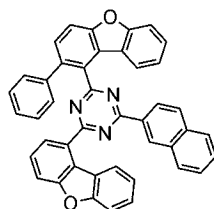
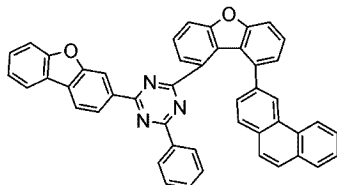
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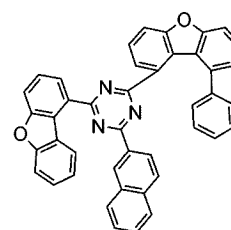
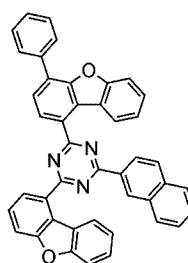
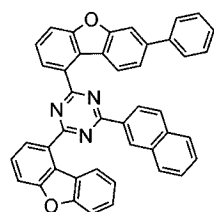
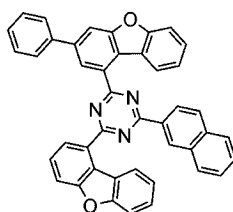
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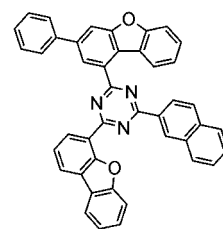
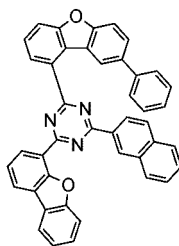
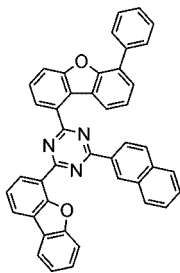
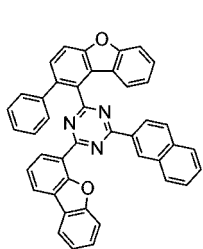
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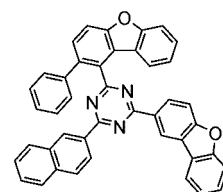
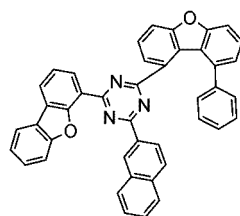
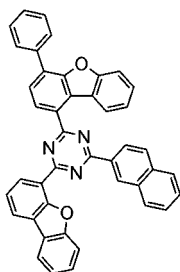
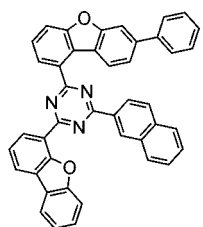
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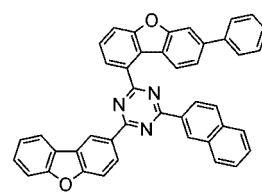
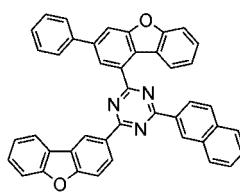
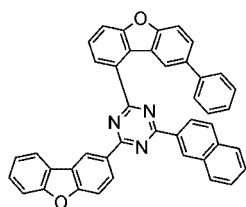
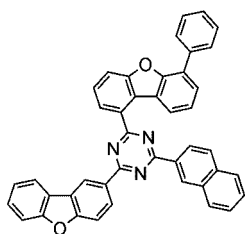
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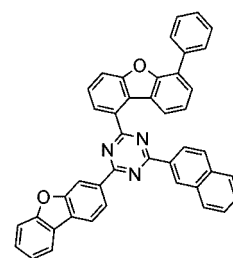
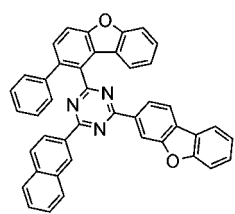
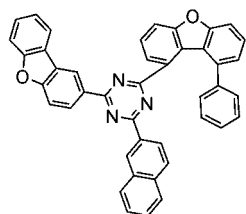
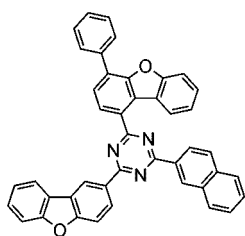
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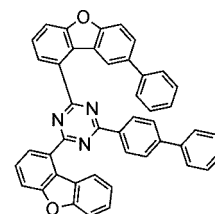
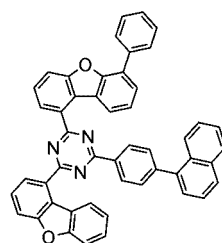
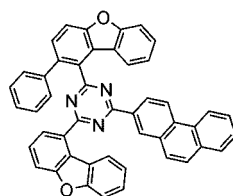
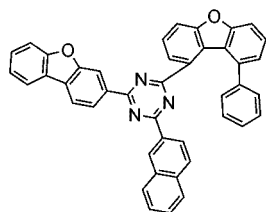
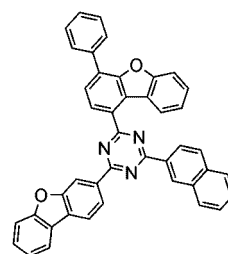
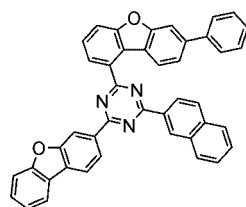
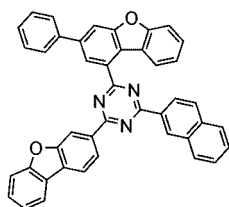
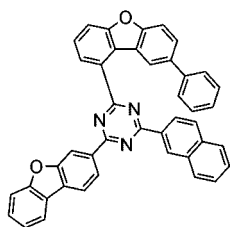
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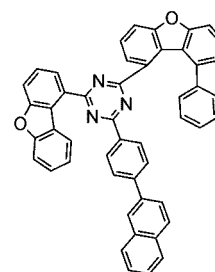
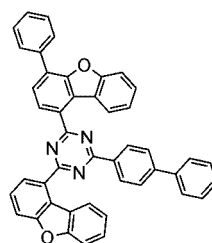
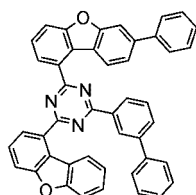
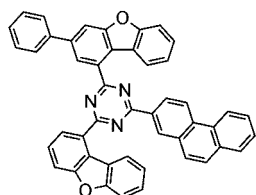
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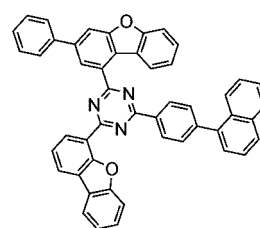
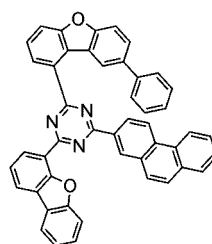
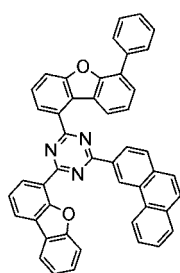
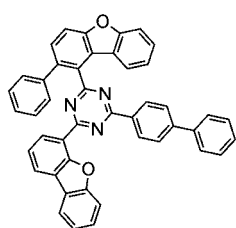
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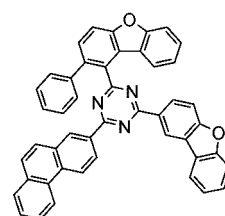
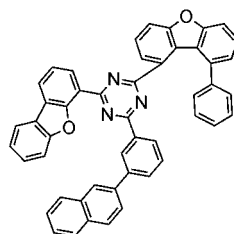
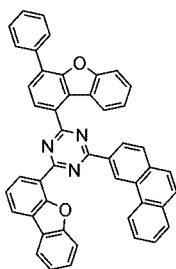
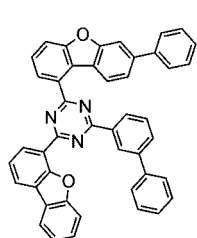


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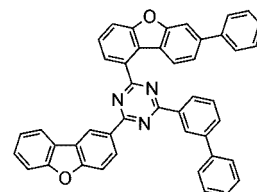
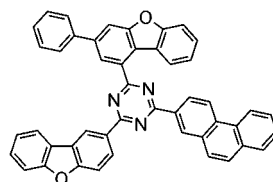
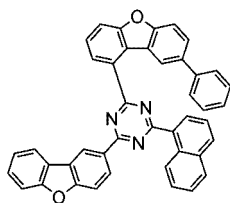
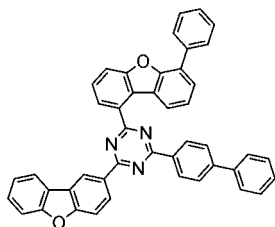
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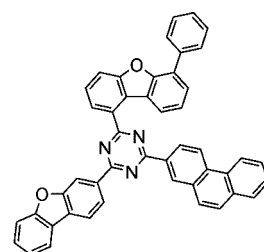
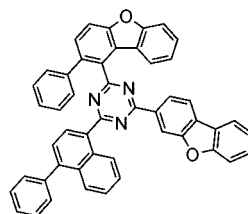
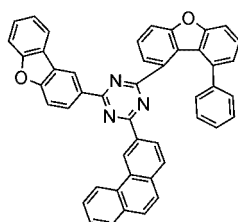
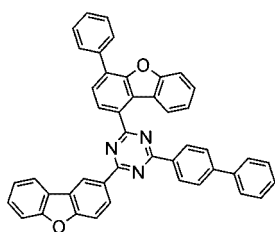
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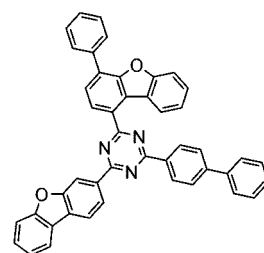
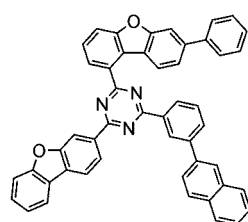
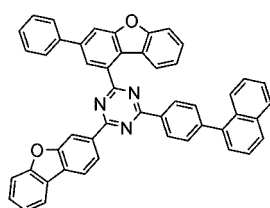
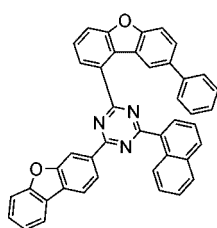
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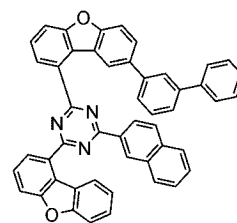
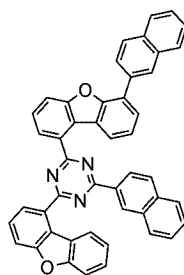
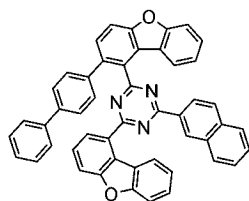
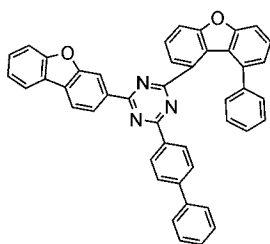
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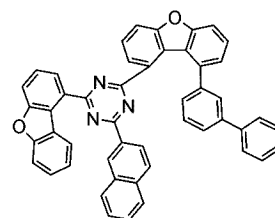
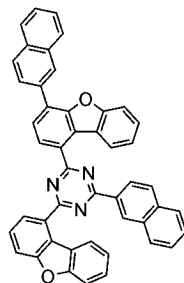
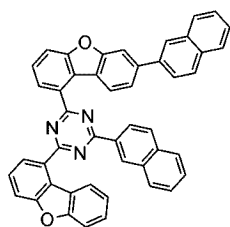
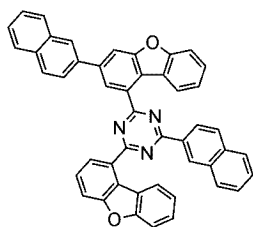
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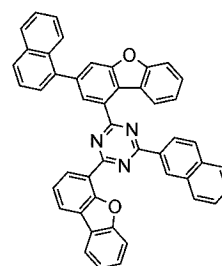
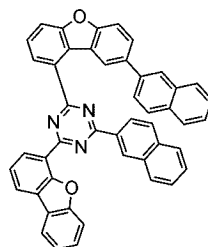
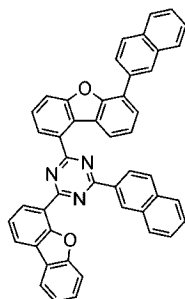
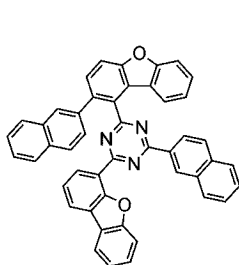
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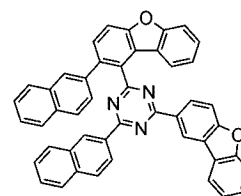
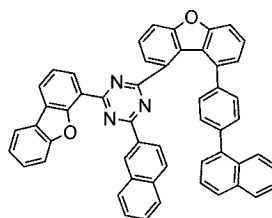
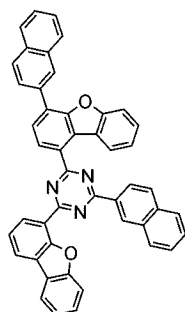
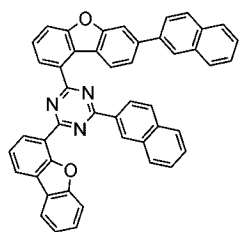
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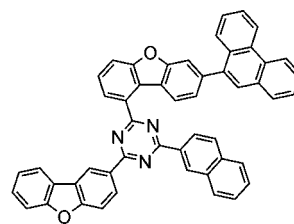
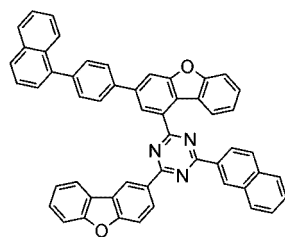
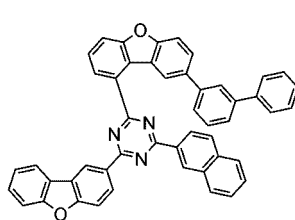
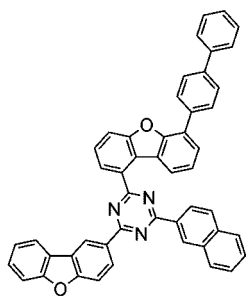
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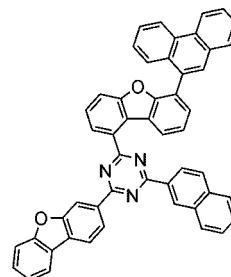
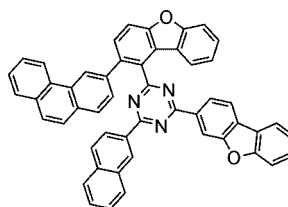
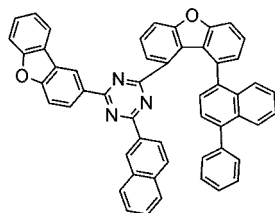
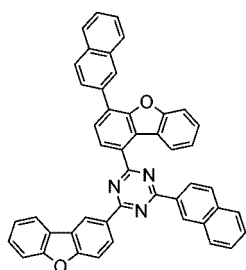
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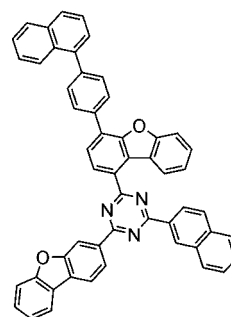
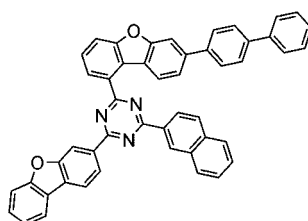
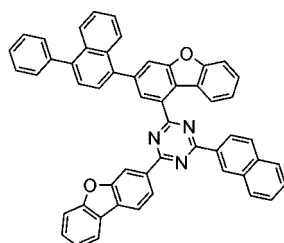
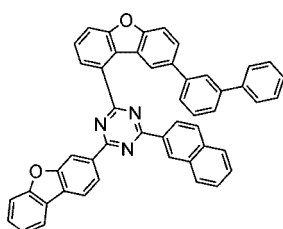
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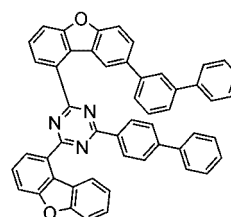
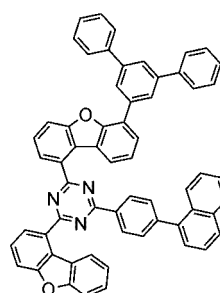
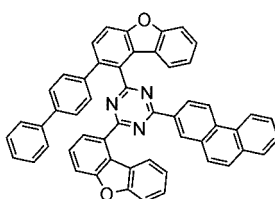
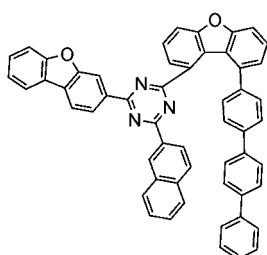
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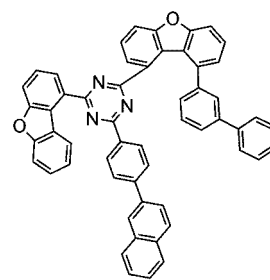
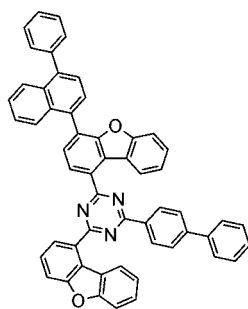
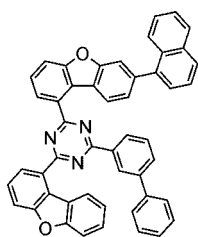
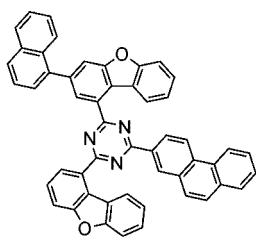
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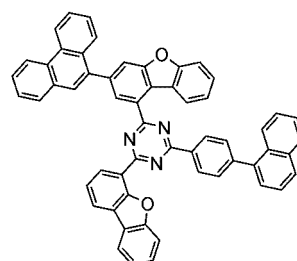
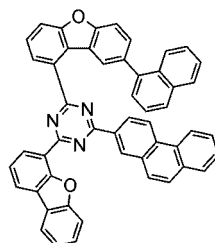
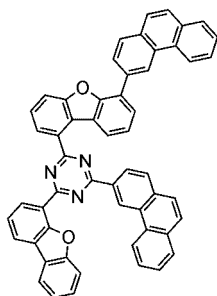
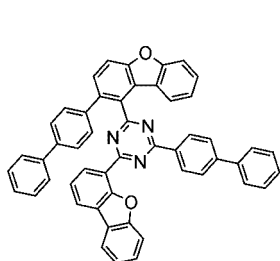
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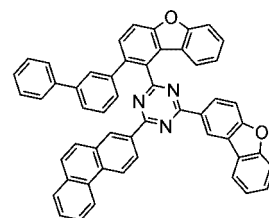
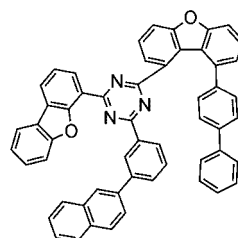
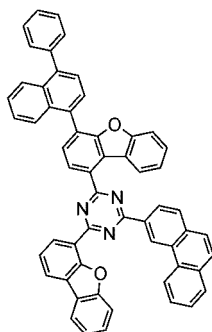
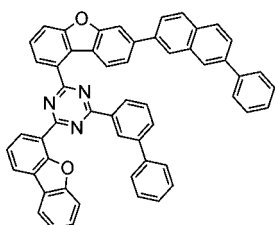
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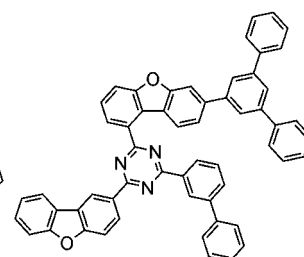
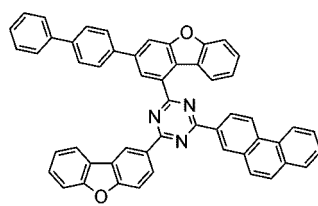
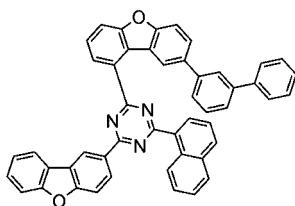
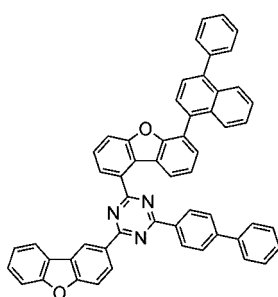
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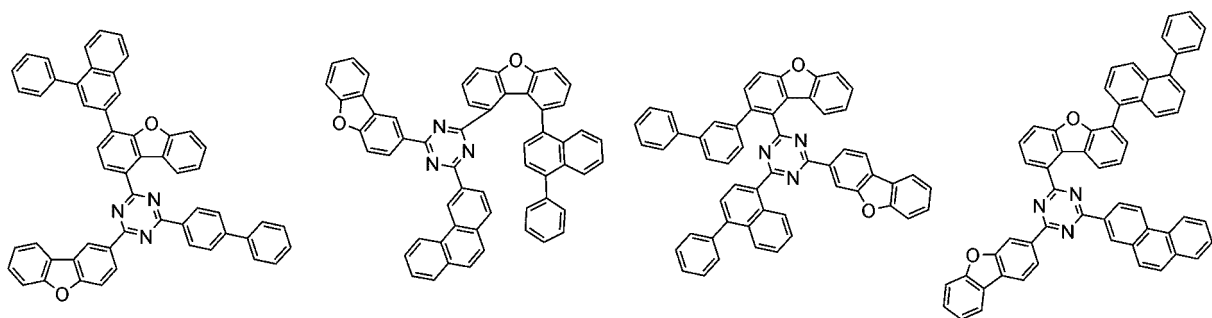
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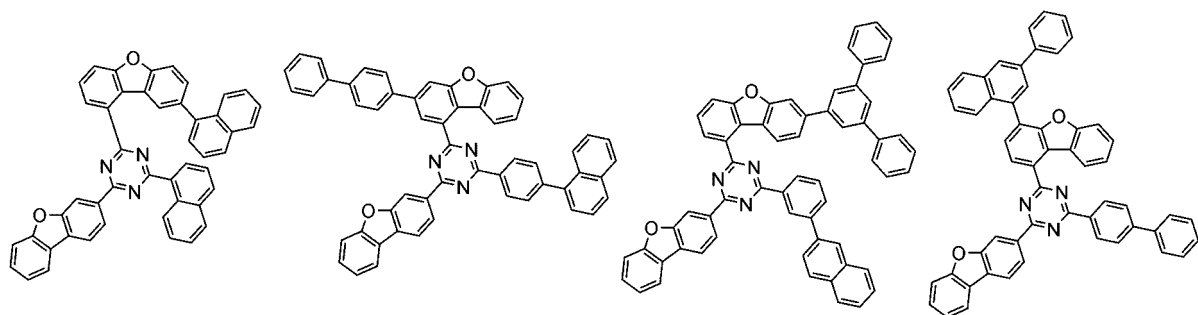
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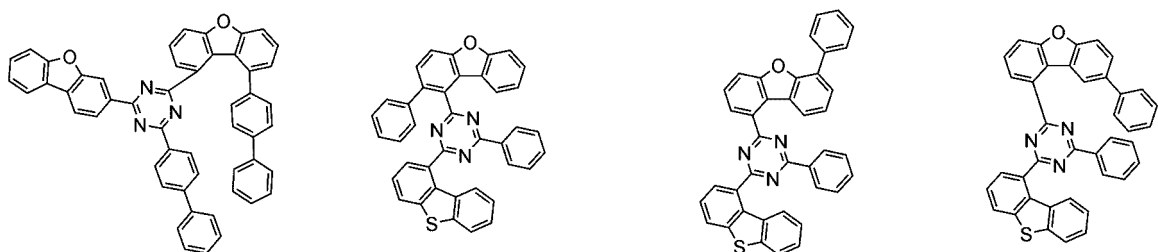
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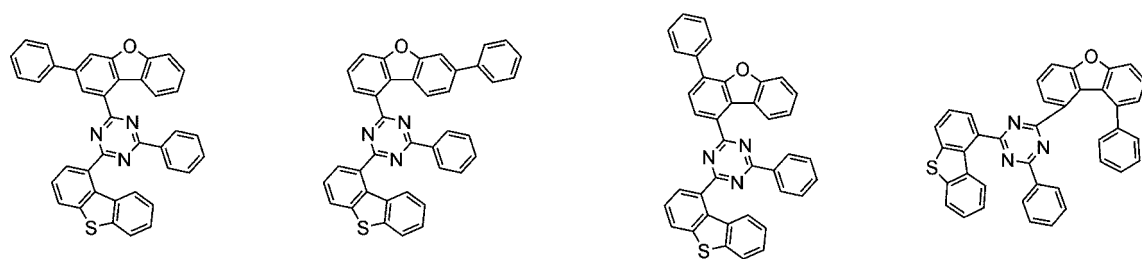
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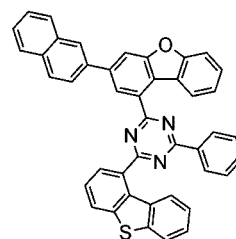
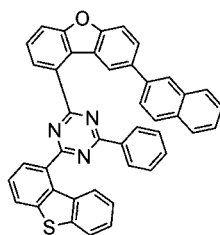
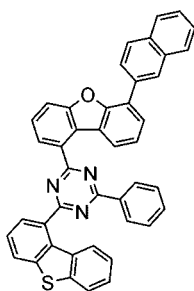
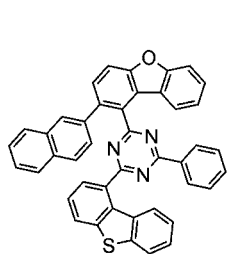
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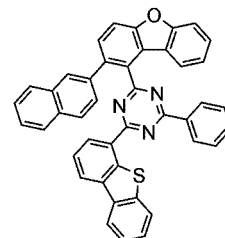
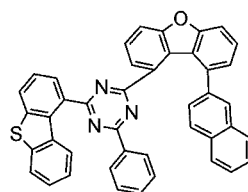
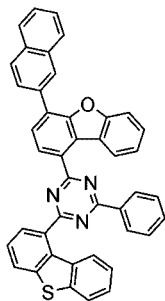
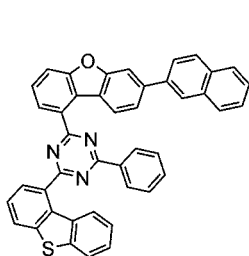
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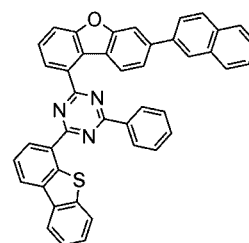
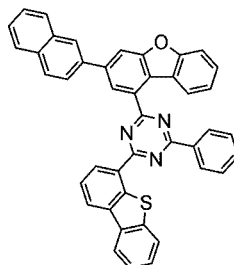
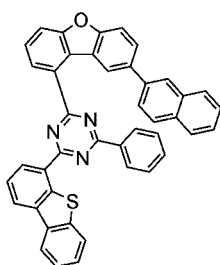
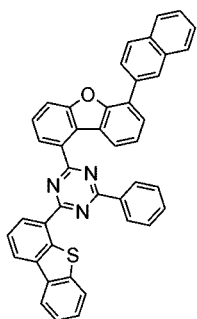
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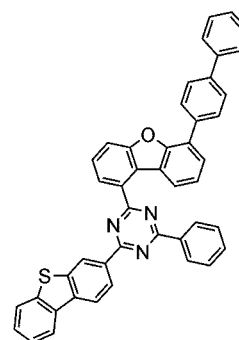
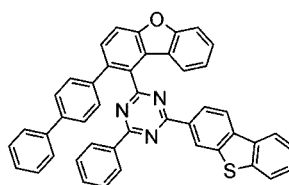
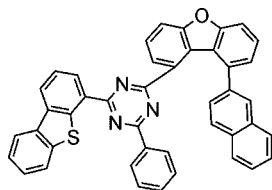
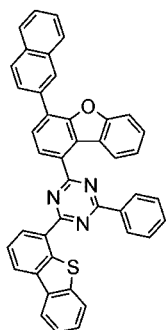
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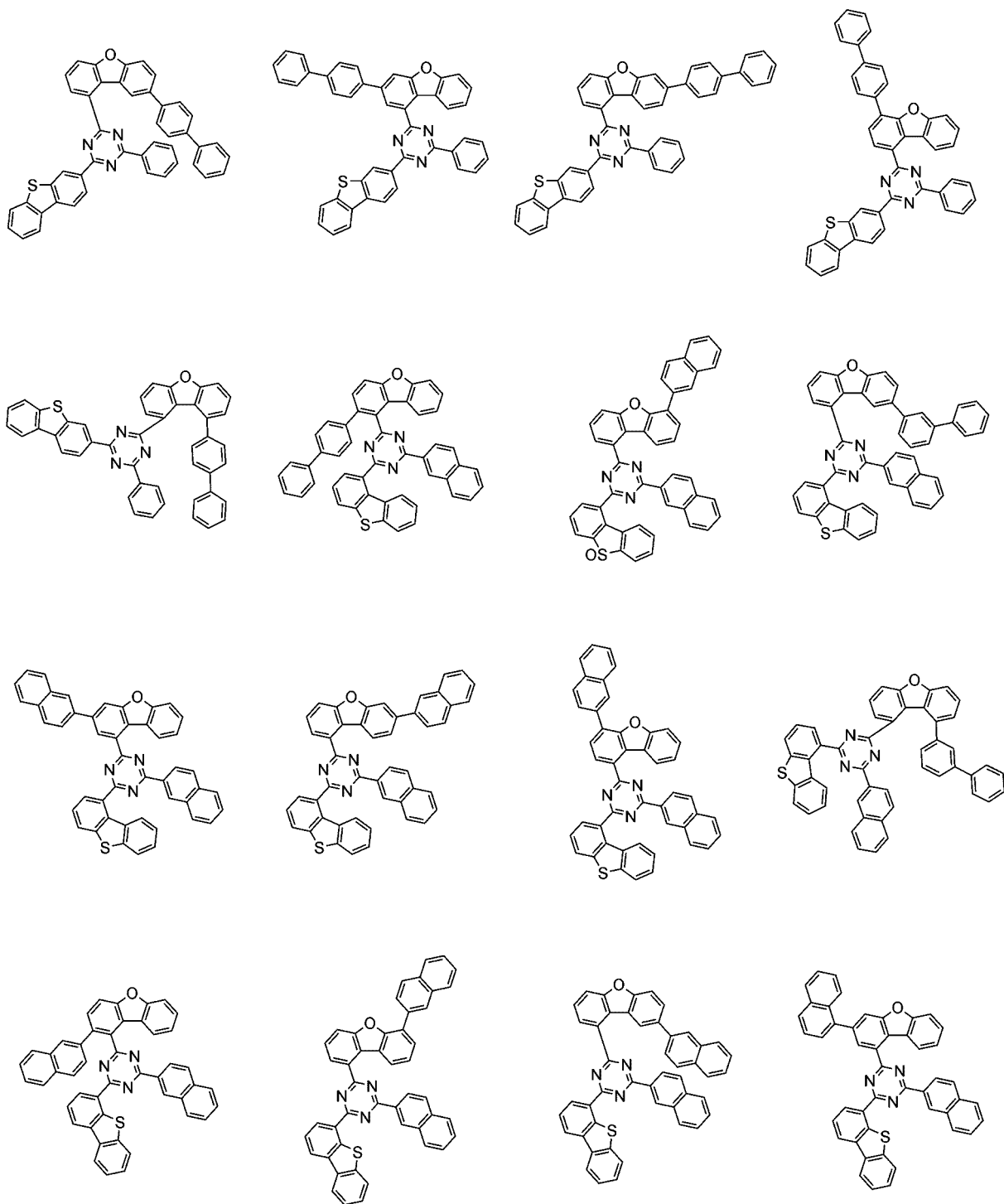
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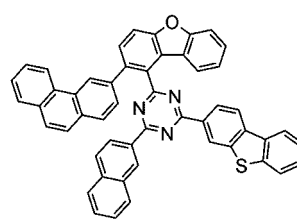
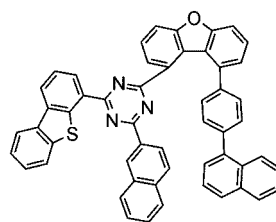
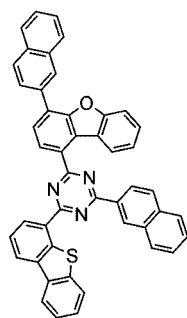
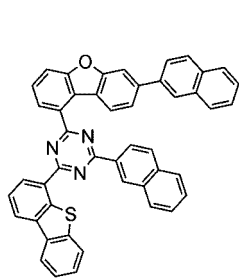
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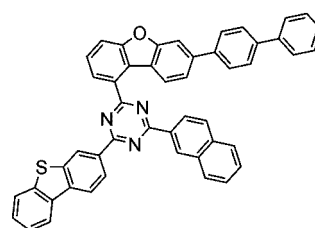
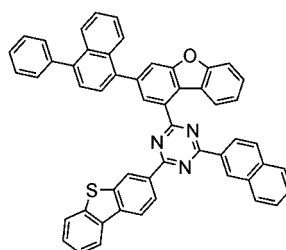
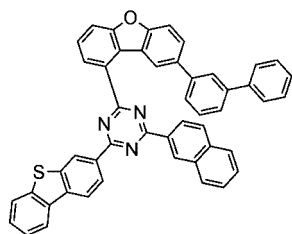
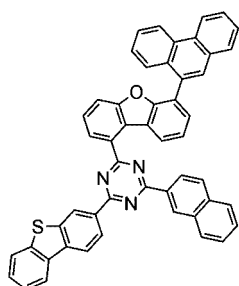
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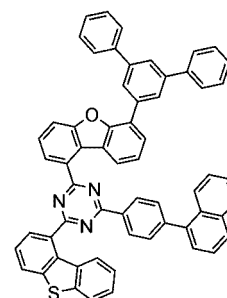
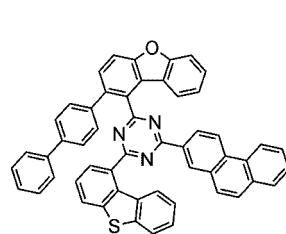
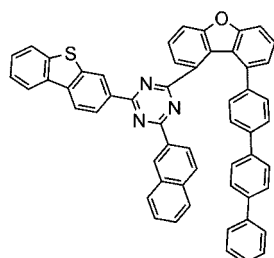
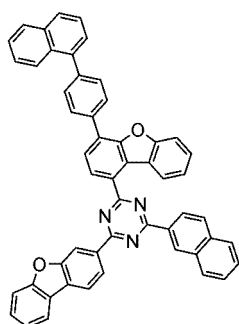
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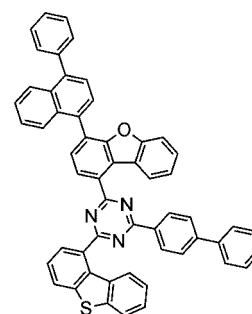
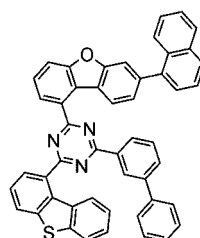
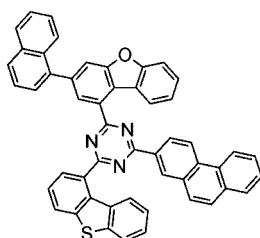
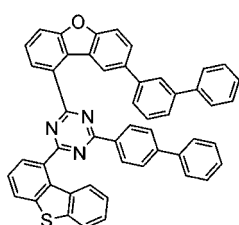
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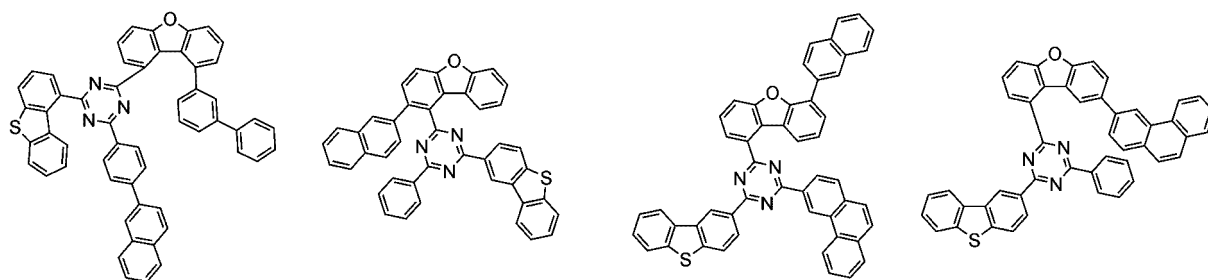
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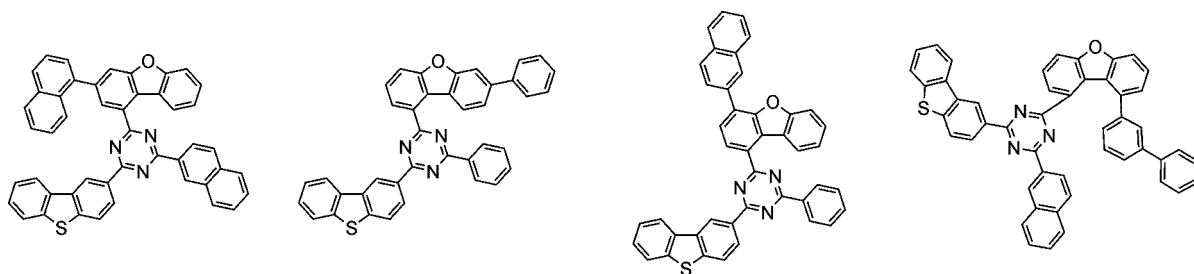
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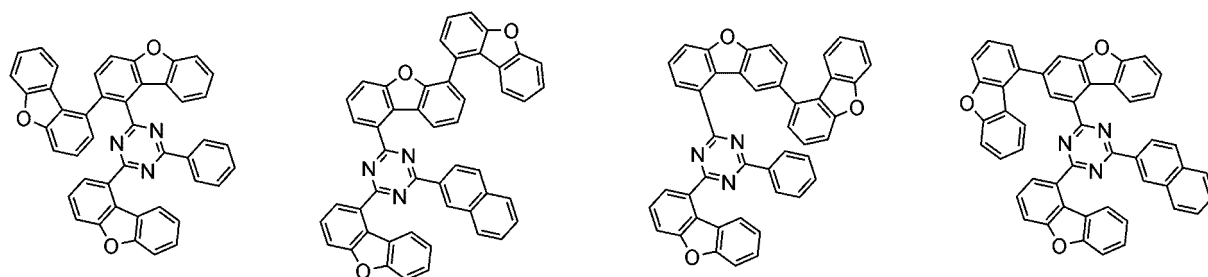
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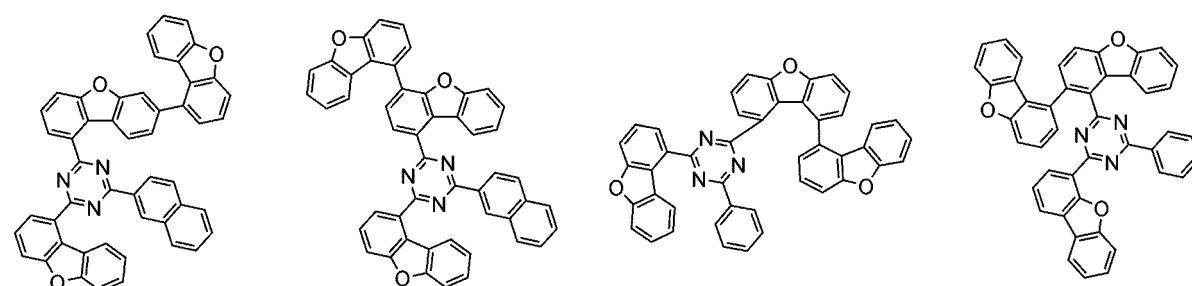
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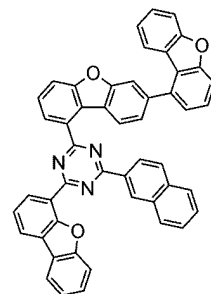
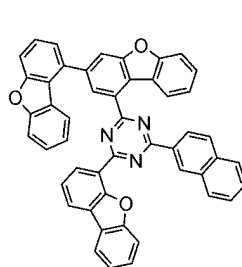
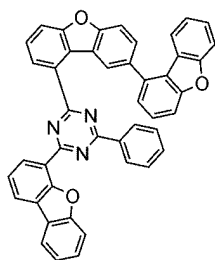
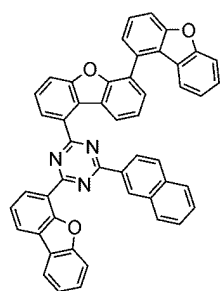


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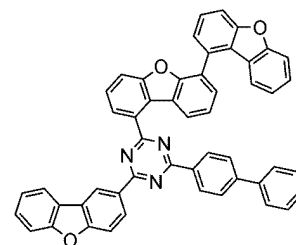
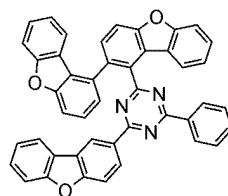
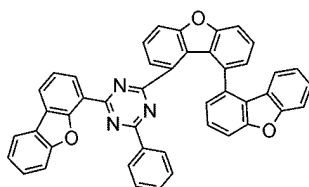
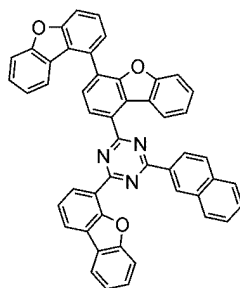
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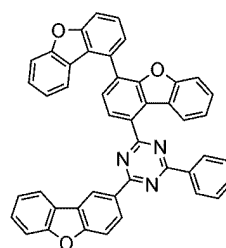
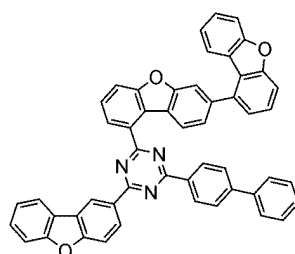
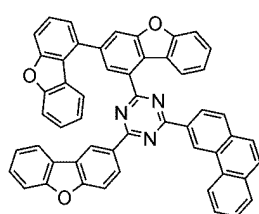
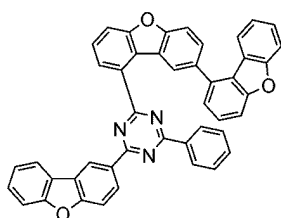
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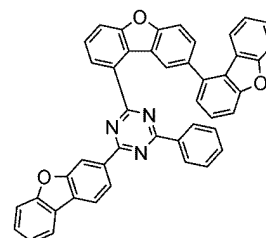
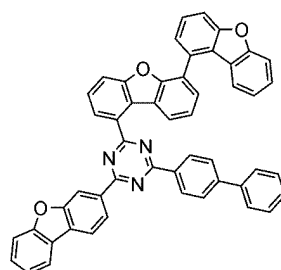
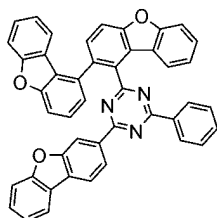
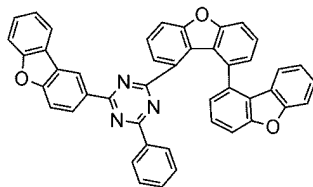
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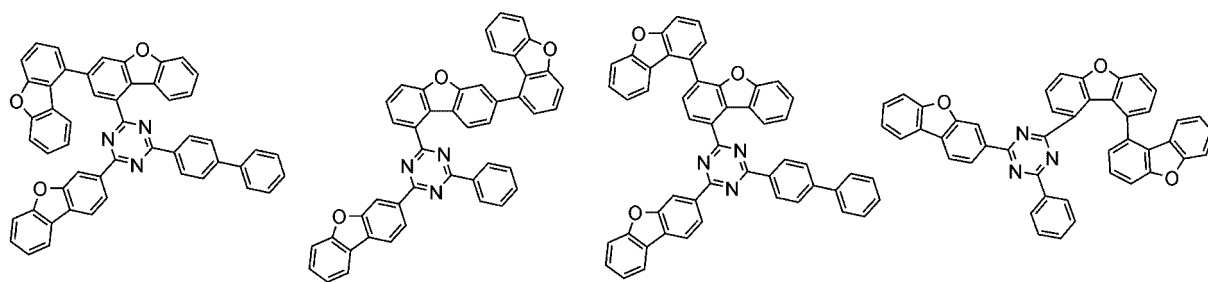
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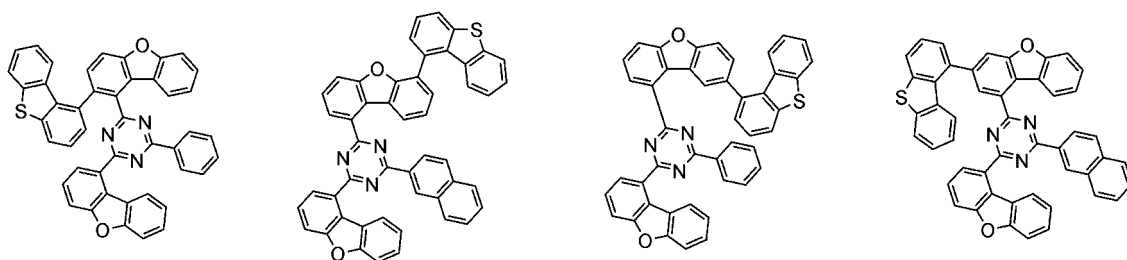
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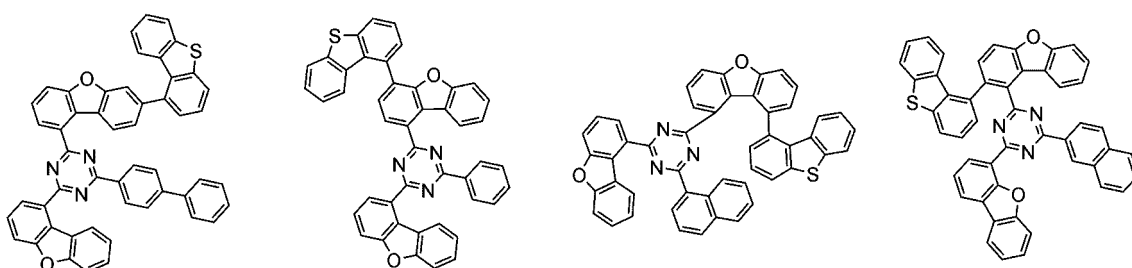
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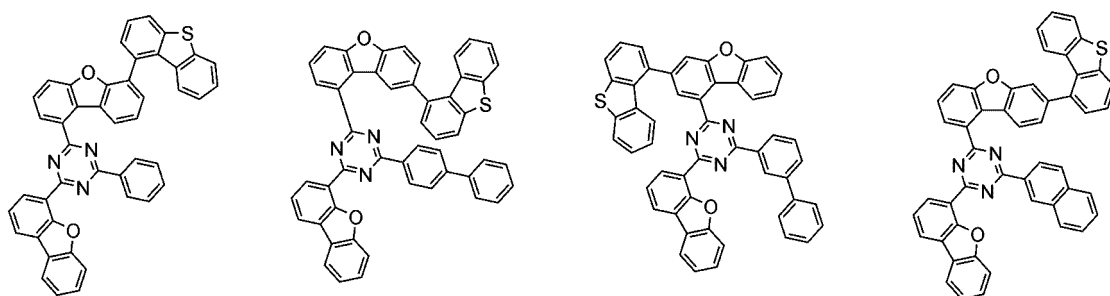
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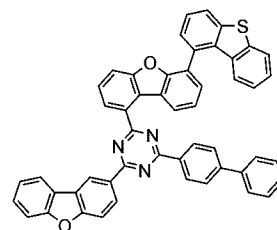
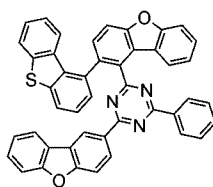
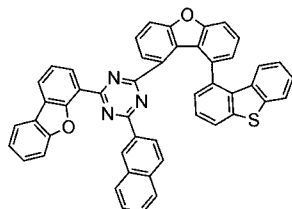
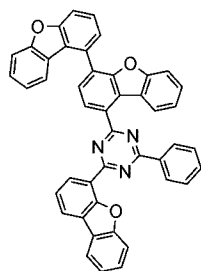
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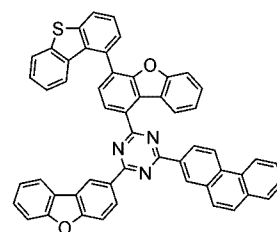
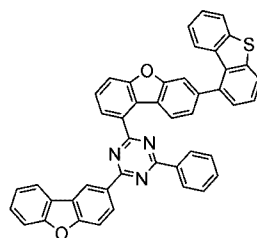
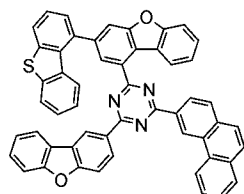
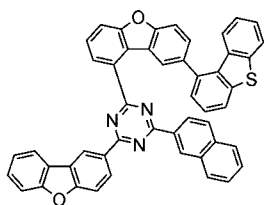
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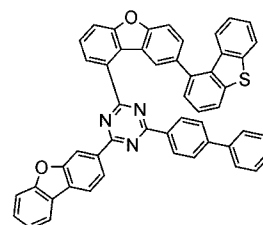
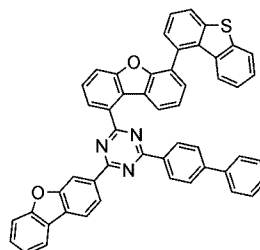
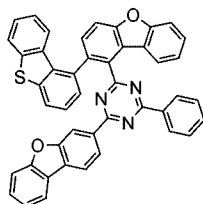
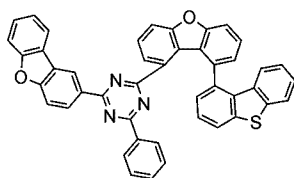
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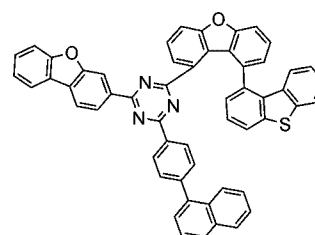
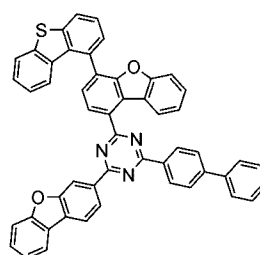
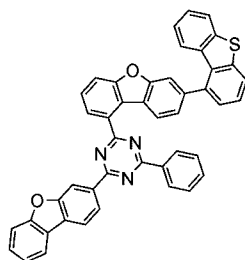
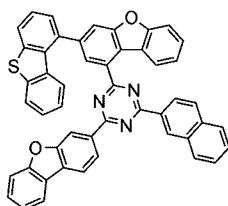
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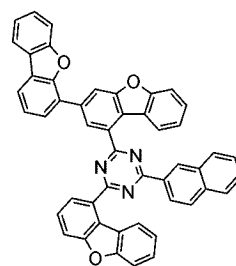
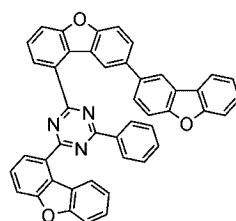
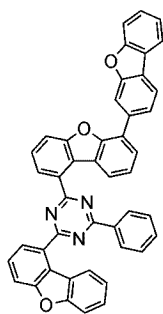
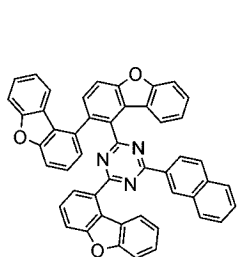
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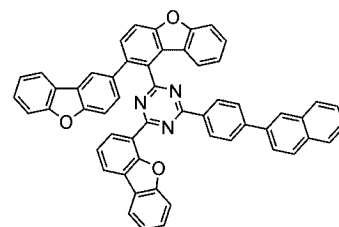
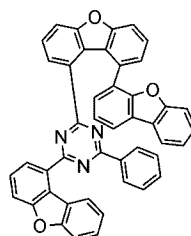
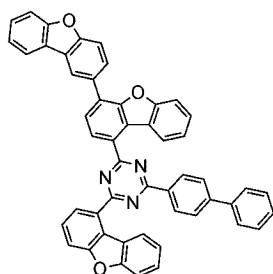
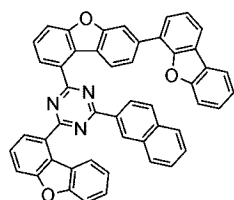
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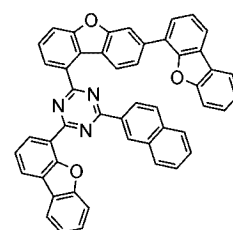
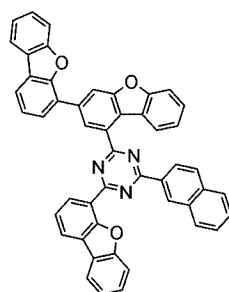
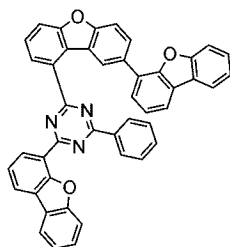
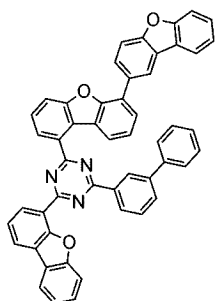
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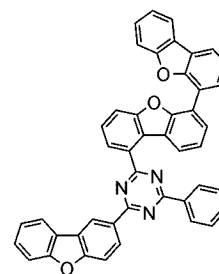
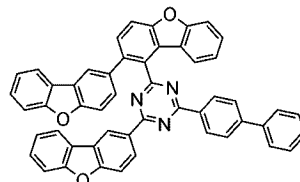
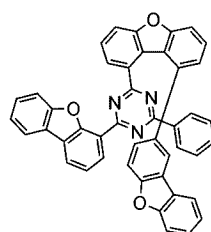
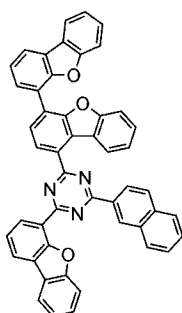
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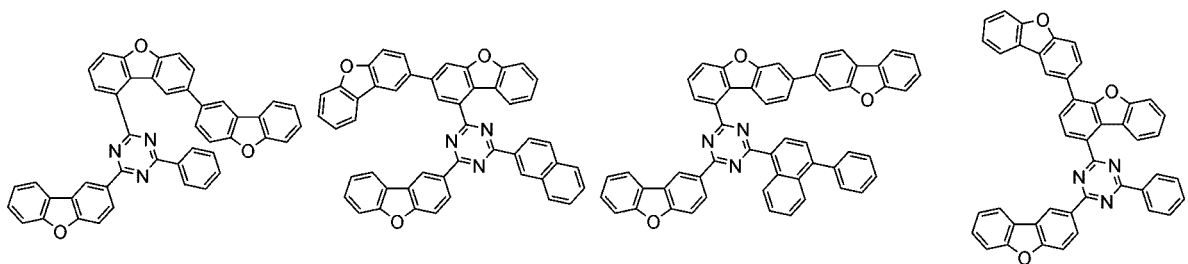
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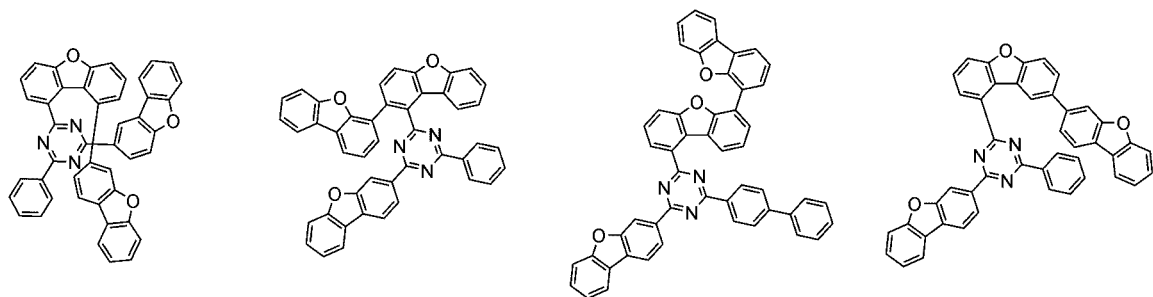
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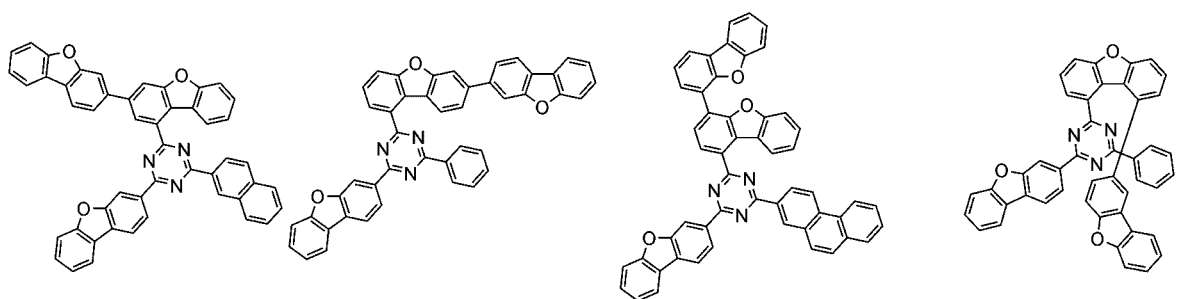
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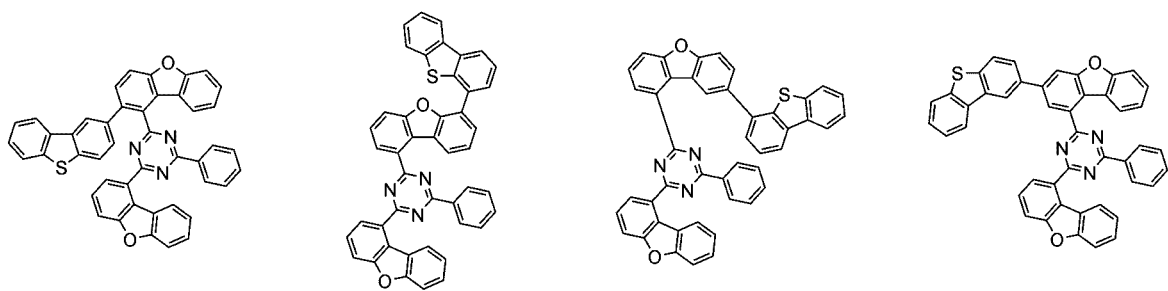
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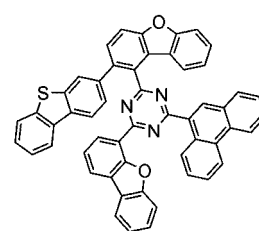
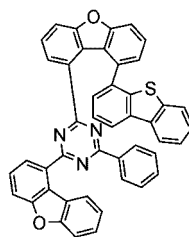
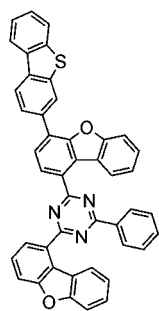
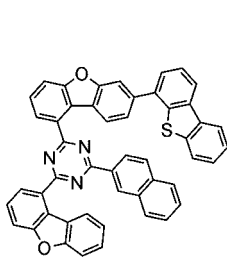
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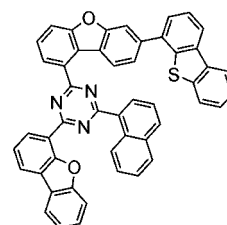
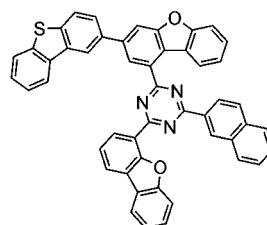
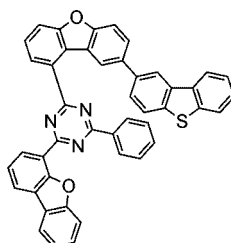
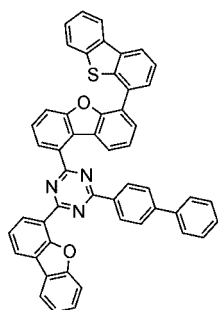
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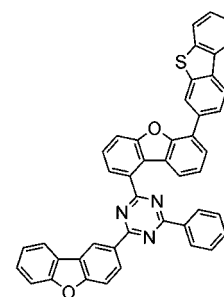
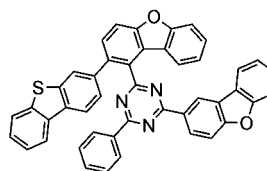
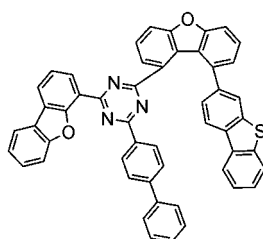
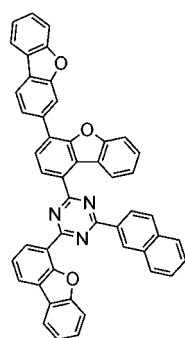
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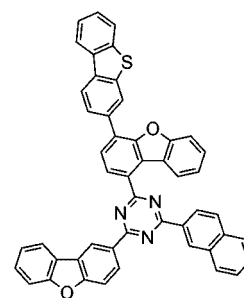
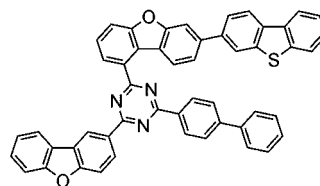
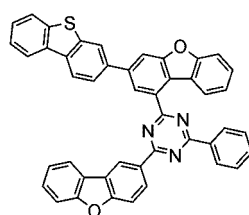
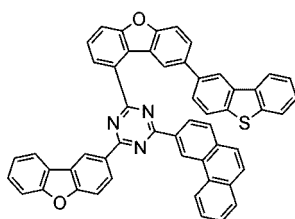
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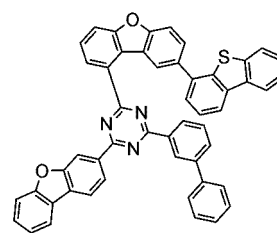
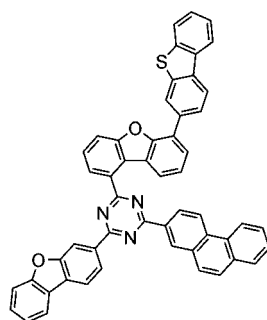
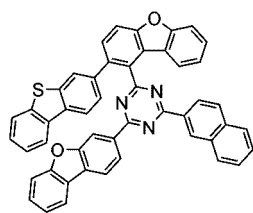
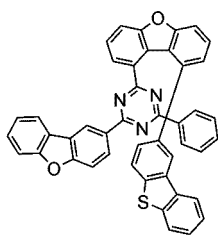
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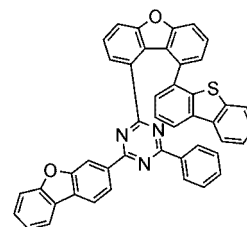
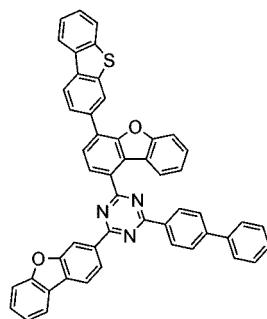
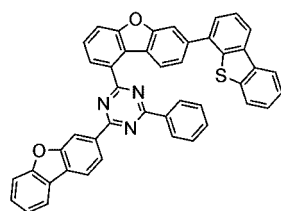
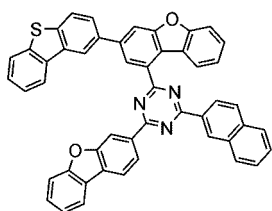
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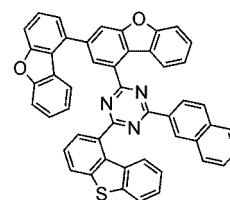
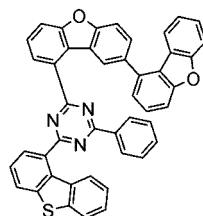
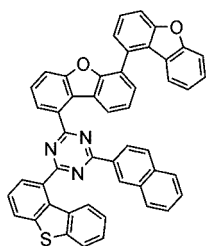
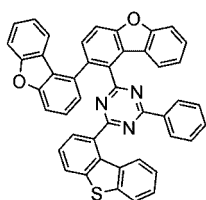
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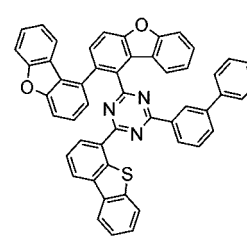
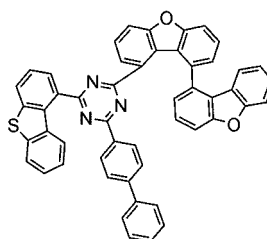
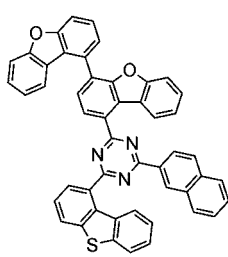
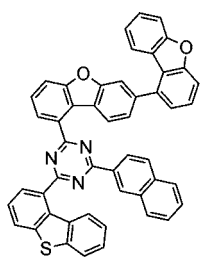
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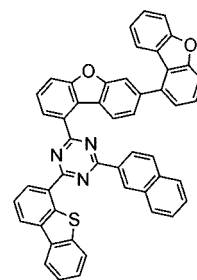
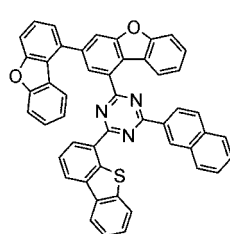
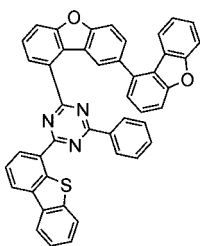
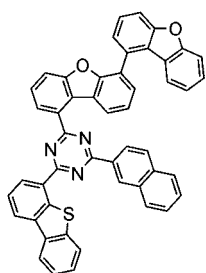
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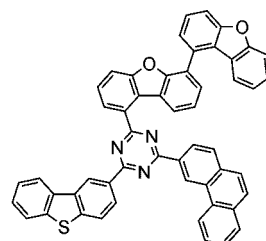
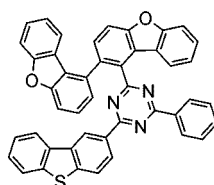
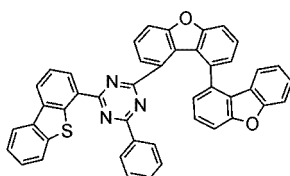
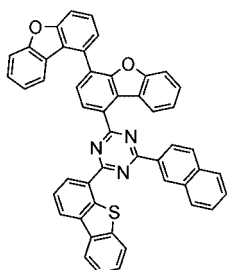
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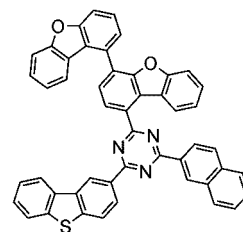
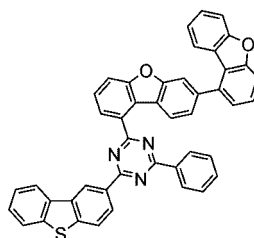
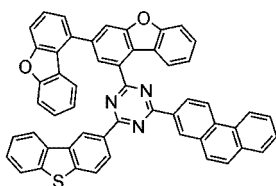
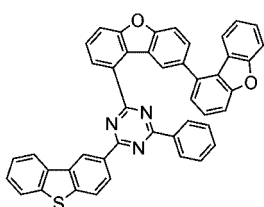
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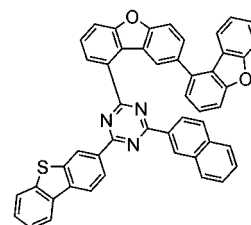
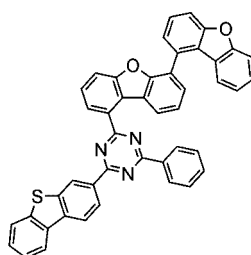
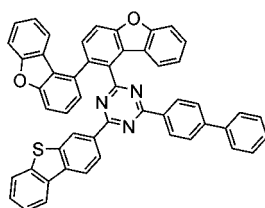
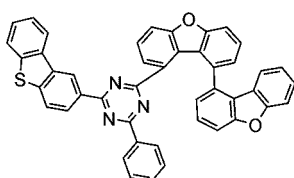
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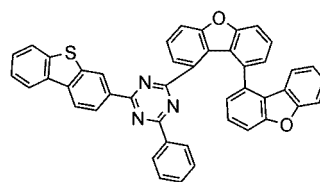
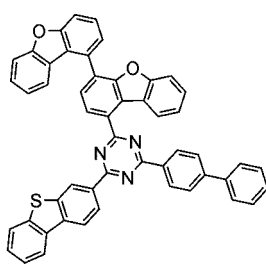
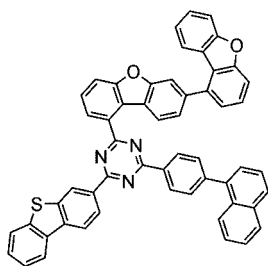
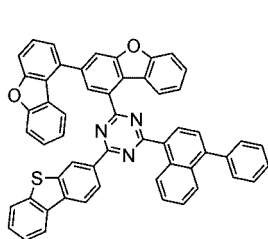
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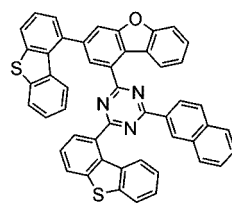
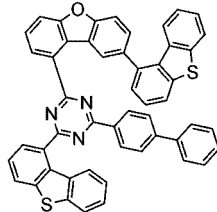
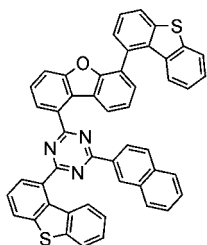
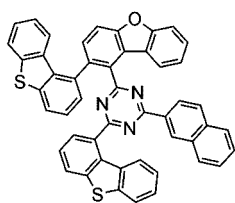
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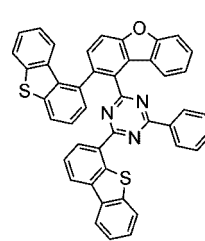
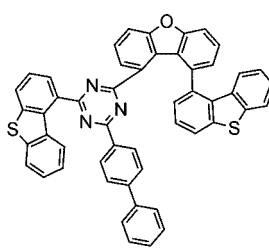
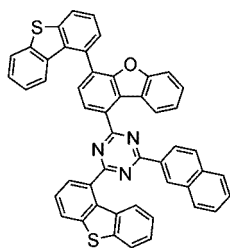
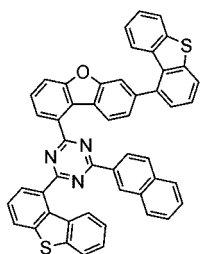
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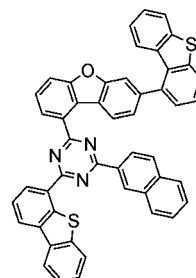
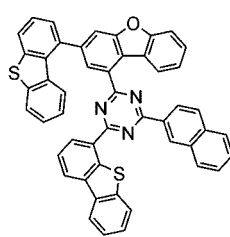
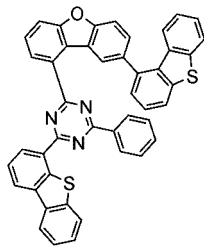
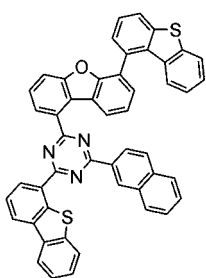
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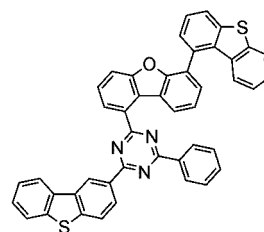
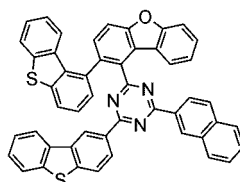
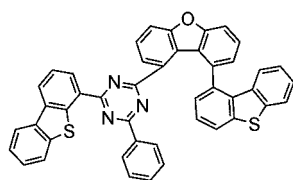
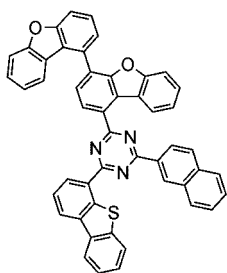
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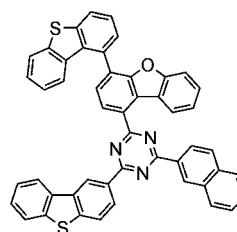
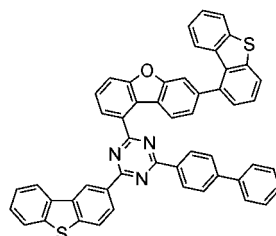
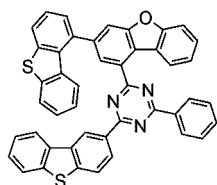
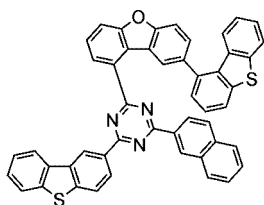
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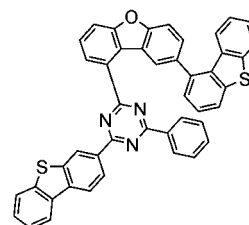
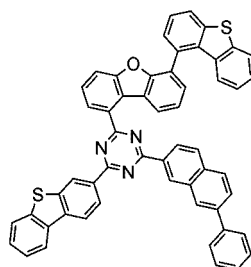
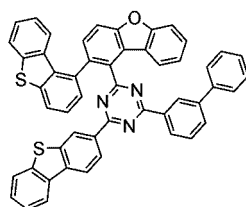
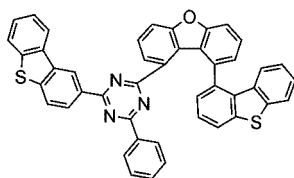
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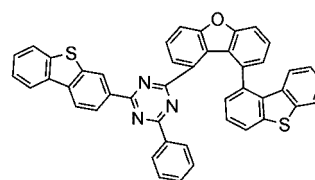
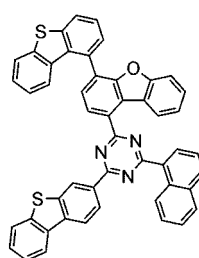
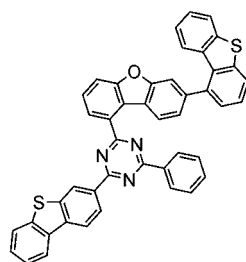
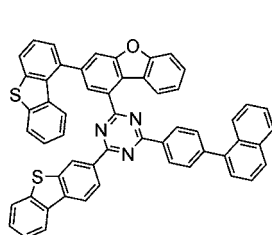
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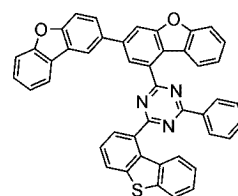
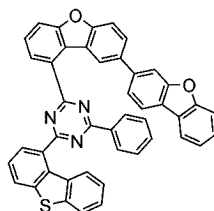
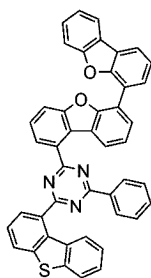
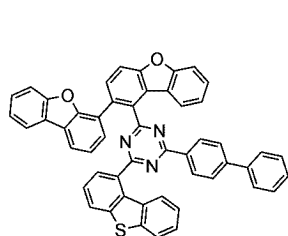
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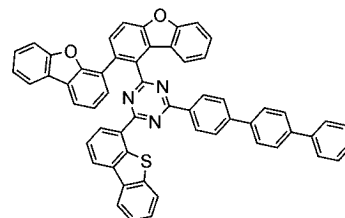
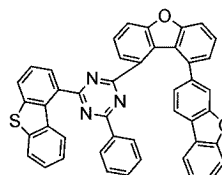
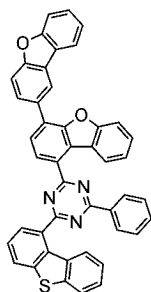
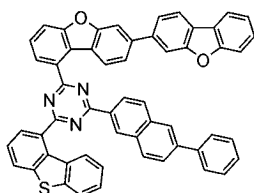
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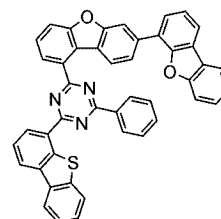
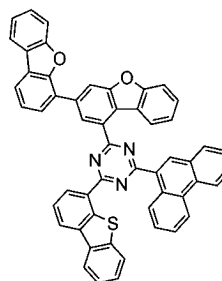
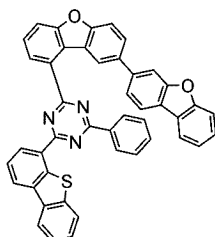
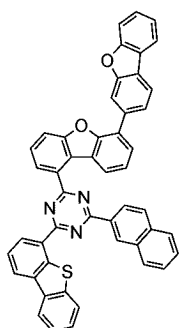
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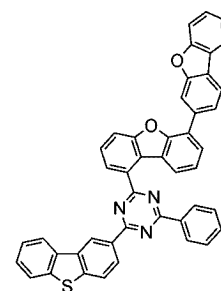
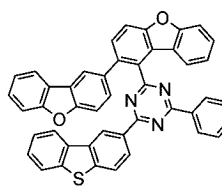
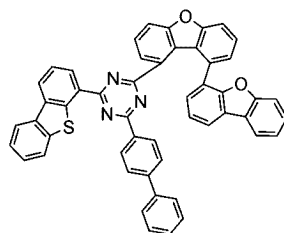
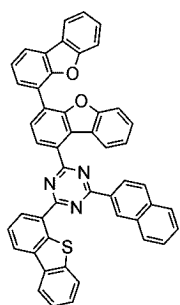
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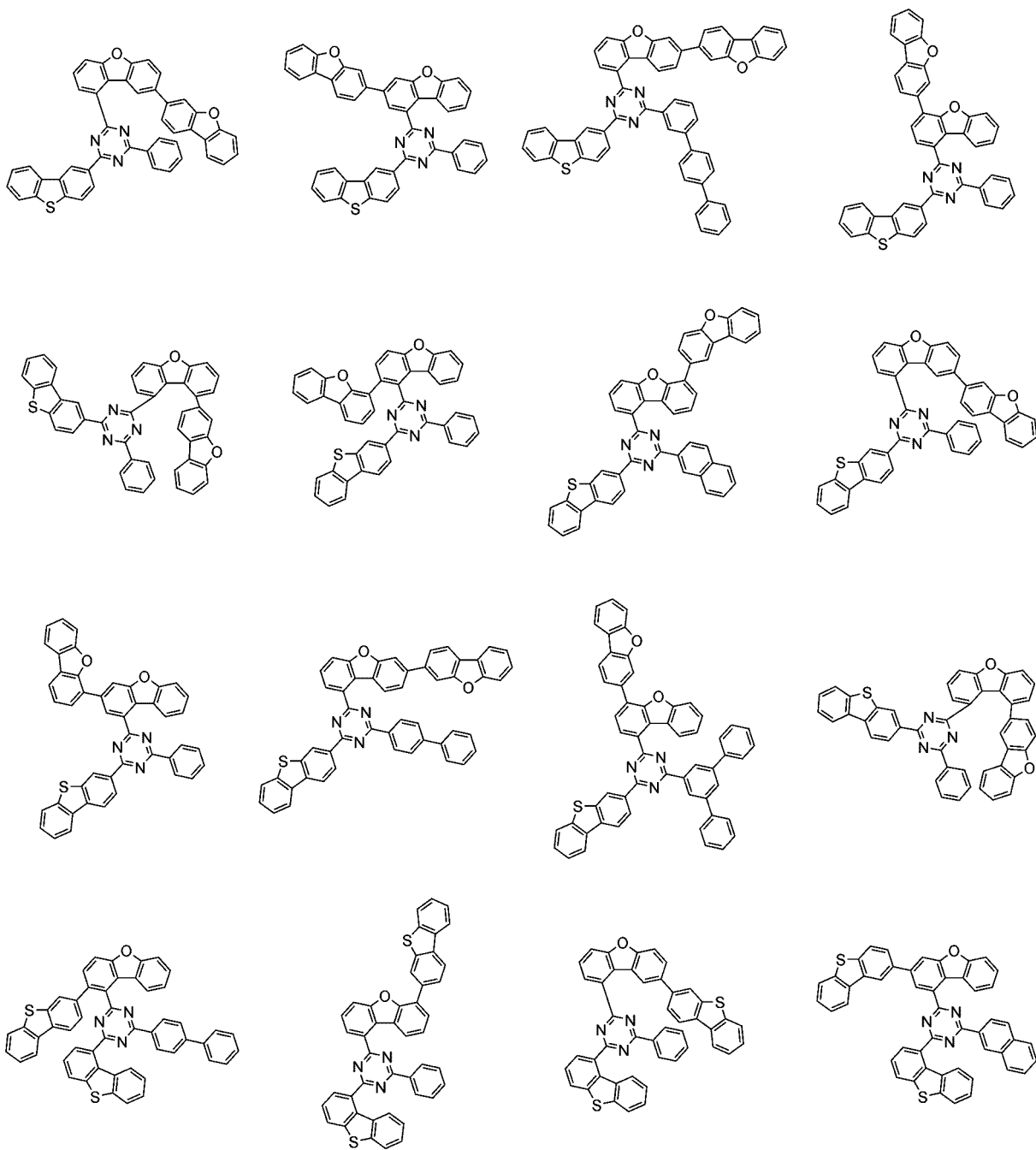
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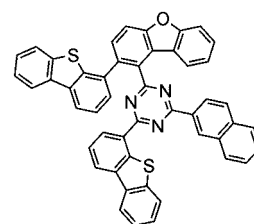
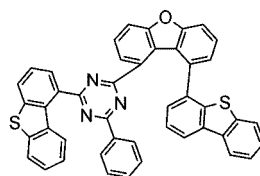
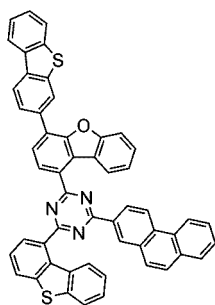
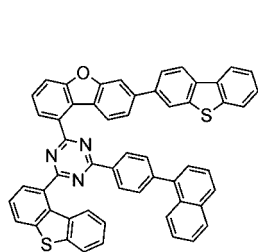
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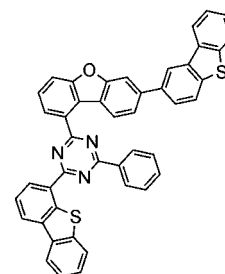
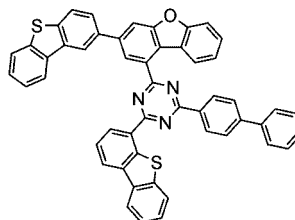
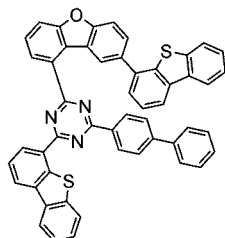
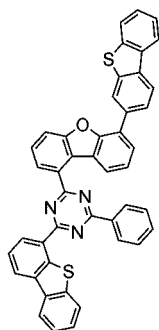
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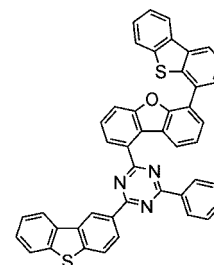
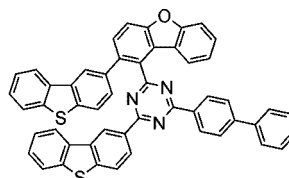
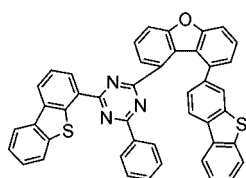
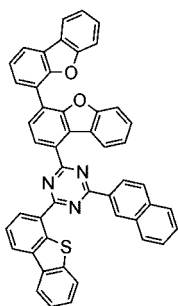
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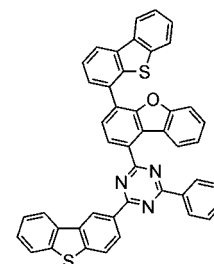
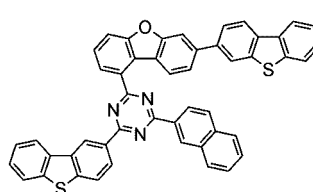
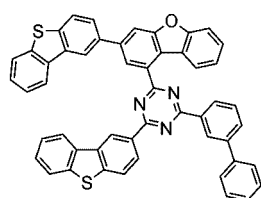
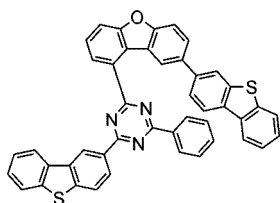
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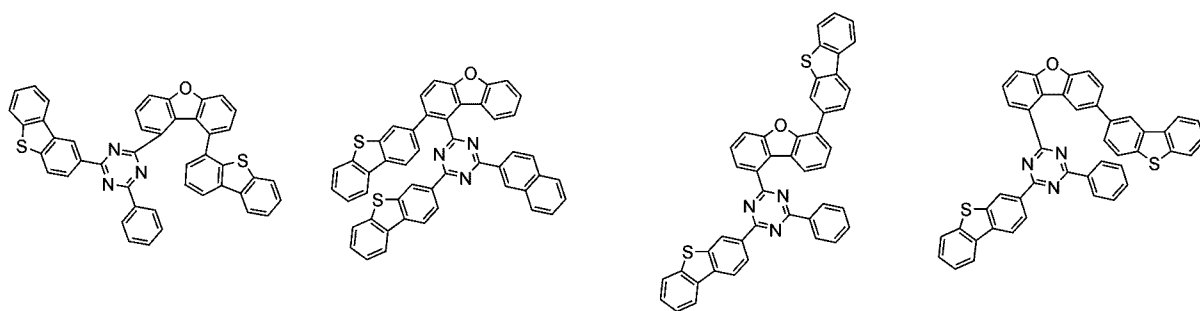
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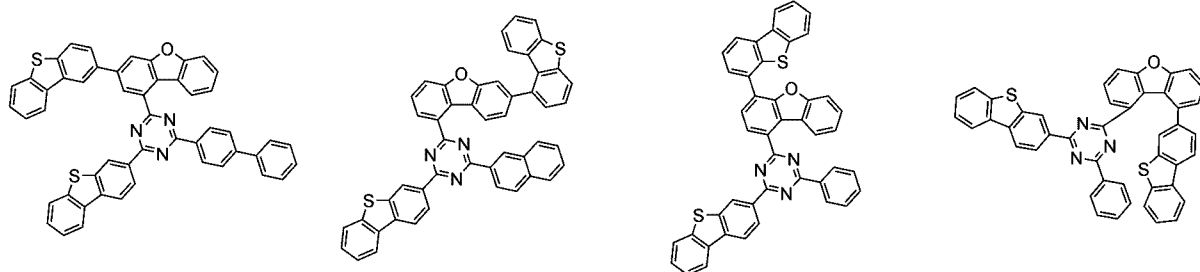
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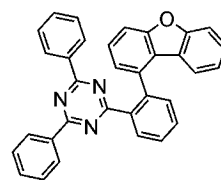
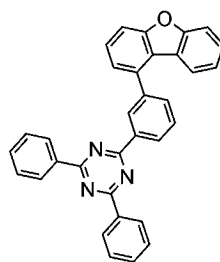
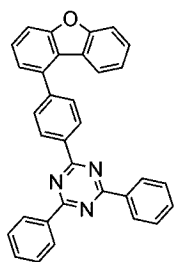
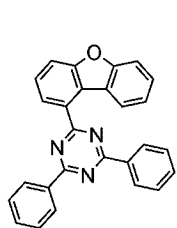
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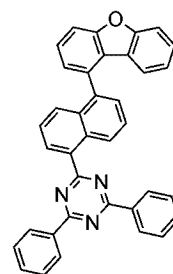
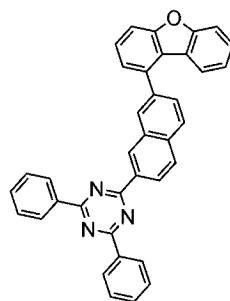
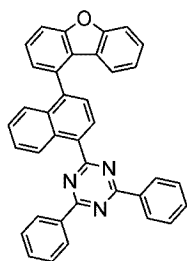
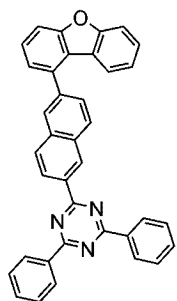
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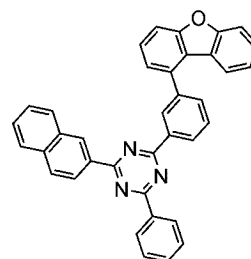
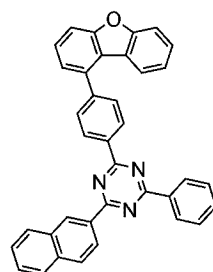
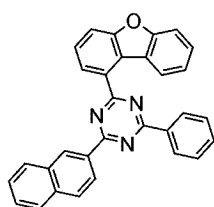
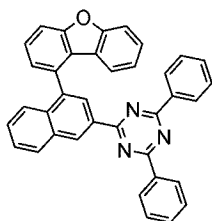
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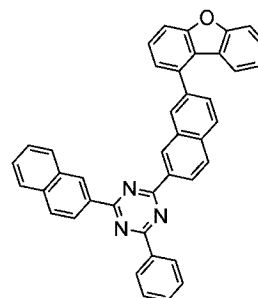
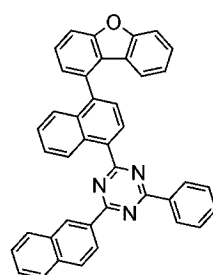
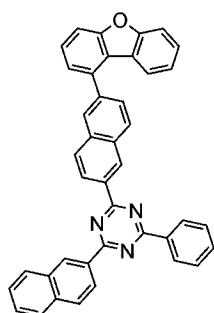
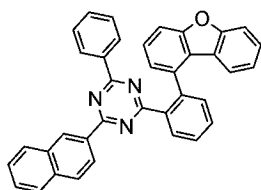
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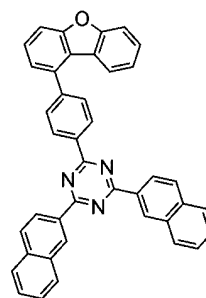
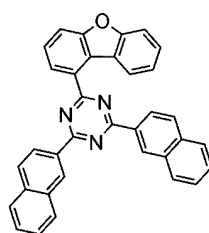
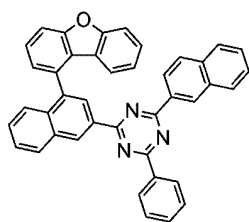
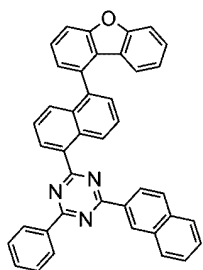
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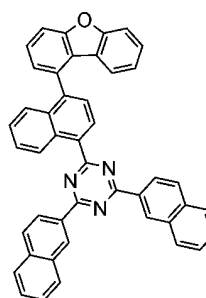
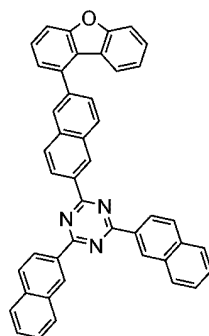
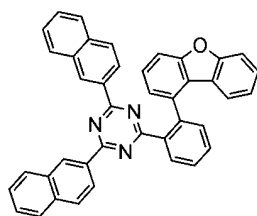
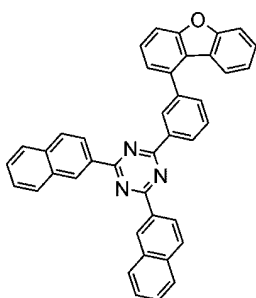
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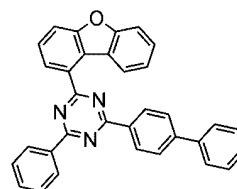
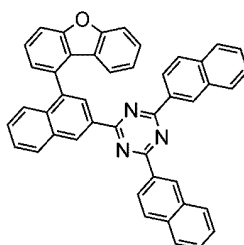
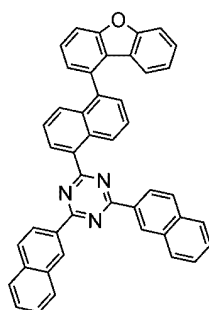
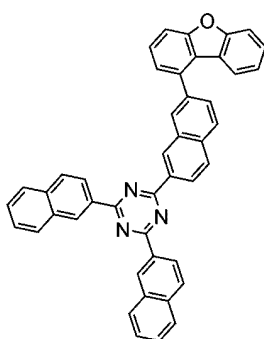
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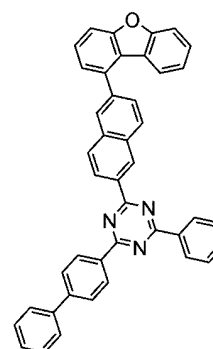
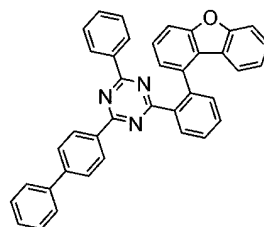
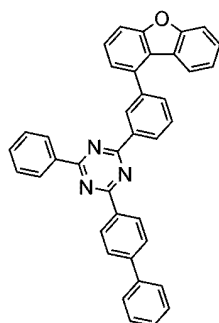
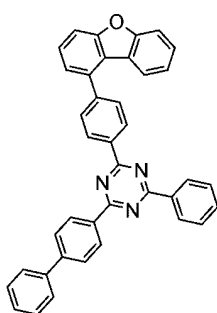
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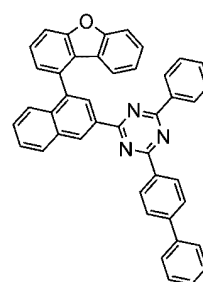
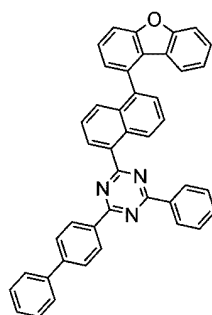
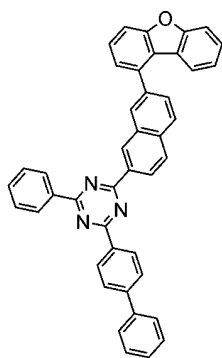
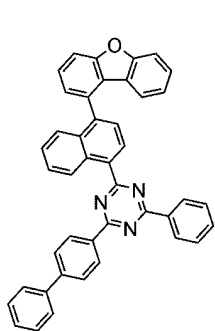
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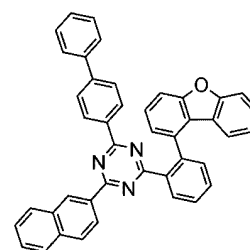
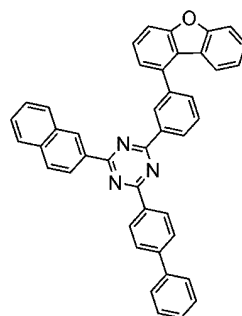
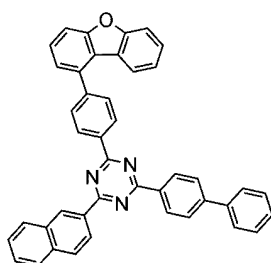
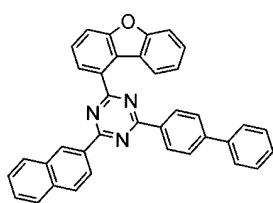
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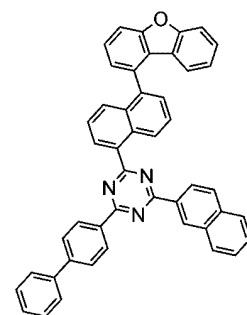
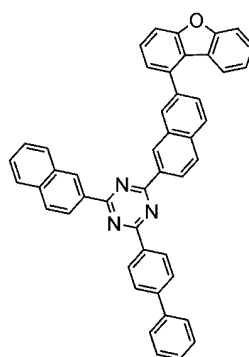
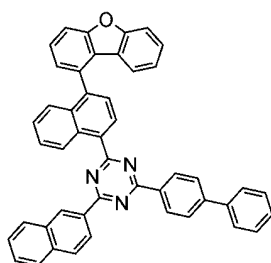
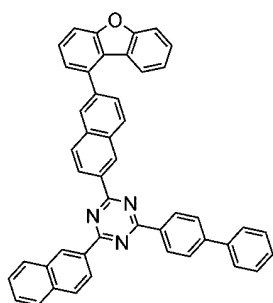
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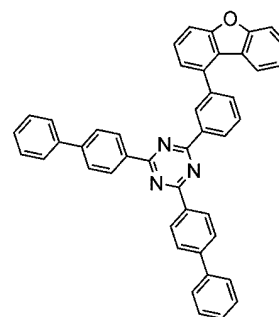
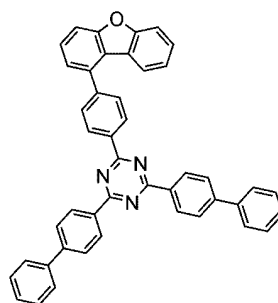
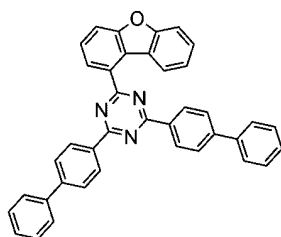
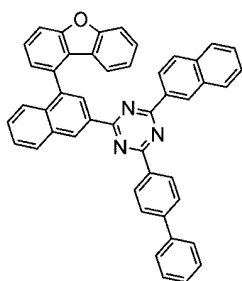
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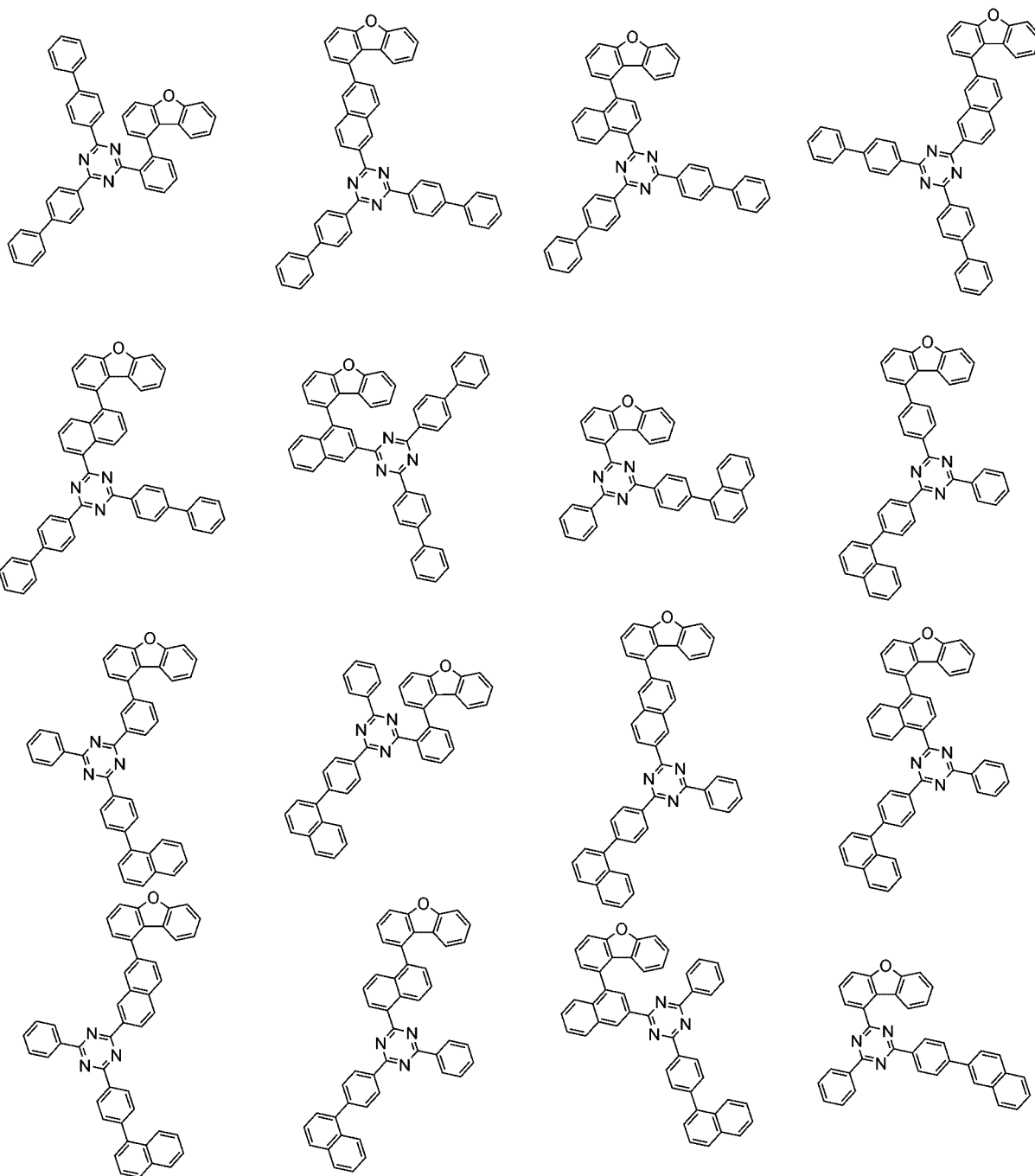
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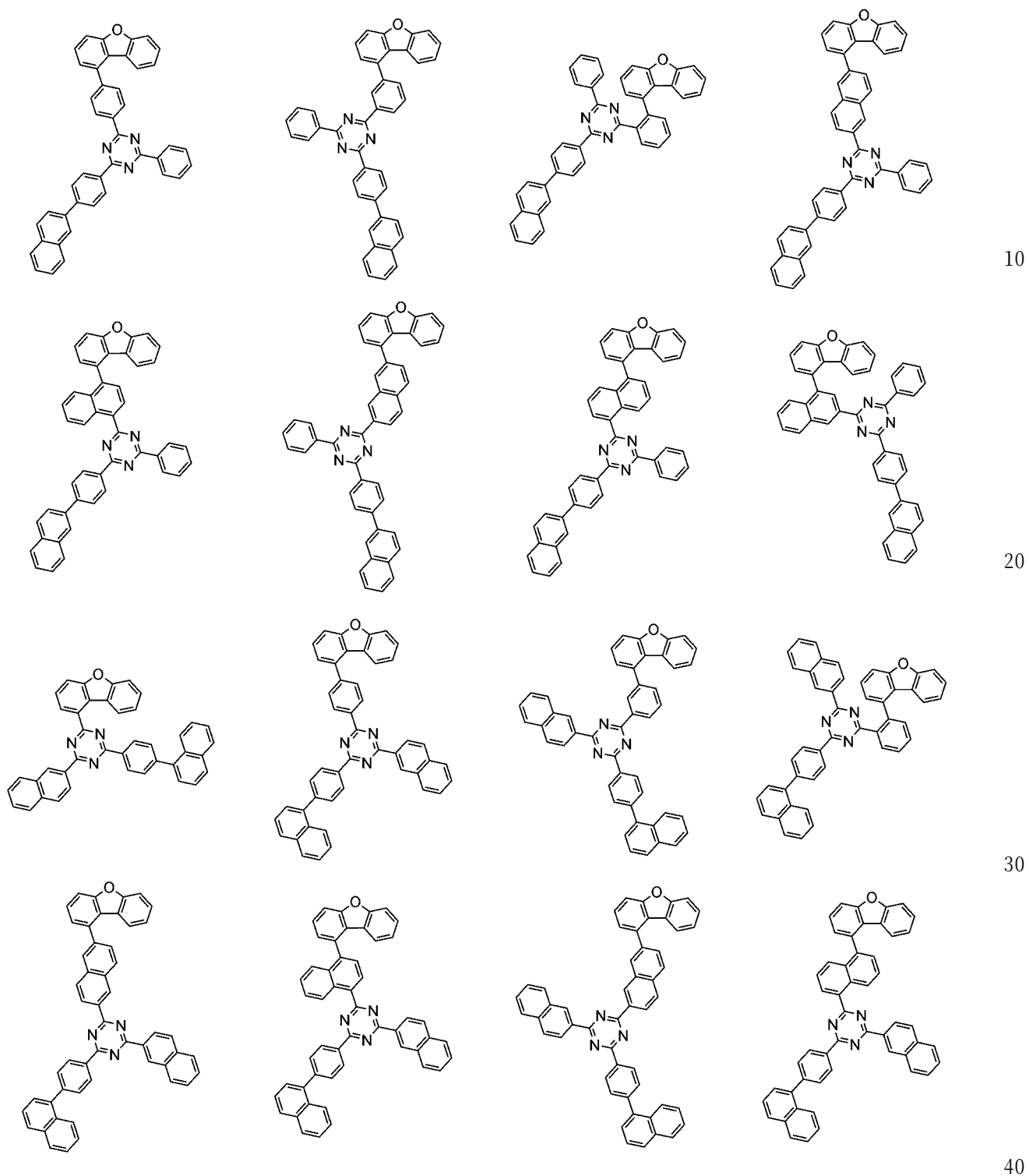
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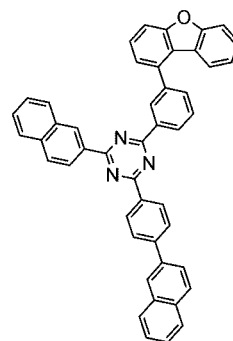
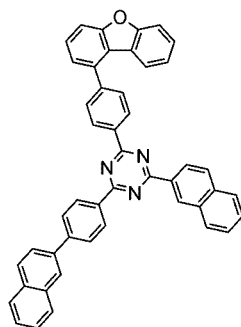
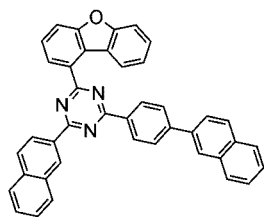
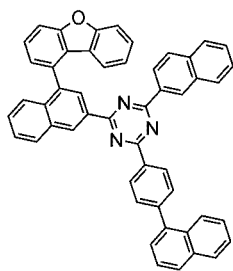
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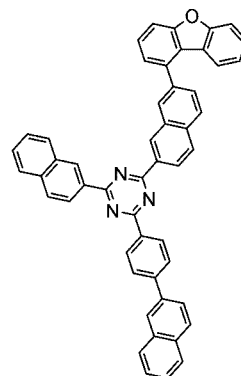
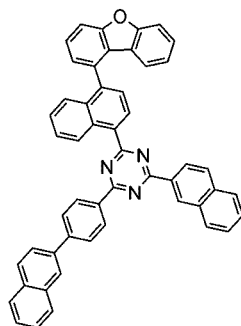
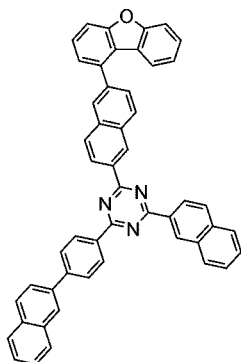
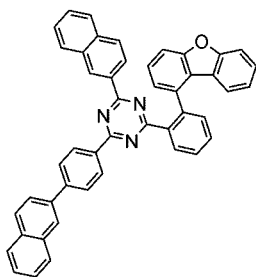
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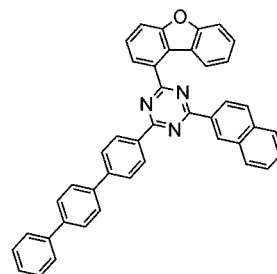
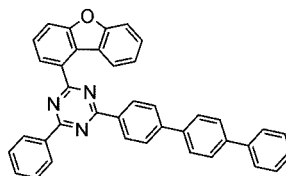
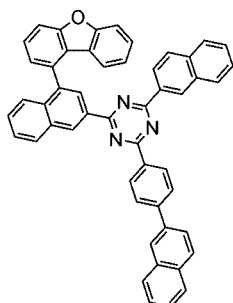
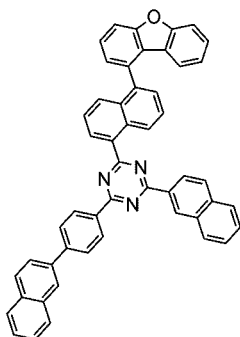
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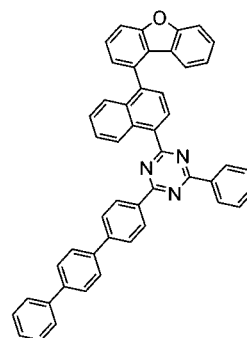
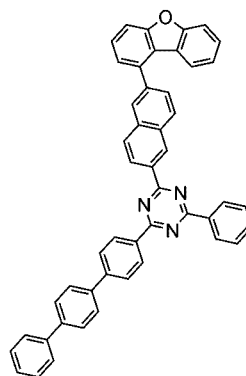
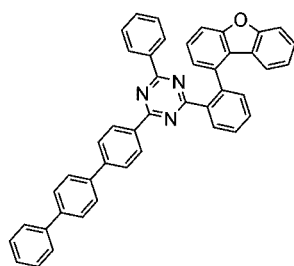
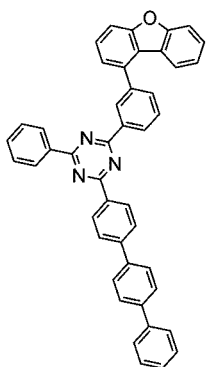
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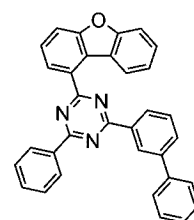
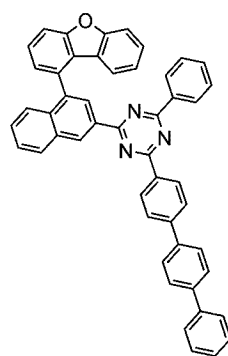
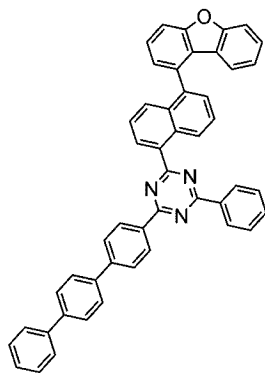
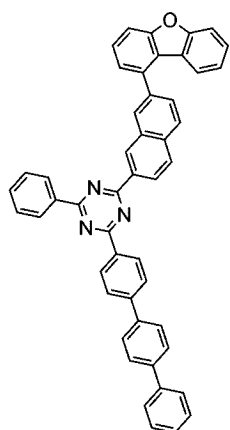
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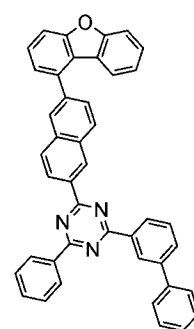
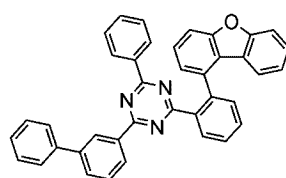
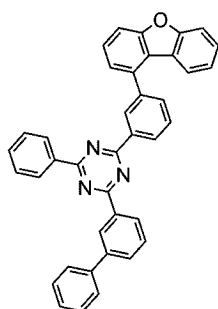
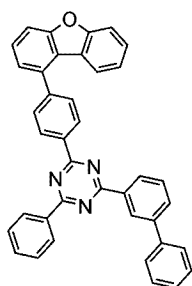
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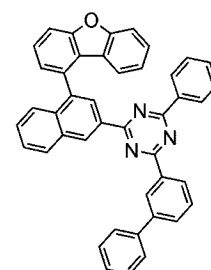
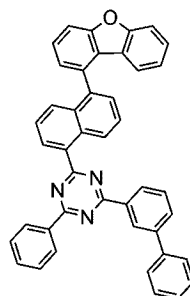
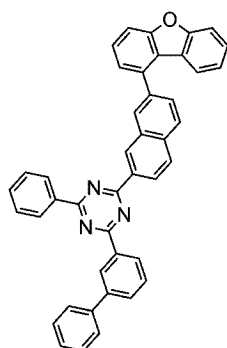
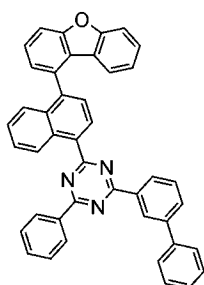
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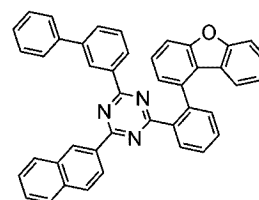
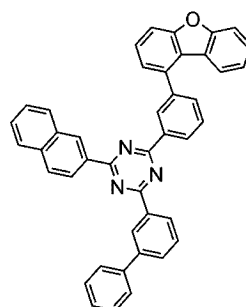
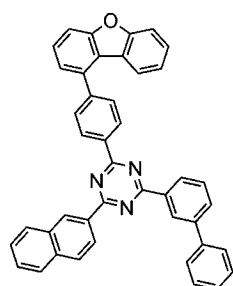
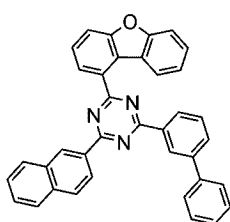
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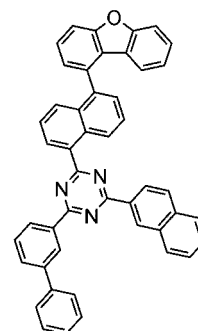
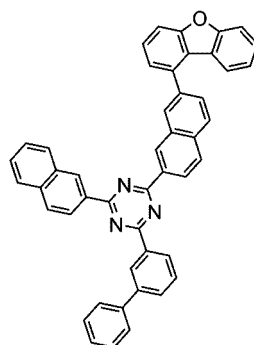
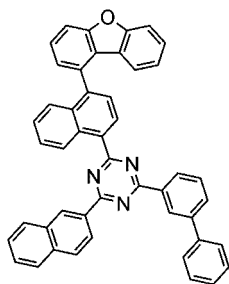
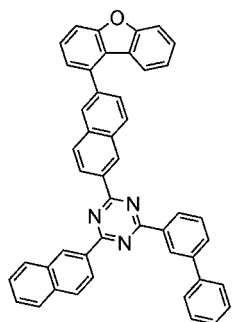
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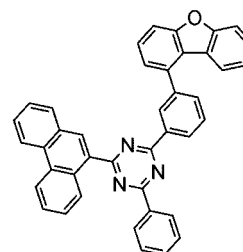
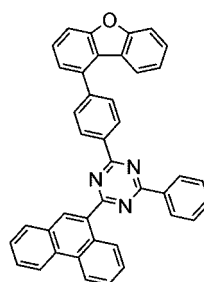
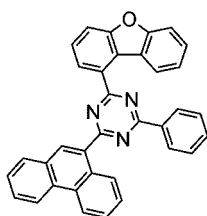
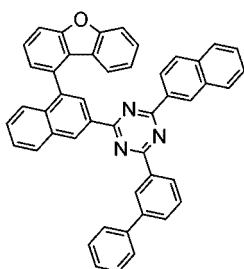
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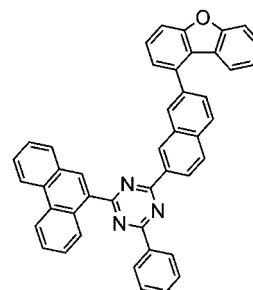
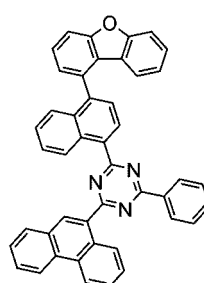
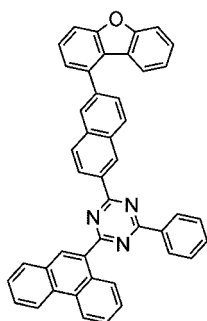
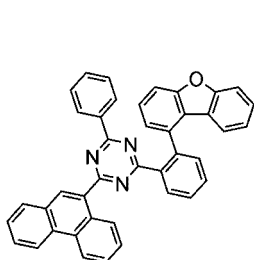
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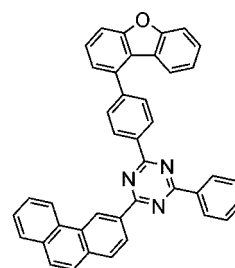
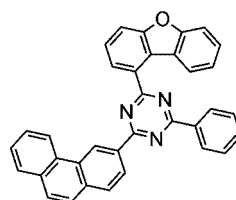
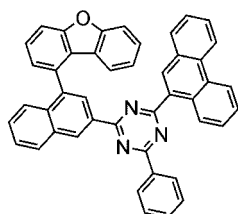
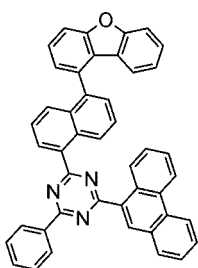
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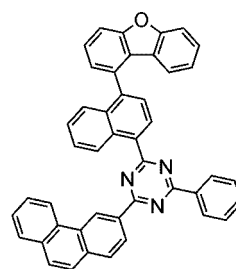
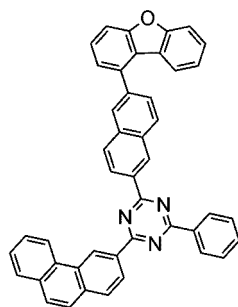
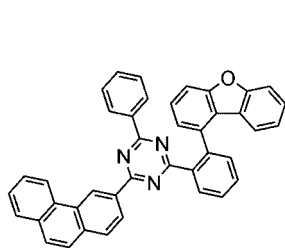
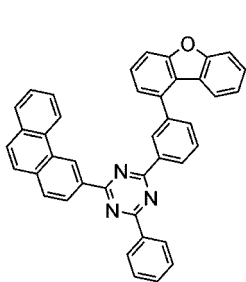
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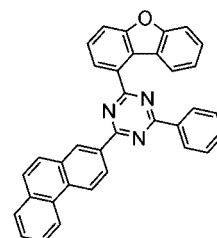
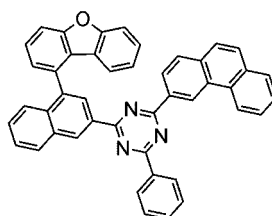
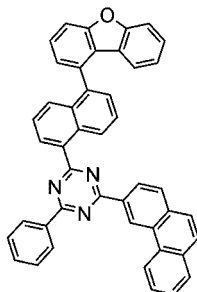
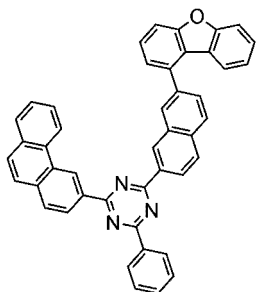
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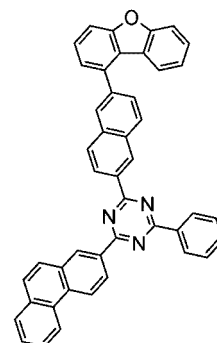
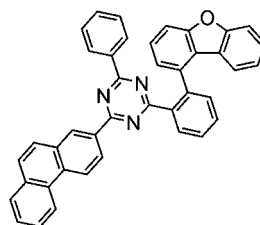
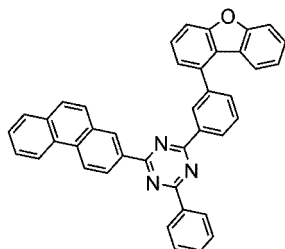
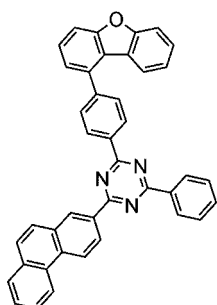
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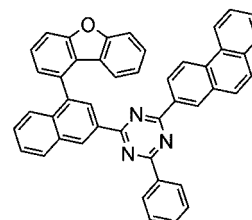
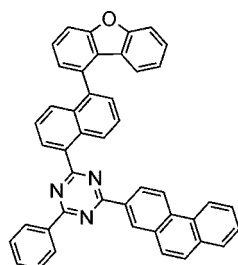
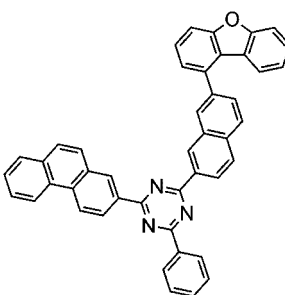
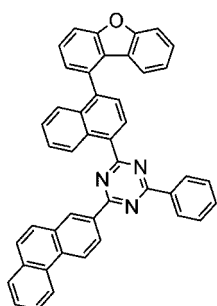
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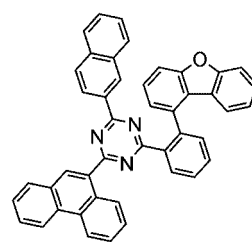
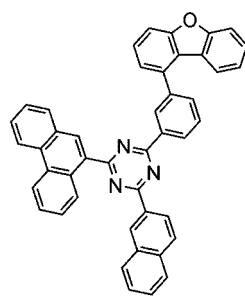
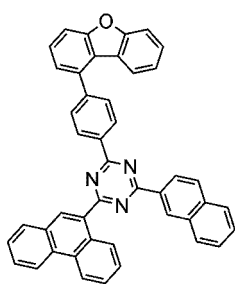
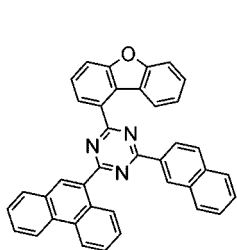
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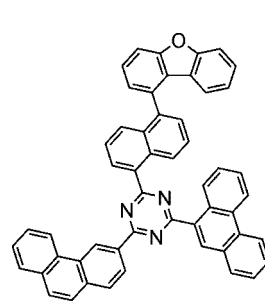
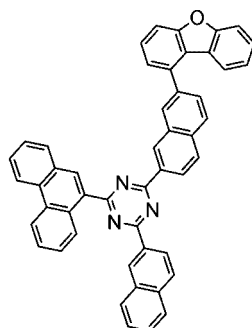
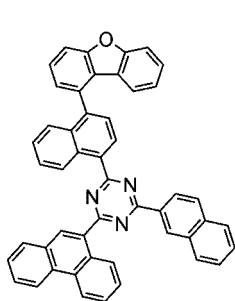
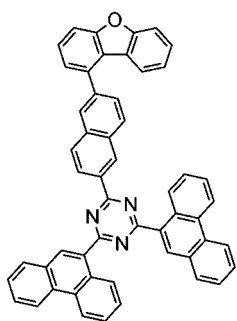
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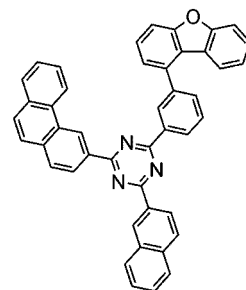
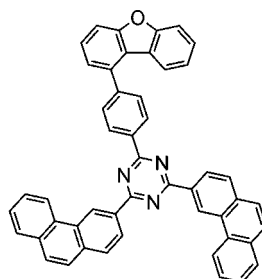
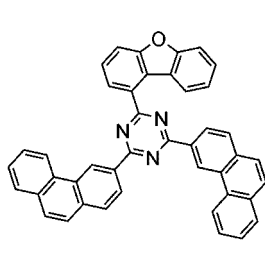
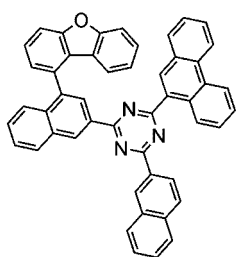
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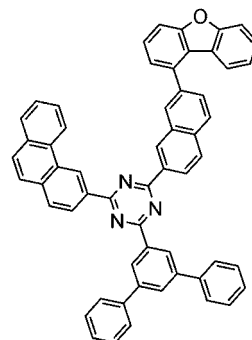
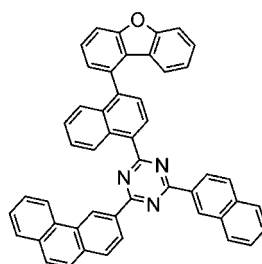
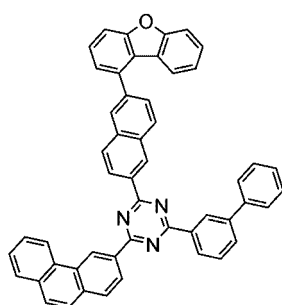
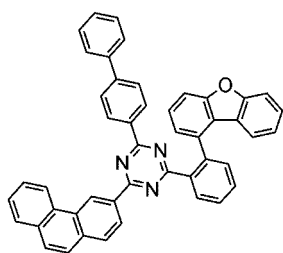
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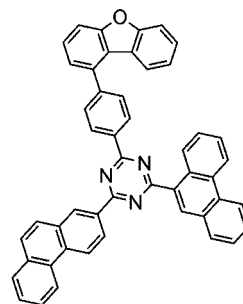
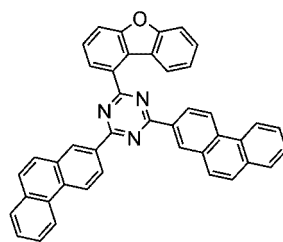
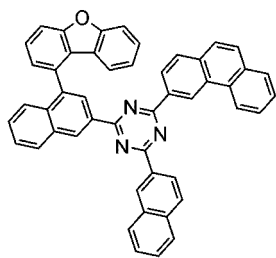
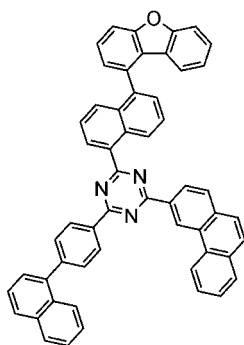
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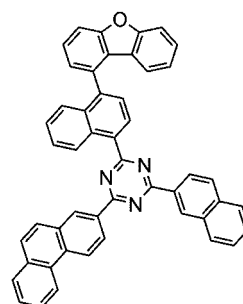
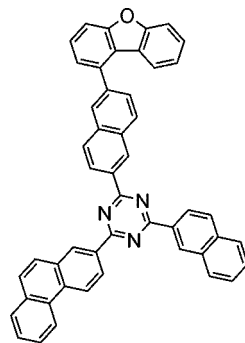
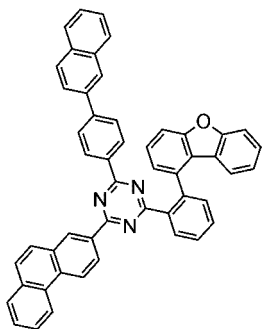
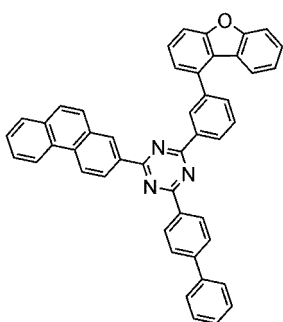
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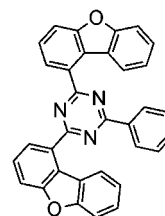
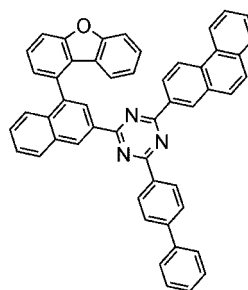
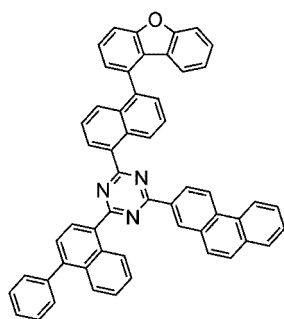
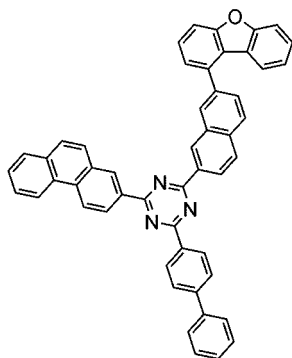
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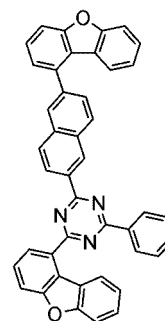
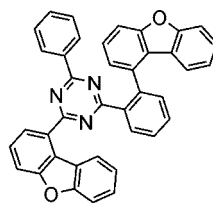
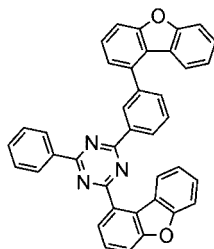
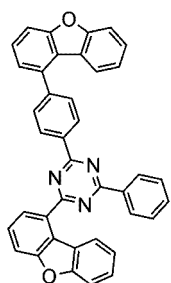
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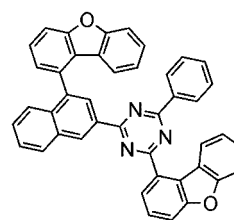
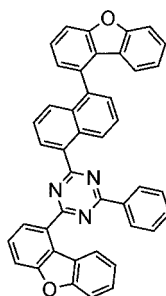
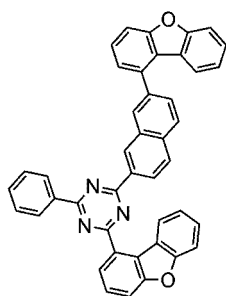
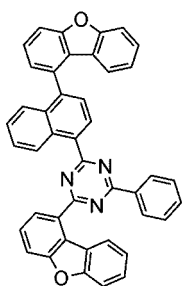
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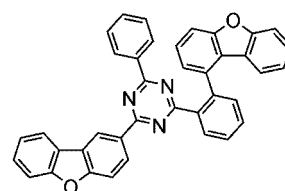
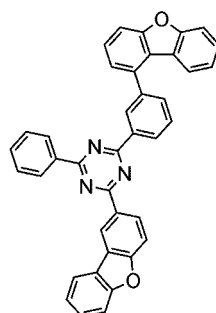
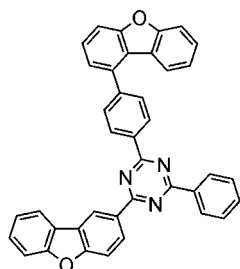
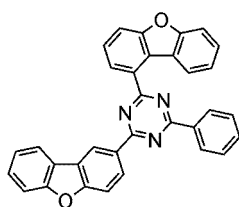
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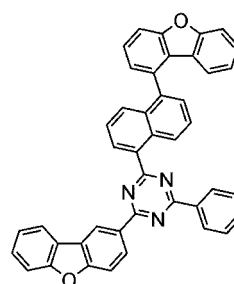
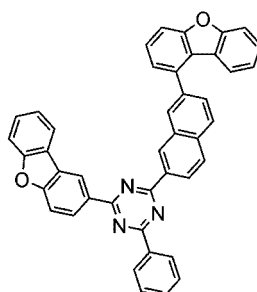
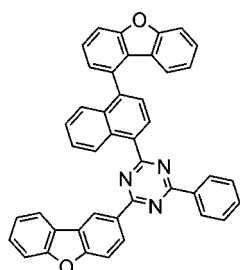
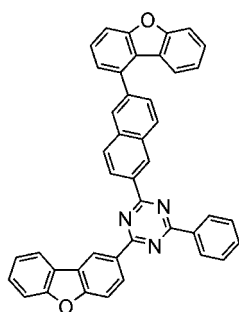
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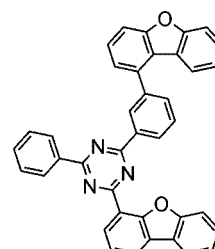
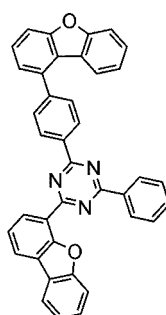
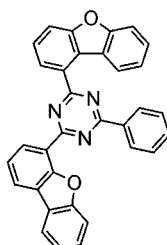
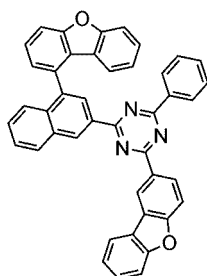
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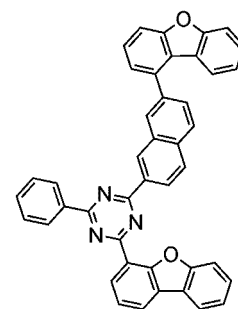
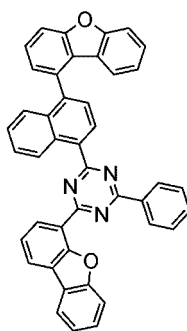
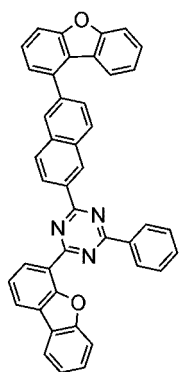
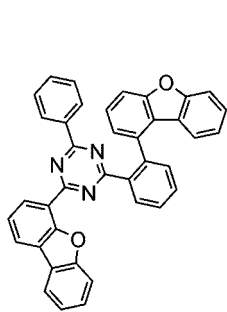
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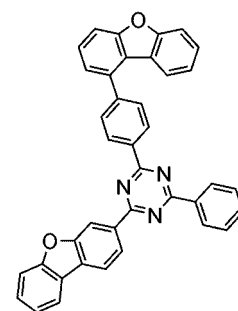
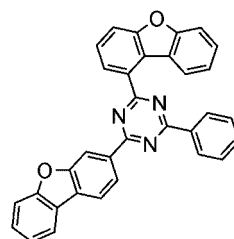
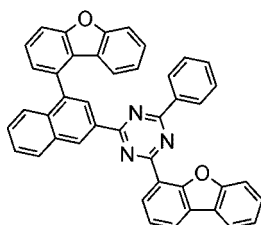
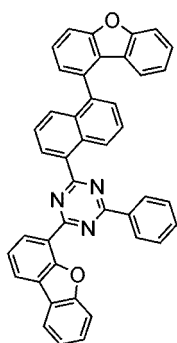
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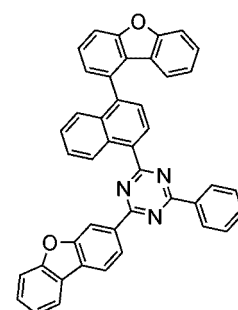
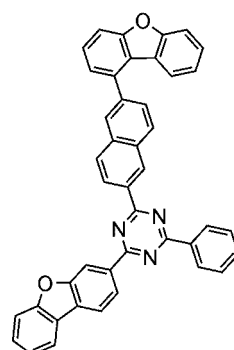
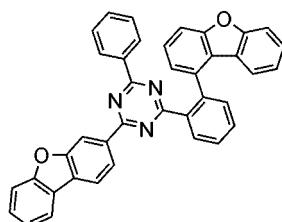
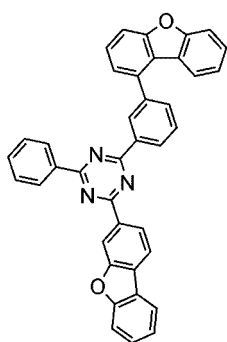
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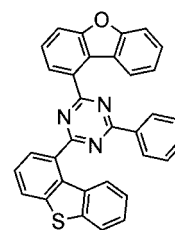
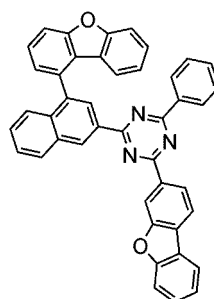
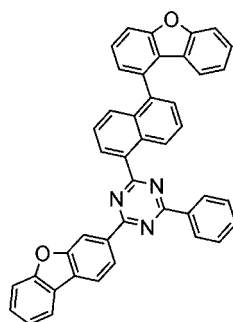
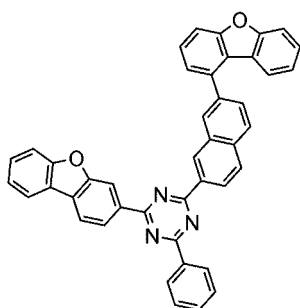
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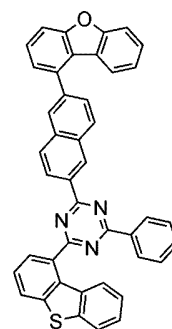
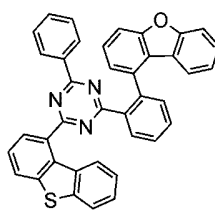
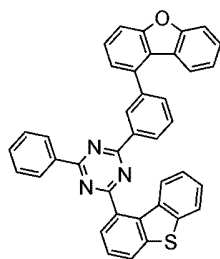
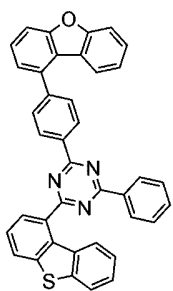
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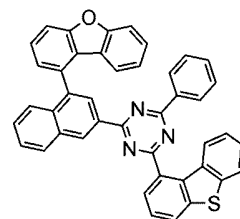
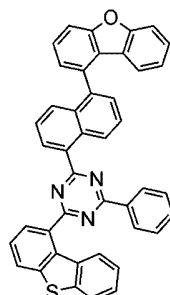
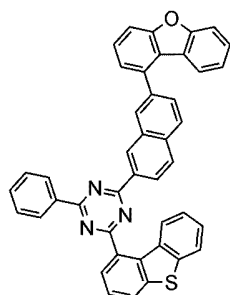
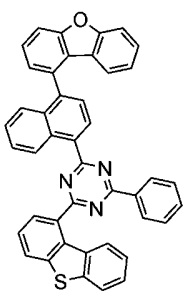
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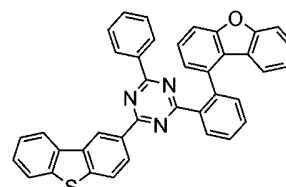
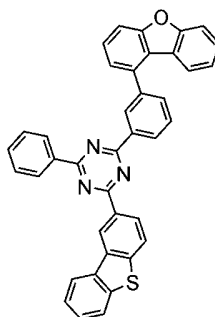
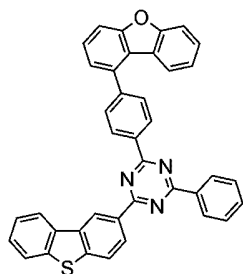
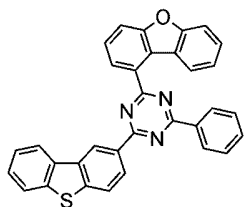
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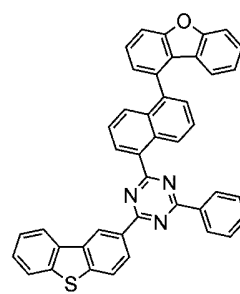
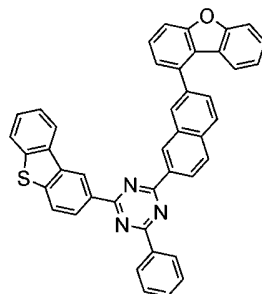
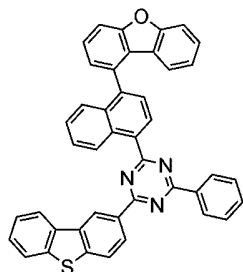
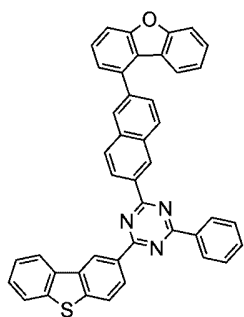
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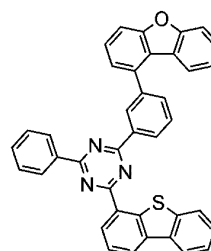
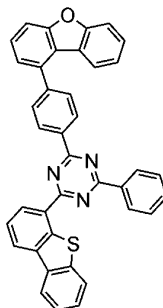
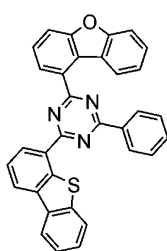
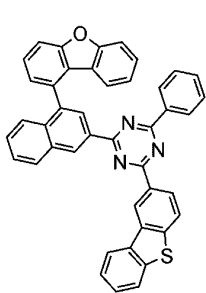
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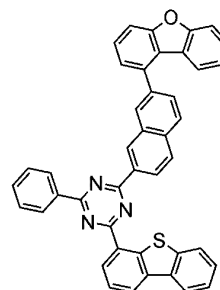
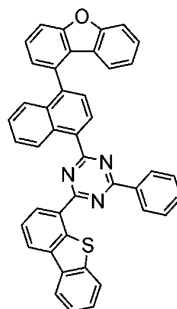
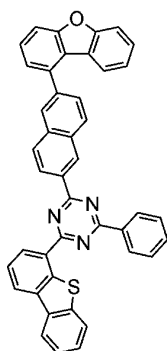
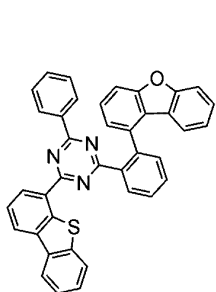
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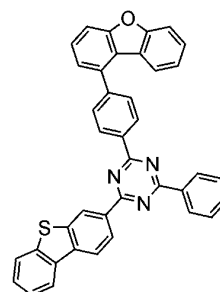
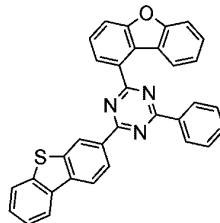
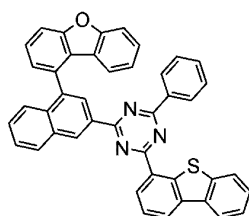
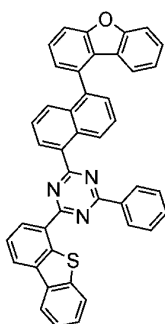
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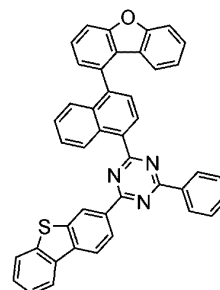
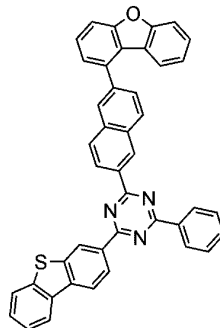
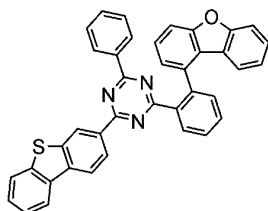
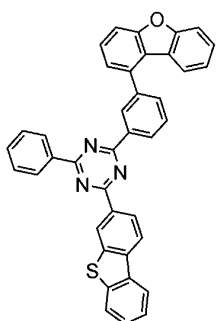
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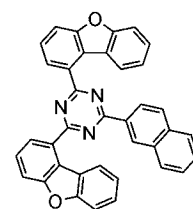
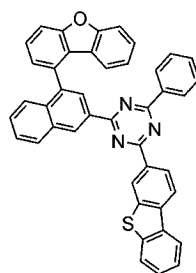
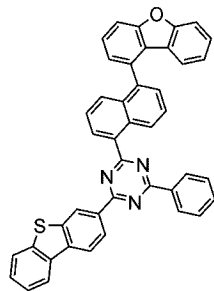
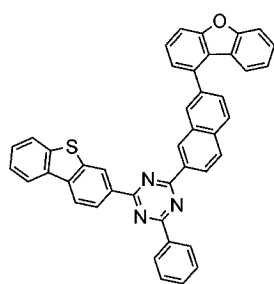
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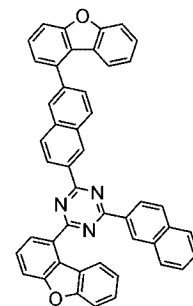
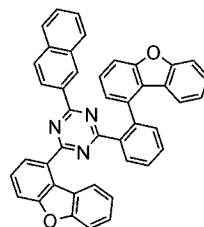
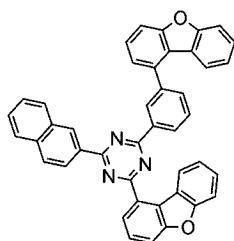
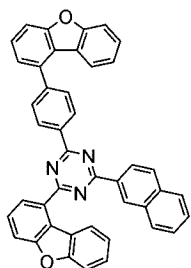
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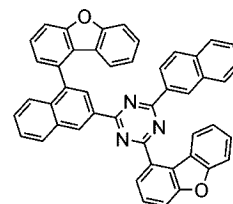
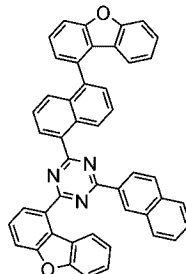
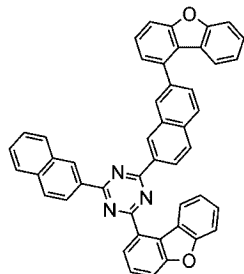
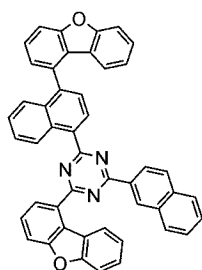
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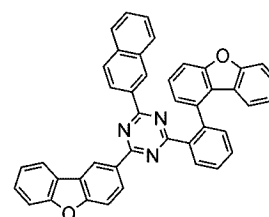
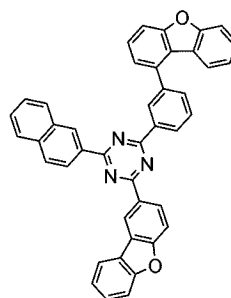
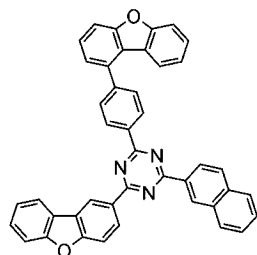
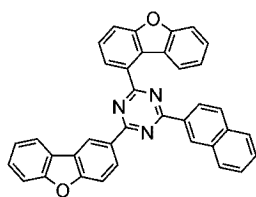
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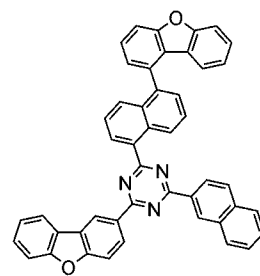
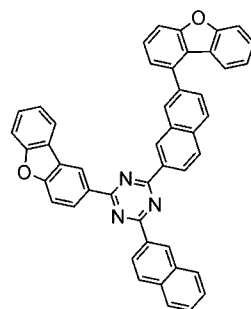
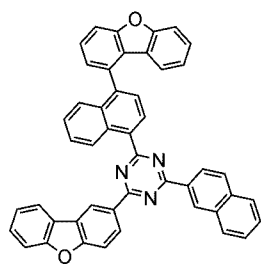
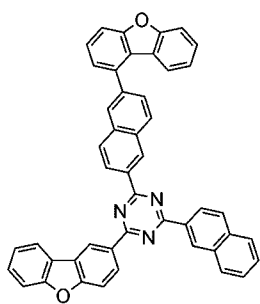
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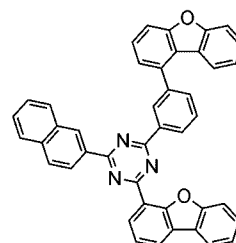
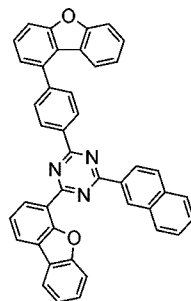
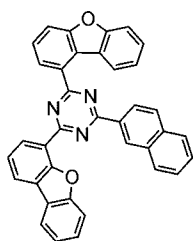
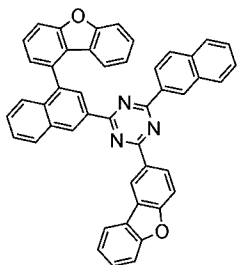
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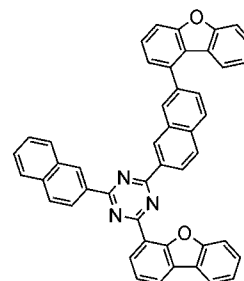
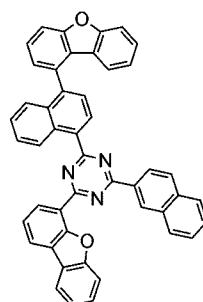
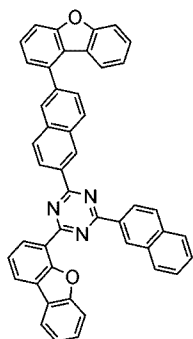
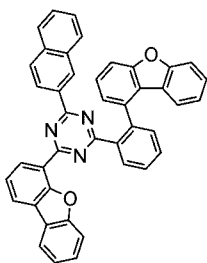
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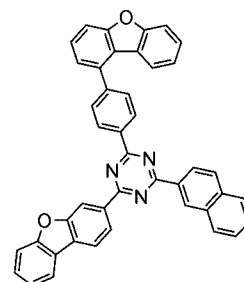
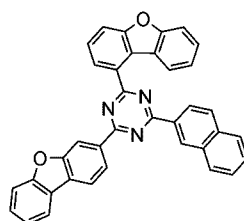
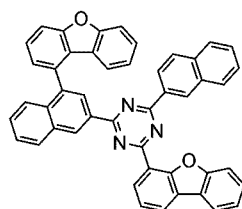
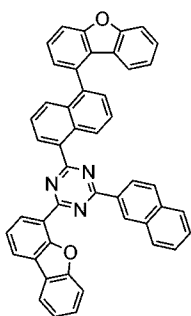
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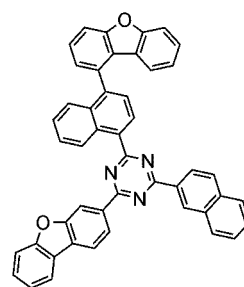
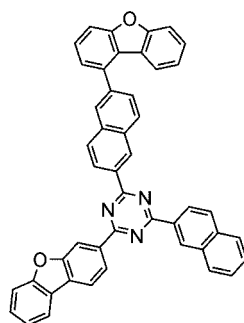
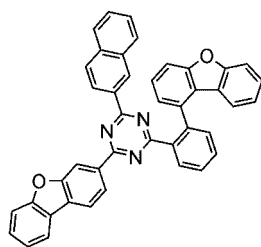
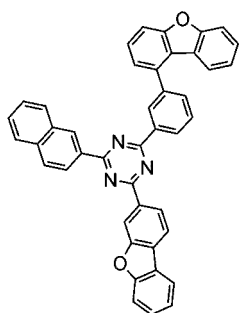
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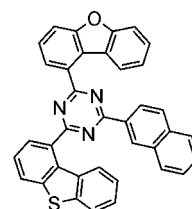
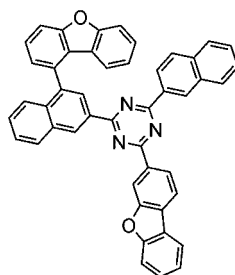
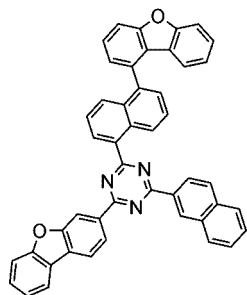
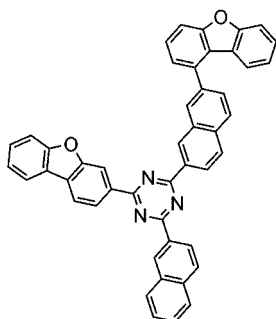
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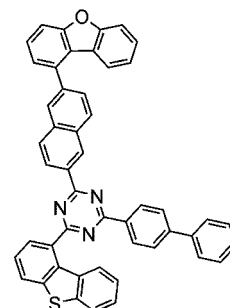
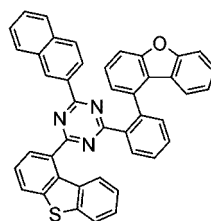
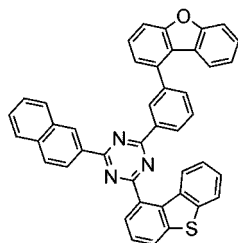
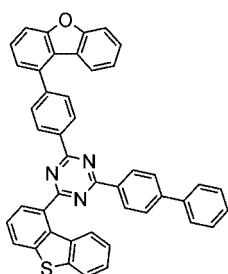
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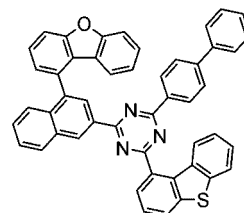
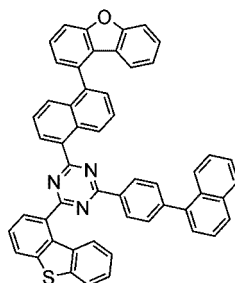
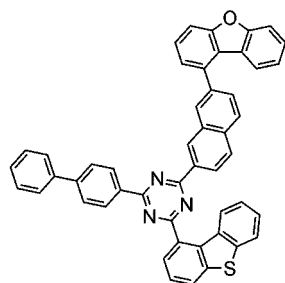
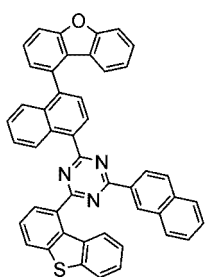
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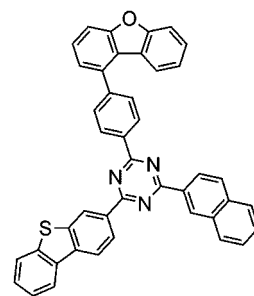
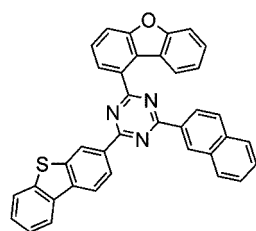
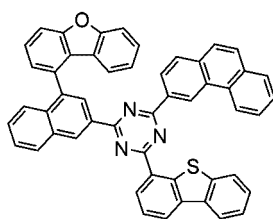
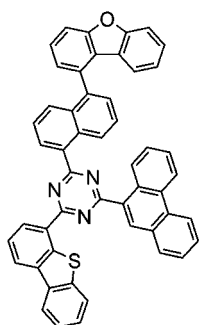


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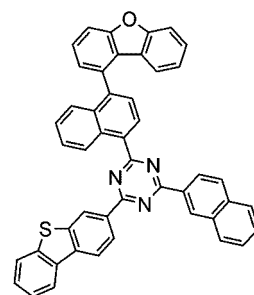
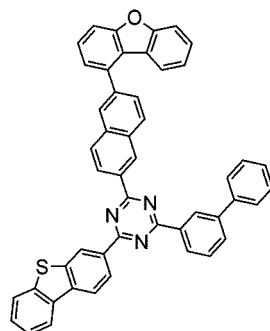
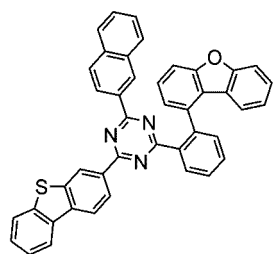
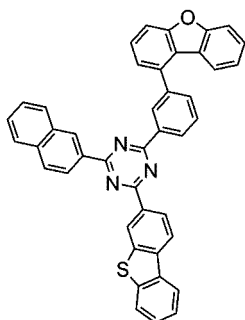
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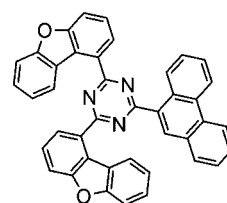
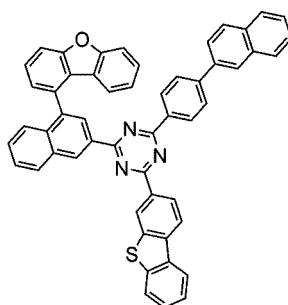
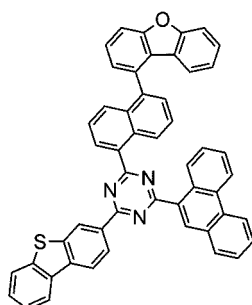
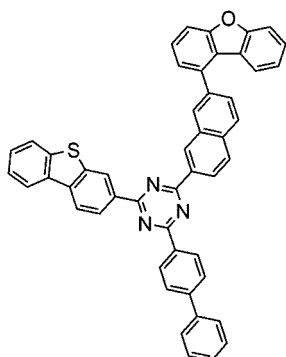
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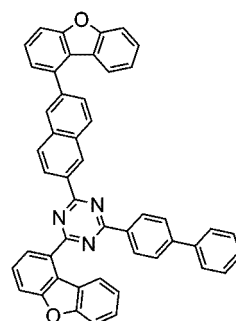
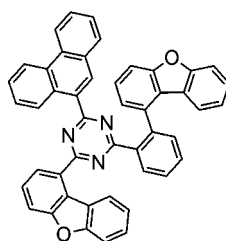
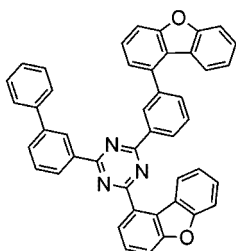
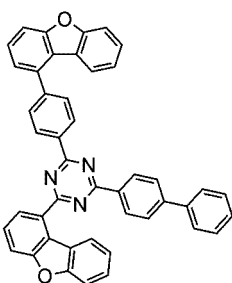
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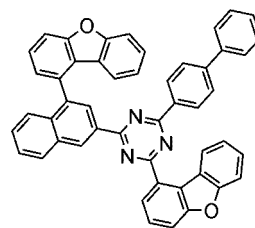
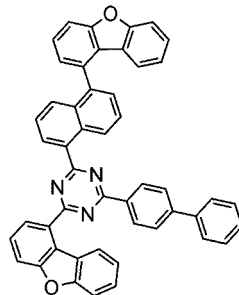
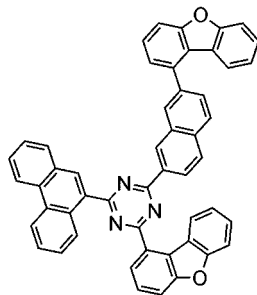
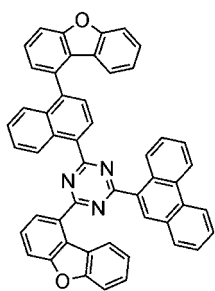
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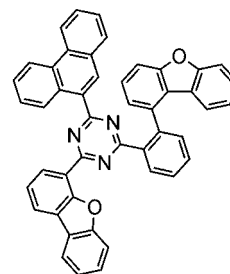
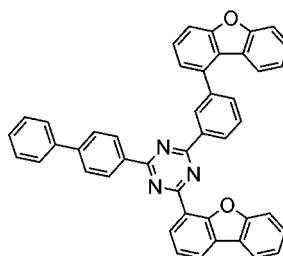
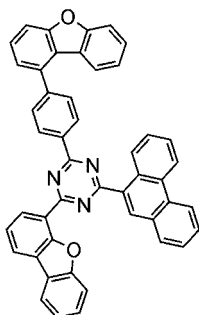
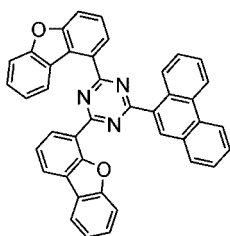
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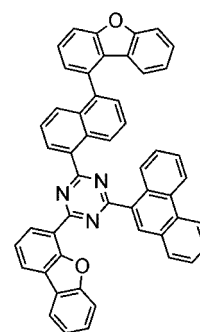
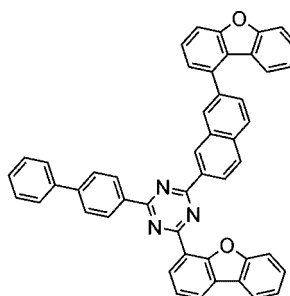
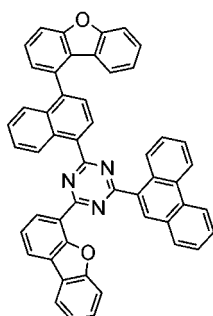
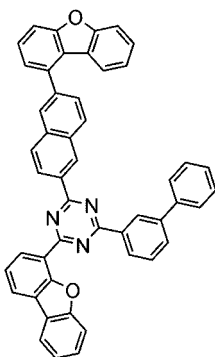
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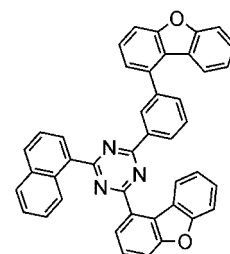
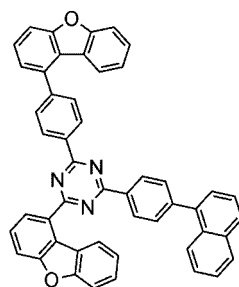
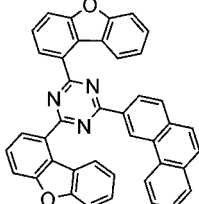
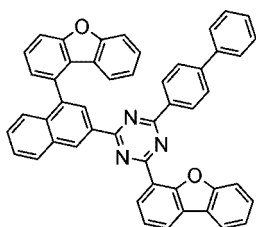
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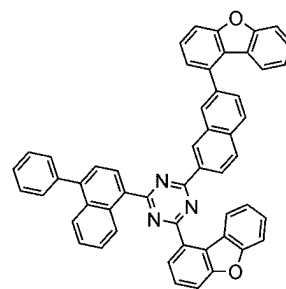
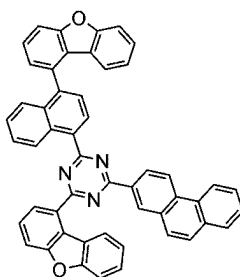
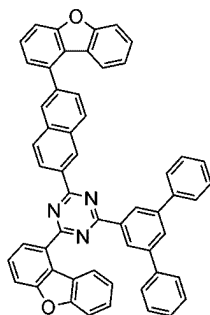
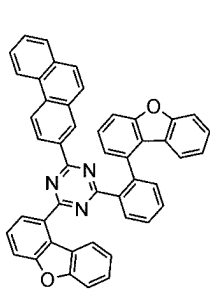
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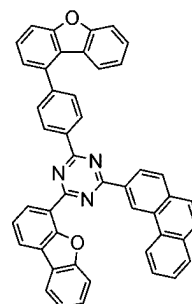
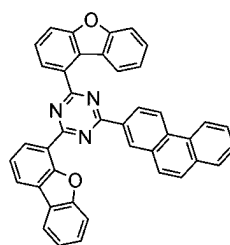
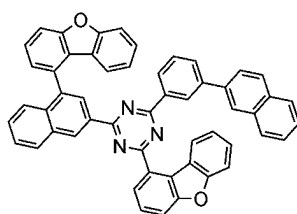
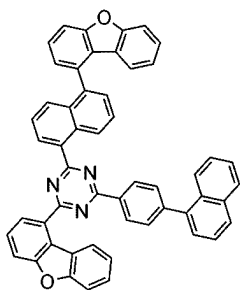
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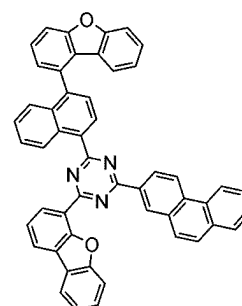
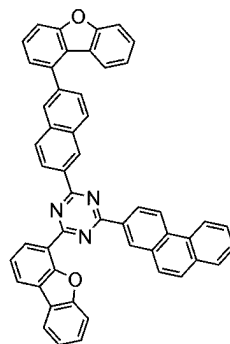
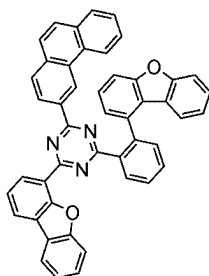
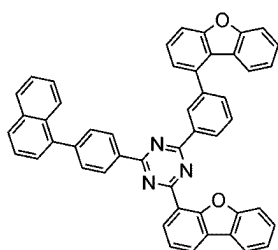
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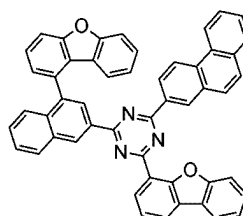
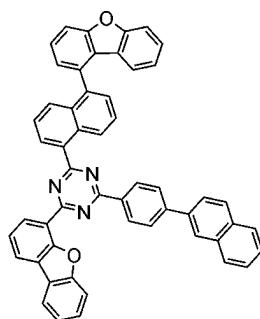
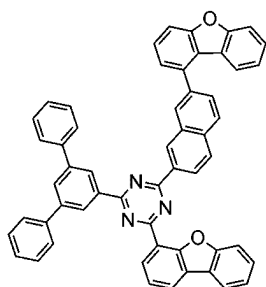
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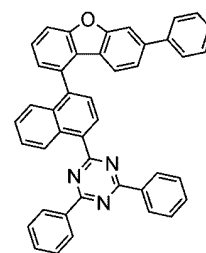
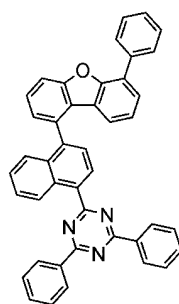
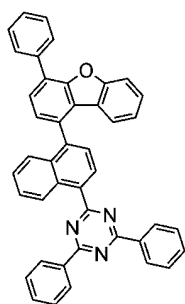
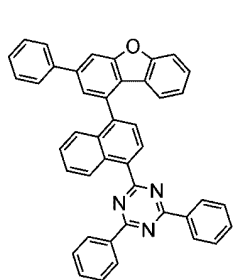
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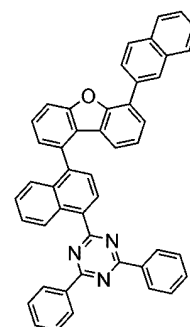
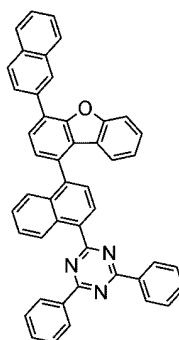
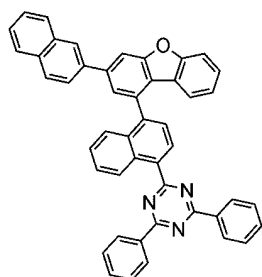
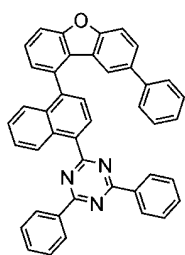
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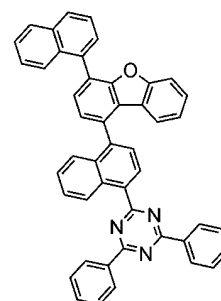
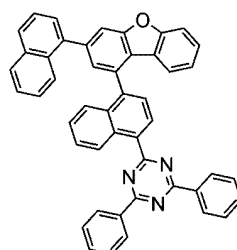
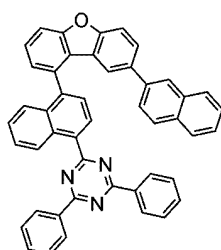
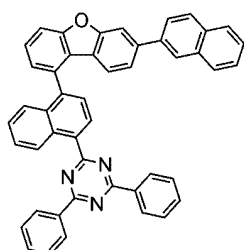
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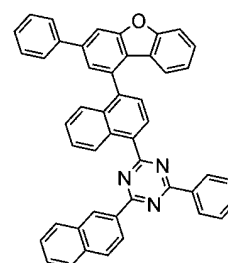
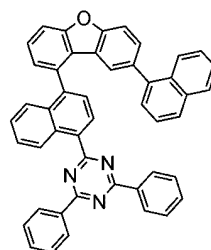
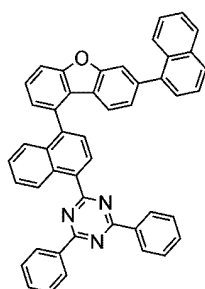
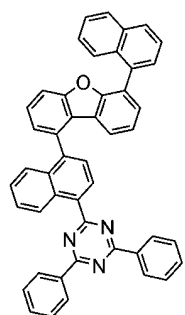
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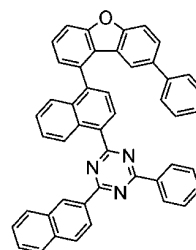
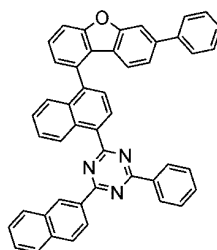
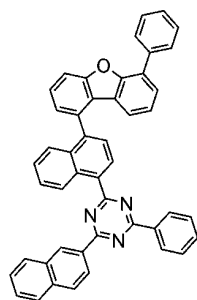
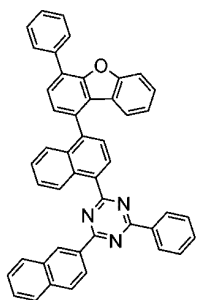
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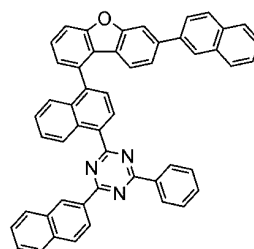
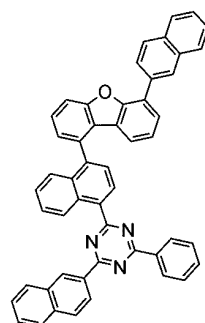
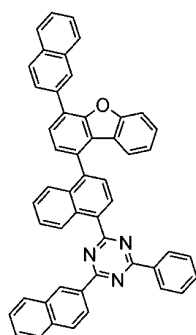
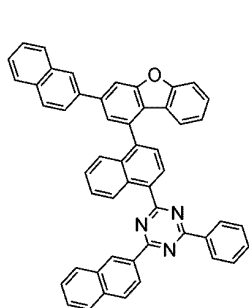
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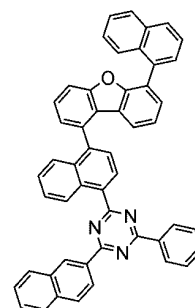
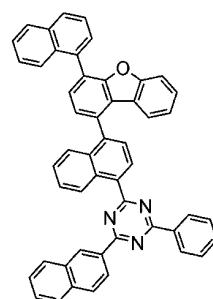
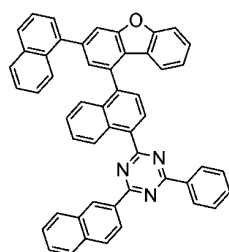
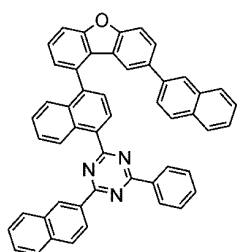
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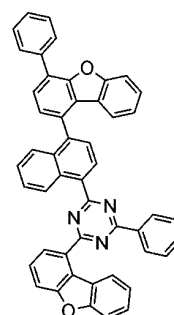
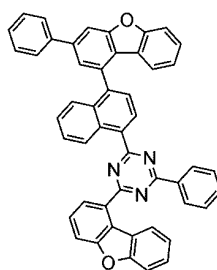
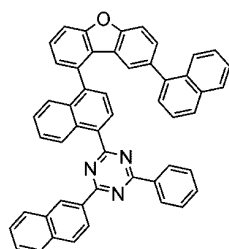
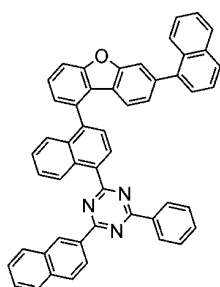
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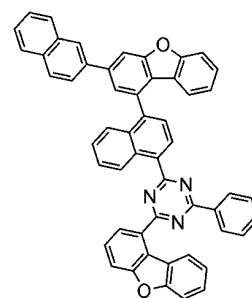
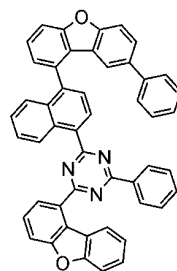
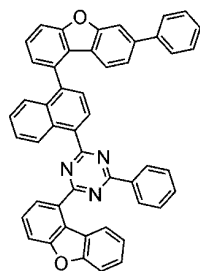
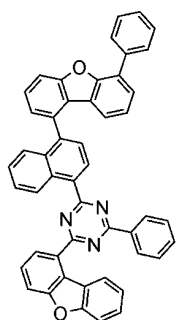
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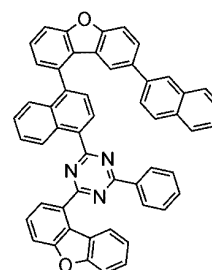
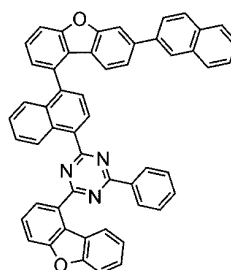
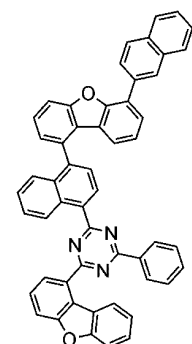
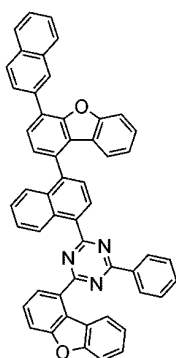
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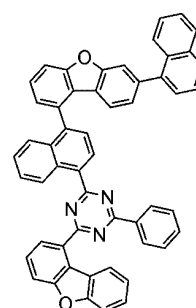
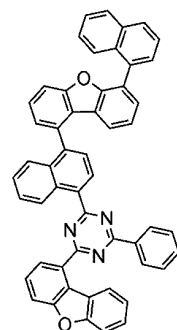
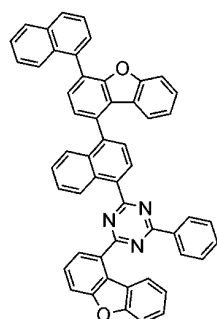
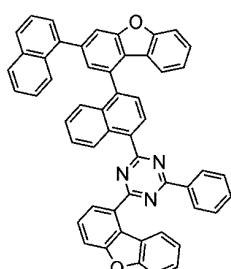
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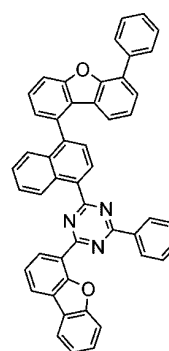
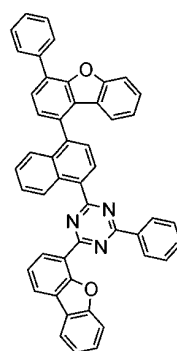
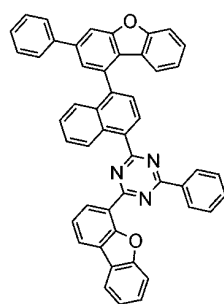
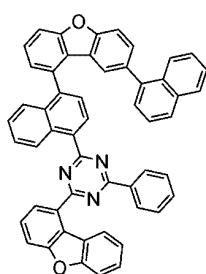
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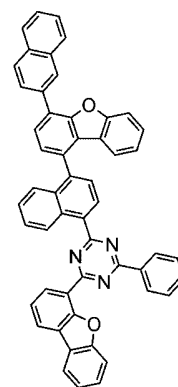
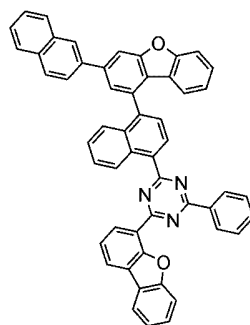
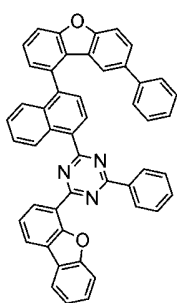
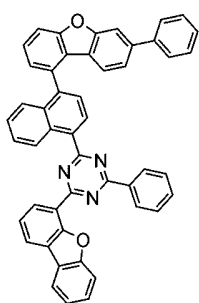
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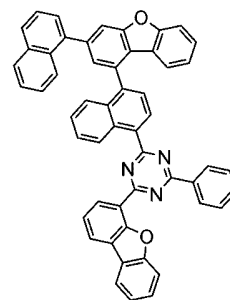
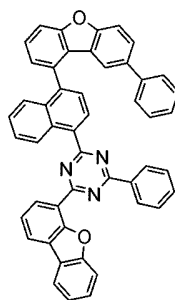
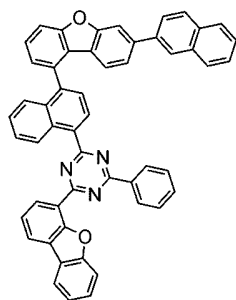
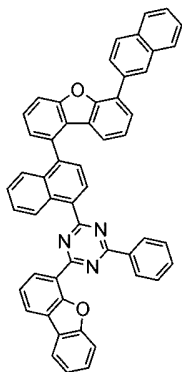
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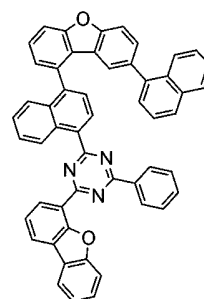
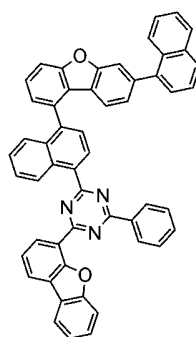
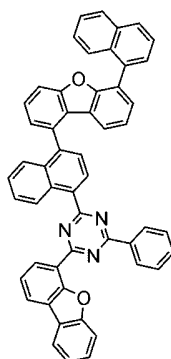
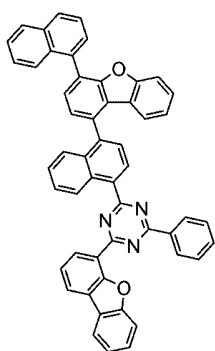
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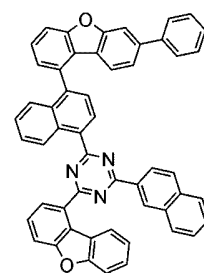
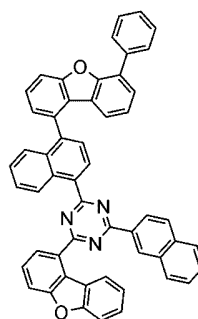
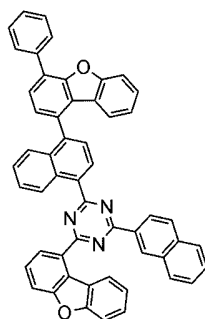
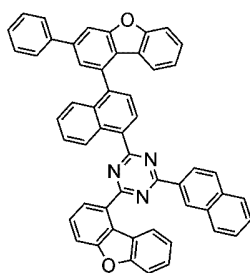
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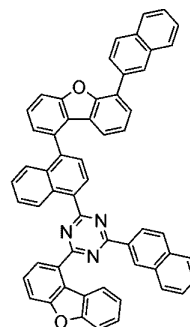
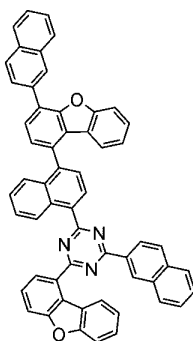
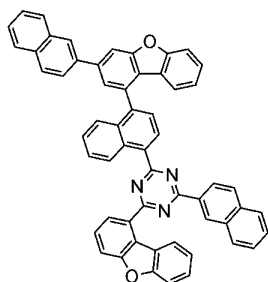
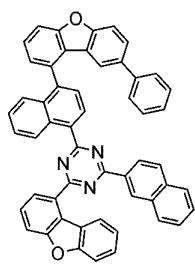
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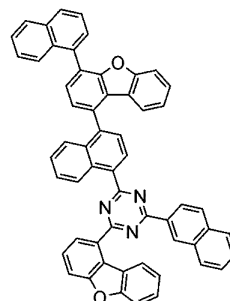
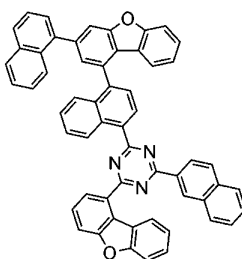
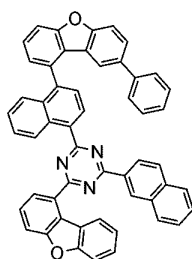
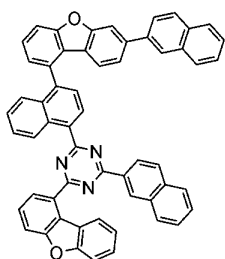
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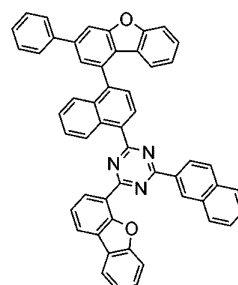
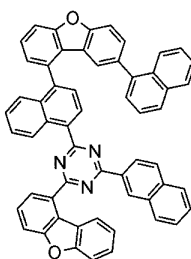
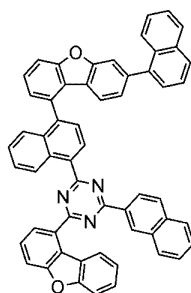
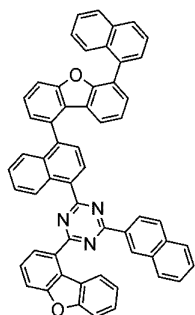
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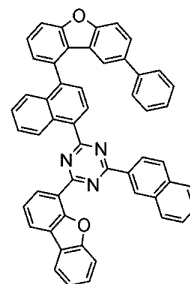
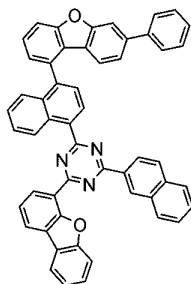
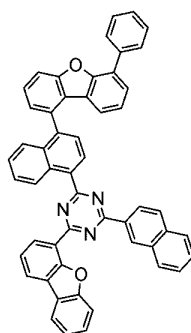
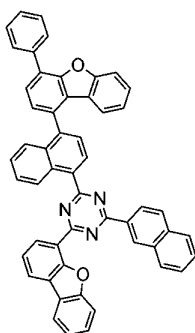
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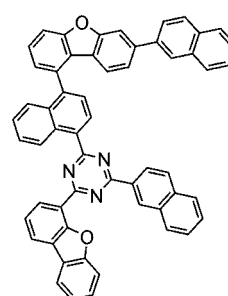
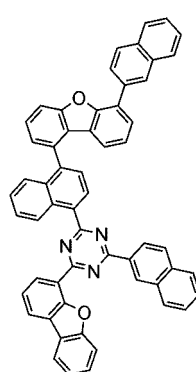
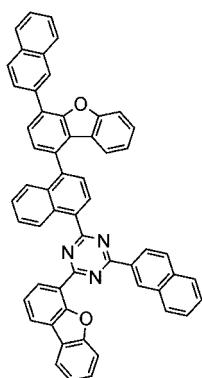
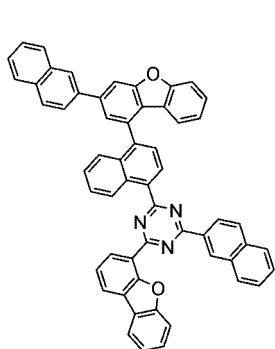
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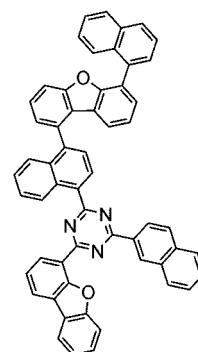
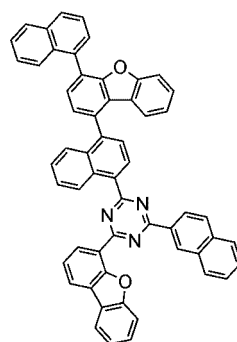
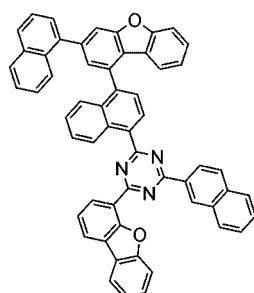
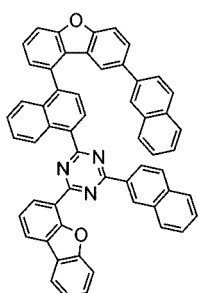
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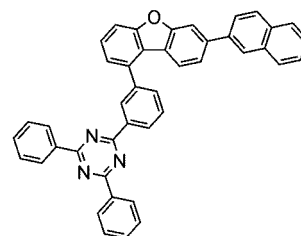
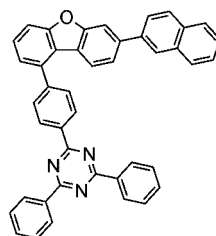
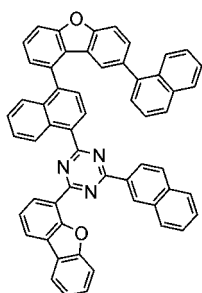
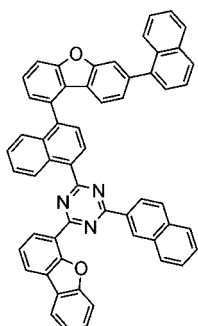
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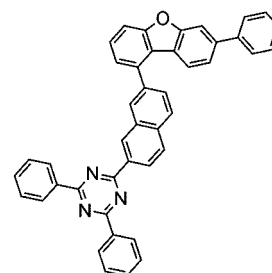
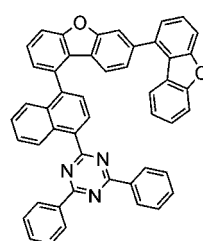
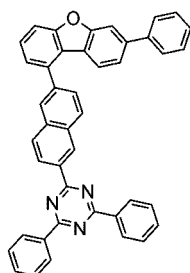
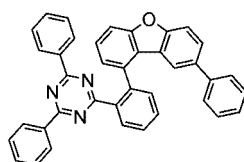
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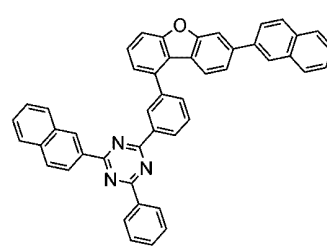
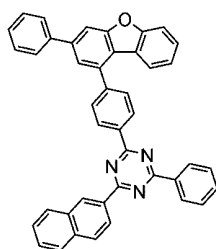
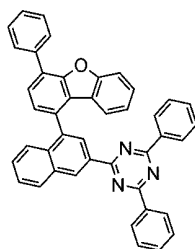
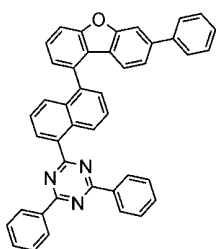
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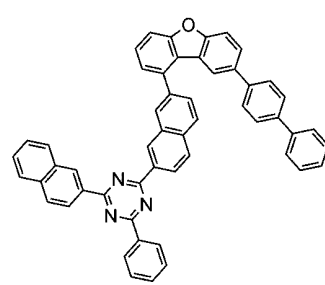
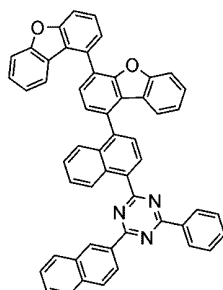
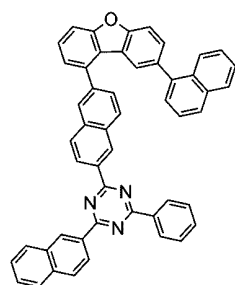
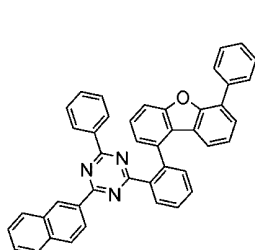
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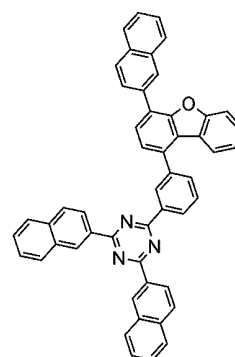
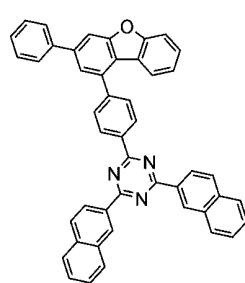
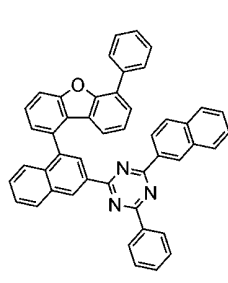
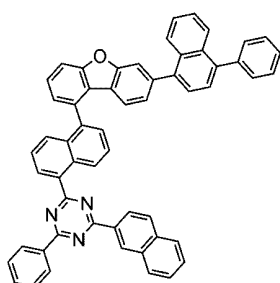
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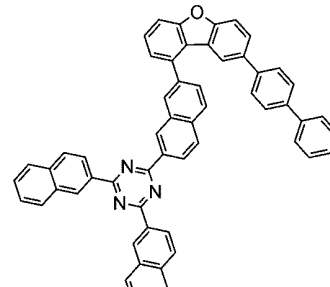
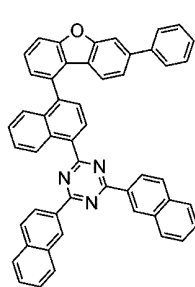
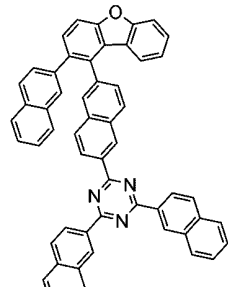
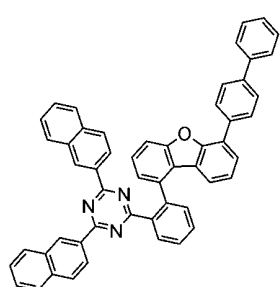
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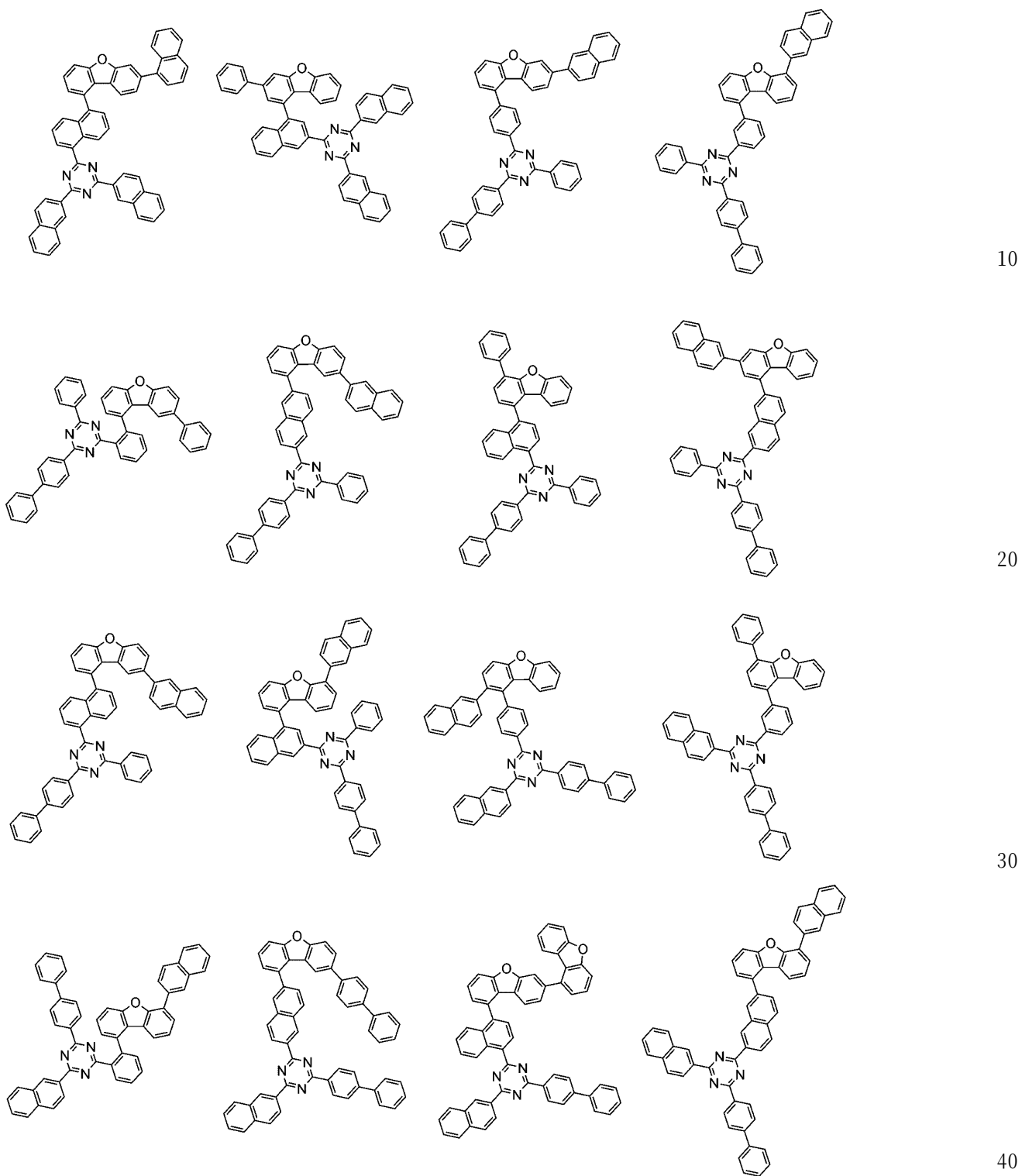
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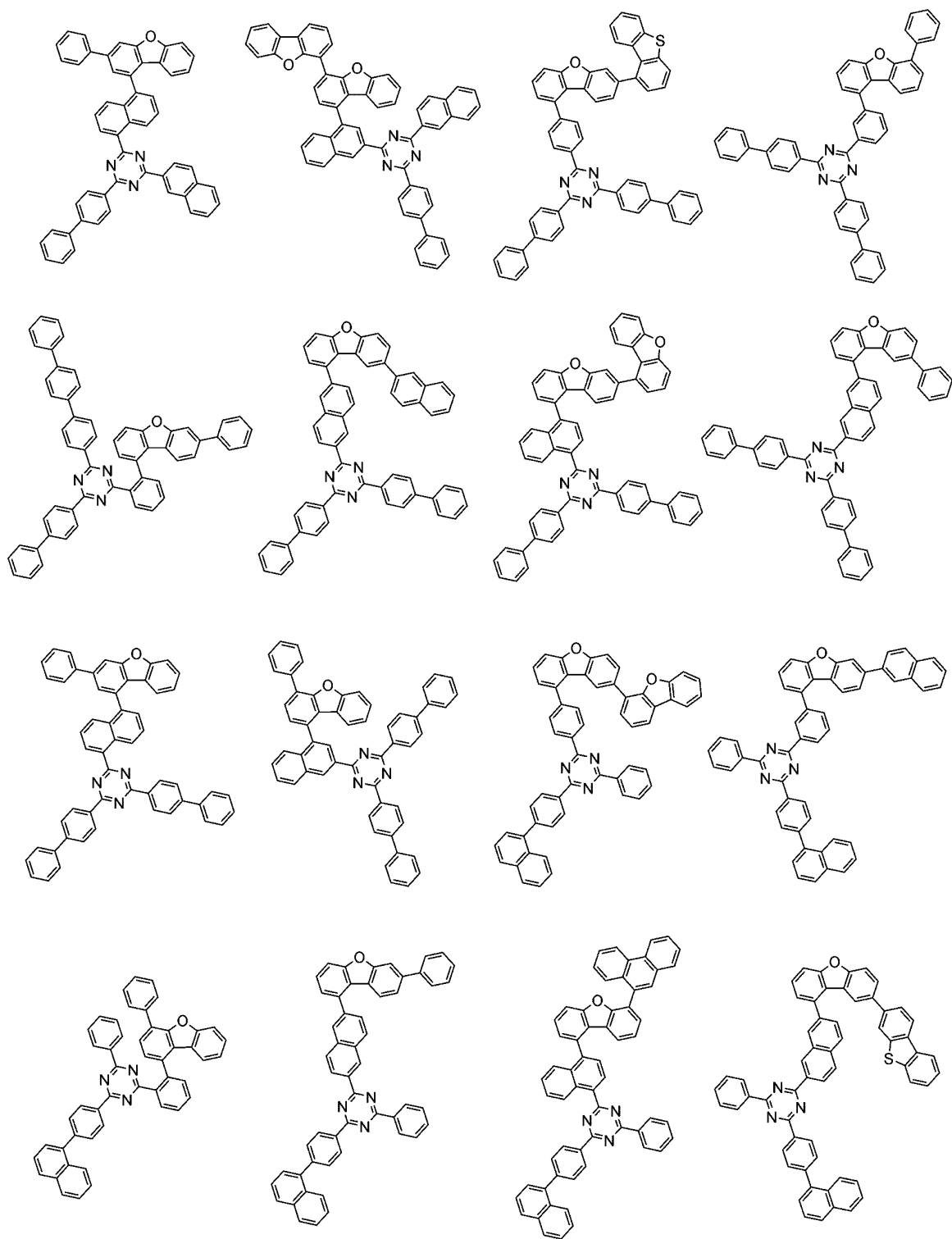
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【化 1 5 1】



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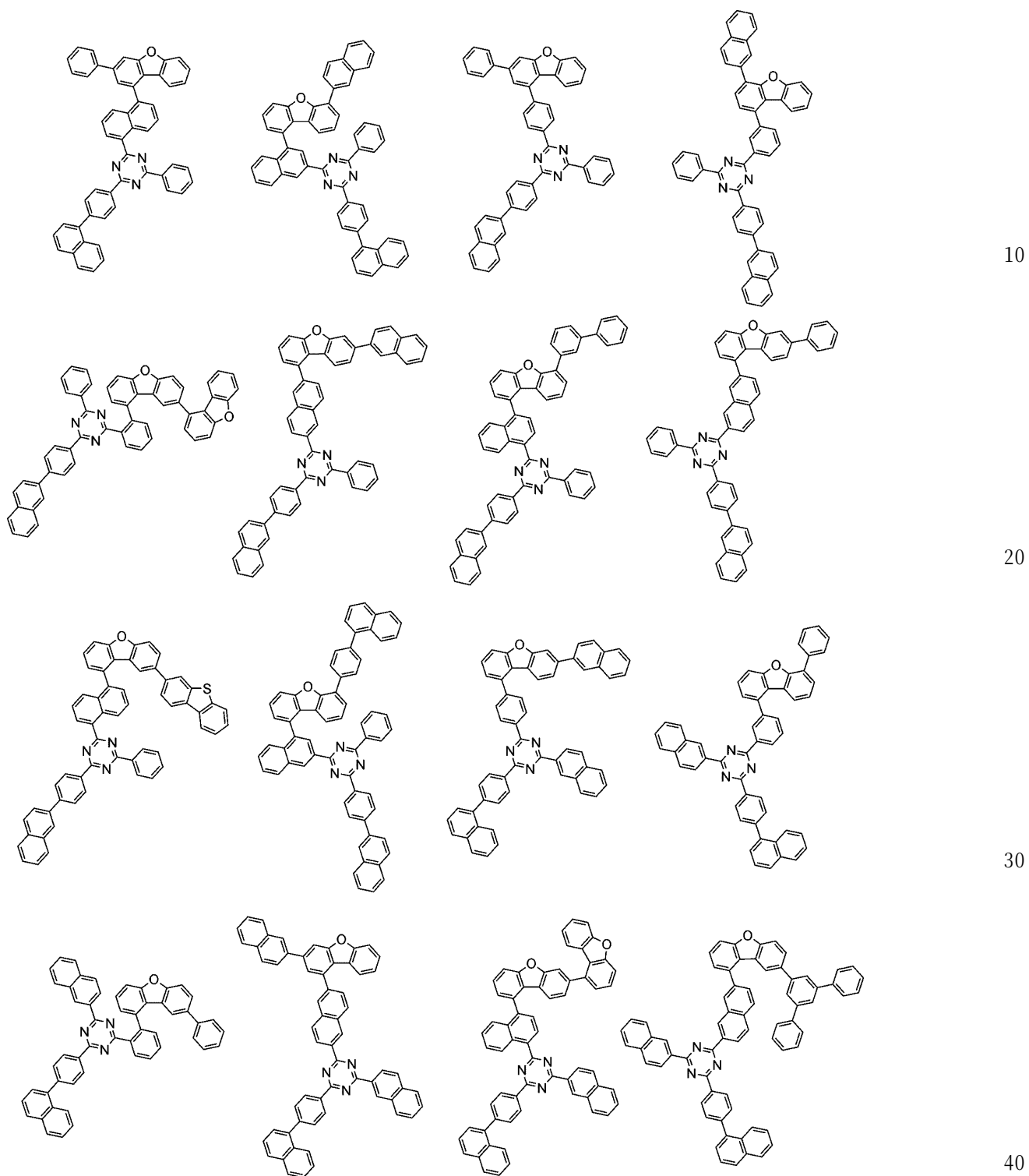
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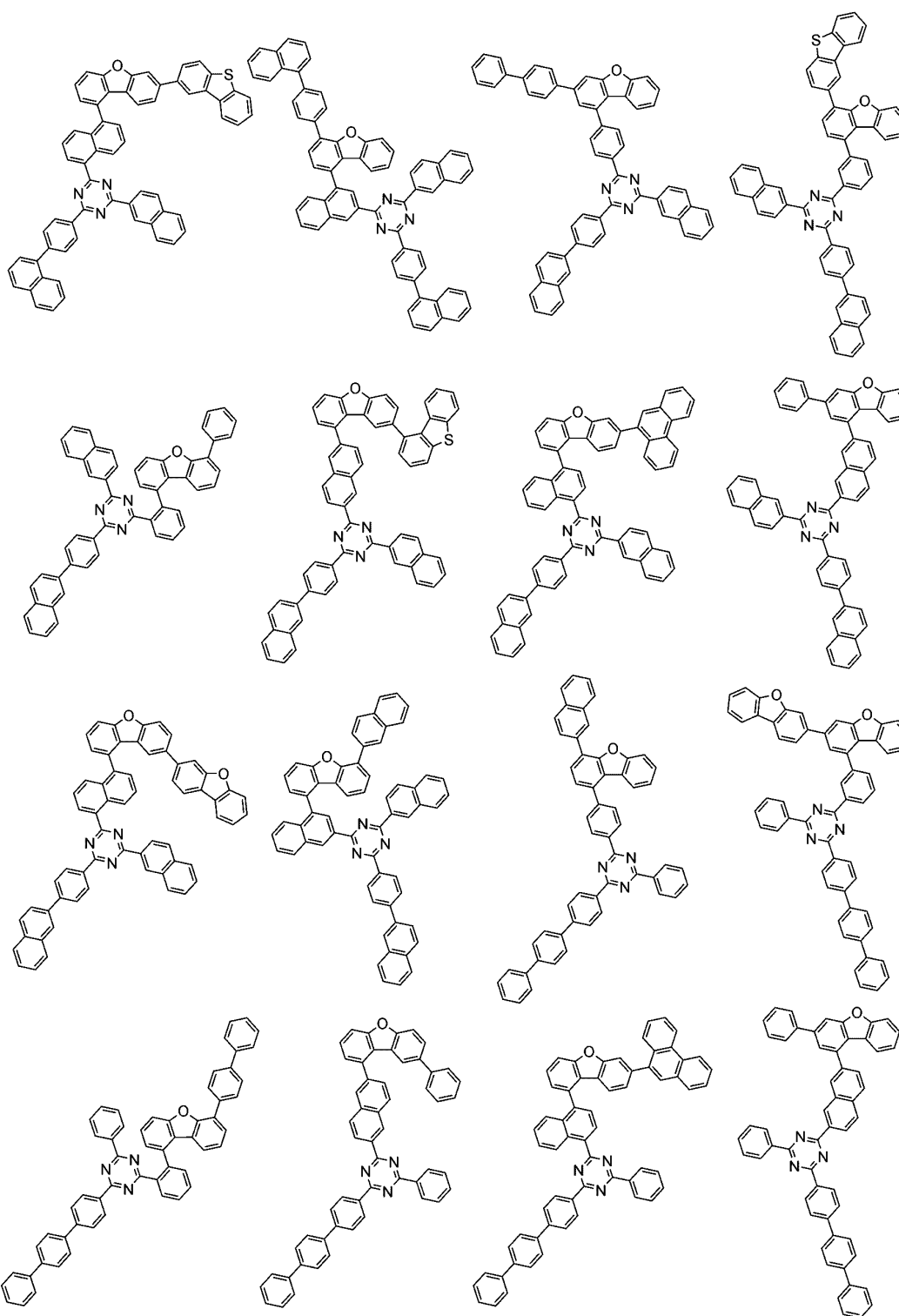
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【化 1 5 3】



【化 1 5 4】



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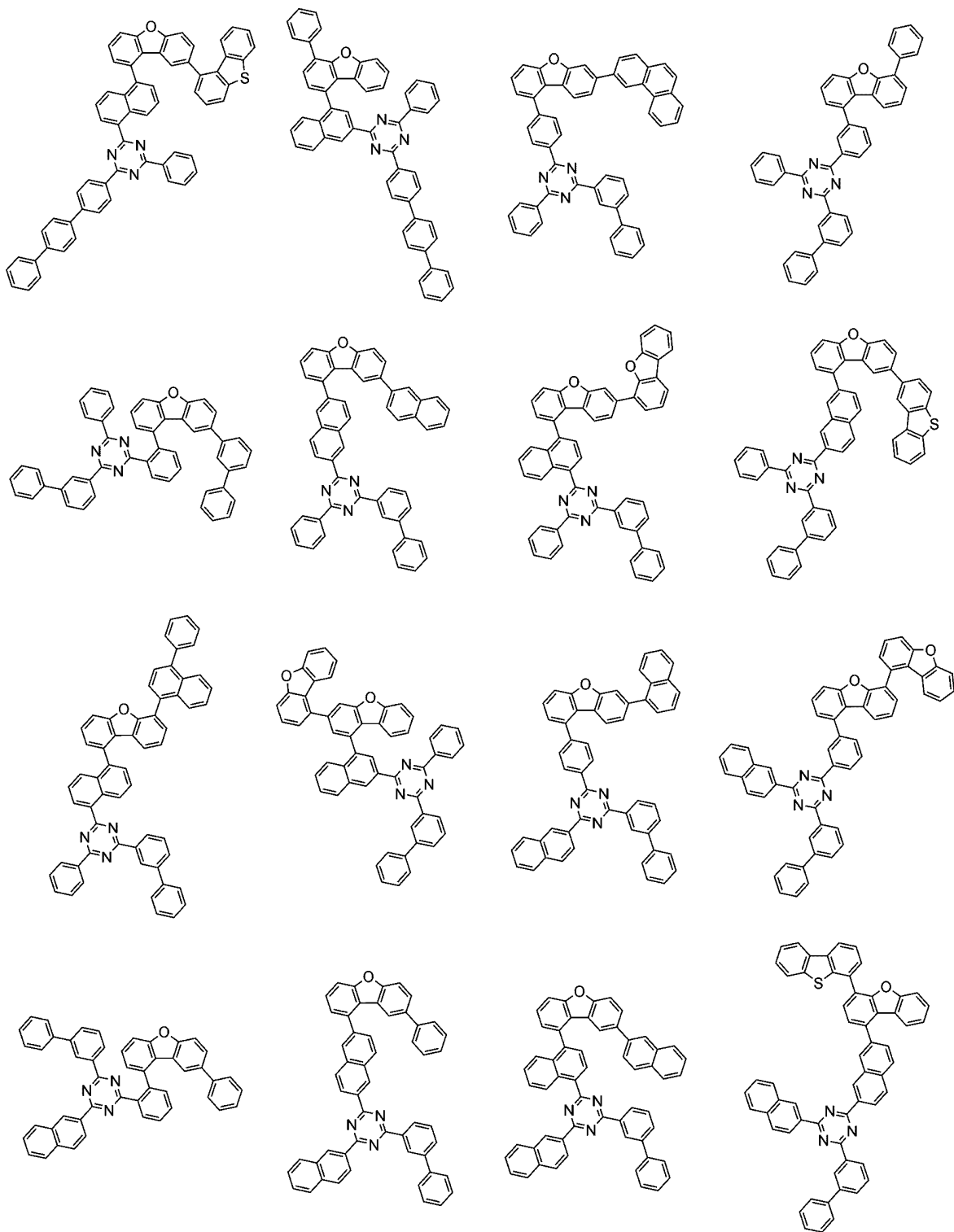
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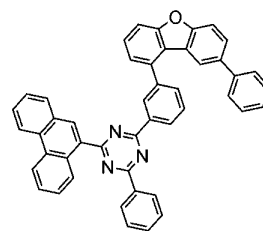
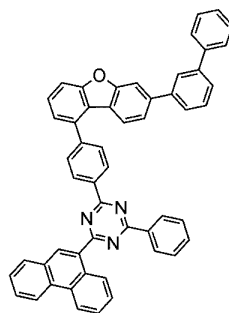
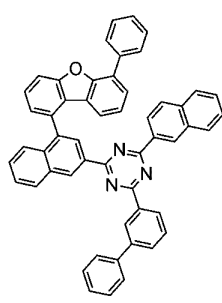
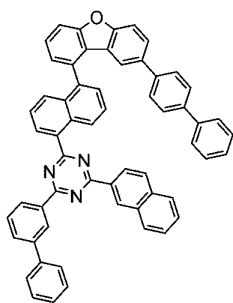
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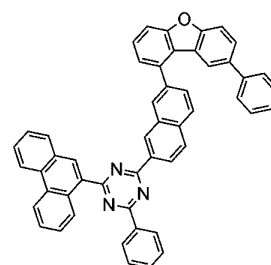
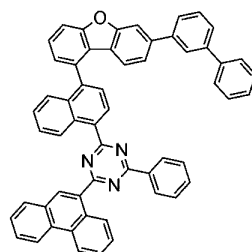
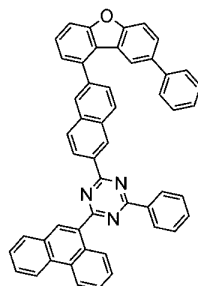
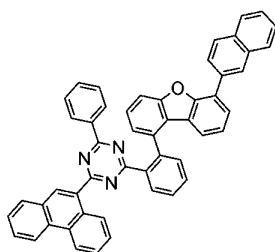
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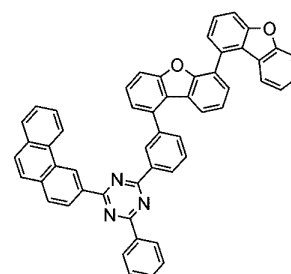
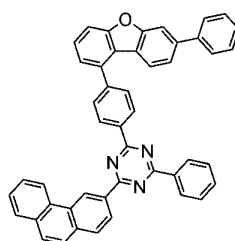
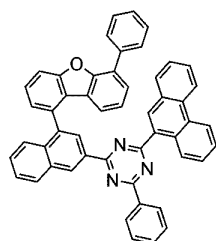
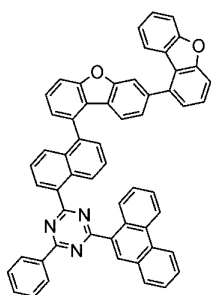
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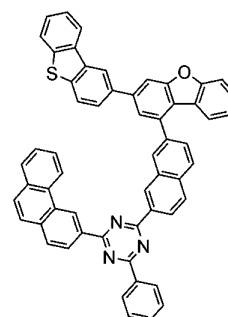
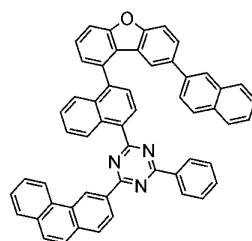
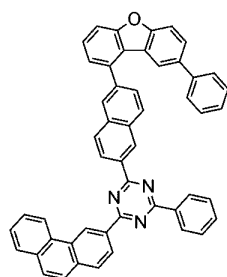
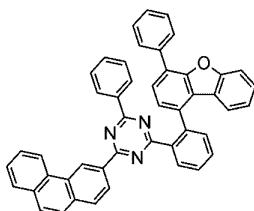
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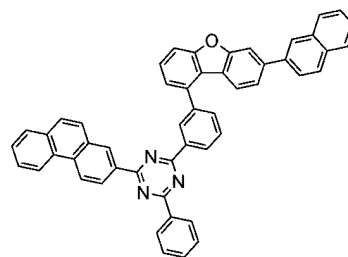
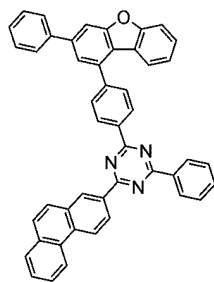
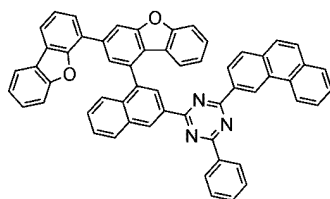
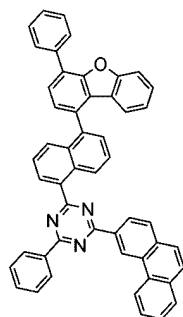
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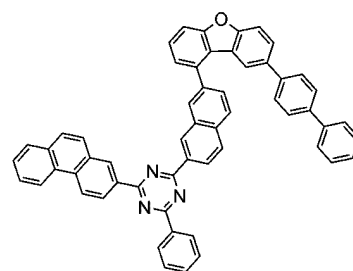
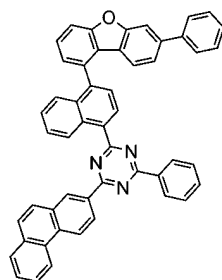
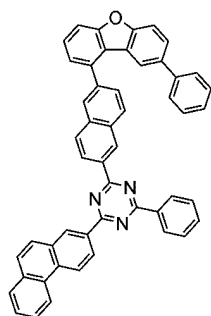
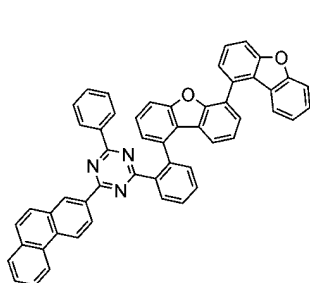
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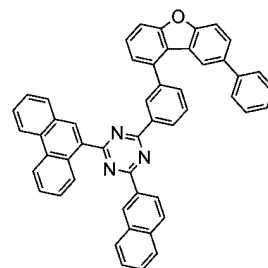
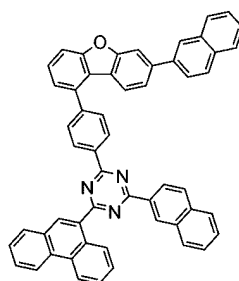
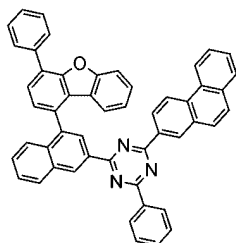
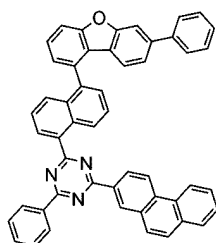
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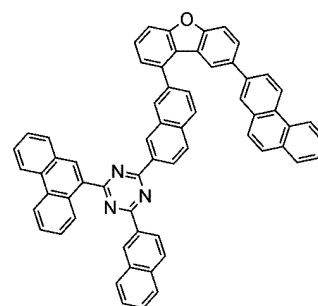
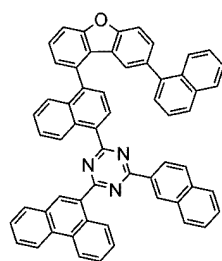
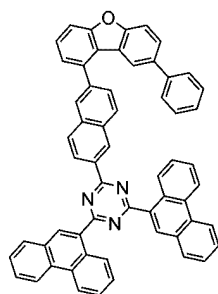
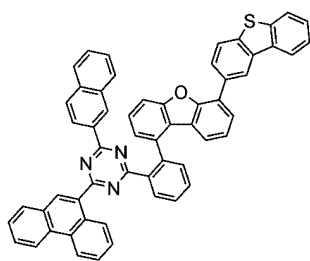
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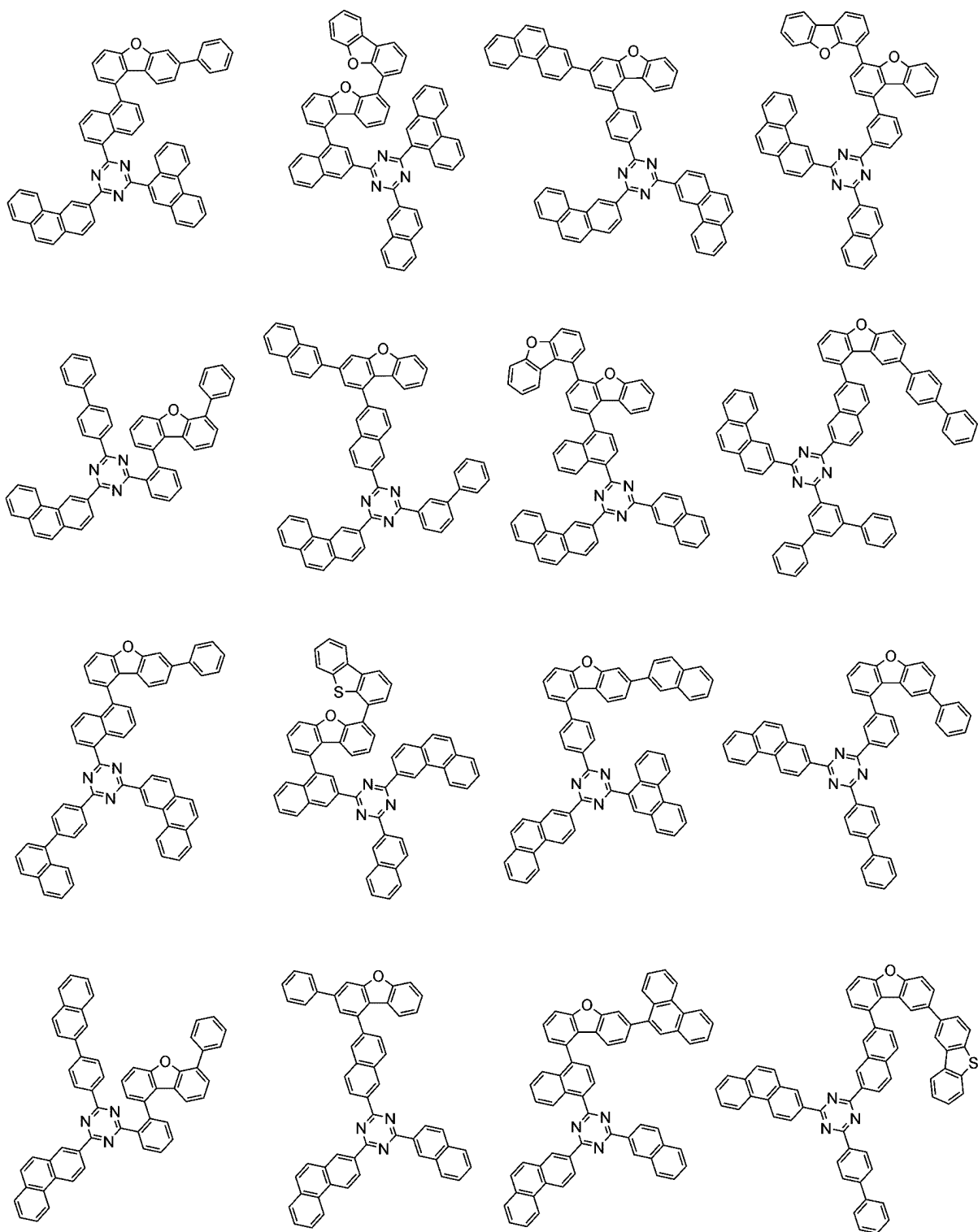
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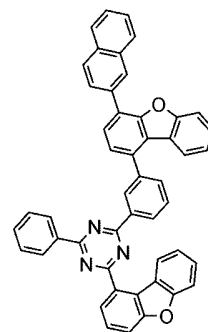
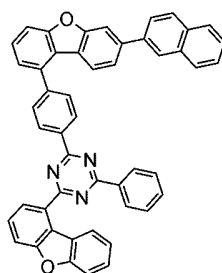
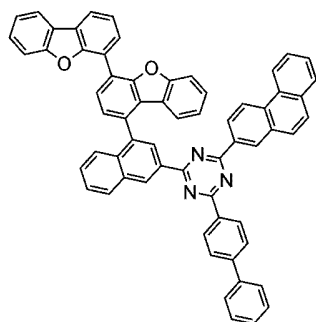
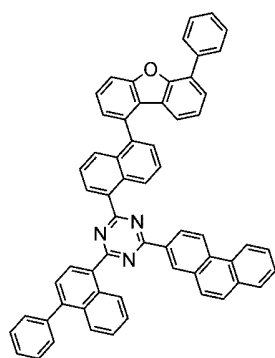
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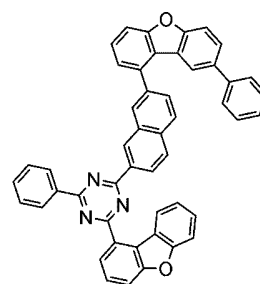
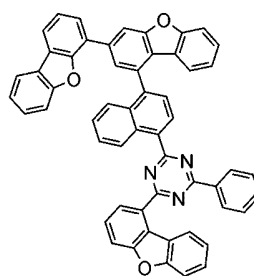
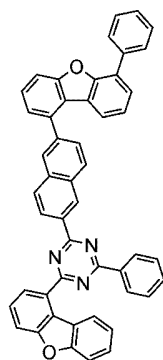
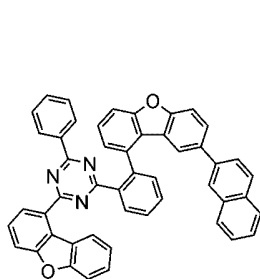
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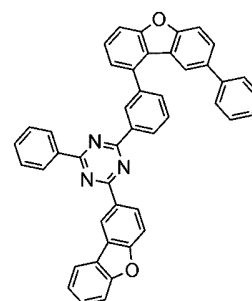
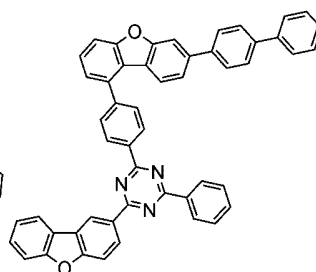
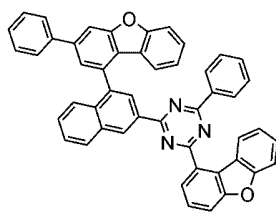
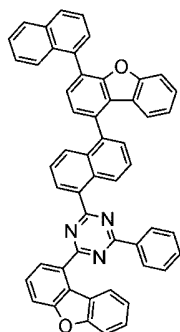
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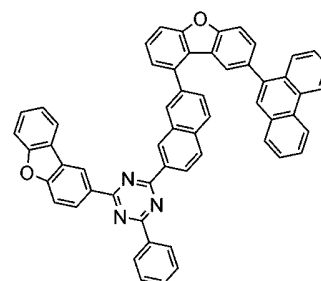
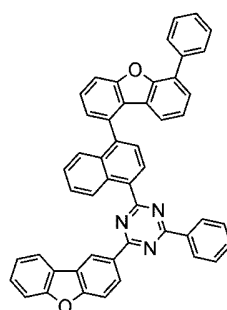
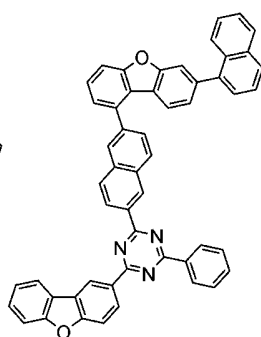
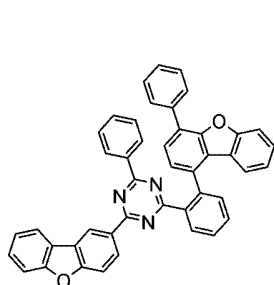
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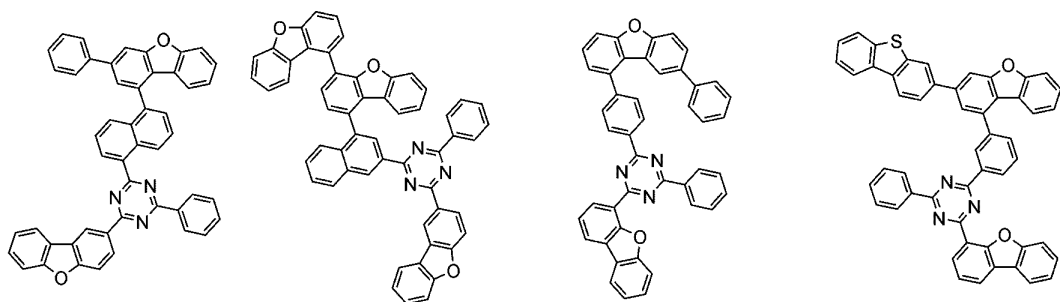
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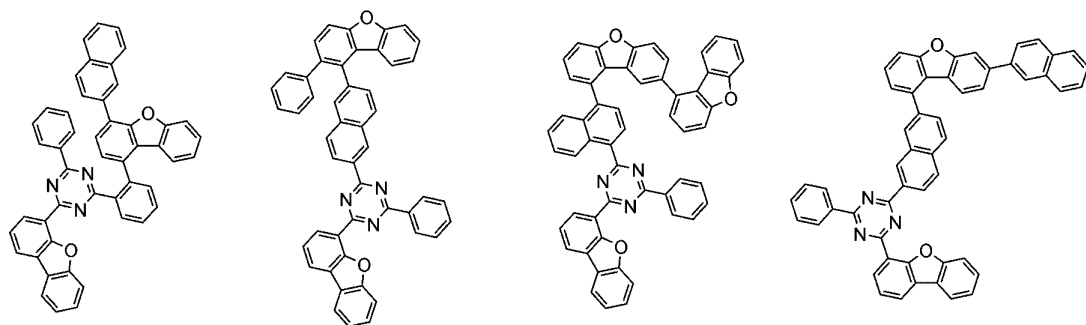
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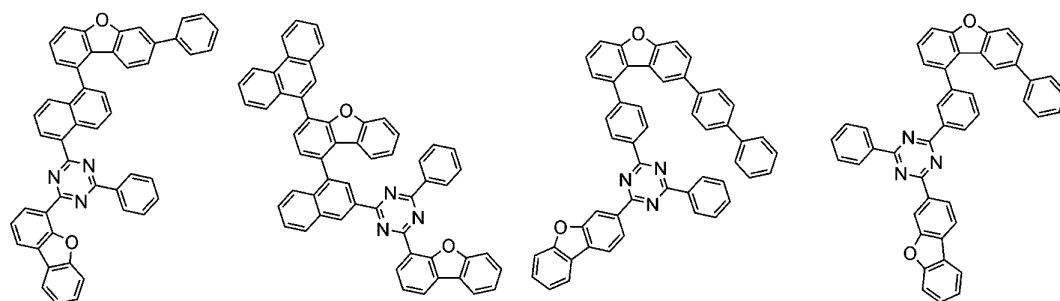
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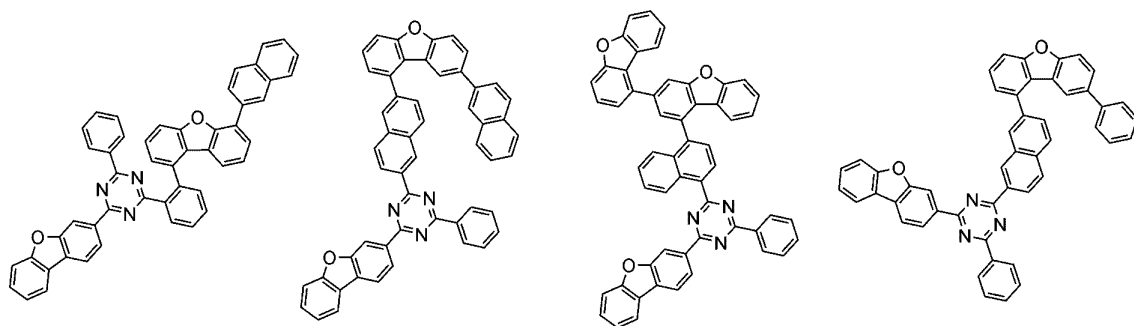
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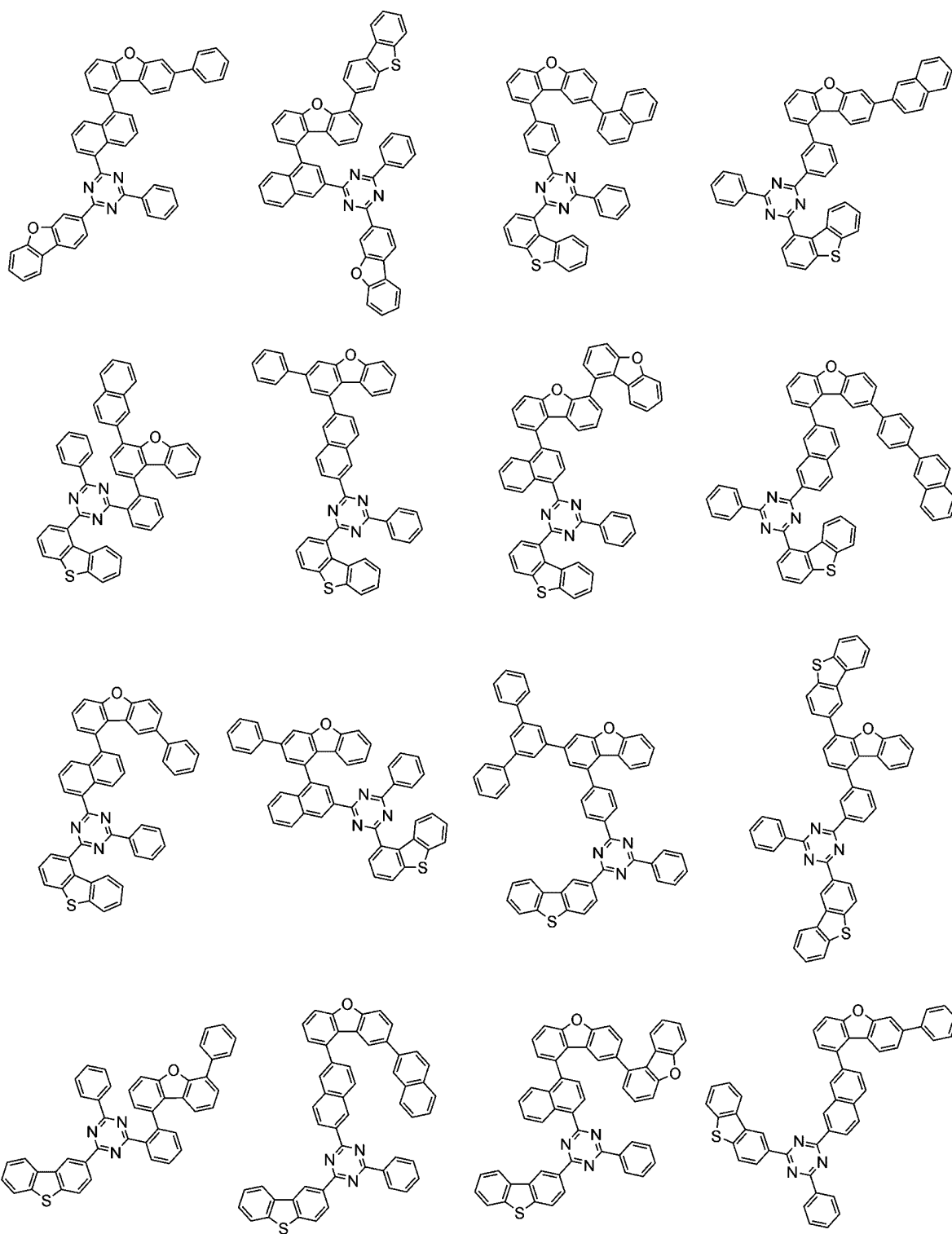
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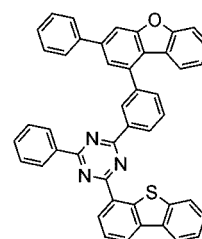
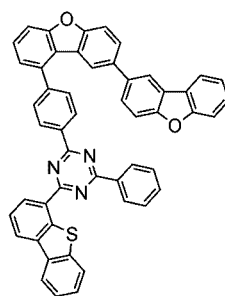
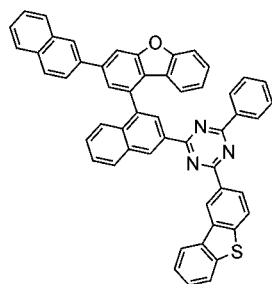
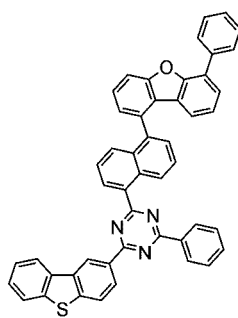
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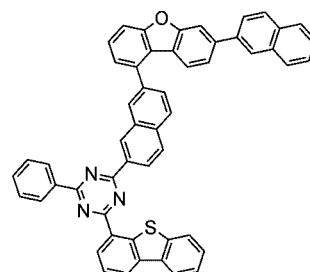
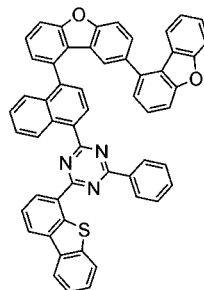
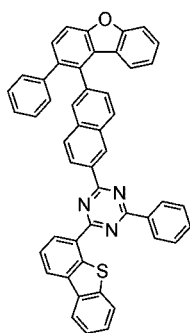
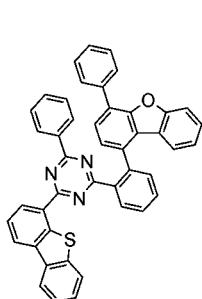
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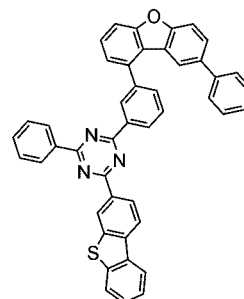
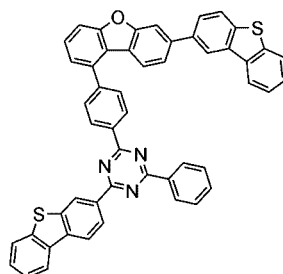
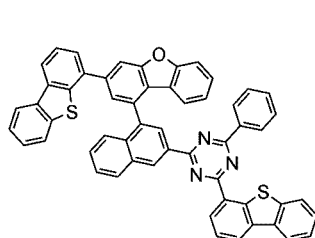
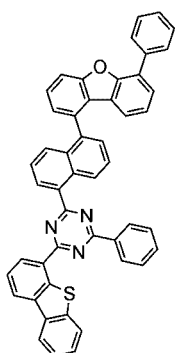
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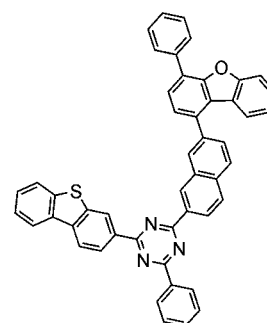
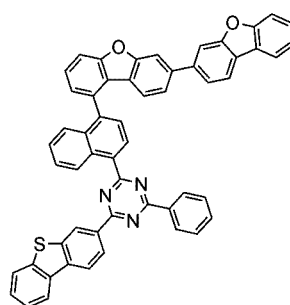
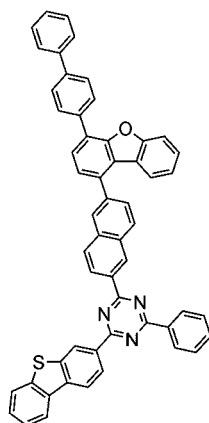
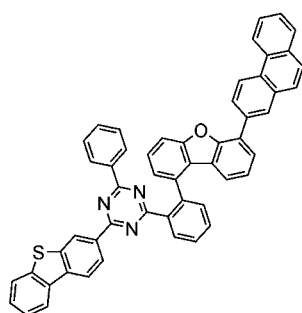
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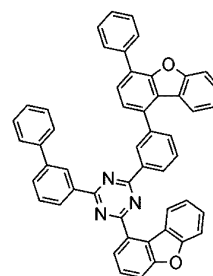
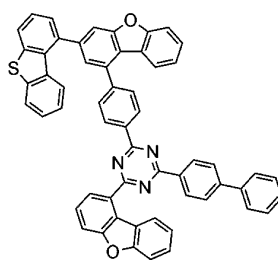
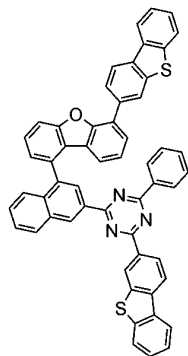
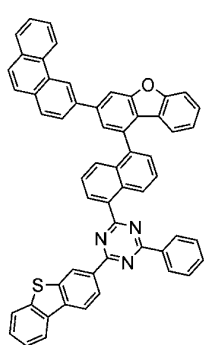
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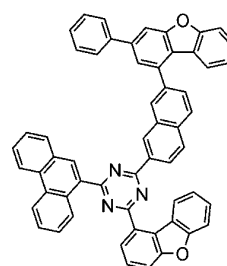
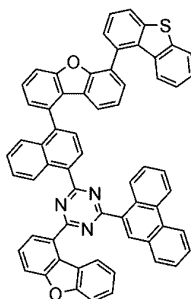
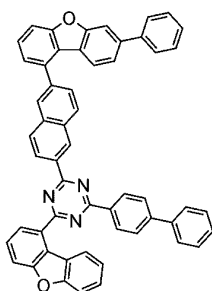
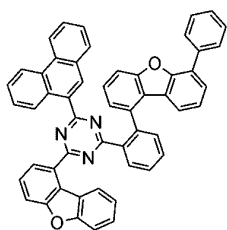
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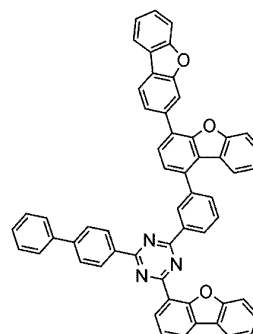
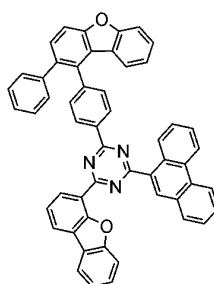
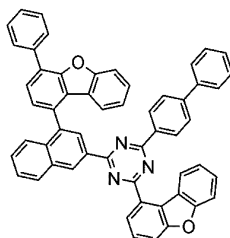
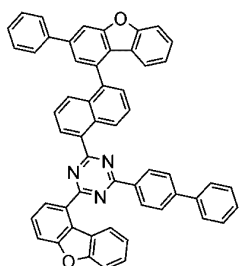
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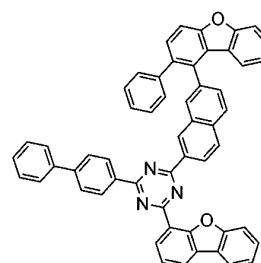
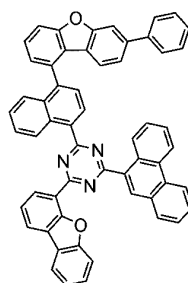
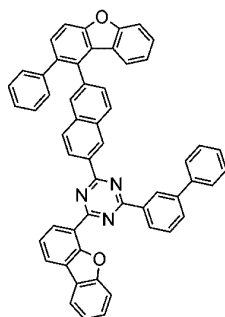
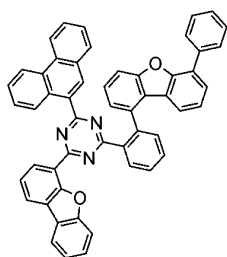
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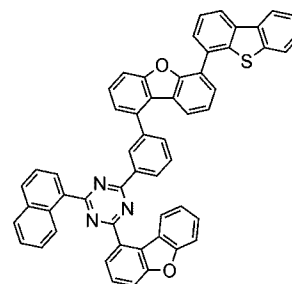
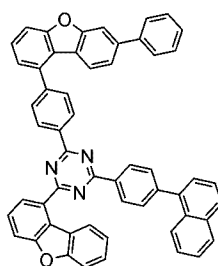
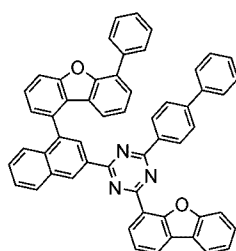
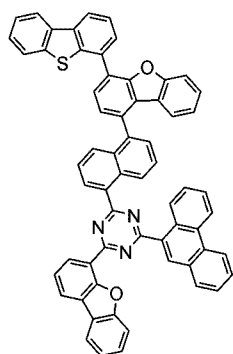
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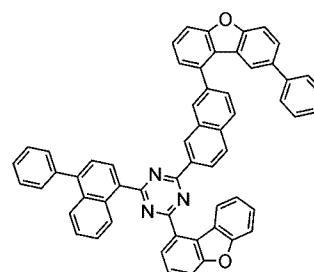
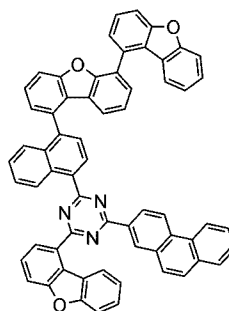
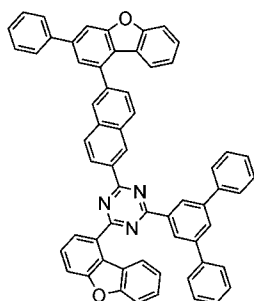
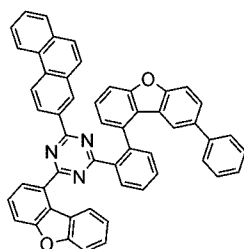
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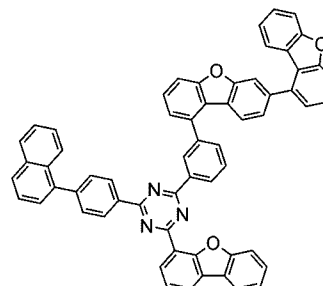
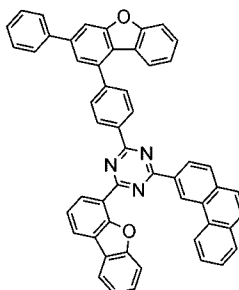
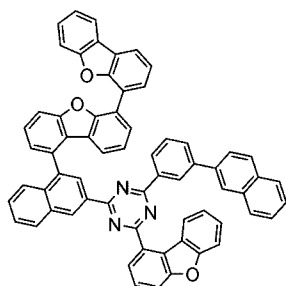
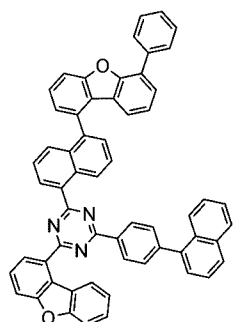
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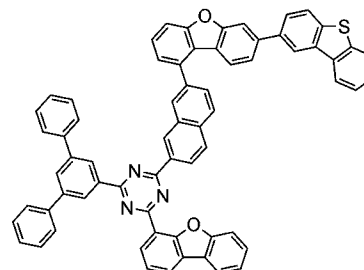
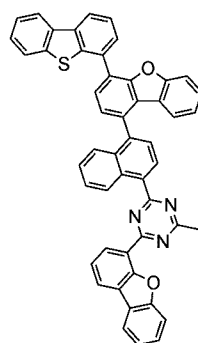
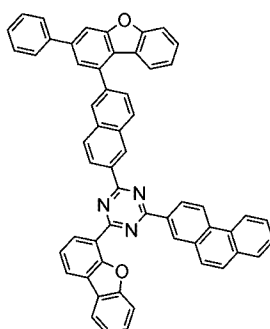
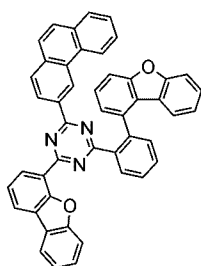
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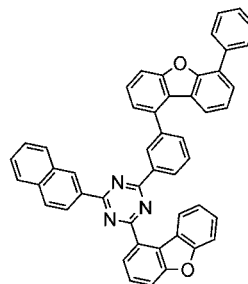
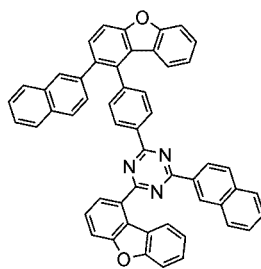
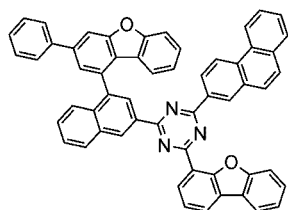
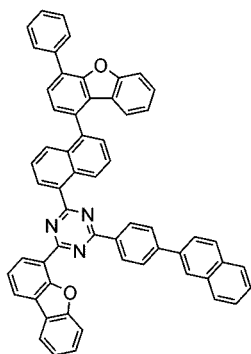
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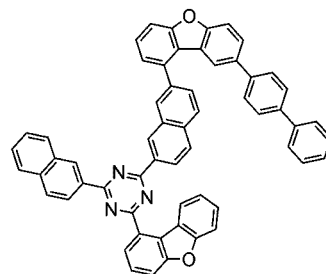
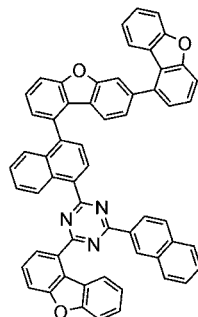
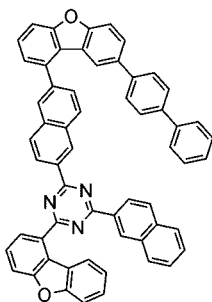
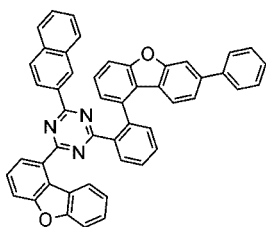
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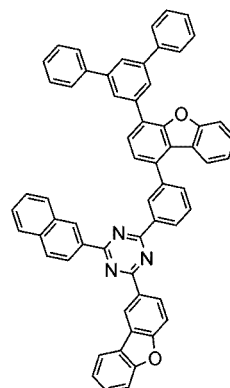
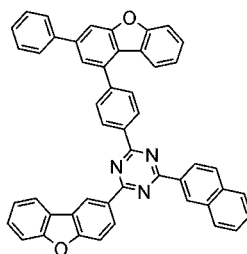
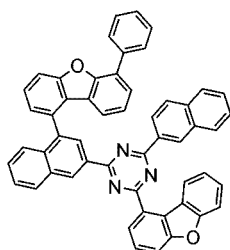
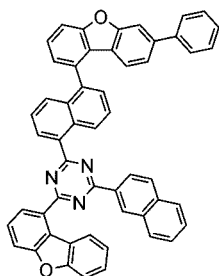
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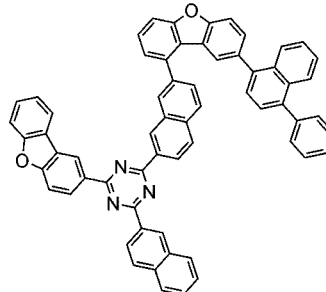
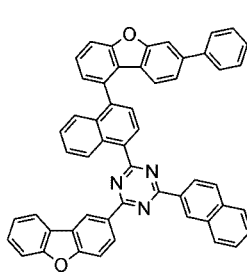
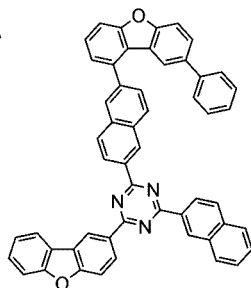
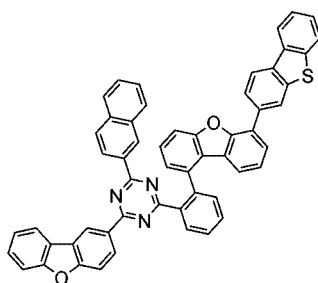
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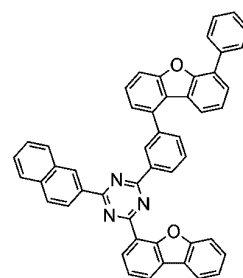
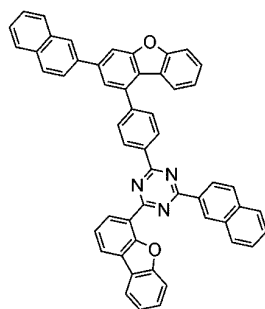
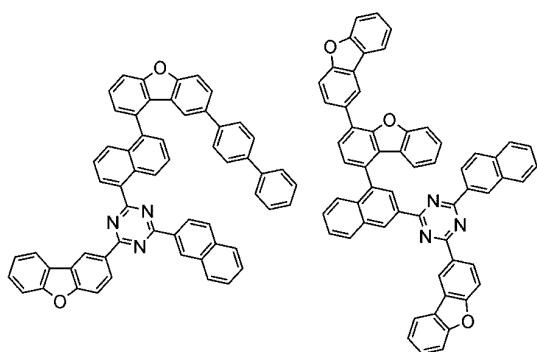
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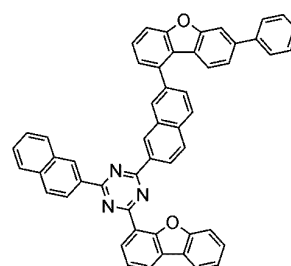
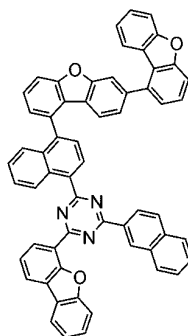
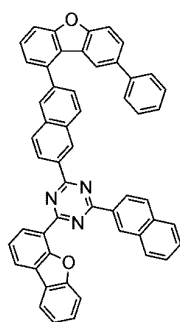
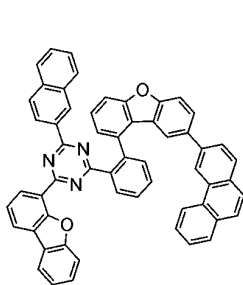
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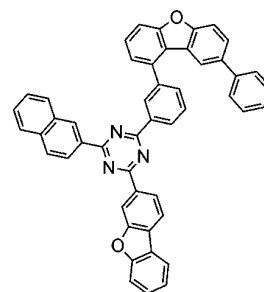
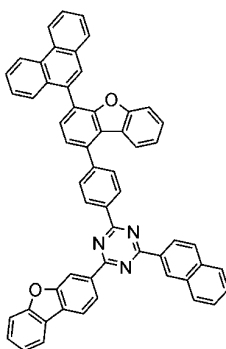
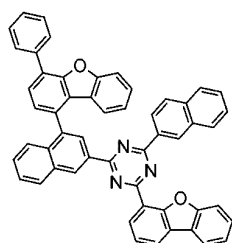
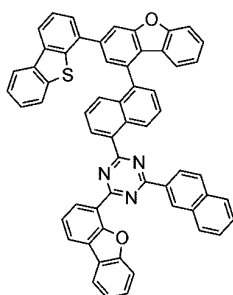
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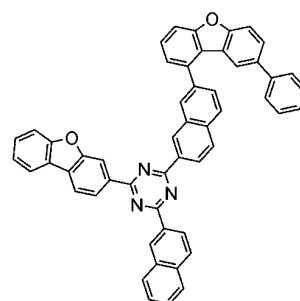
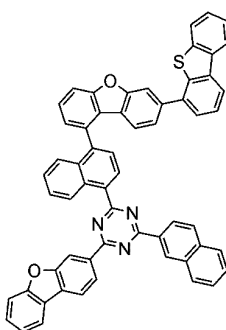
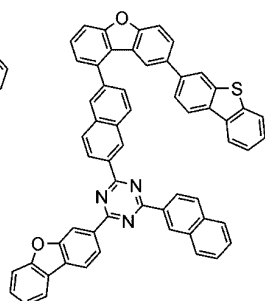
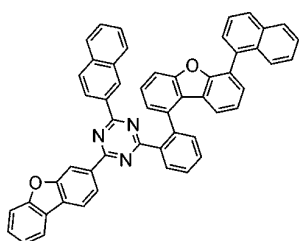
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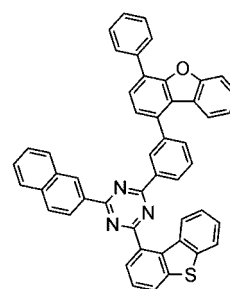
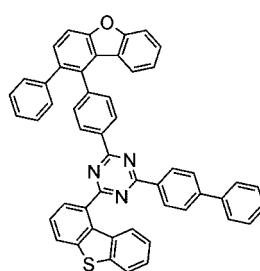
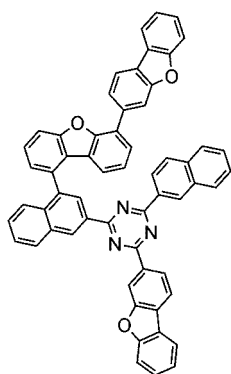
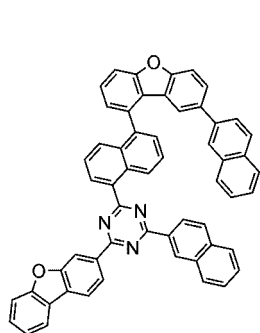
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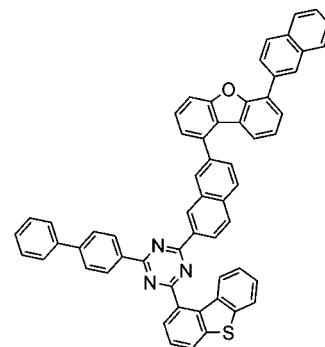
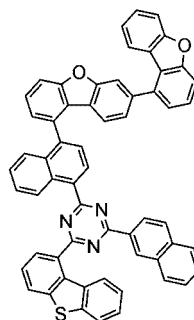
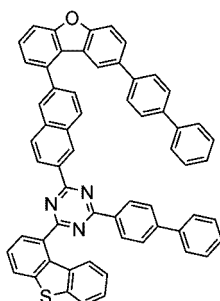
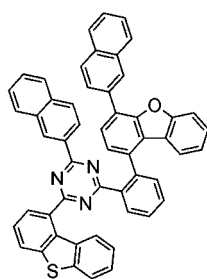
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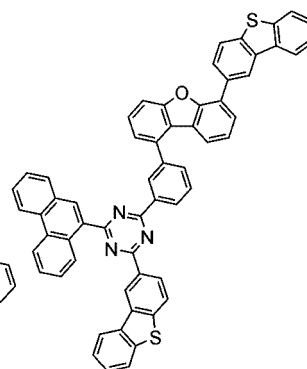
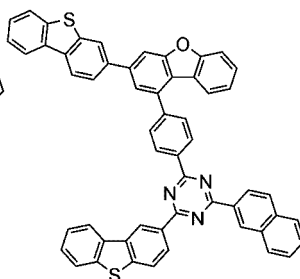
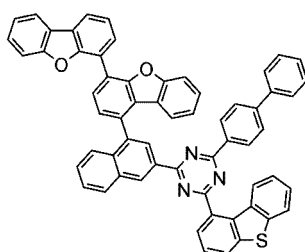
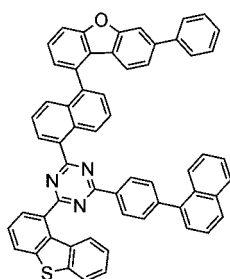
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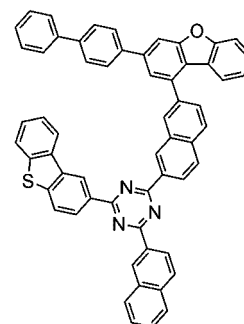
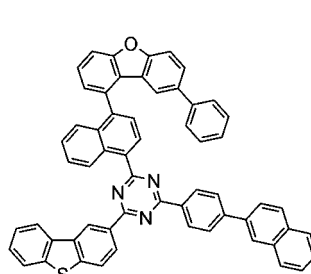
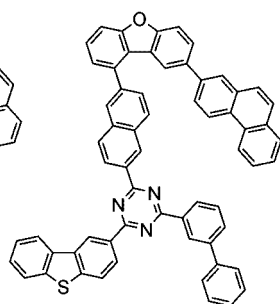
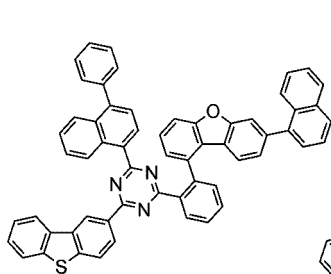
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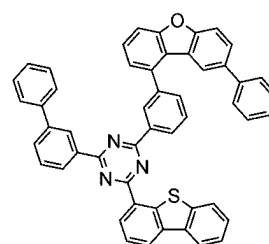
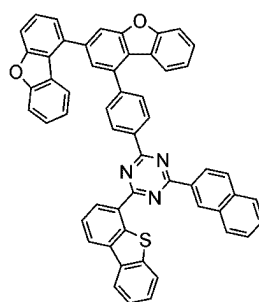
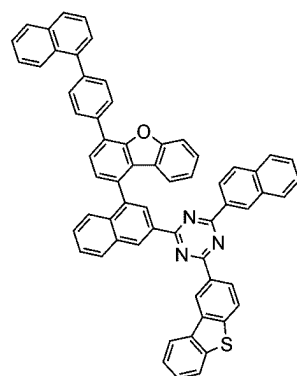
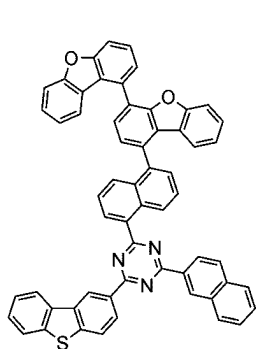
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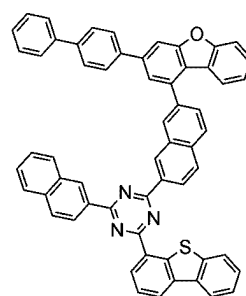
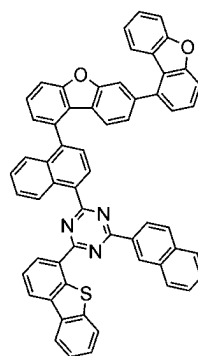
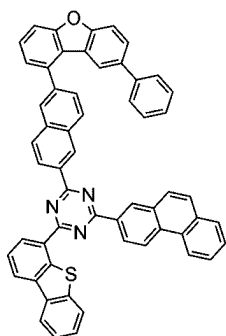
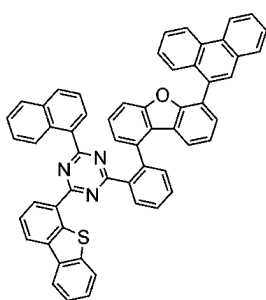
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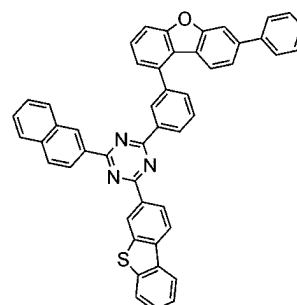
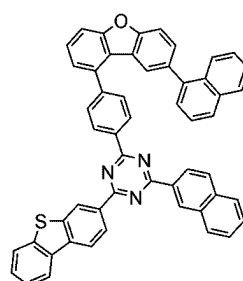
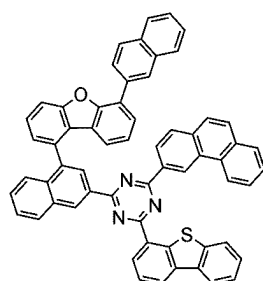
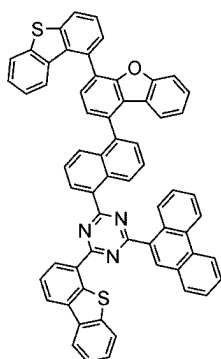
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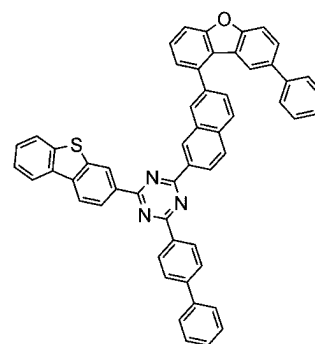
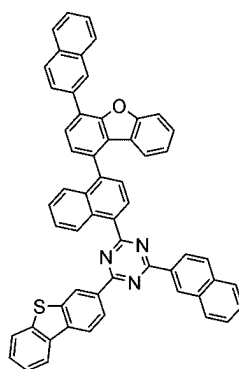
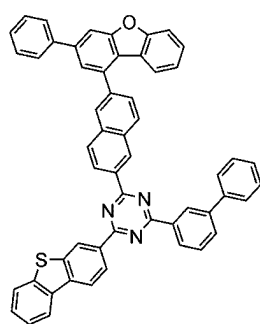
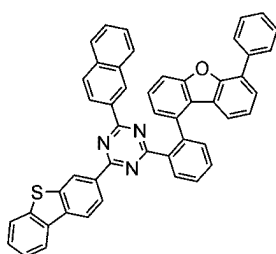
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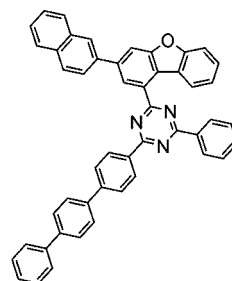
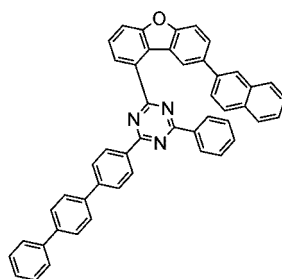
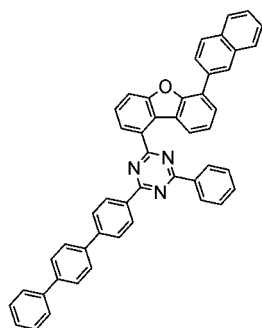
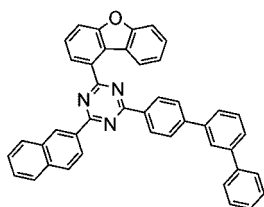
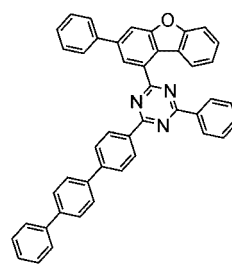
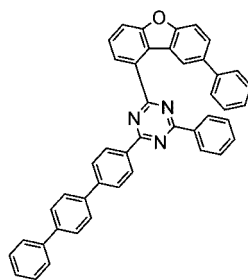
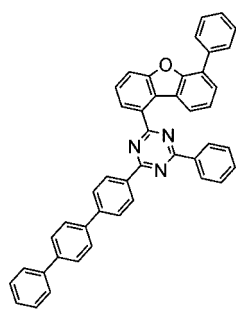
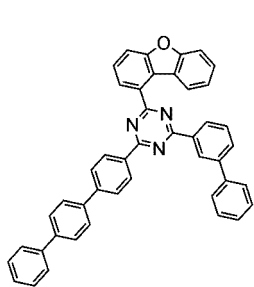
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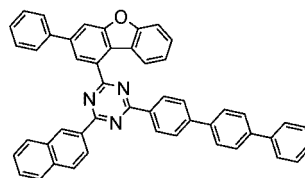
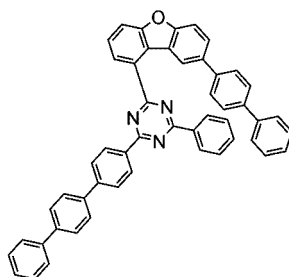
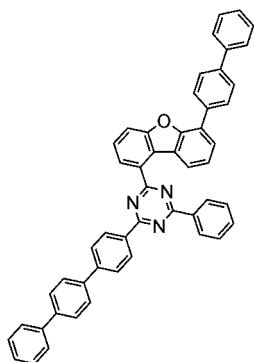
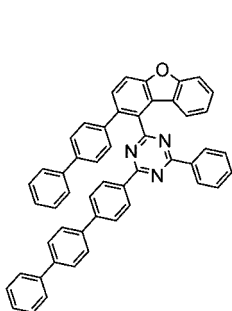
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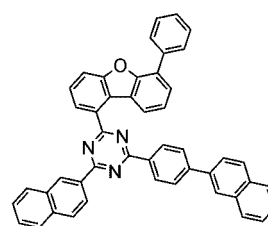
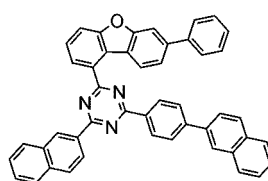
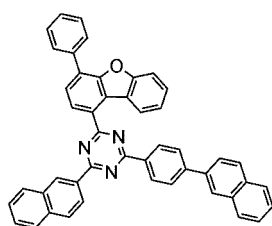
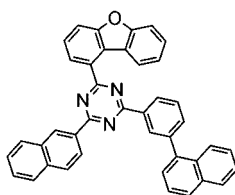
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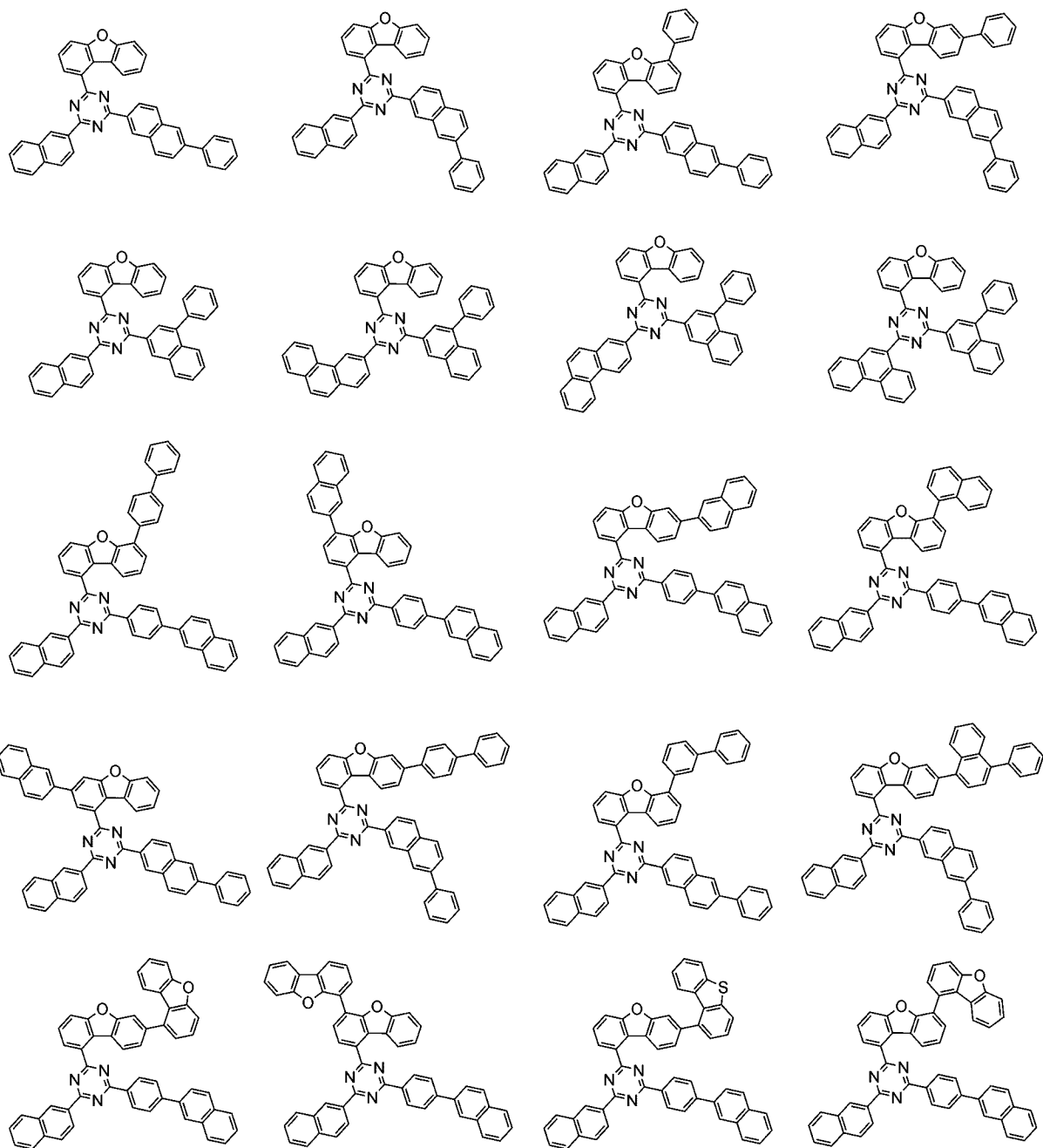


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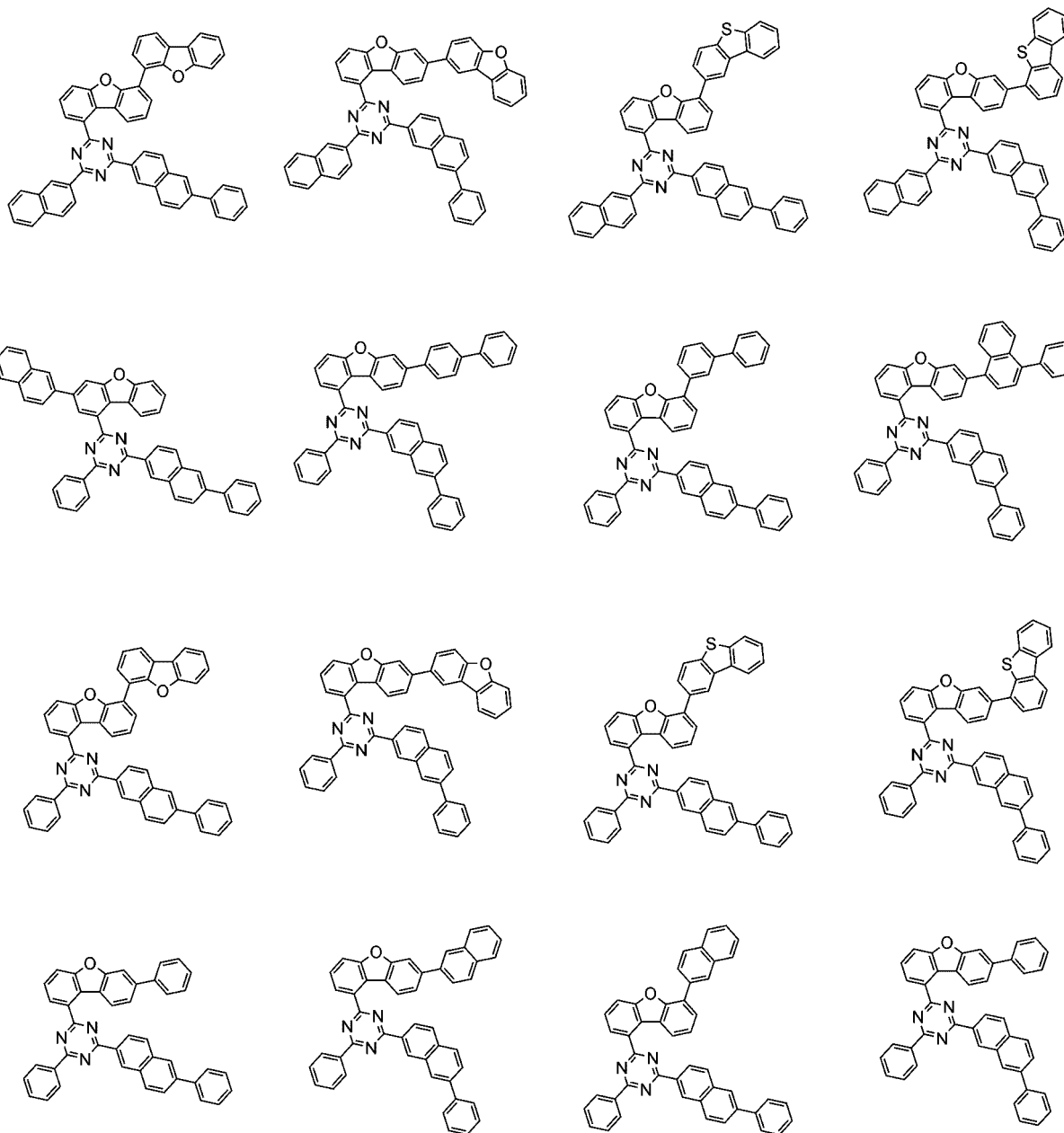
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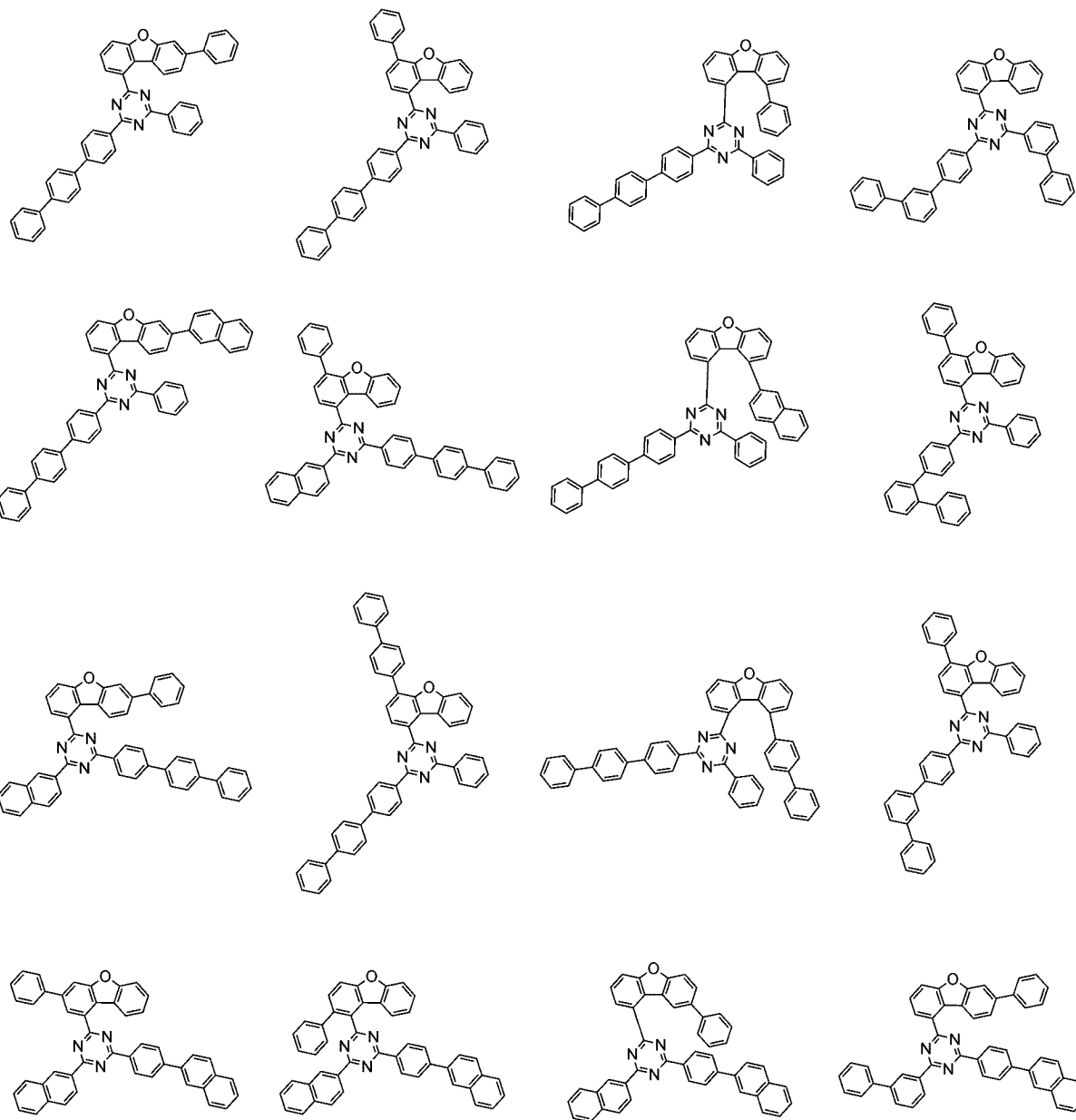
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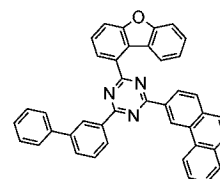
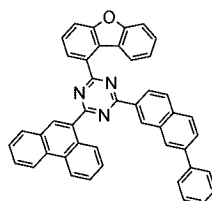
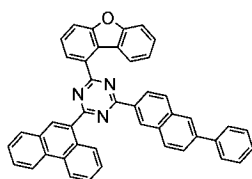
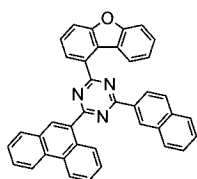
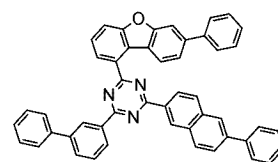
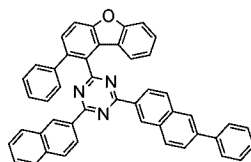
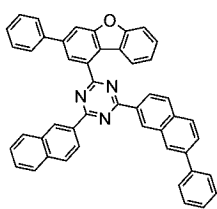
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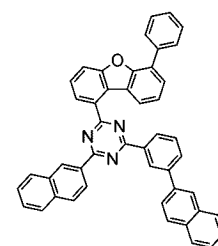
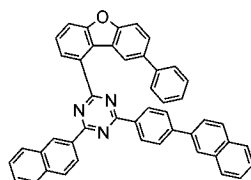
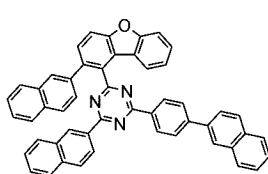
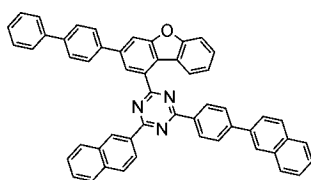
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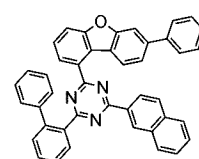
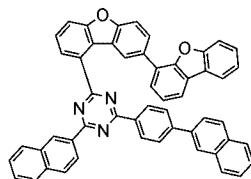
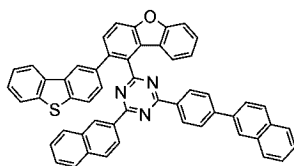
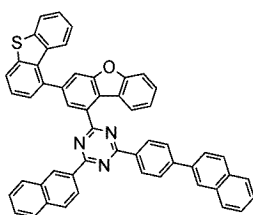
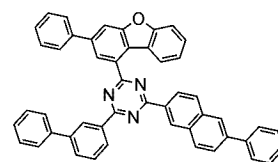
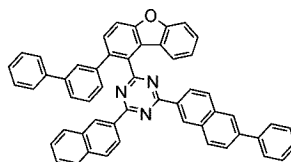
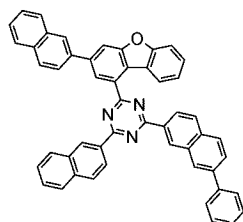
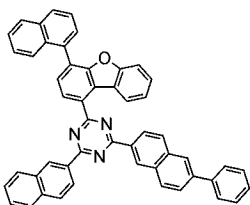
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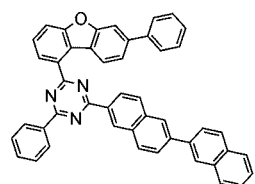
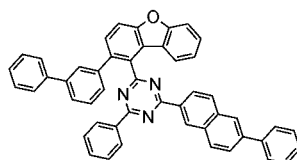
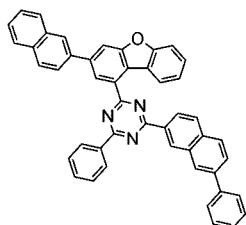
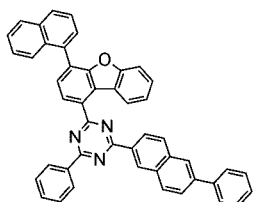
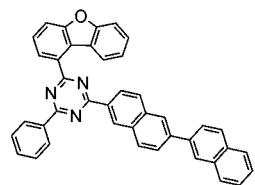
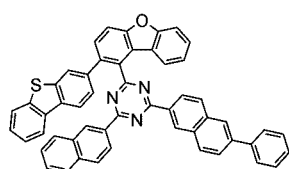
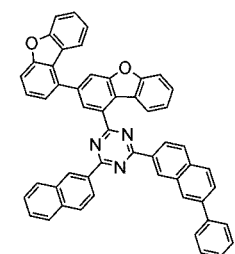
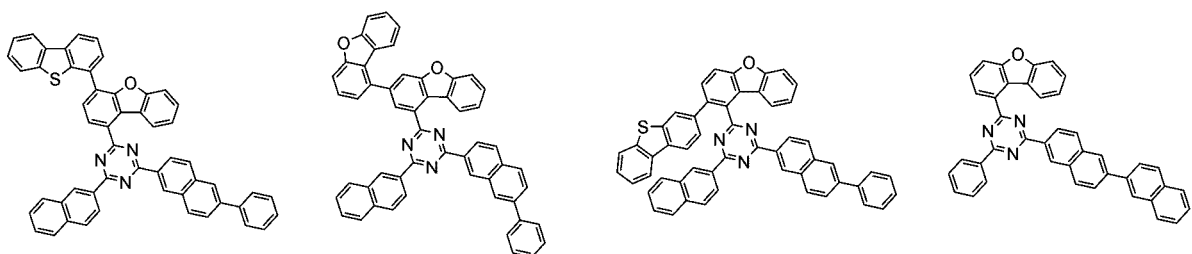


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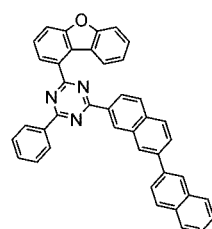
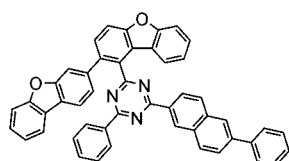
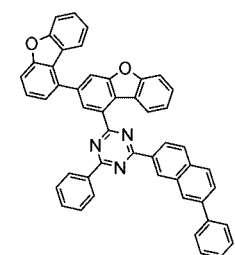
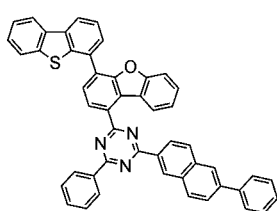
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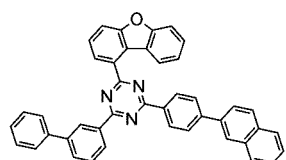
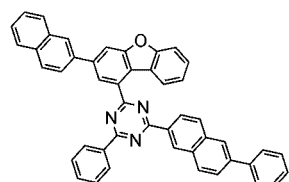
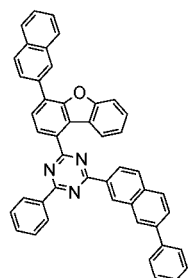
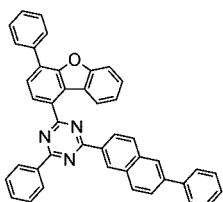
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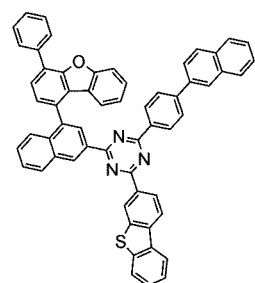
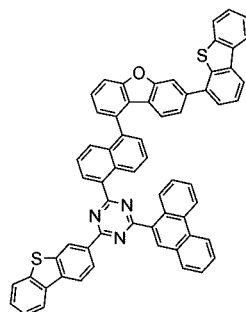
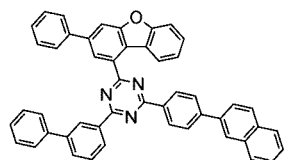
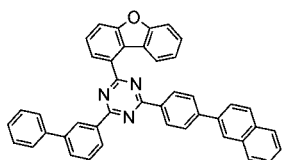
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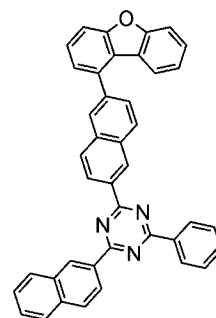
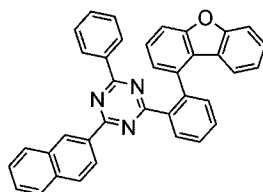
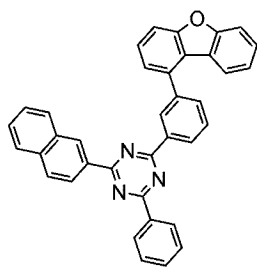
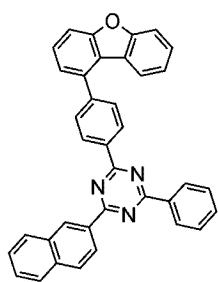
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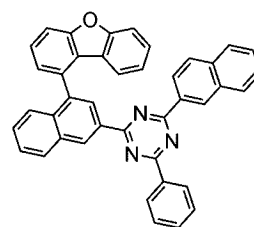
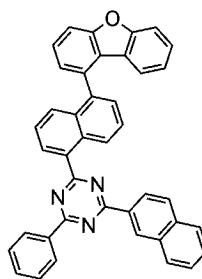
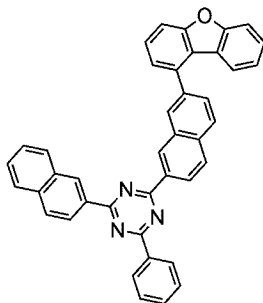
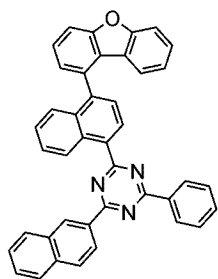
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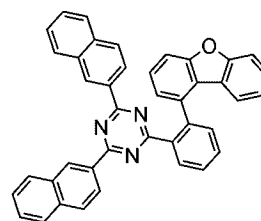
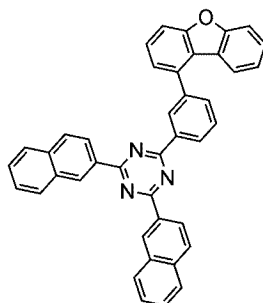
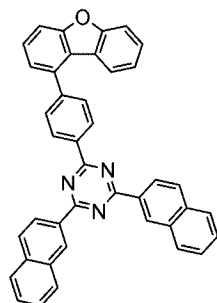
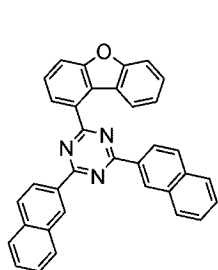
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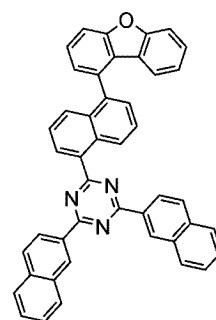
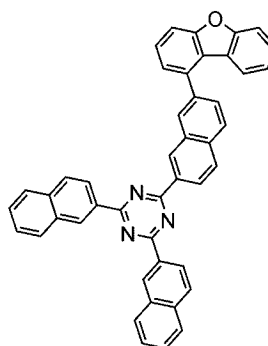
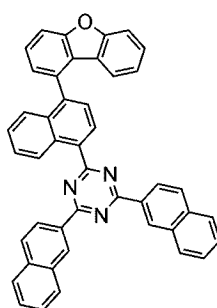
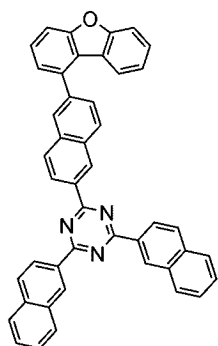
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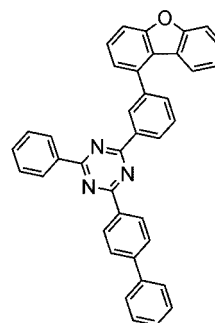
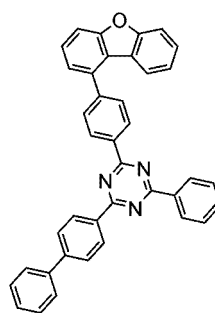
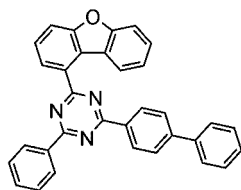
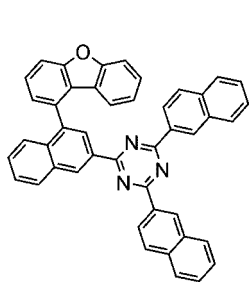
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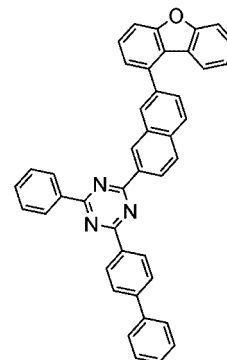
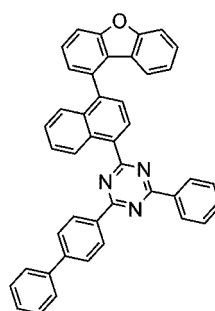
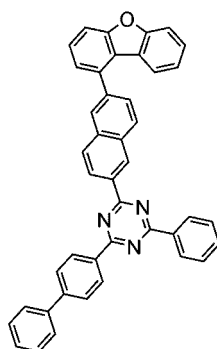
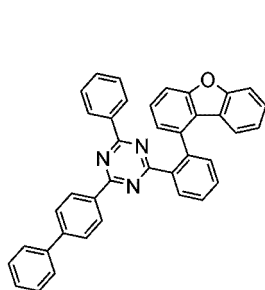
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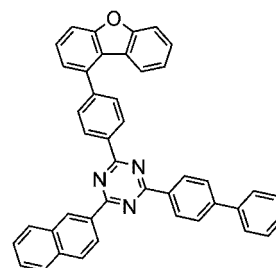
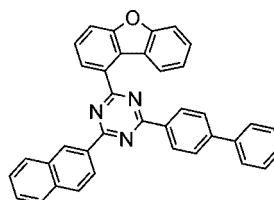
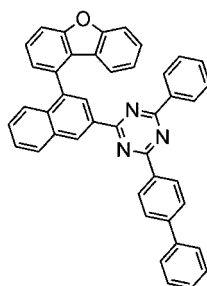
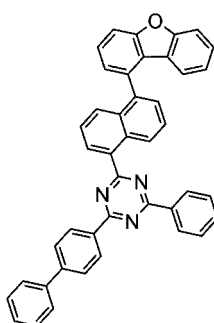
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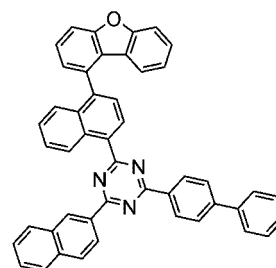
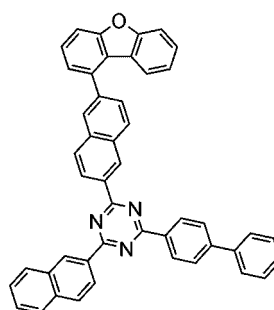
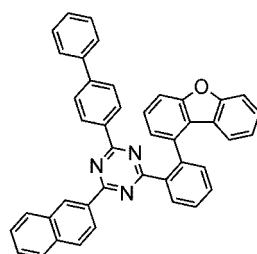
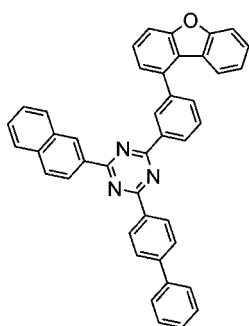
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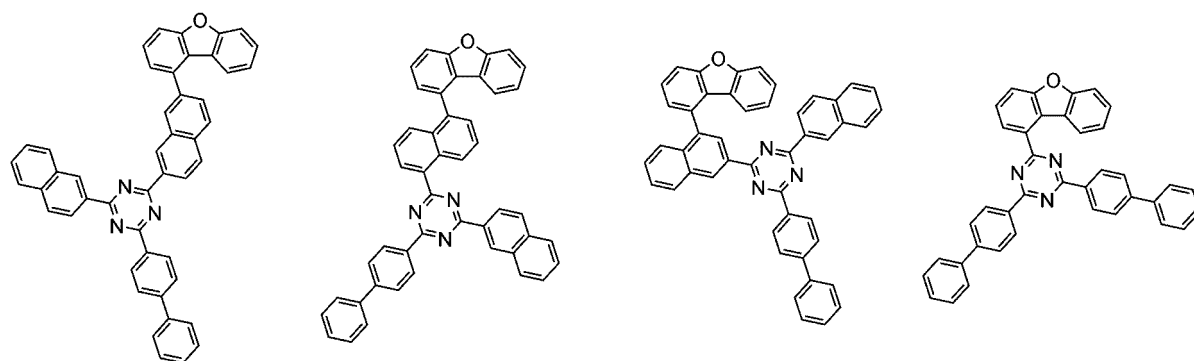
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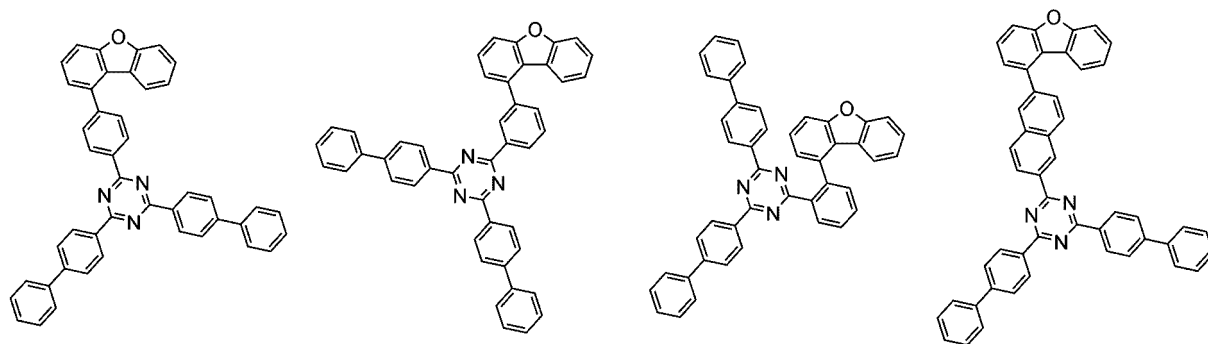
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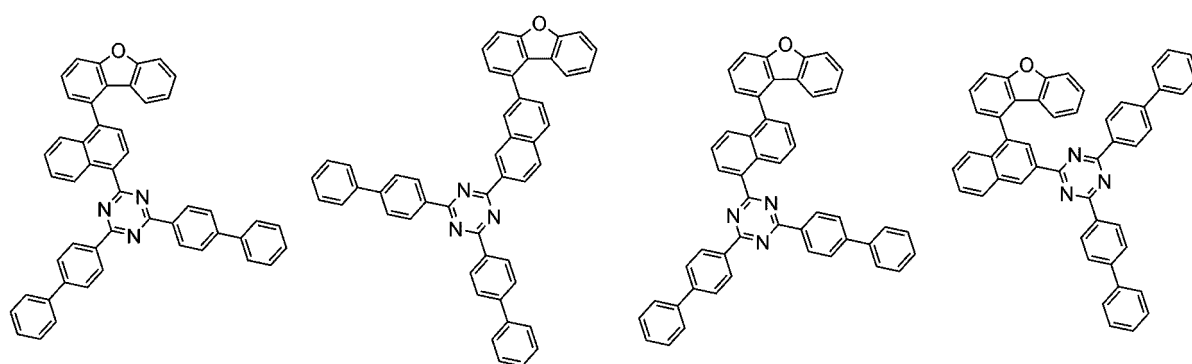
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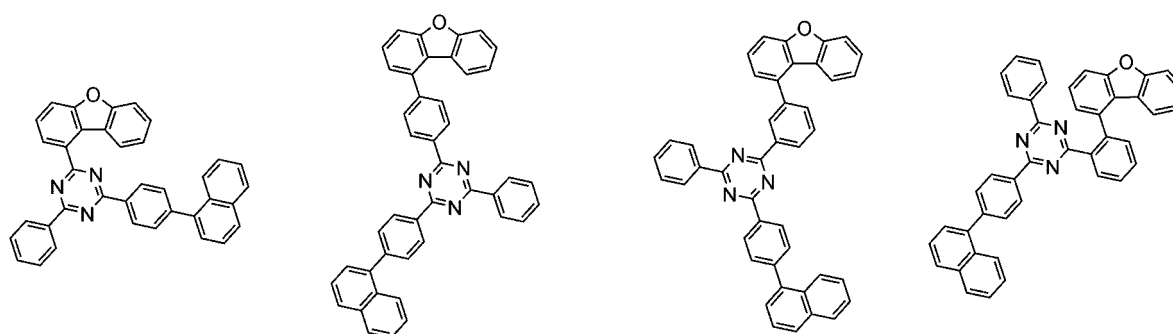
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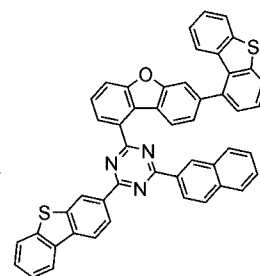
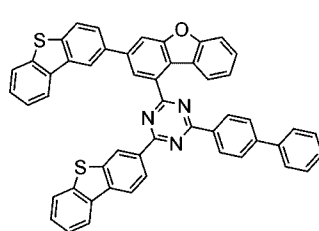
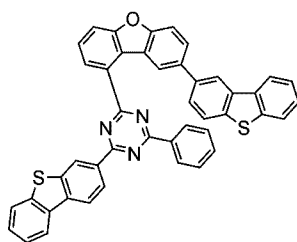
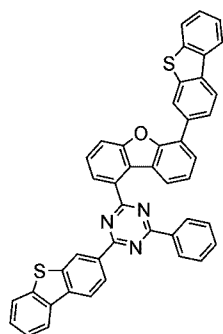
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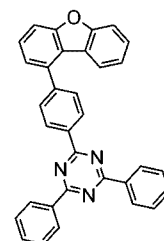
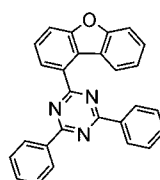
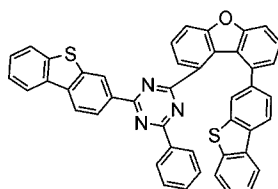
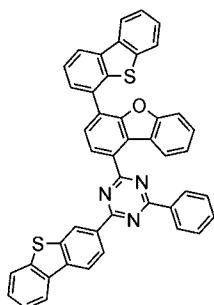
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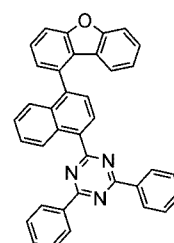
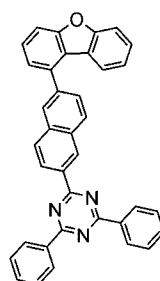
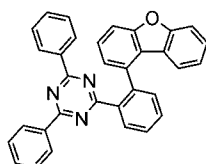
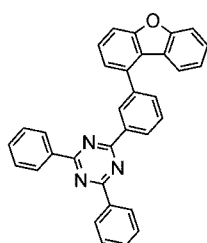
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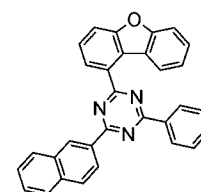
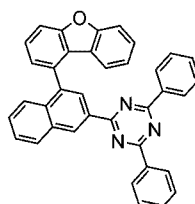
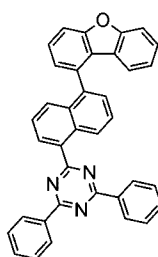
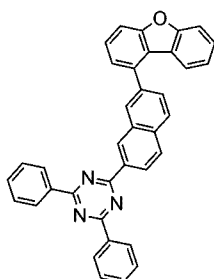
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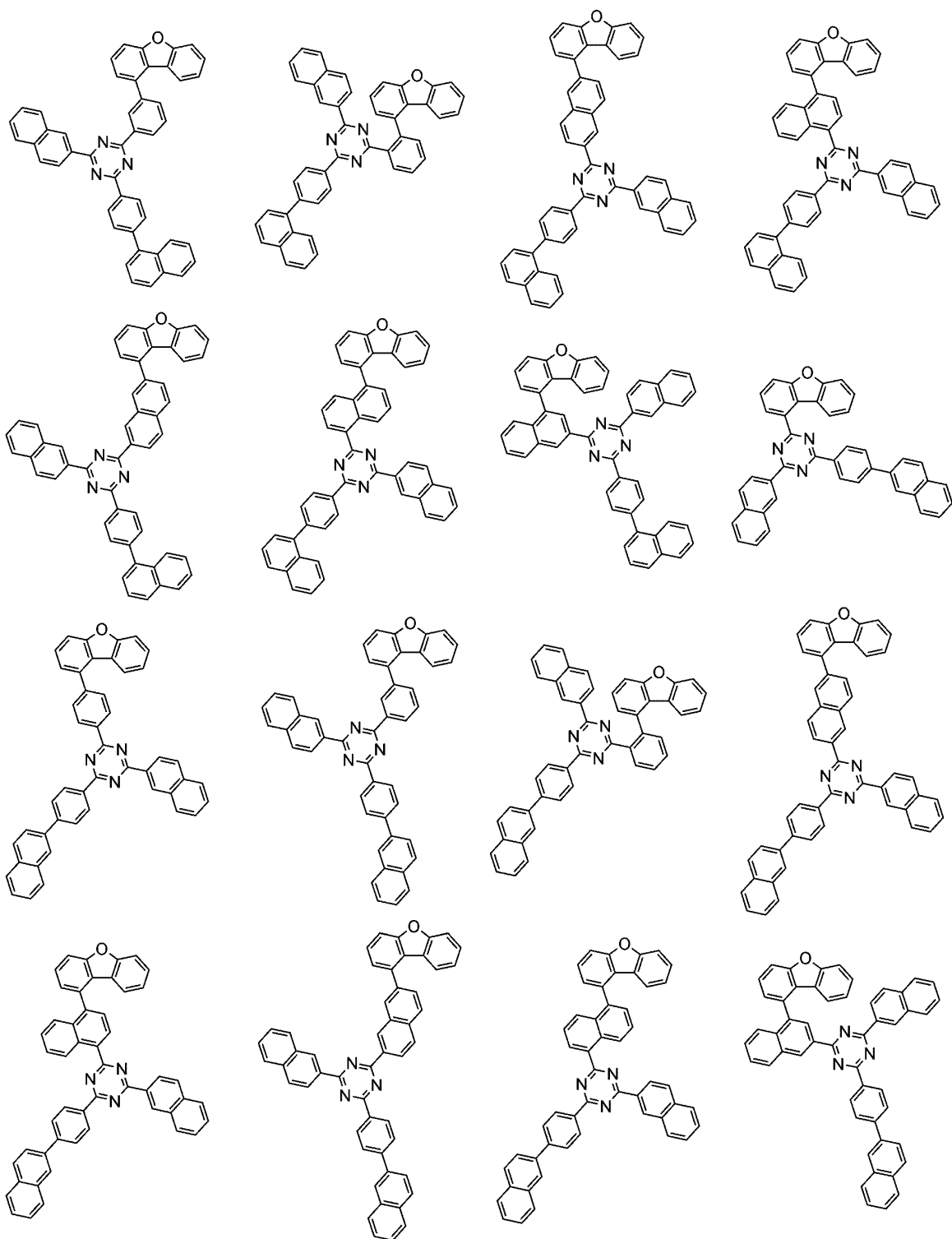
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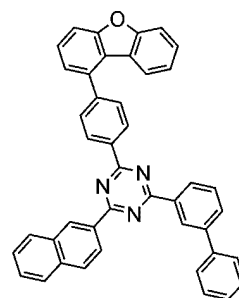
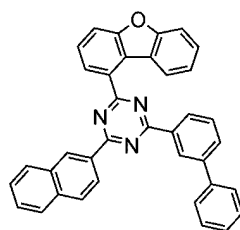
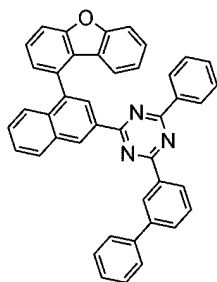
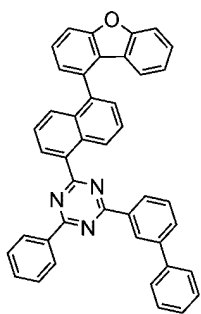
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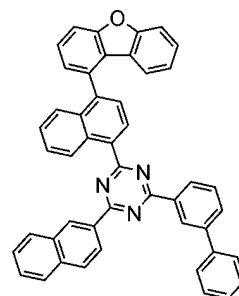
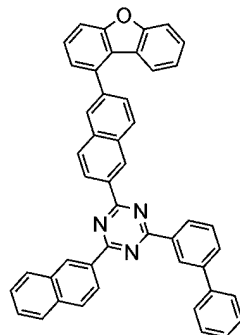
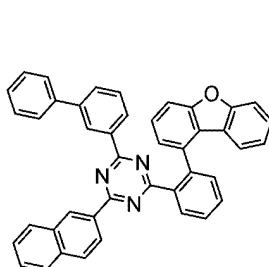
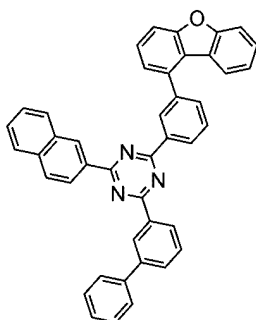
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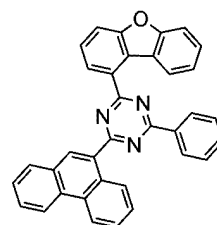
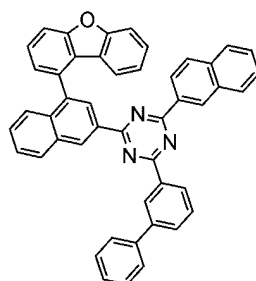
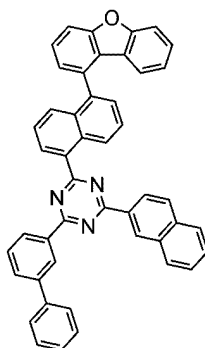
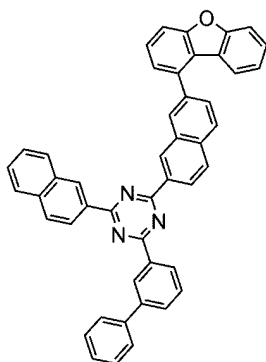
【化 1 8 1】



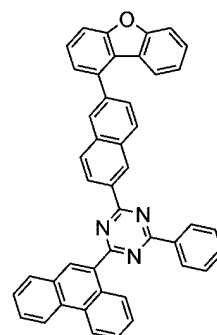
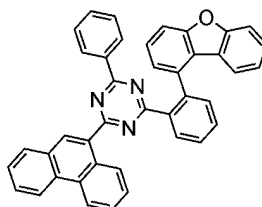
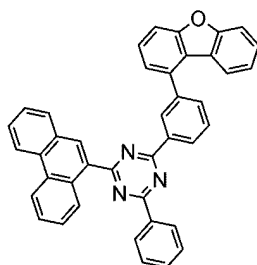
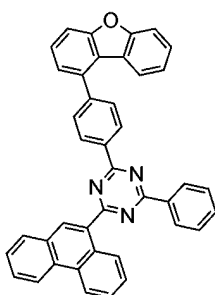
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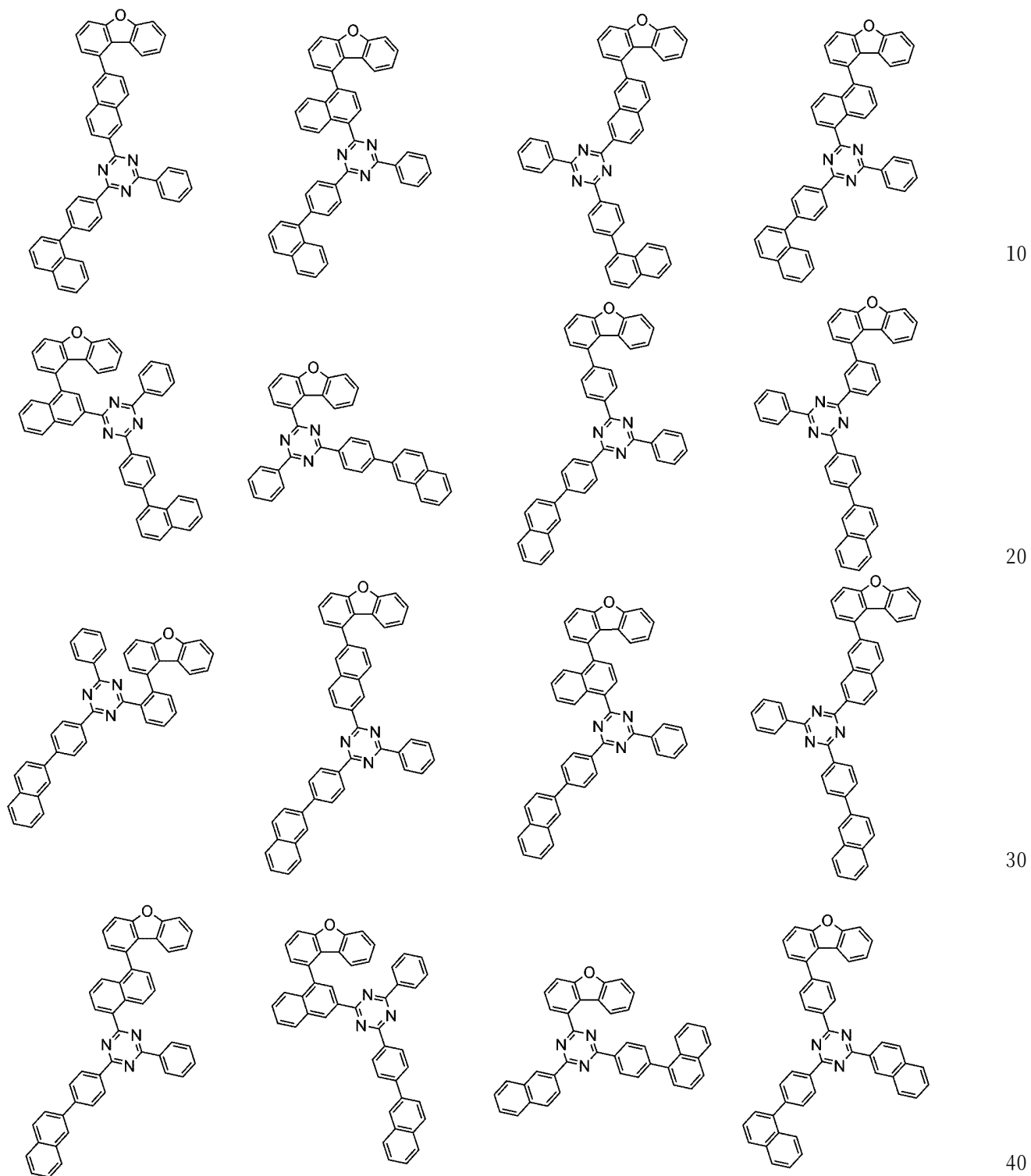
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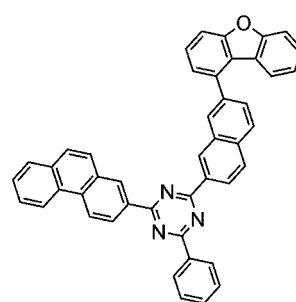
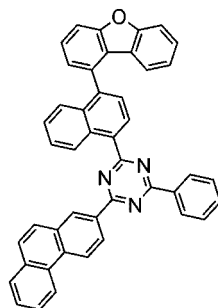
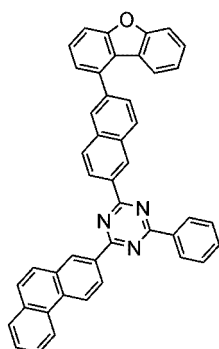
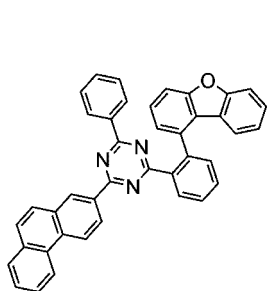
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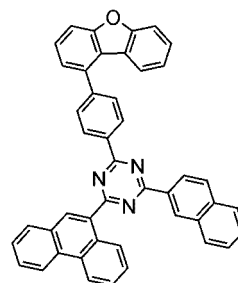
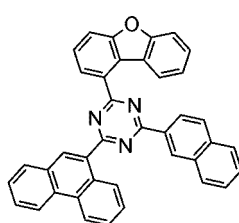
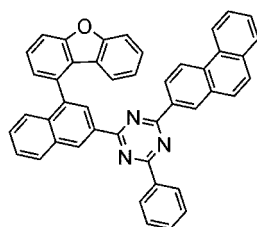
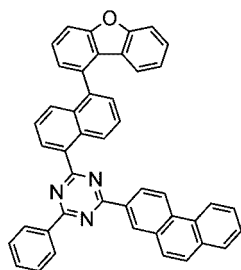
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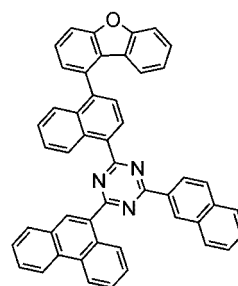
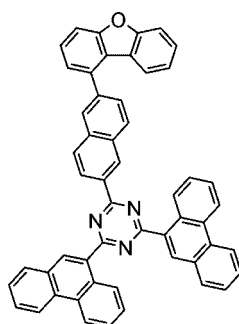
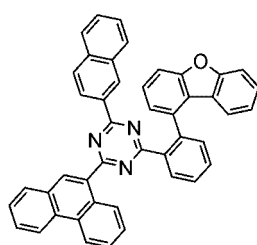
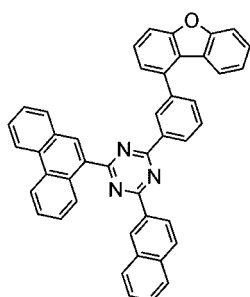
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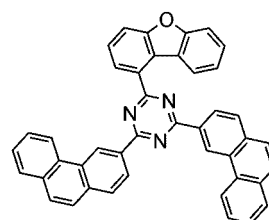
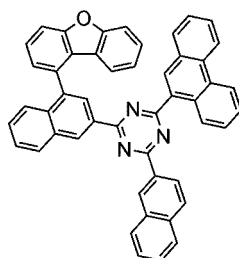
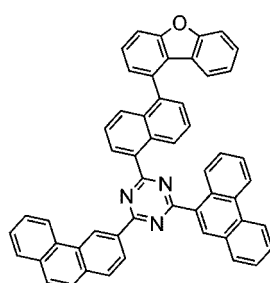
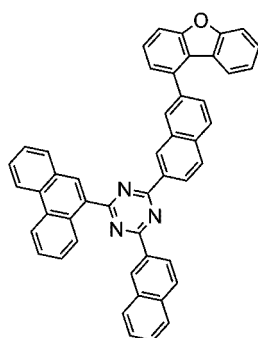
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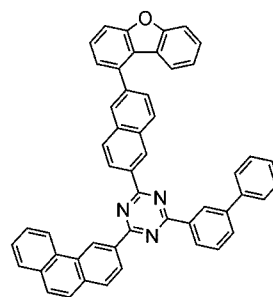
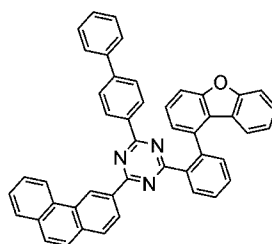
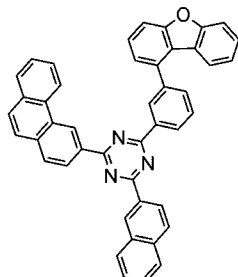
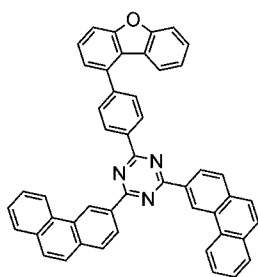
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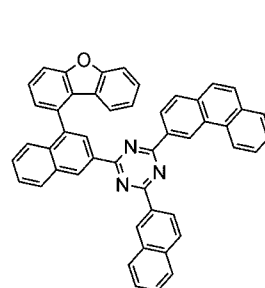
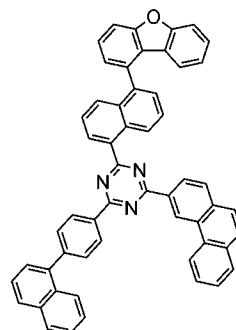
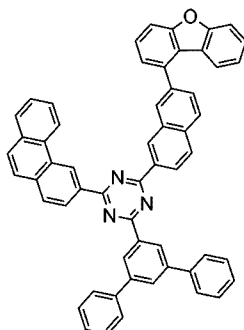
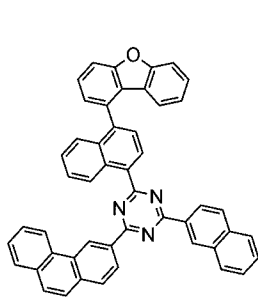
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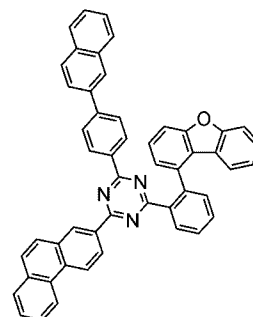
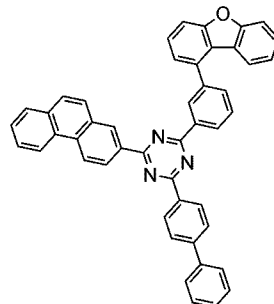
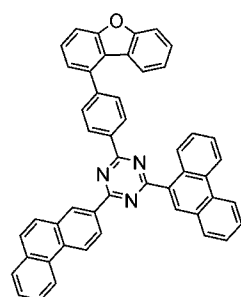
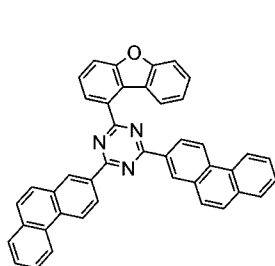
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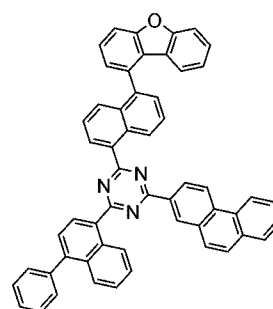
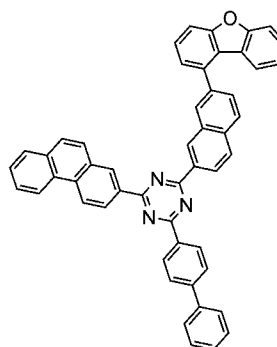
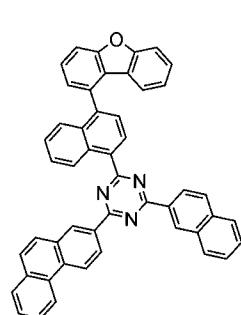
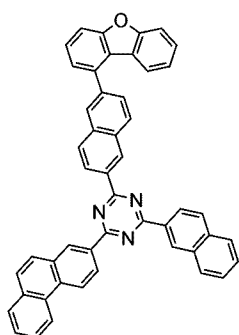
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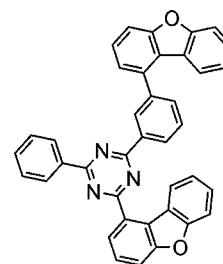
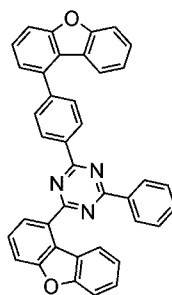
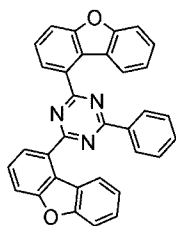
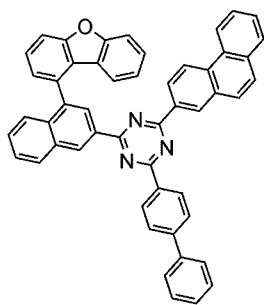
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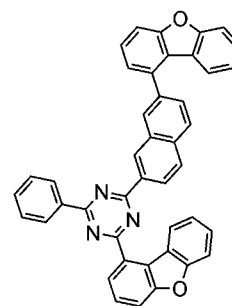
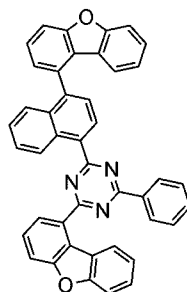
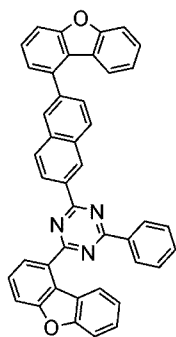
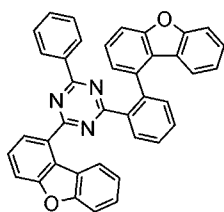
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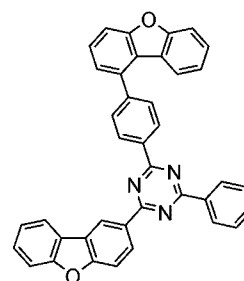
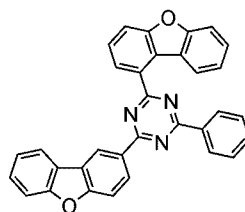
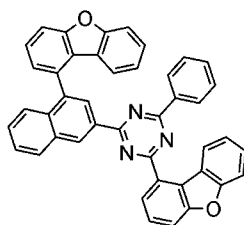
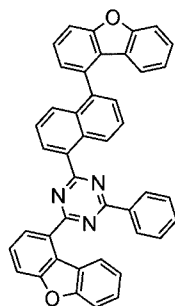
【化 185】



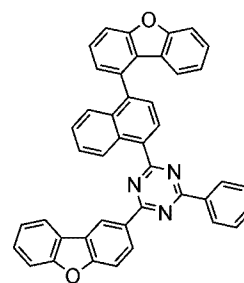
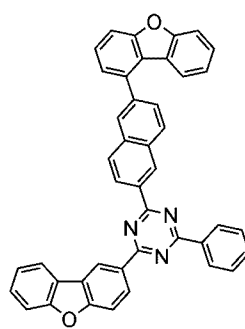
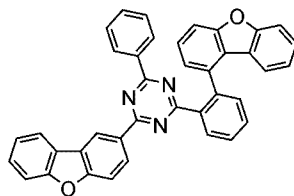
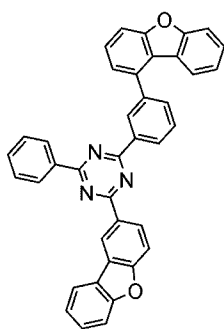
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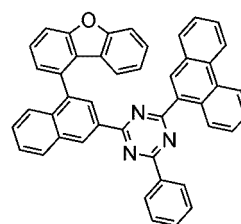
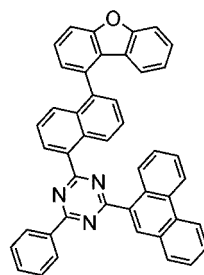
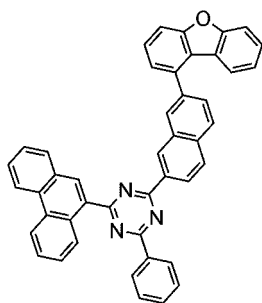
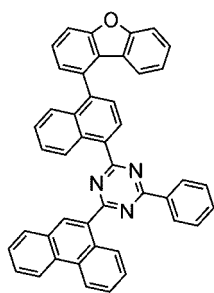
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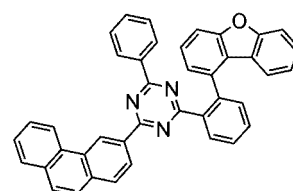
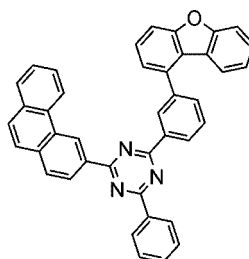
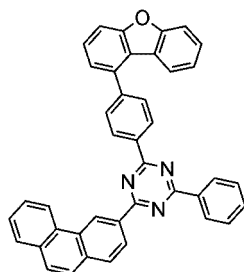
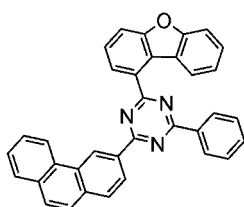
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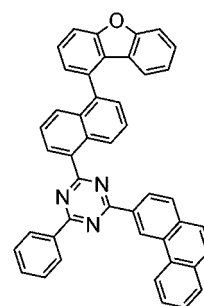
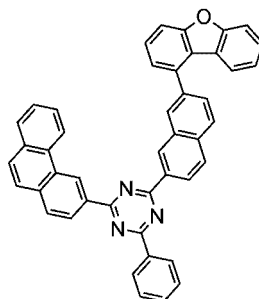
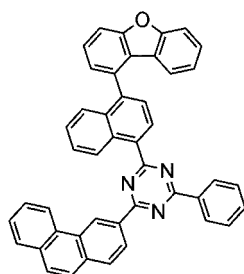
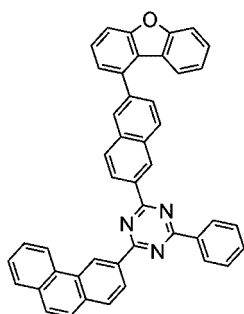
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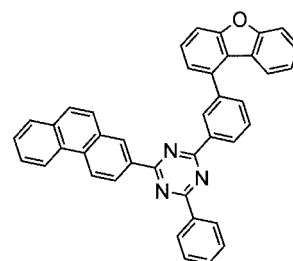
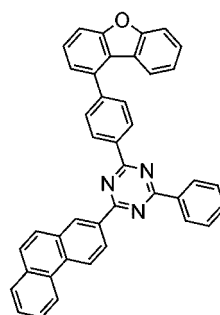
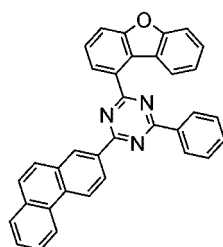
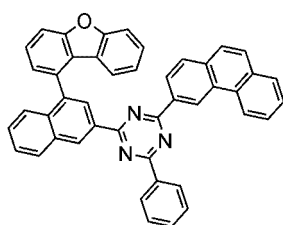
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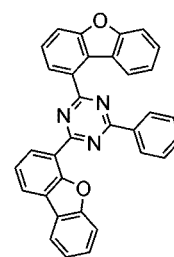
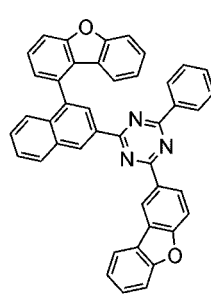
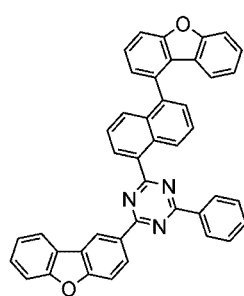
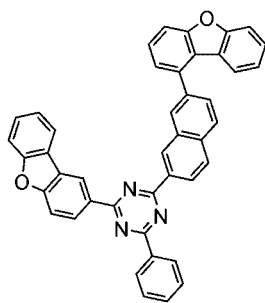
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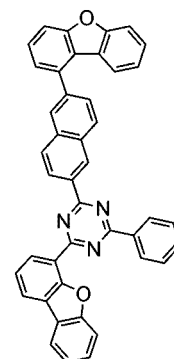
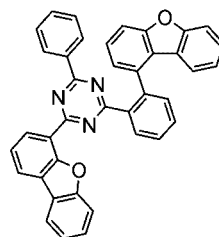
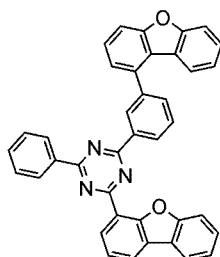
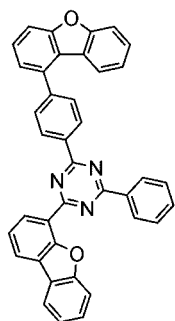
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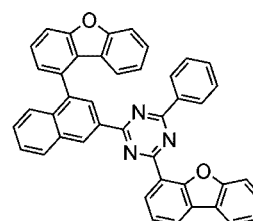
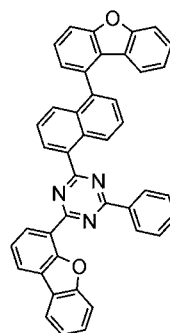
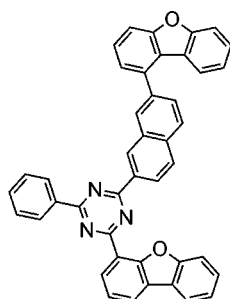
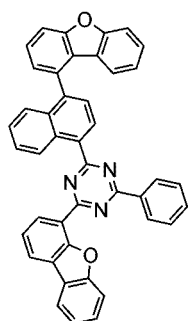
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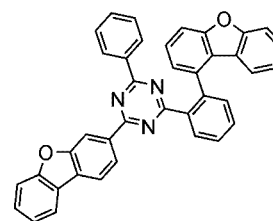
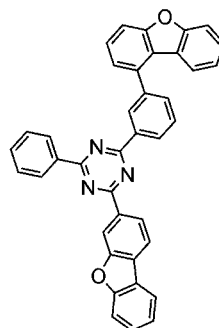
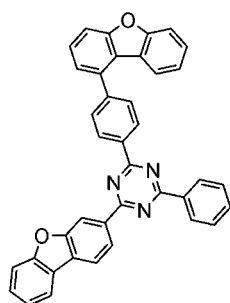
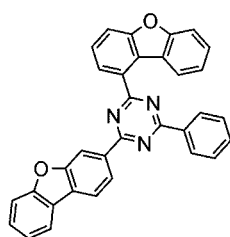
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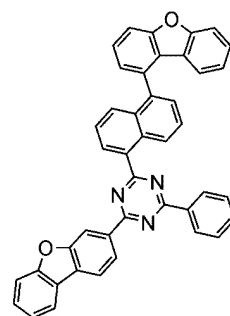
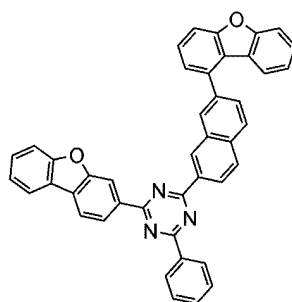
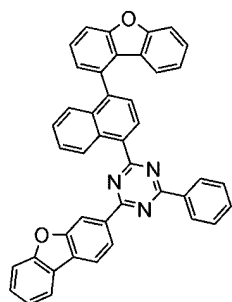
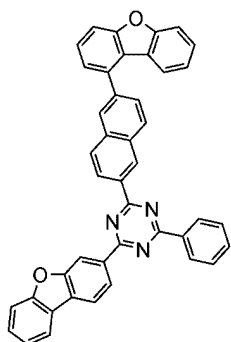
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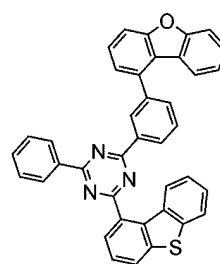
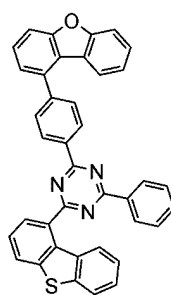
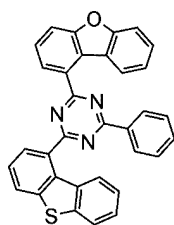
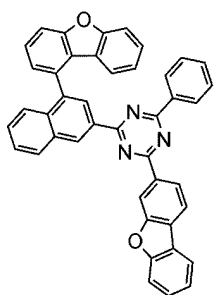
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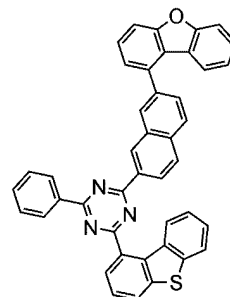
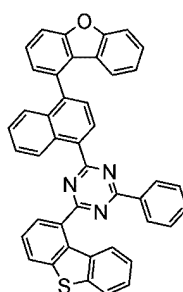
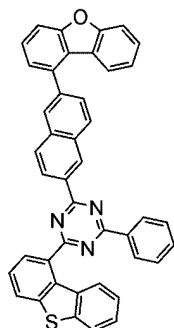
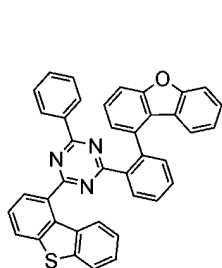
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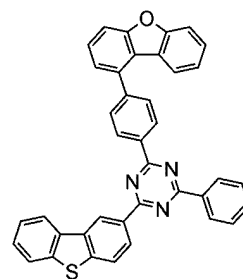
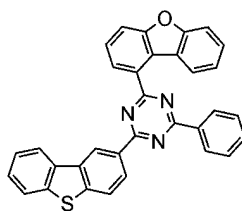
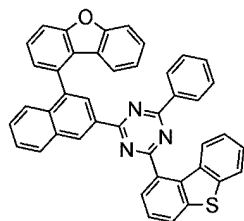
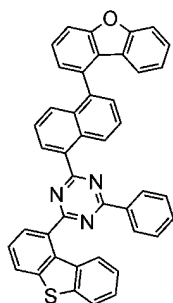
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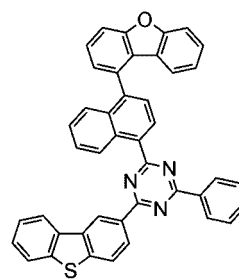
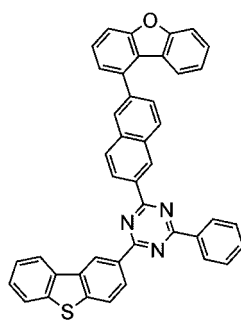
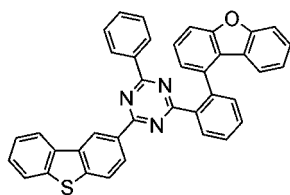
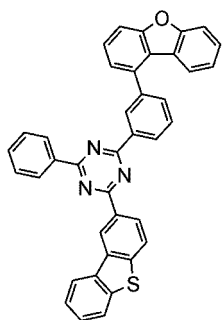
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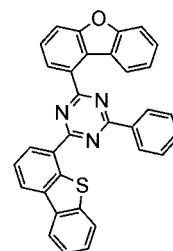
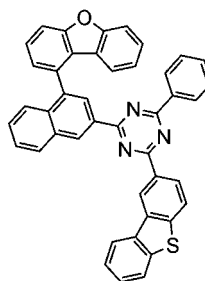
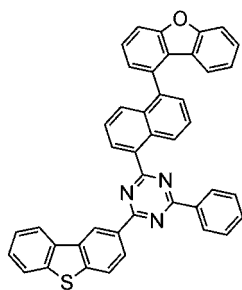
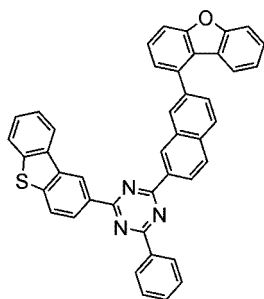
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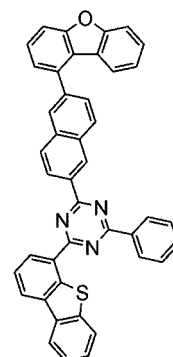
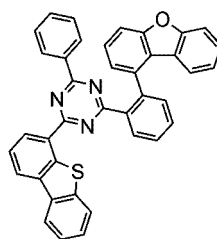
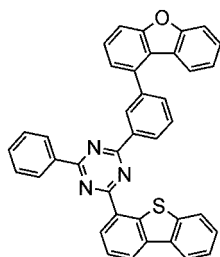
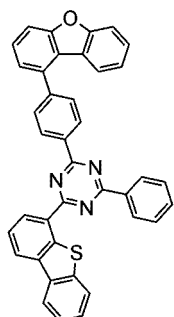
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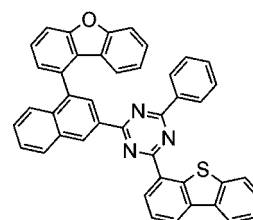
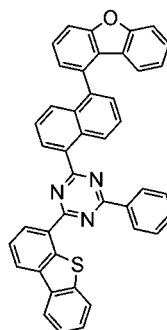
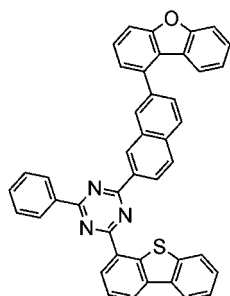
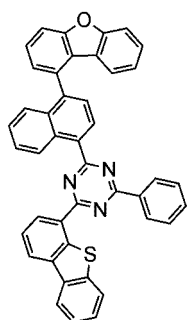
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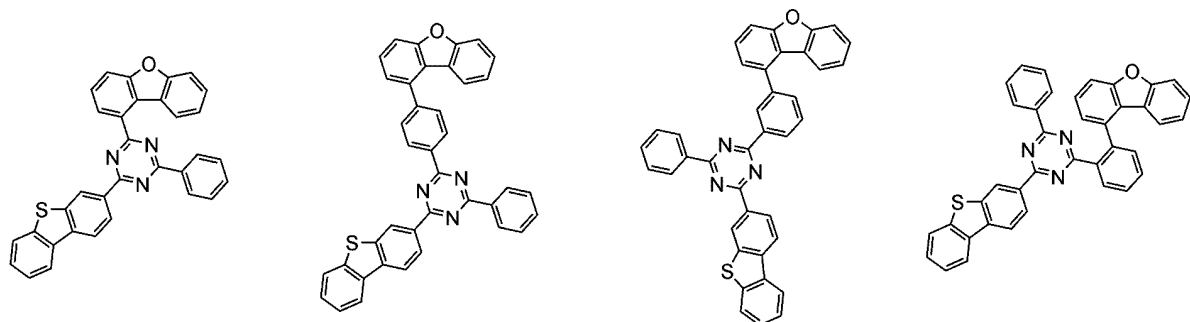
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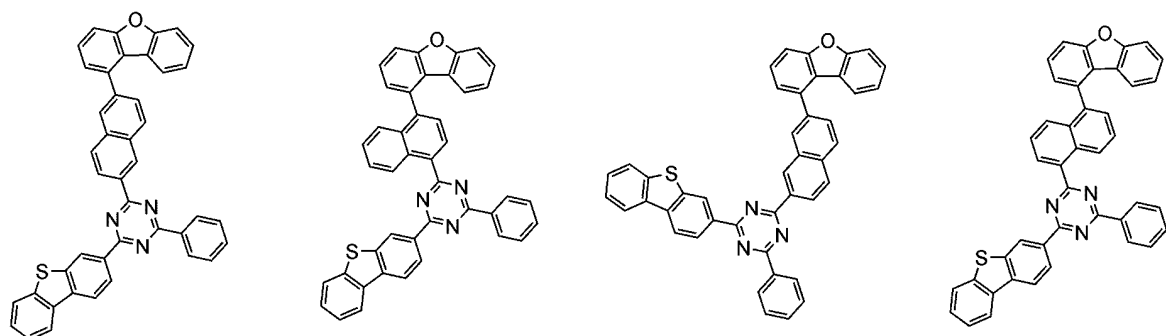
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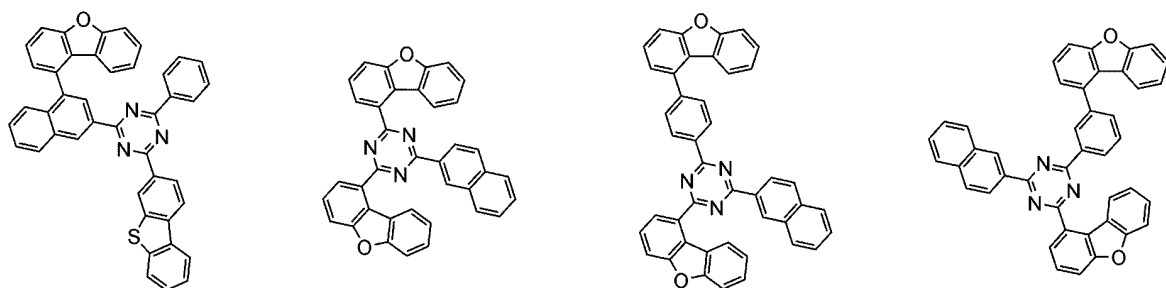
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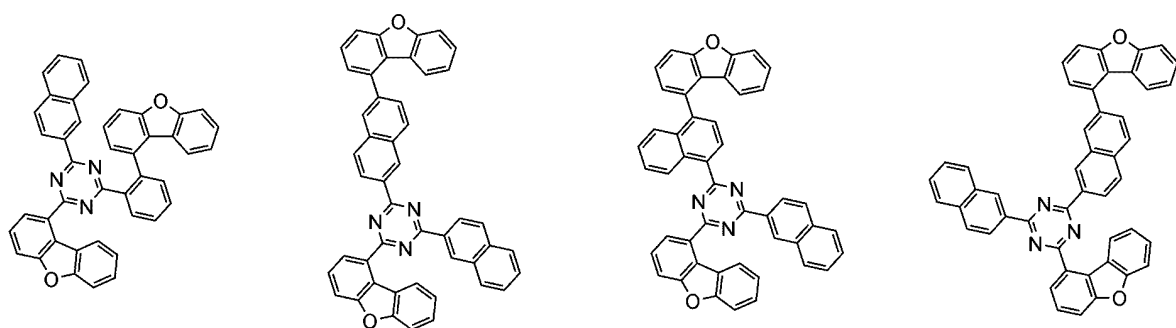
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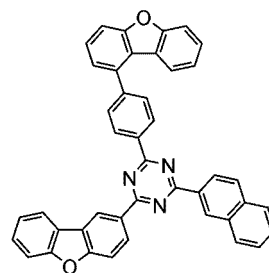
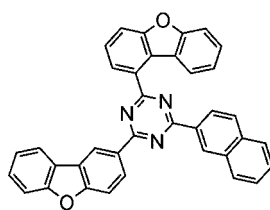
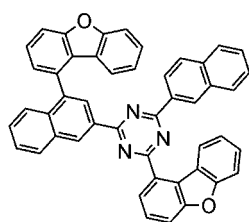
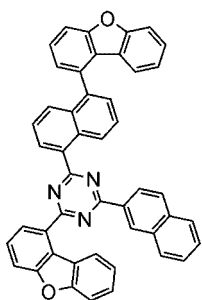
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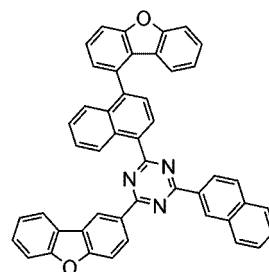
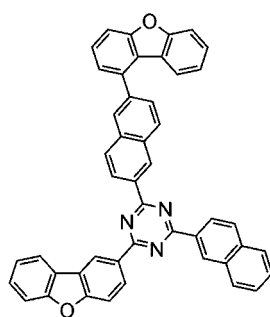
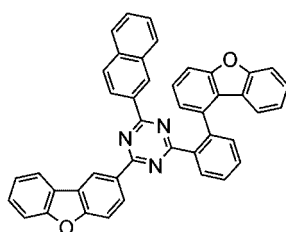
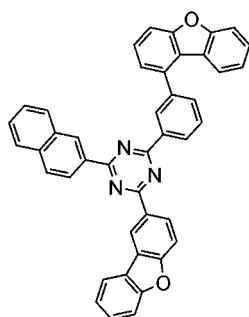
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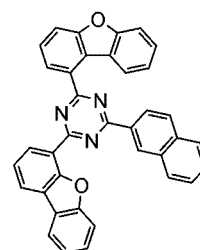
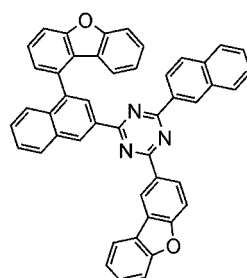
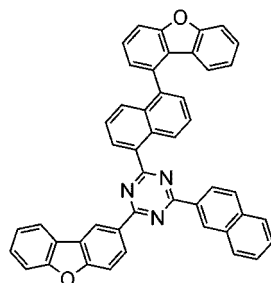
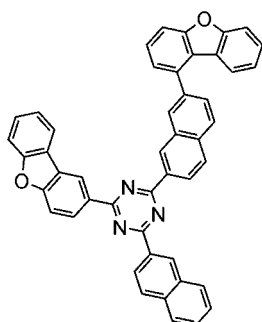
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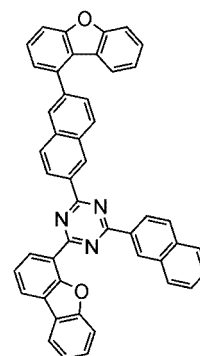
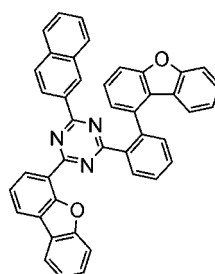
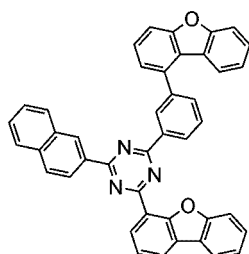
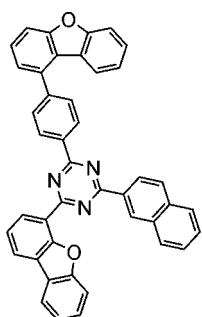
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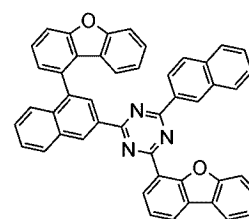
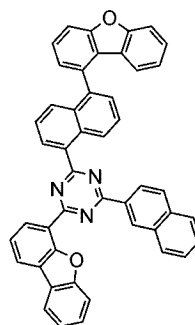
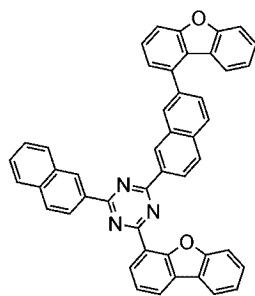
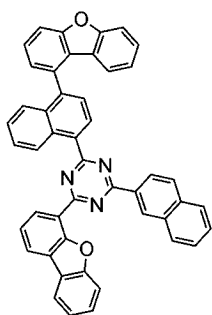
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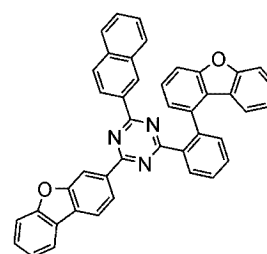
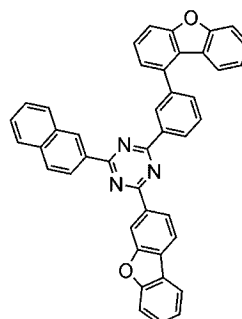
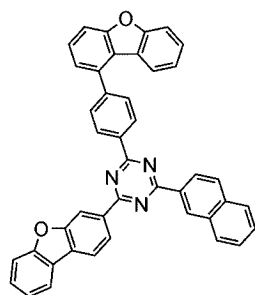
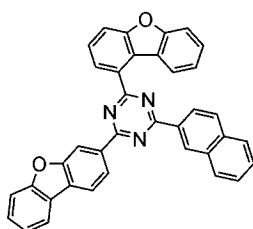
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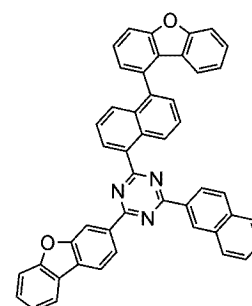
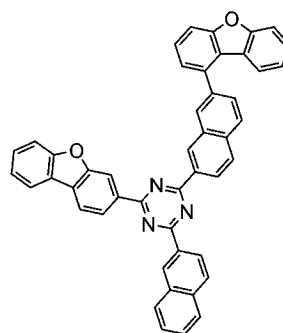
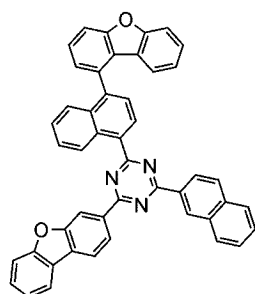
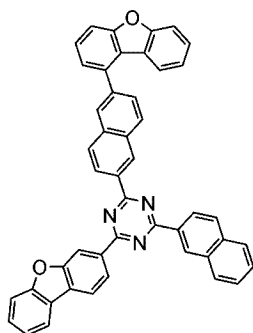
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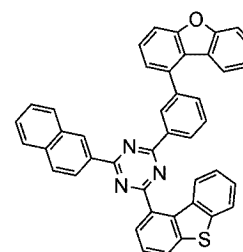
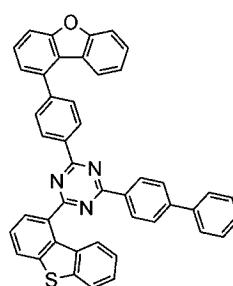
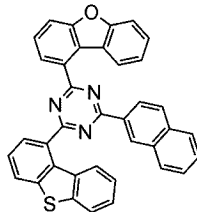
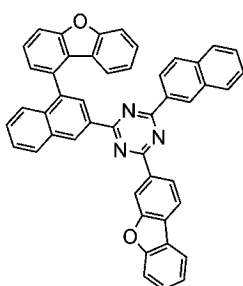
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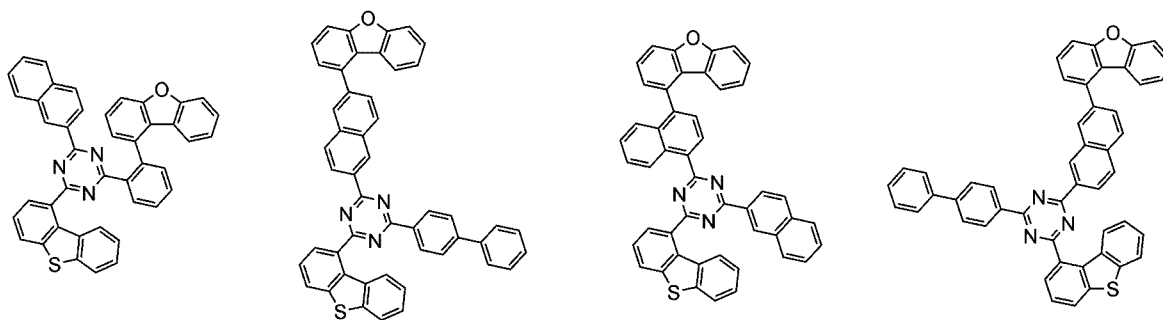
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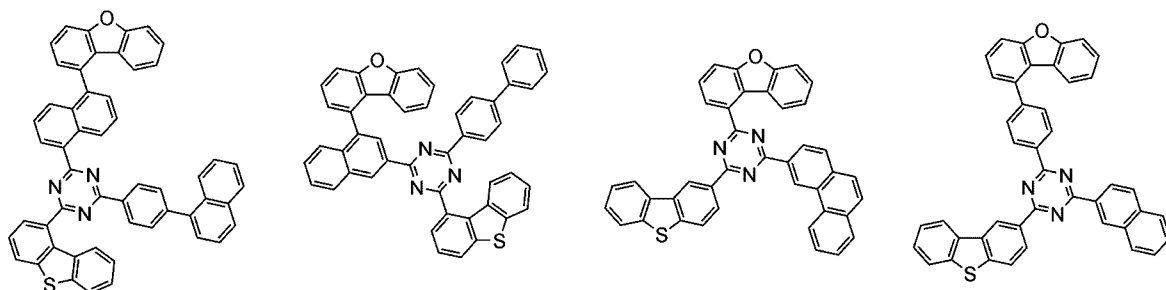
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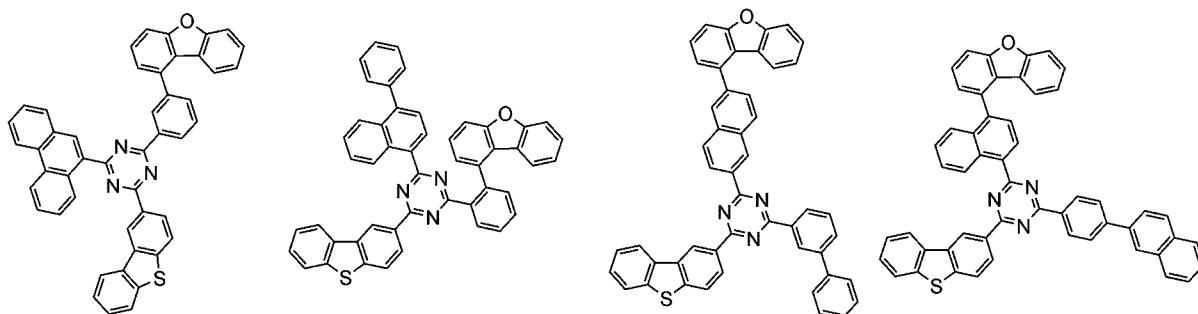
【化 1 9 3】



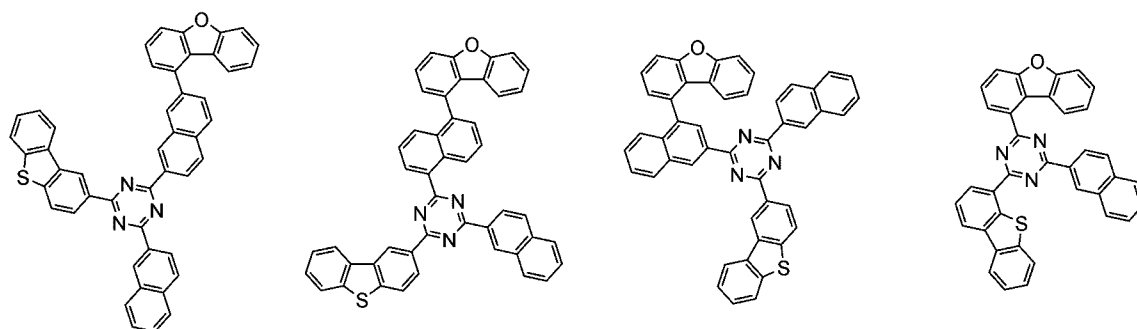
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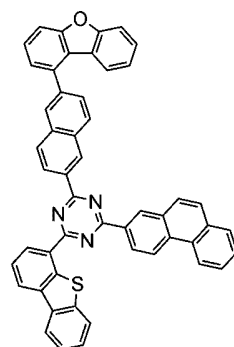
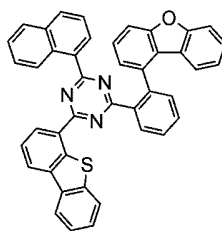
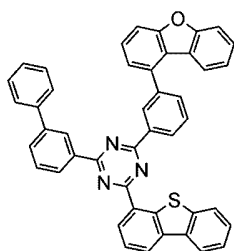
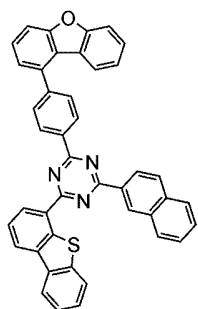
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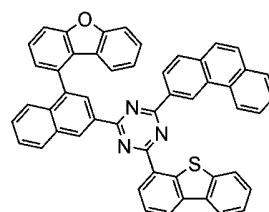
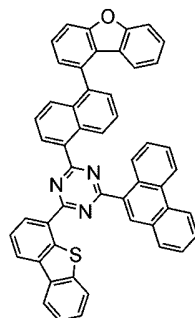
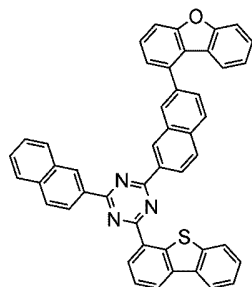
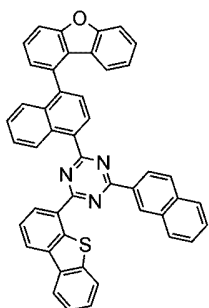
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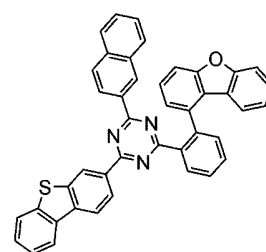
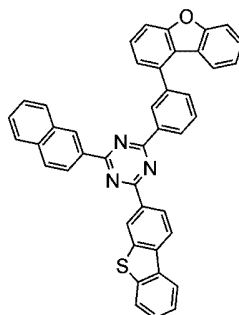
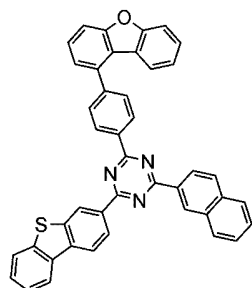
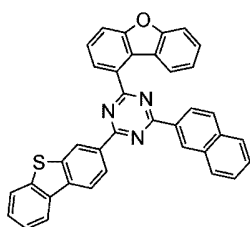
【化 1 9 4】



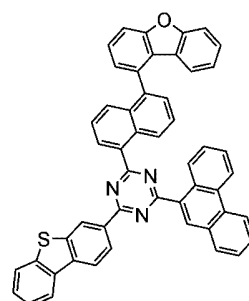
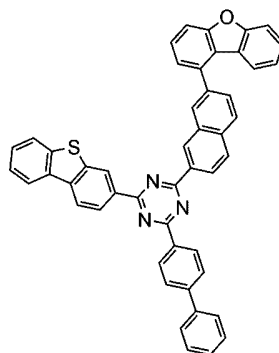
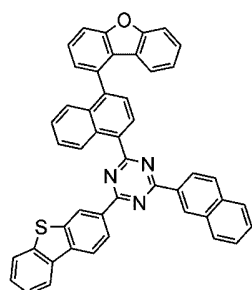
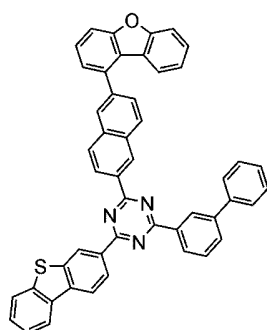
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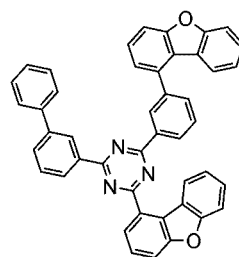
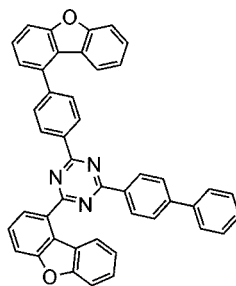
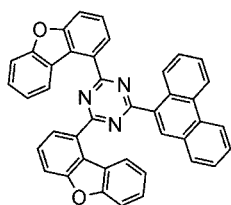
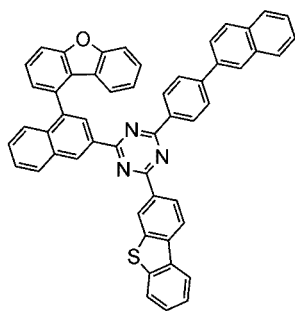
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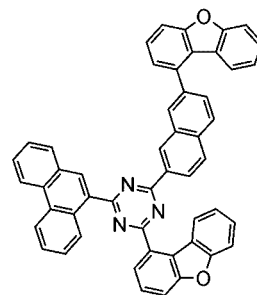
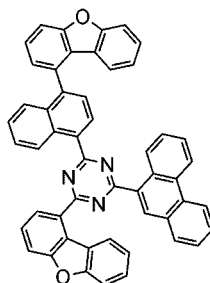
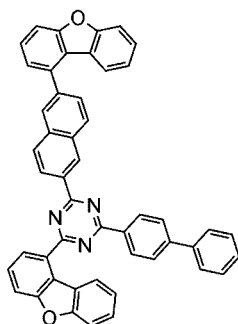
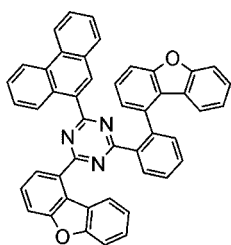
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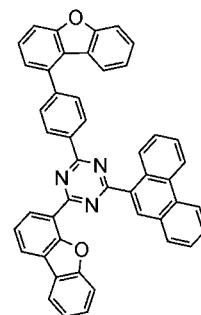
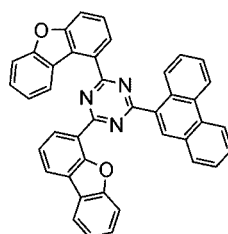
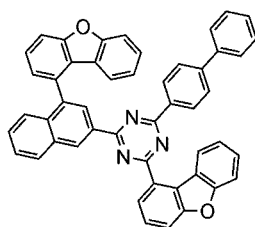
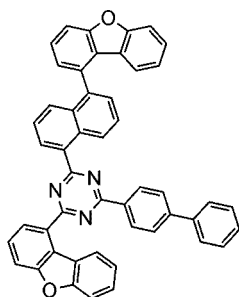
【化 195】



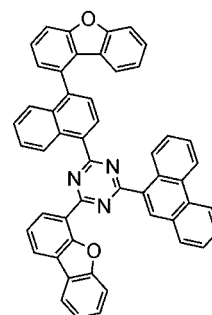
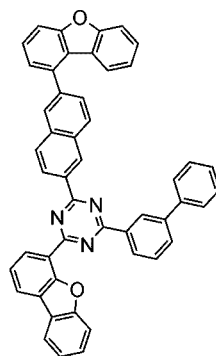
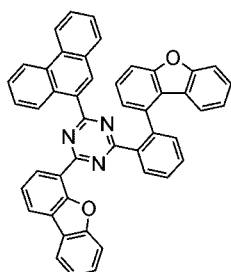
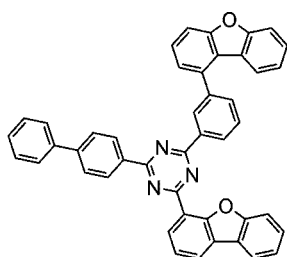
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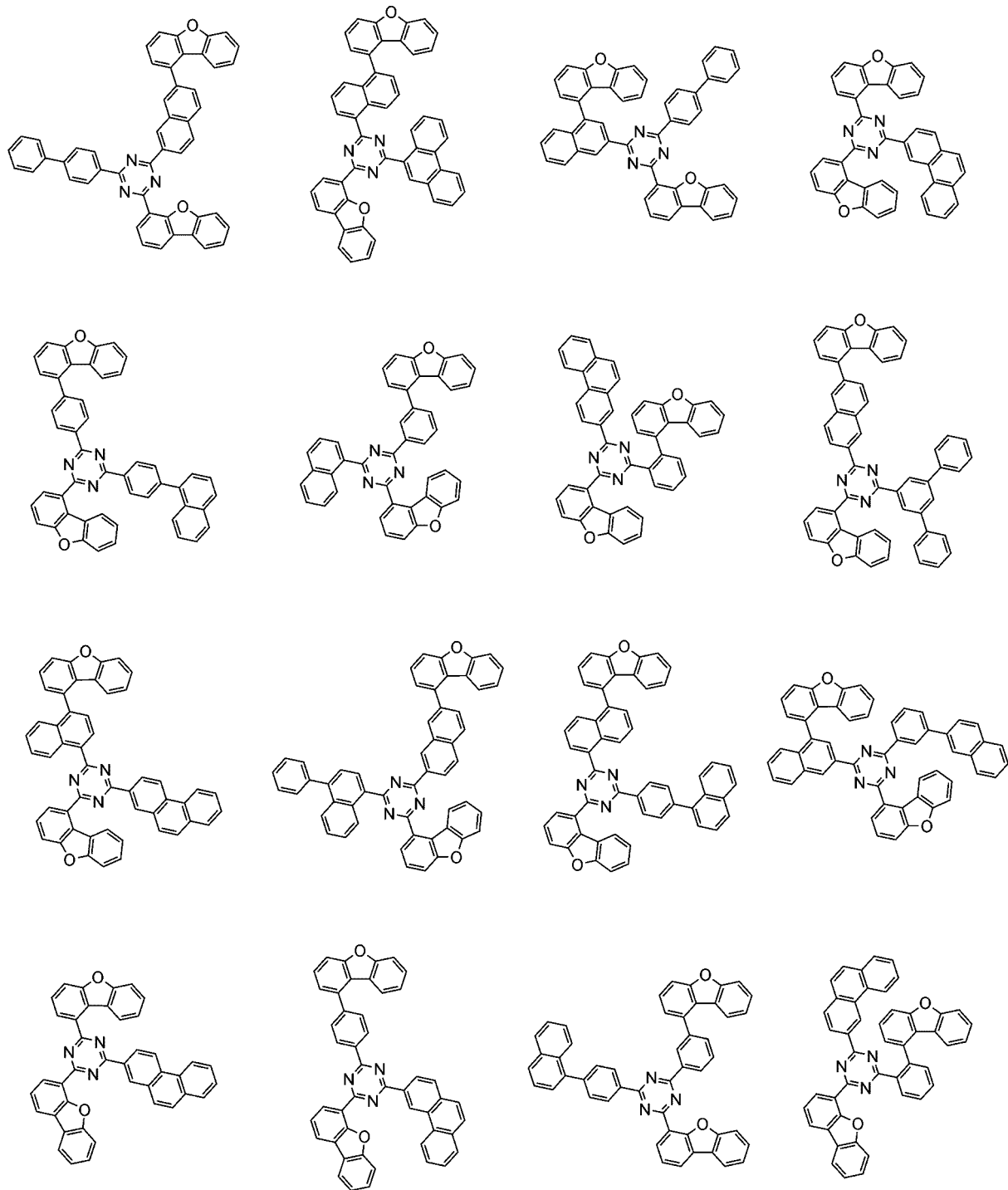
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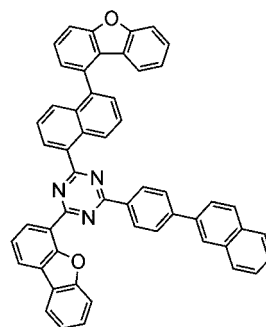
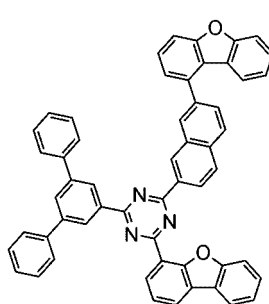
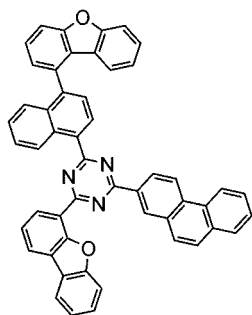
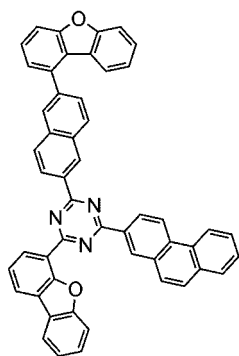
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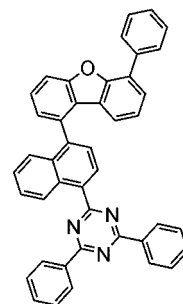
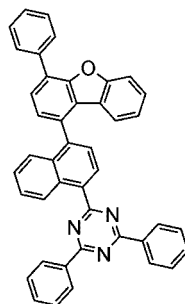
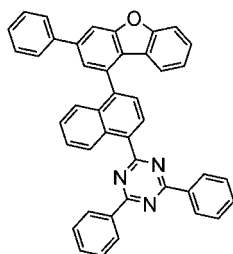
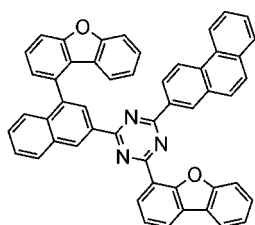
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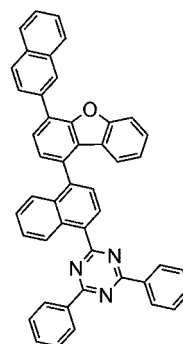
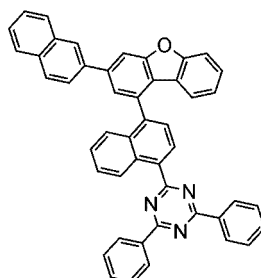
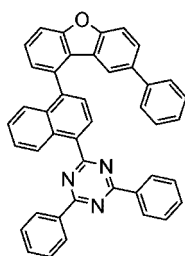
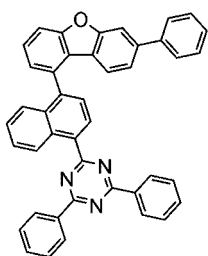
【化 1 9 7】



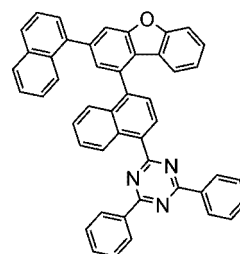
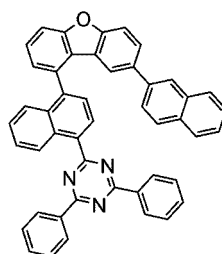
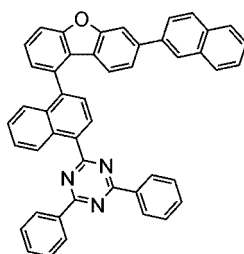
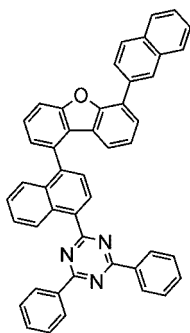
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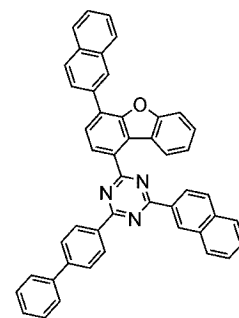
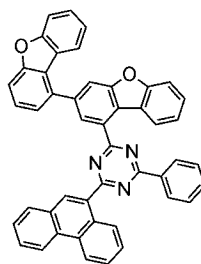
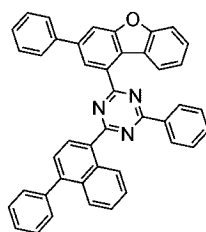
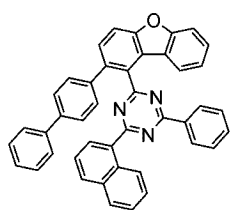
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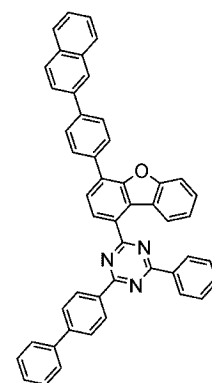
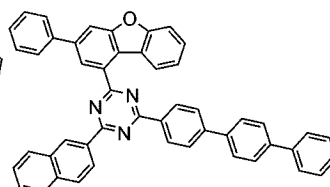
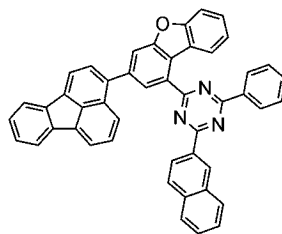
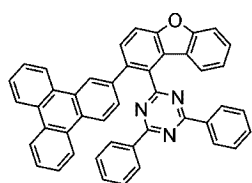
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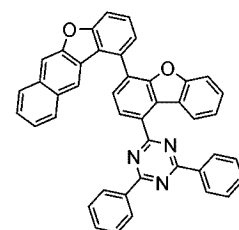
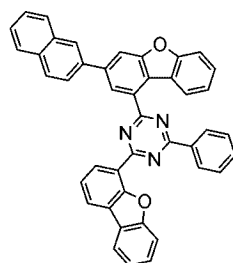
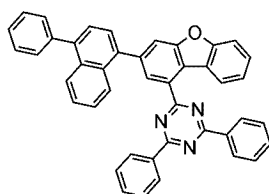
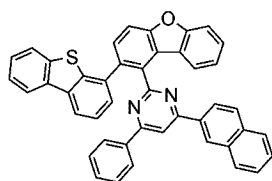
【化 1 9 8】



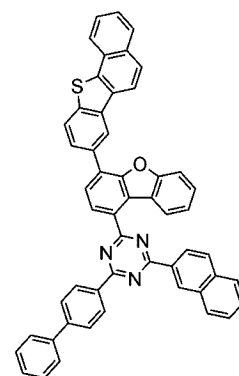
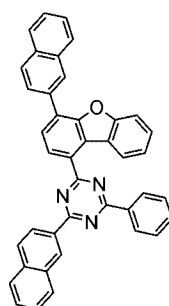
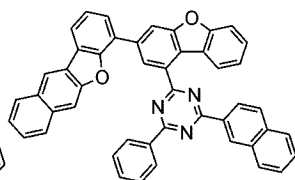
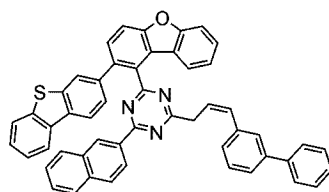
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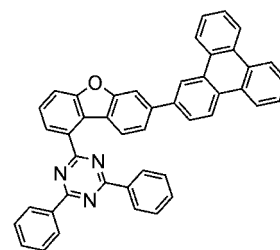
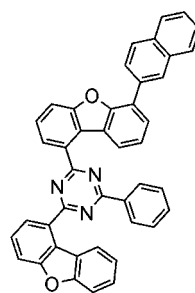
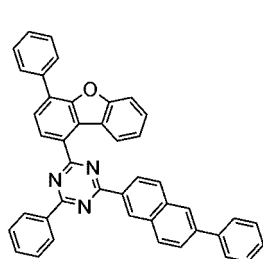
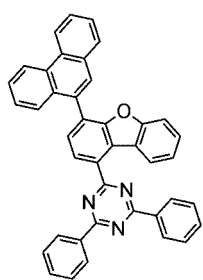
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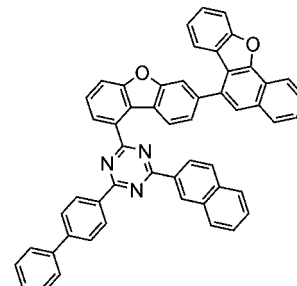
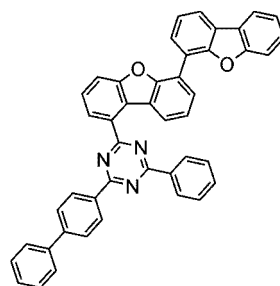
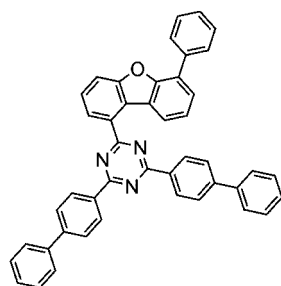
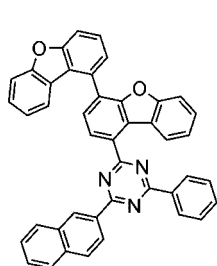
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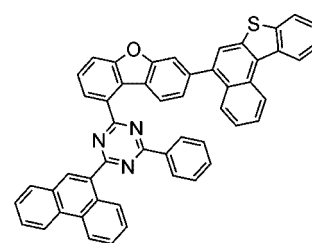
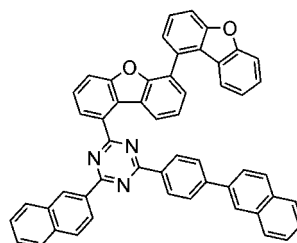
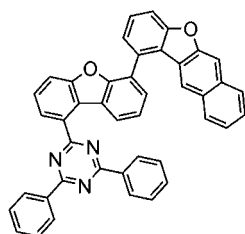
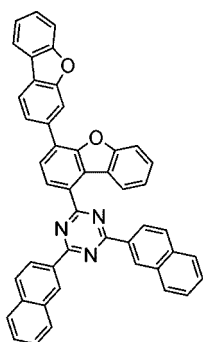
【化 199】



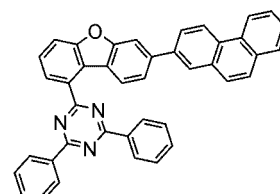
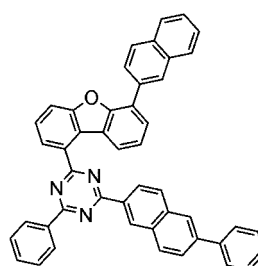
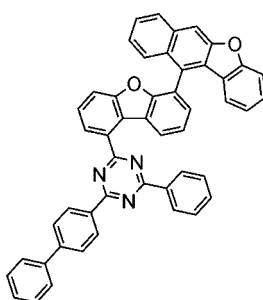
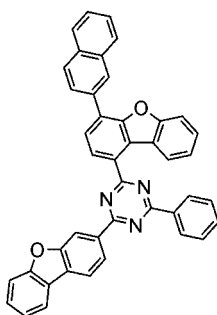
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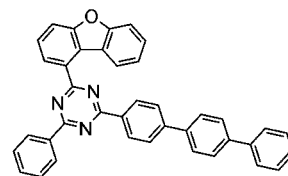
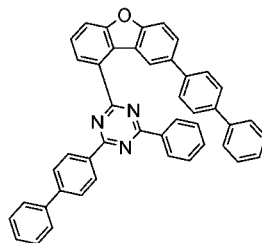
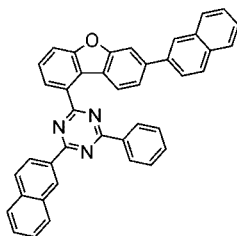
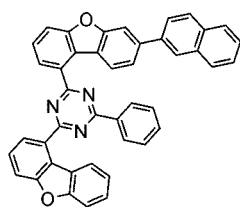
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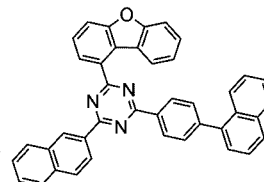
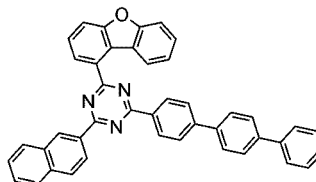
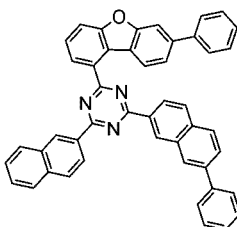
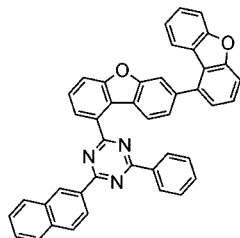
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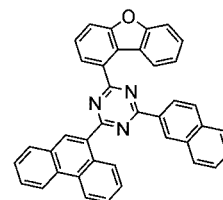
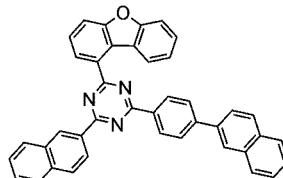
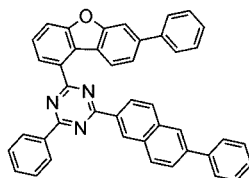
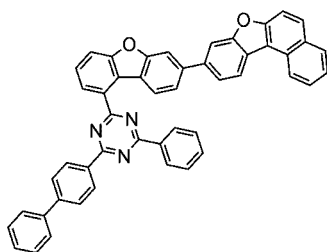
【化 2 0 0】



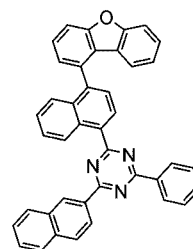
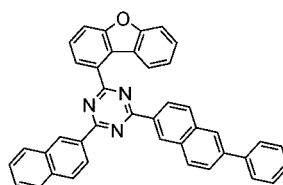
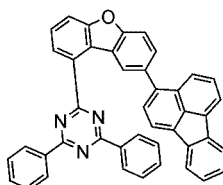
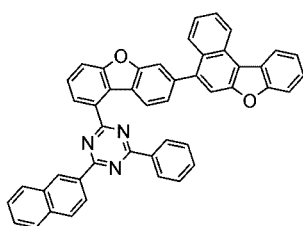
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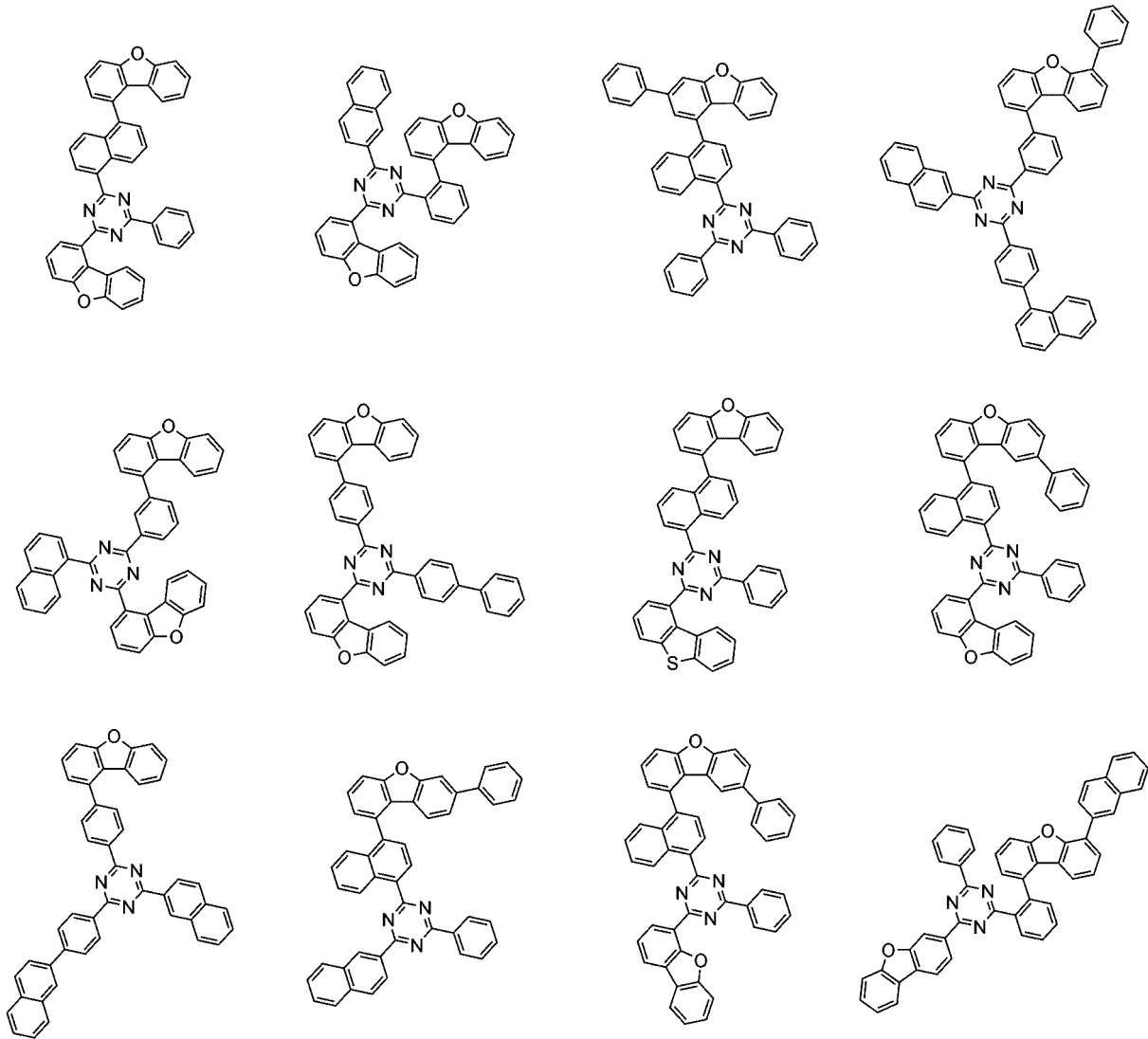
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【化 2 0 1】



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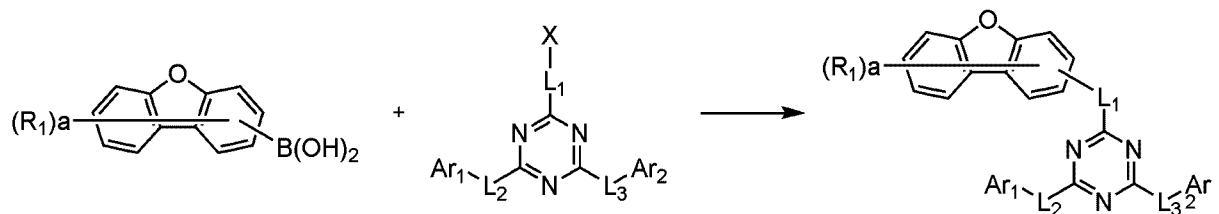
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【 0 0 4 6】

前記化学式 1 で表される化合物は、例えば下記の反応式 1 のような製造方法で製造することができ、それ以外の残りの化合物も似たような方法で製造することができる。

【反応式 1】

【化 2 0 2】



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【 0 0 4 7】

前記反応式 1 中、 Ar_1 、 Ar_2 、 $L_1 \sim L_3$ 、 R_1 および a は、前記化学式 1 で定義した通りであり、 X はハロゲンで、好ましくは X_1 は、クロロまたはブロモである。

【 0 0 4 8】

前記反応式 1 は鈴木カップリング反応であって、パラジウム触媒と塩基存在下で行うことが好ましく、鈴木カップリング反応のための反応基は当業界で公知のものに従って変更可能である。前記製造方法は、後述する製造例でより具体化される。

【 0 0 4 9】

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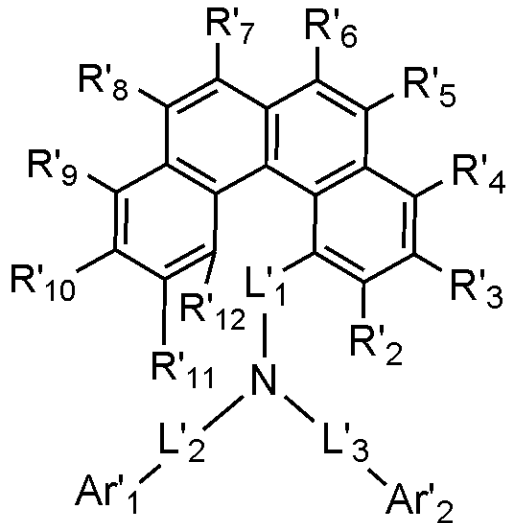
好ましくは、 R'_1 、 $R'_3 \sim R'_{10}$ および R'_{12} のうちいずれか1つは、前記化学式3で表される置換基であり、残りは水素または重水素であり、 R'_2 および R'_{11} は水素または重水素であってもよい。より好ましくは、 R'_1 、 $R'_3 \sim R'_{10}$ および R'_{12} のうちいずれか1つは、前記化学式3で表される置換基であり、残りは水素であり、 R'_2 および R'_{11} は水素であってもよい。

【0050】

好ましくは、前記化学式2で表される化合物は、下記化学式2-1～化学式2-6のうちいずれか1つで表される：

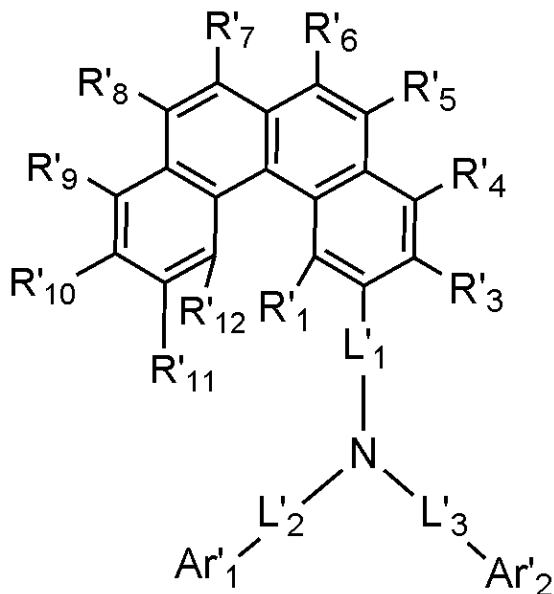
〔化学式2-1〕

〔化203〕



〔化学式2-2〕

〔化204〕



〔化学式2-3〕

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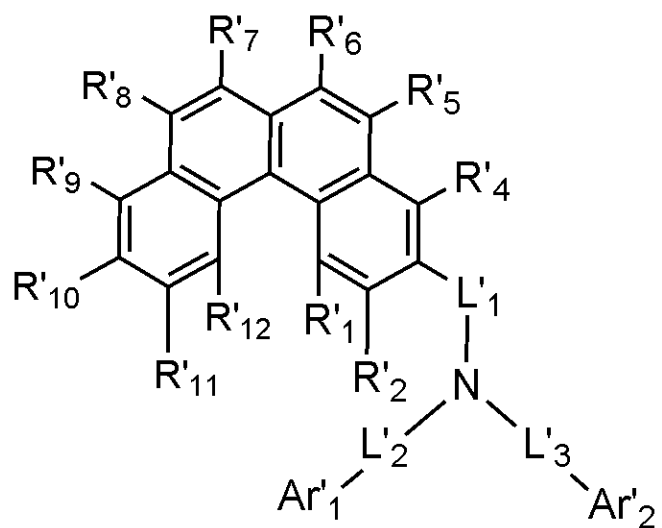
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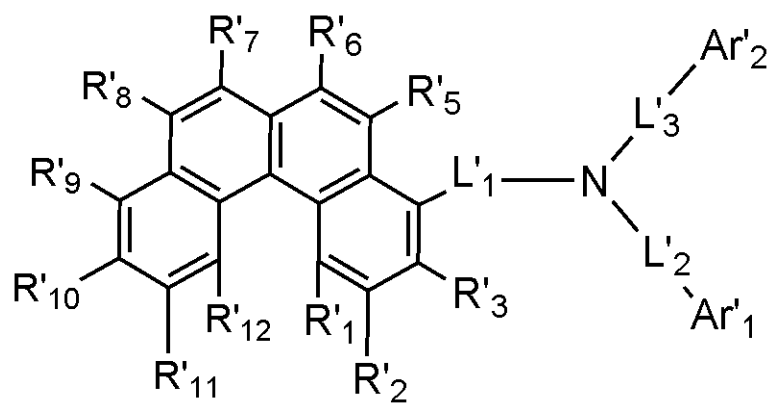
【化 2 0 5】



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〔化学式 2 - 4〕

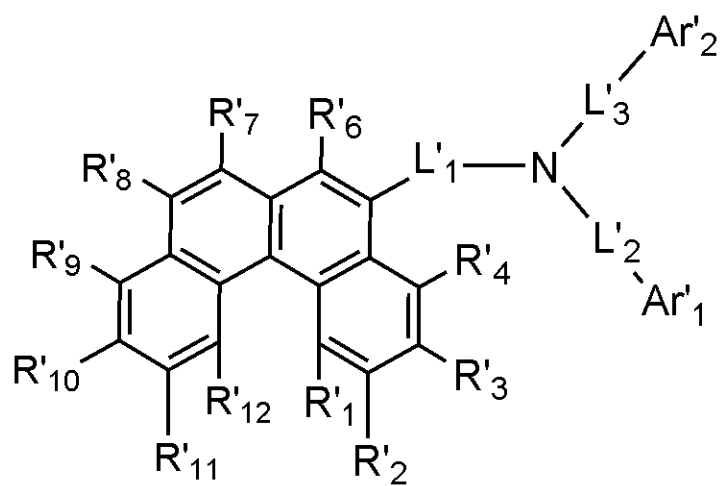
【化 2 0 6】



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〔化学式 2 - 5〕

【化 2 0 7】



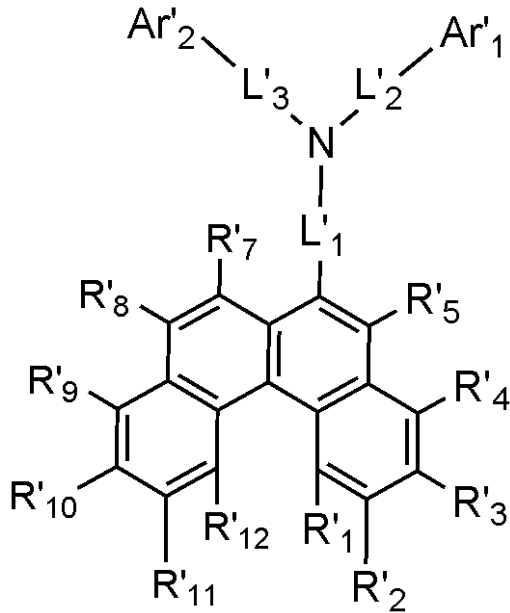
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〔化学式 2 - 6〕

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【化 2 0 8】



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前記化学式 2 - 1 ~ 化学式 2 - 6 中、

$R'_1 \sim R'_{12}$ 、 $L'_1 \sim L'_3$ 、 Ar'_1 および Ar'_2 は、化学式 2 で定義した通りである

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【0 0 5 1】

好ましくは、 L'_1 は、単結合；置換または非置換の炭素数 6 ~ 20 のアリーレンであってもよく、

より好ましくは、 L'_1 は、単結合、置換または非置換のフェニレン、置換または非置換のビフェニルジイル、または、置換または非置換のナフタレンジイルであり得る。

【0 0 5 2】

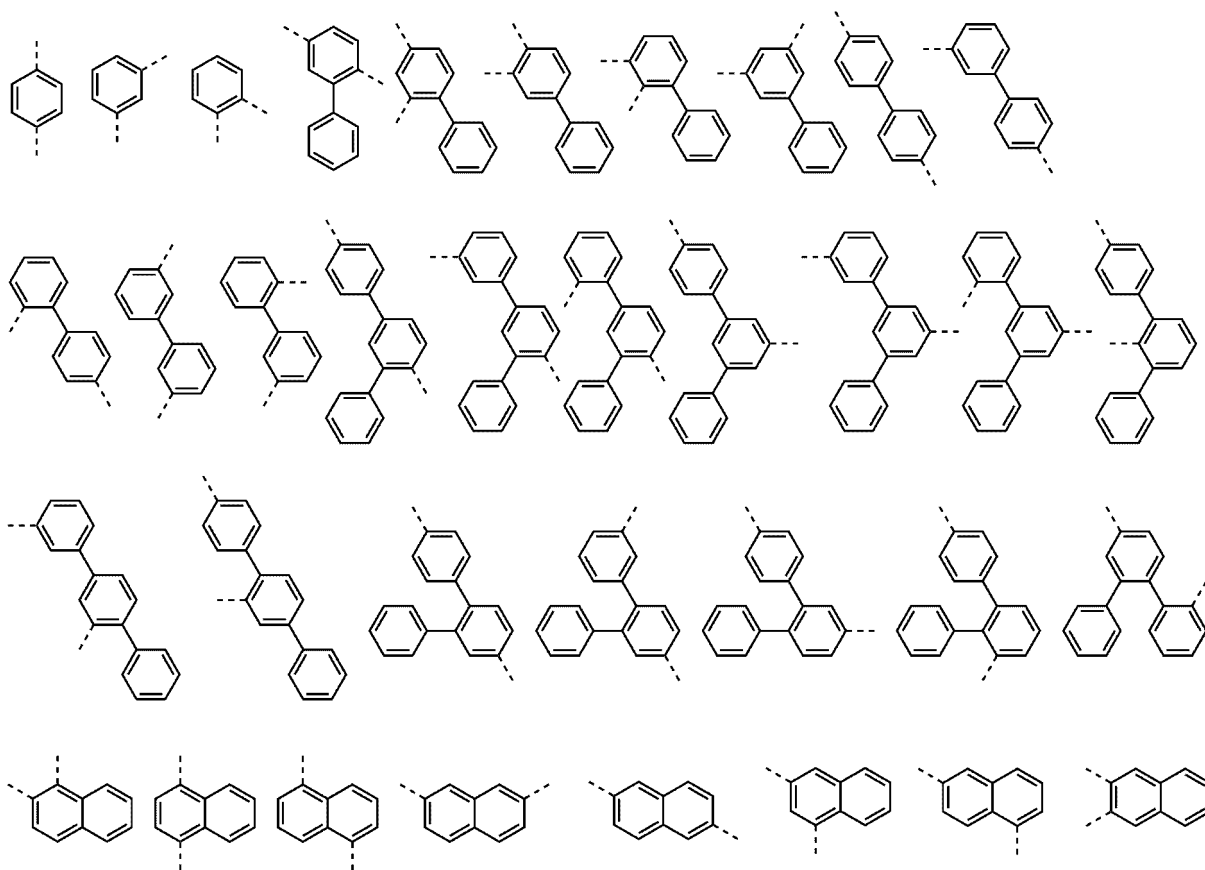
より好ましくは、 L'_1 は、下記で構成された群より選択されるいずれか一つであり得る：

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【化 2 0 9】



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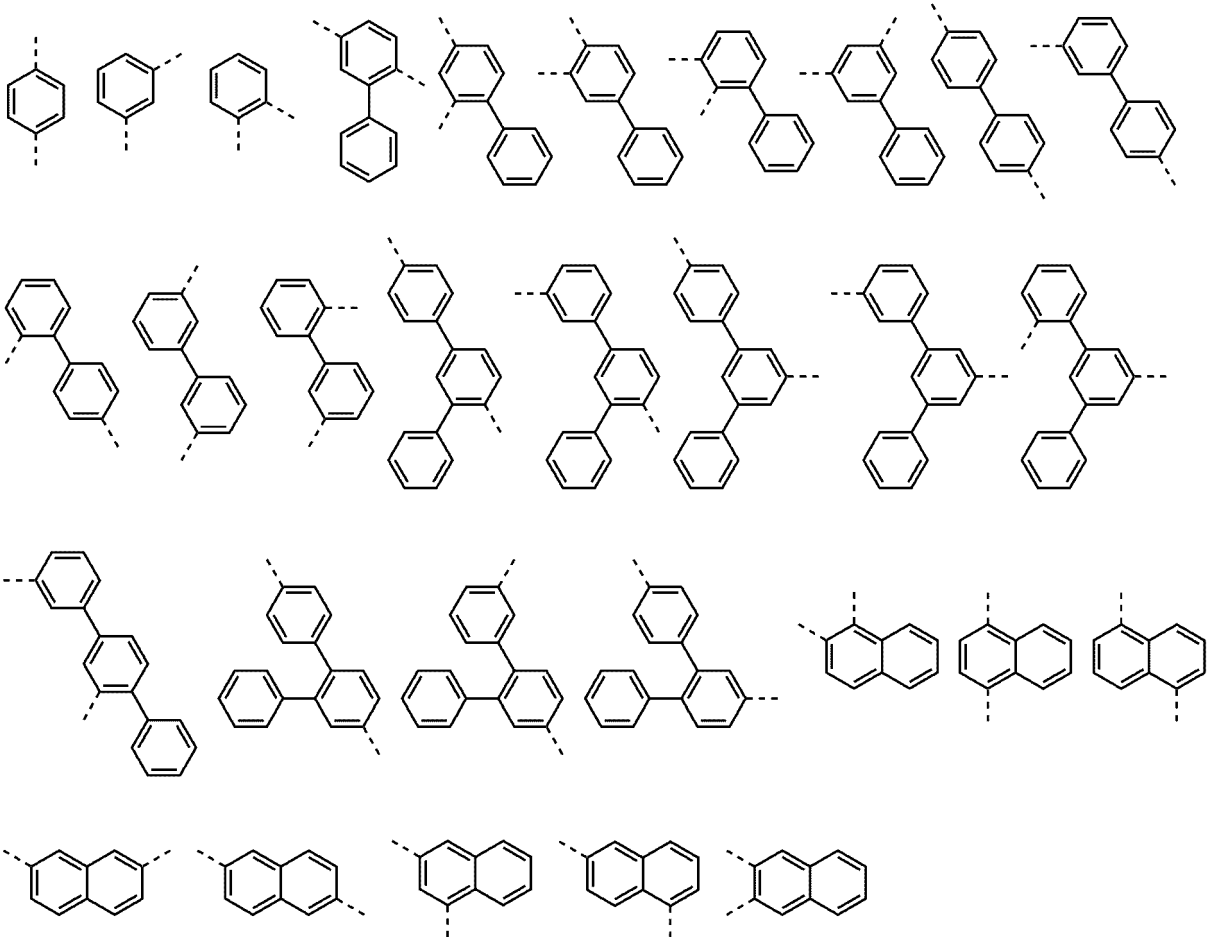
最も好ましくは、 L'_1 は、下記で構成された群より選択されるいずれか一つであり得る
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【化 2 1 0】



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好ましくは、 L'_2 および L'_3 はそれぞれ独立して、単結合；置換または非置換の炭素数 6～20 のアリーレン；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2～20 のヘテロアリーレンであってもよく、

より好ましくは、 L'_2 および L'_3 はそれぞれ独立して、単結合、フェニレン、2 個のフェニルで置換されたフェニレン、ビフェニルジイル、またはナフタレンジイルであり得る。

【0053】

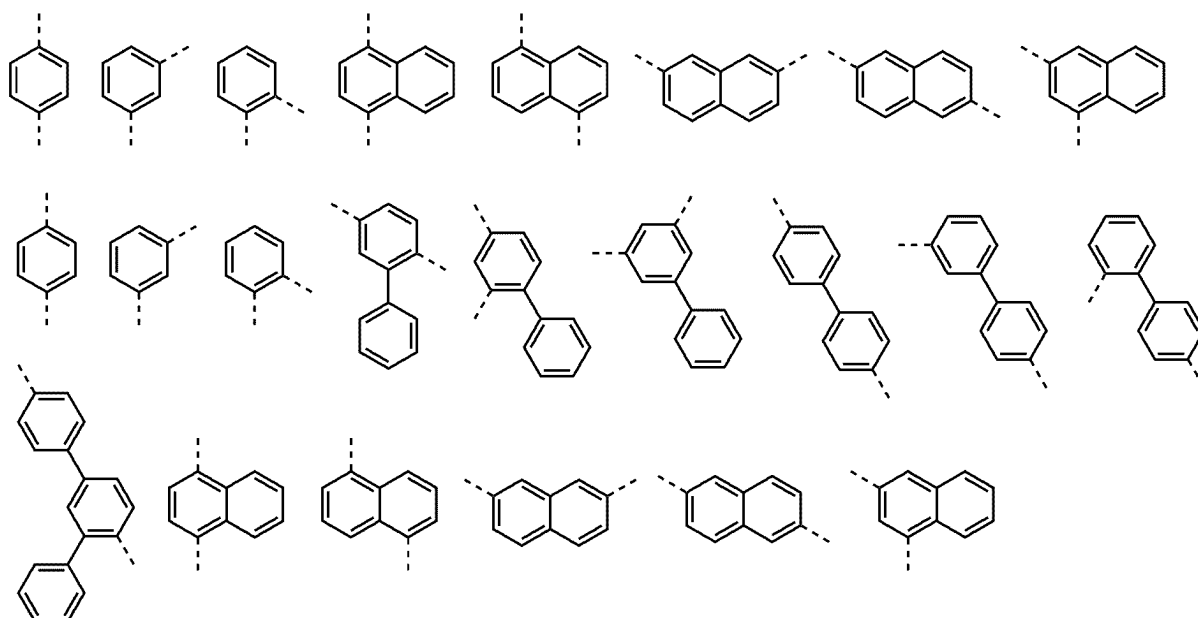
最も好ましくは、 L'_2 および L'_3 はそれぞれ独立して、単結合または下記で構成される群より選択されるいずれか 1 つであり得る：

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【化 2 1 1】



好ましくは、 Ar'_{1} および Ar'_{2} はそれぞれ独立して、置換または非置換の炭素数 6 ~ 20 のアリール；または、置換または非置換の N、O および S で構成される群より選択されるいずれか 1 つ以上を含む炭素数 2 ~ 20 のヘテロアリールであってもよく、

より好ましくは、 Ar^1 および Ar^2 はそれぞれ独立して、フェニル、ピフェニリル、ターフェニリル、ナフチル、フェナントレニル、ジベンゾフラニル、ジベンゾチオフエニル、フェニルカルバゾール、ジメチルフルオレニル、ベンゾナフトフラニル、またはベンゾナフトチオフエニルであり得る。

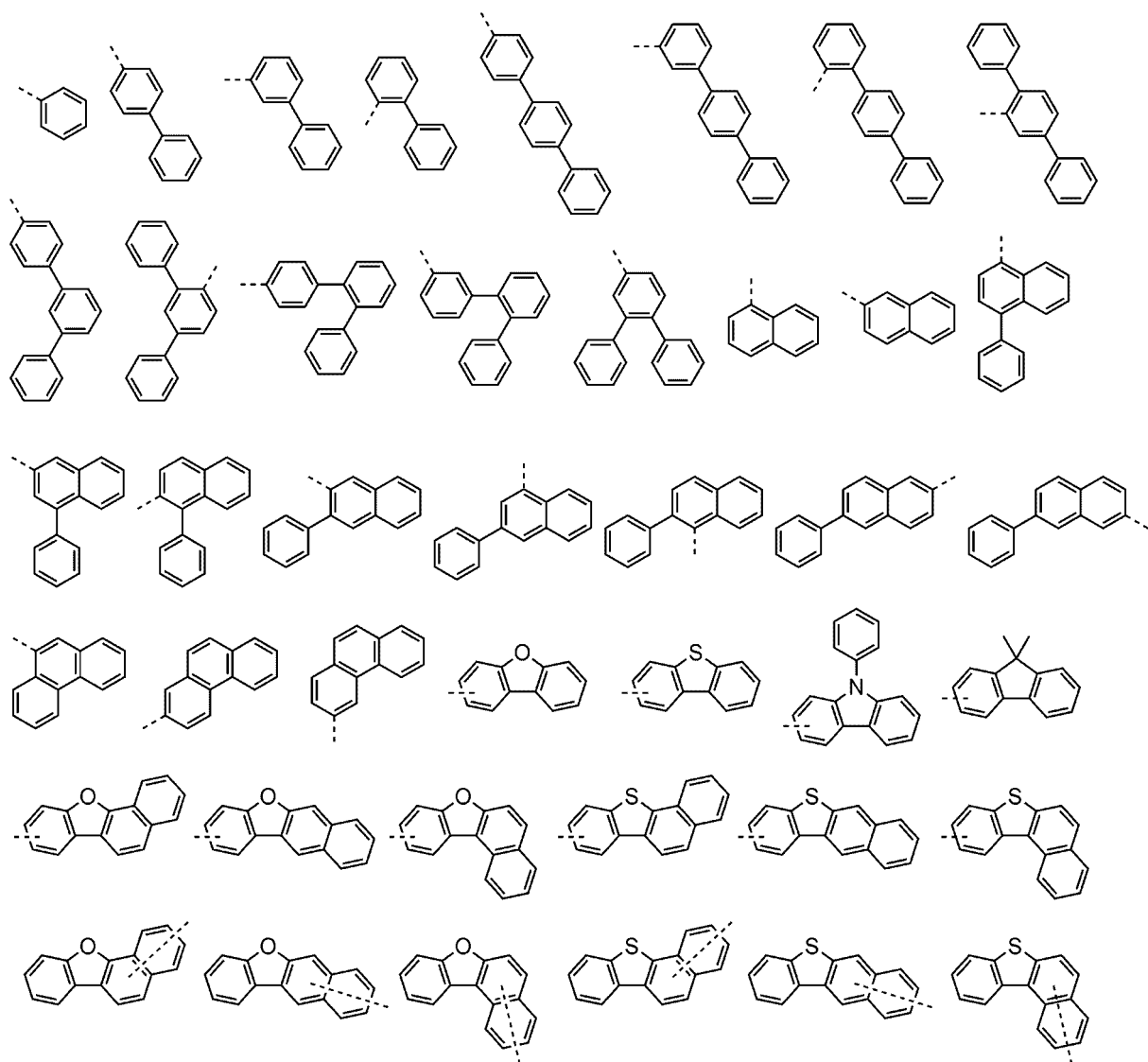
【 0 0 5 4 】

より好ましくは、 Ar^1 および Ar^2 はそれぞれ独立して、フェニル、ピフェニリル、ターフェニリル、ナフチル、フェナントレニル、ジベンゾフラニル、ジベンゾチオフェニル、9-フェニル-9H-カルバゾール、ジメチルフルオレニル、ベンゾ [b] ナフト [2, 1-d] フラニル、ベンゾ [b] ナフト [2, 3-d] フラニル、ベンゾ [b] ナフト [1, 2-d] フラニル、ベンゾ [b] ナフト [2, 1-d] チオフェニル、ベンゾ [b] ナフト [2, 3-d] チオフェニル、または、ベンゾ [b] ナフト [1, 2-d] チオフェニルであってもよい。

【 0 0 5 5 】

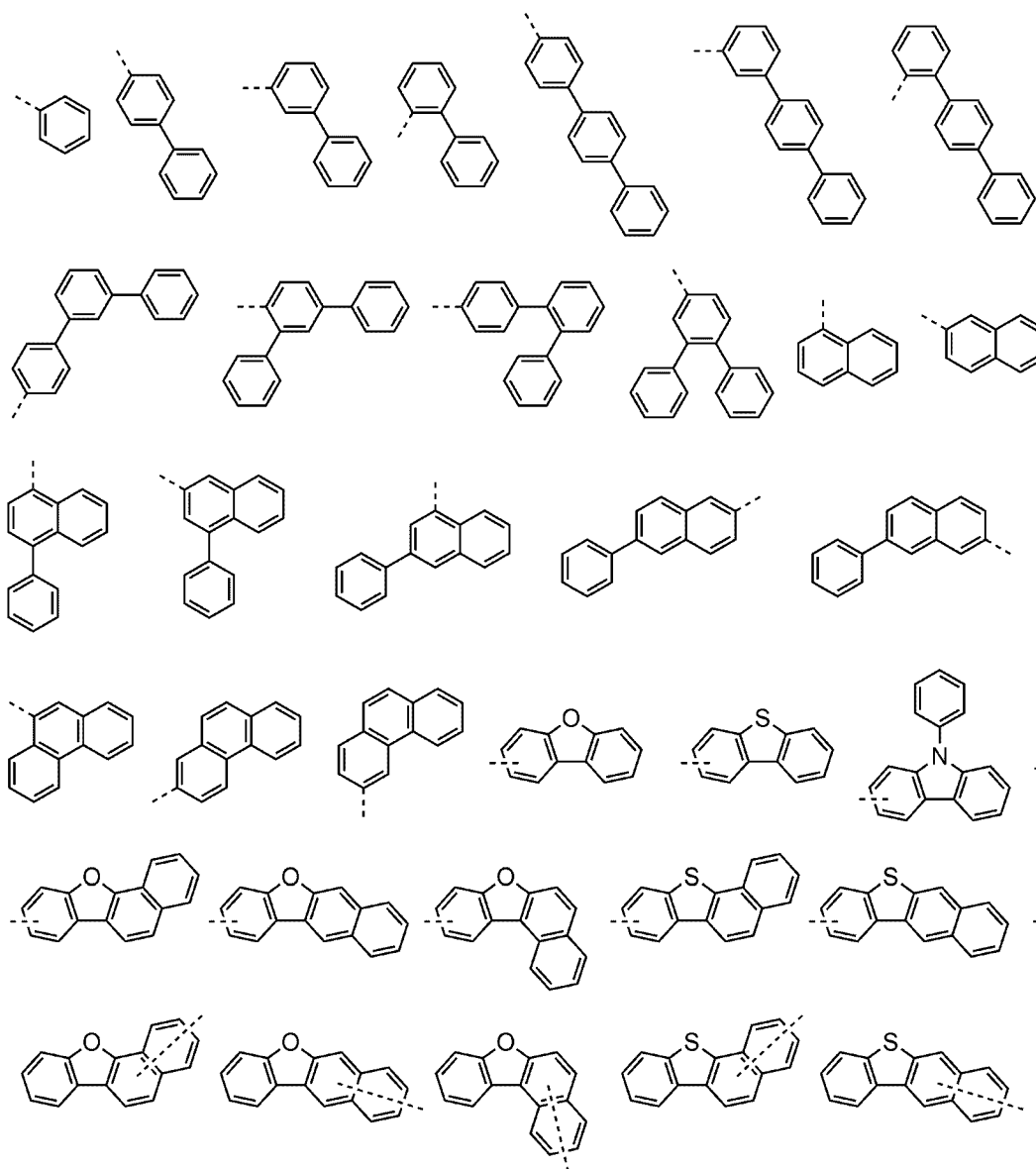
より好ましくは、 Ar'_1 および Ar'_2 はそれぞれ独立して、下記で構成される群より選択されるいずれか1つであり得る：

【化 2 1 2】



最も好ましくは、 Ar_1 および Ar_2 はそれぞれ独立して、下記で構成される群より選択されるいずれか 1 つであり得る：

【化 2 1 3】



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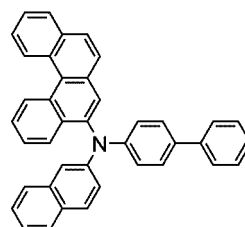
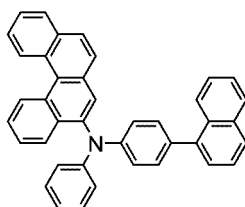
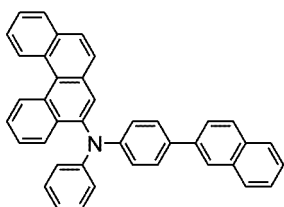
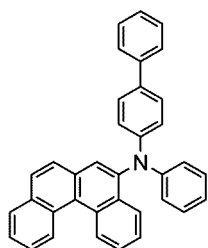
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前記化学式 2 で表される化合物の代表的な例は下記の通りである：

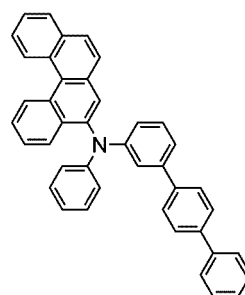
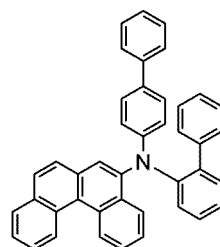
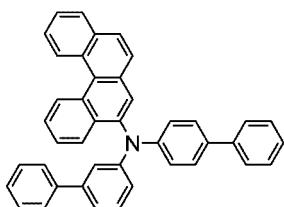
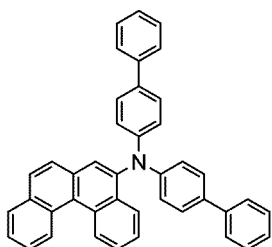
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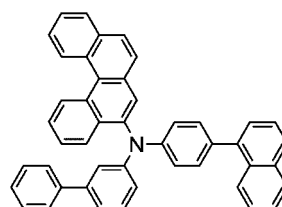
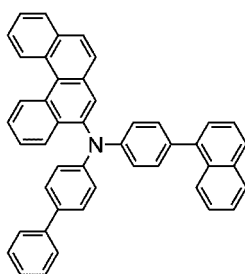
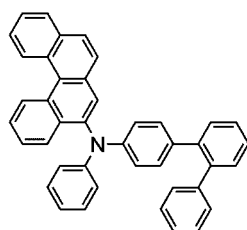
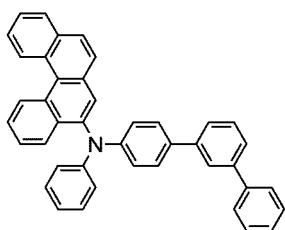
【化 2 1 4】



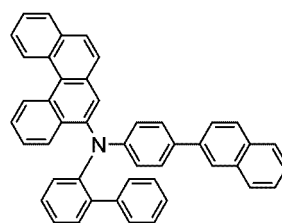
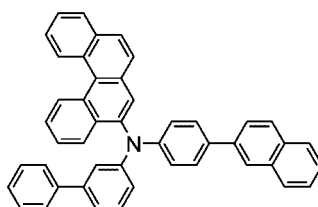
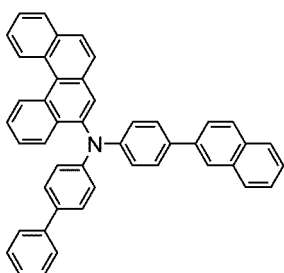
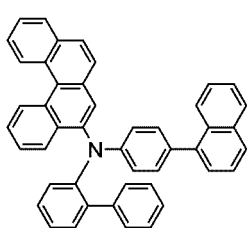
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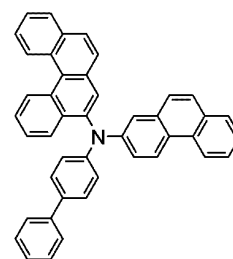
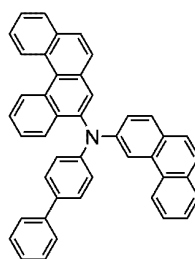
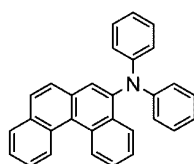
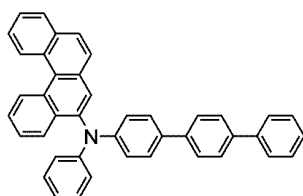
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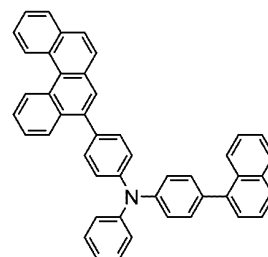
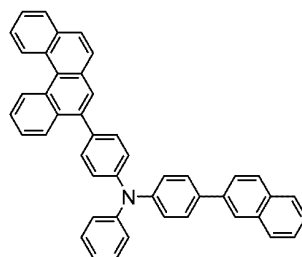
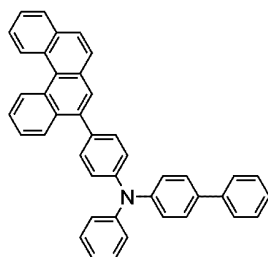
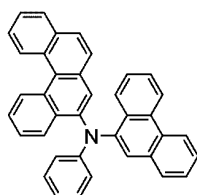
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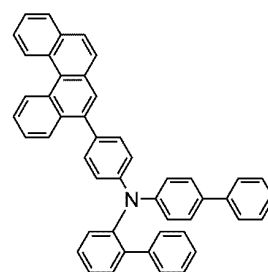
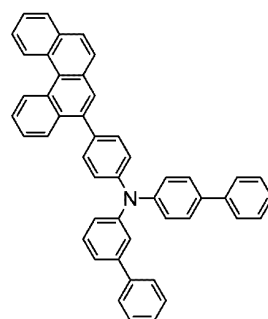
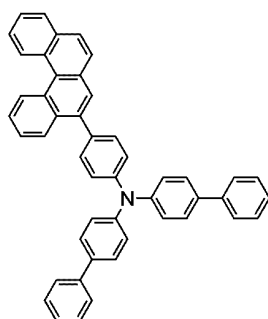
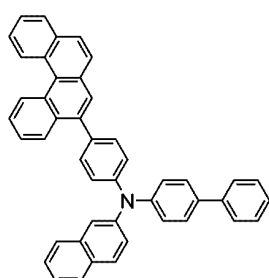
【化 2 1 5】



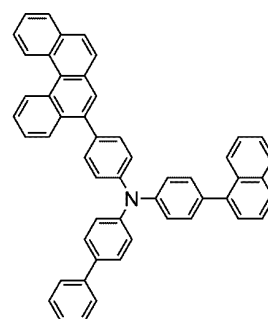
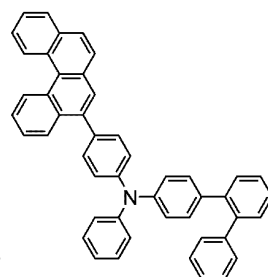
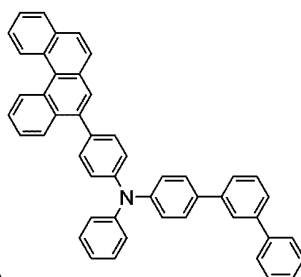
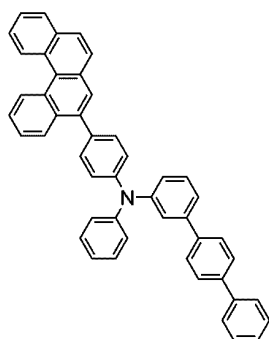
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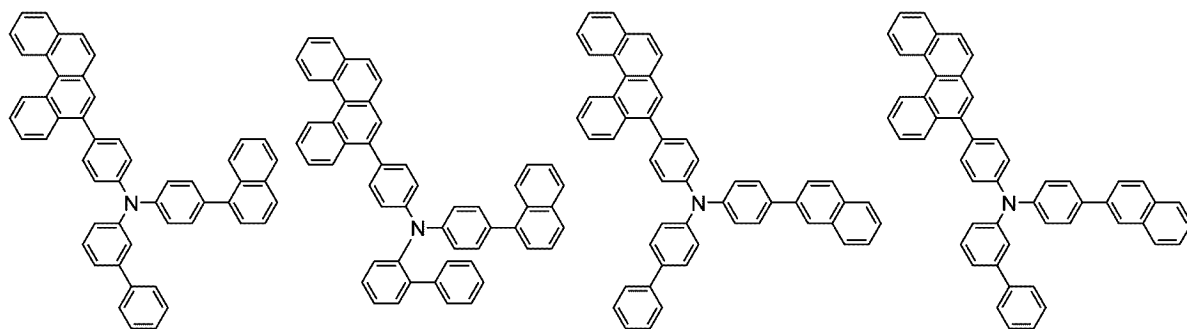
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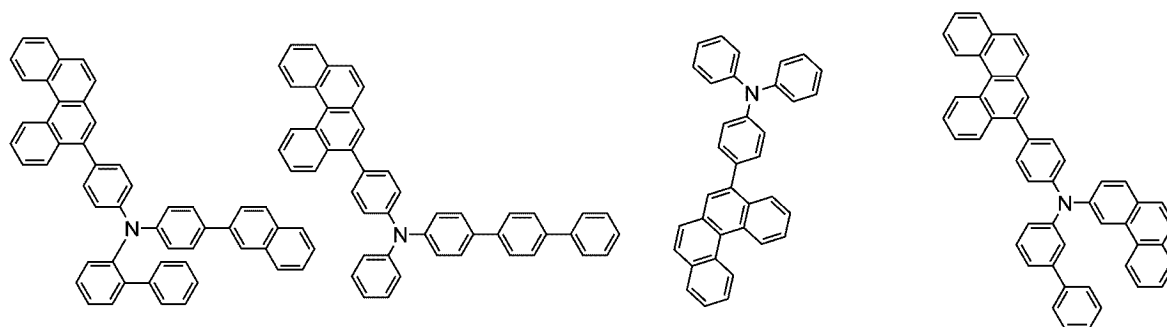
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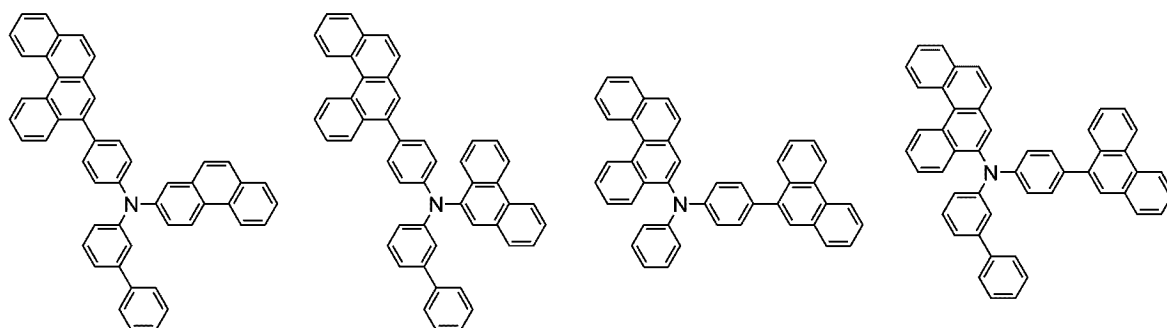
【化 2 1 6】



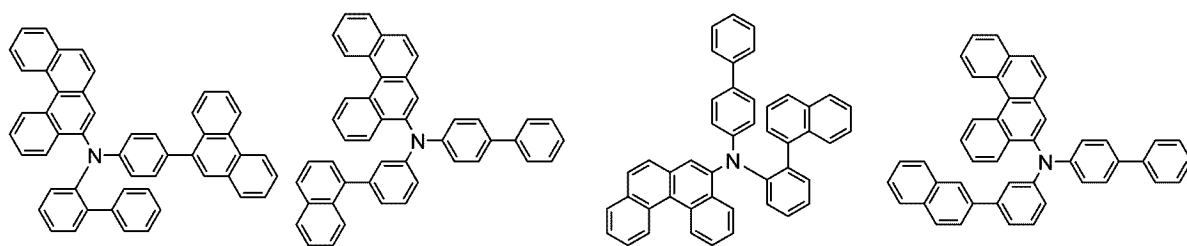
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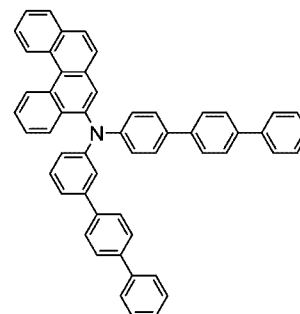
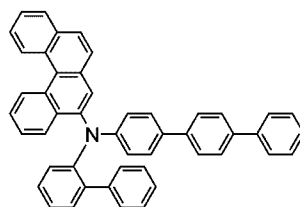
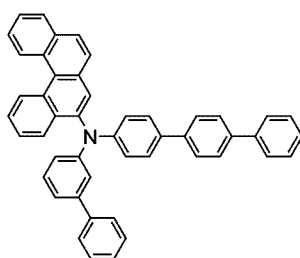
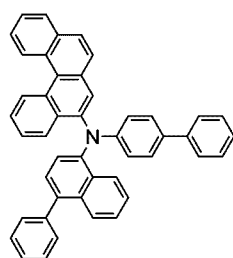
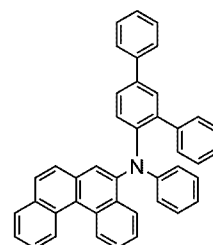
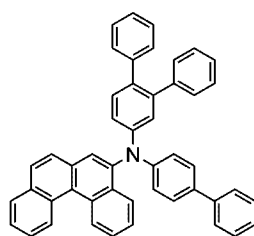
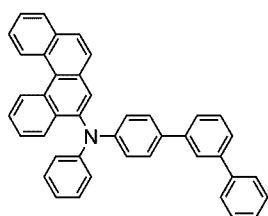
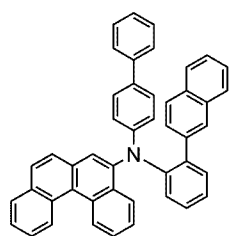
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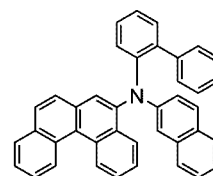
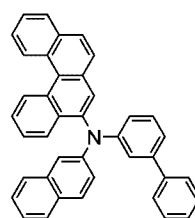
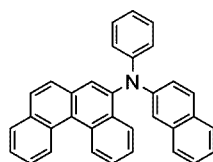
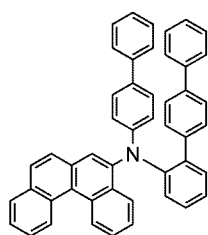
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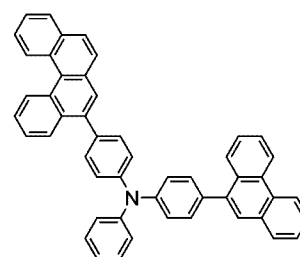
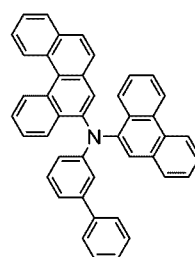
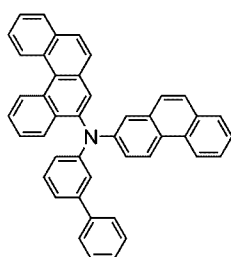
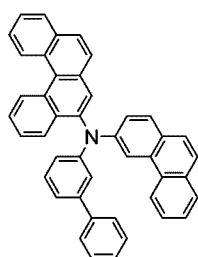
【化 2 1 7】



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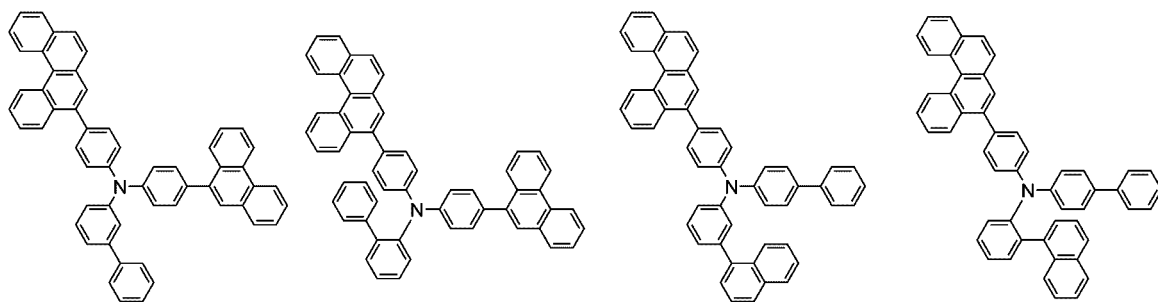


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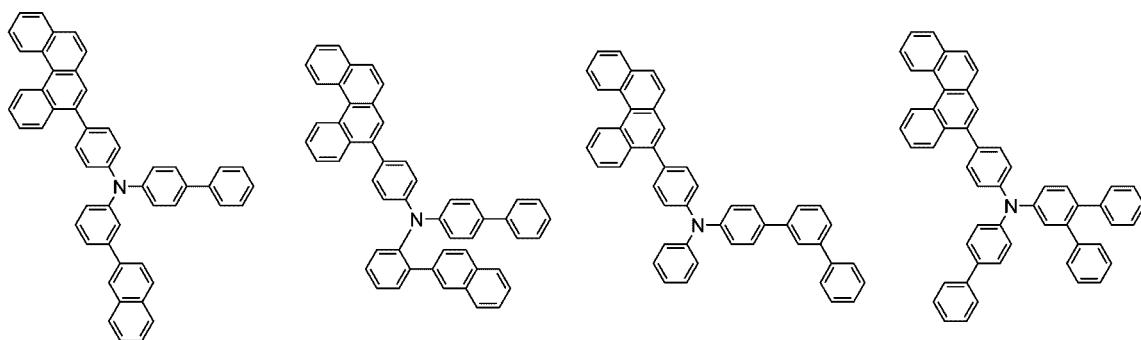
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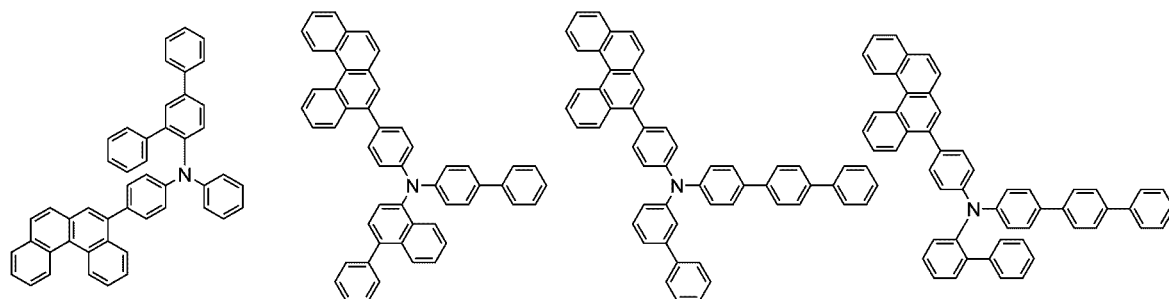
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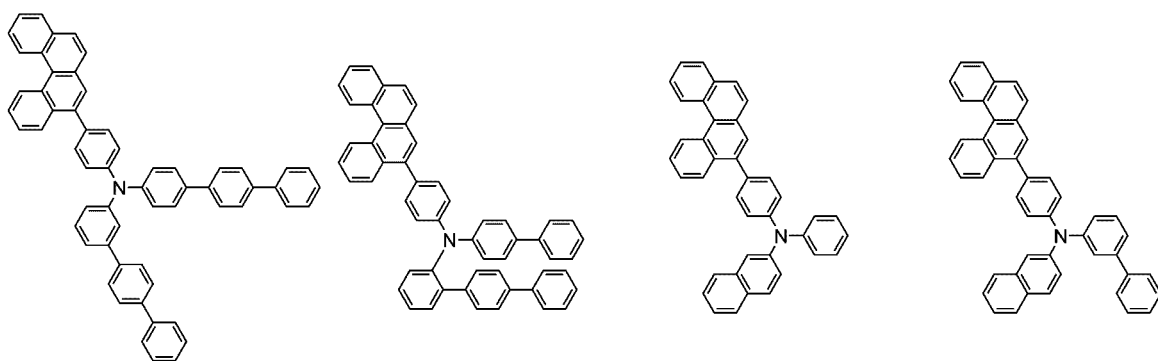
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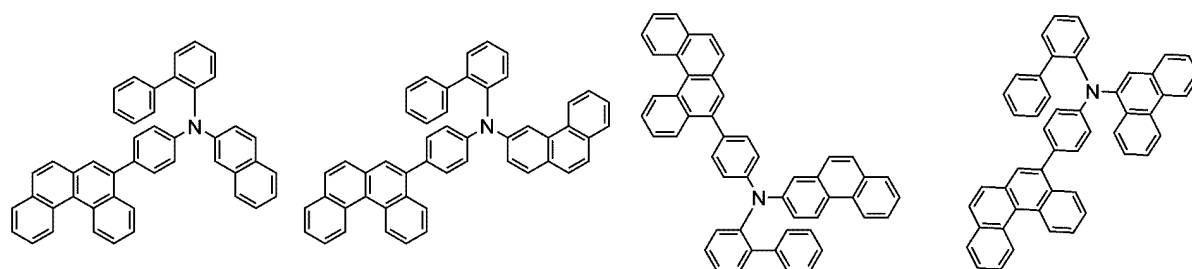


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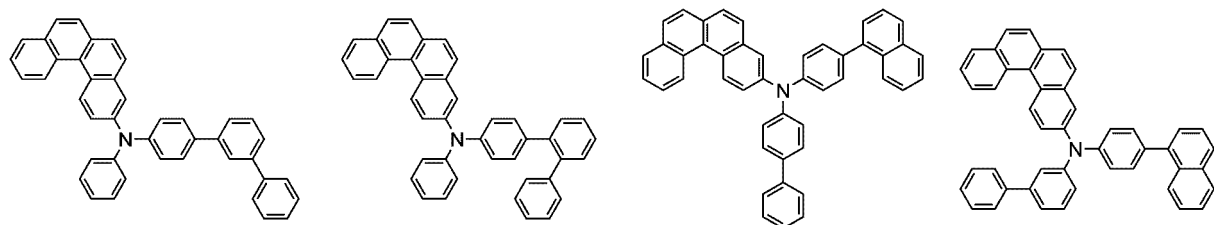
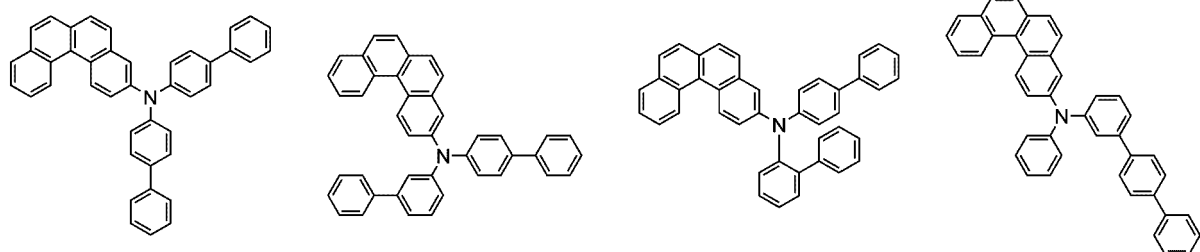
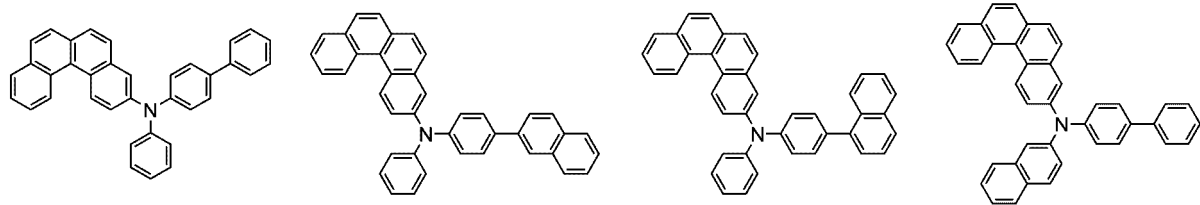
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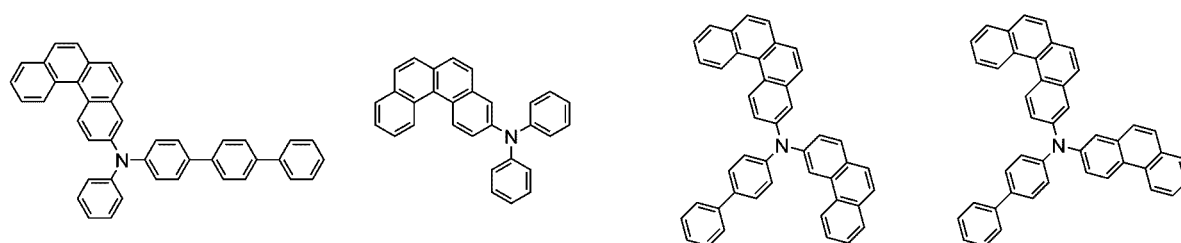
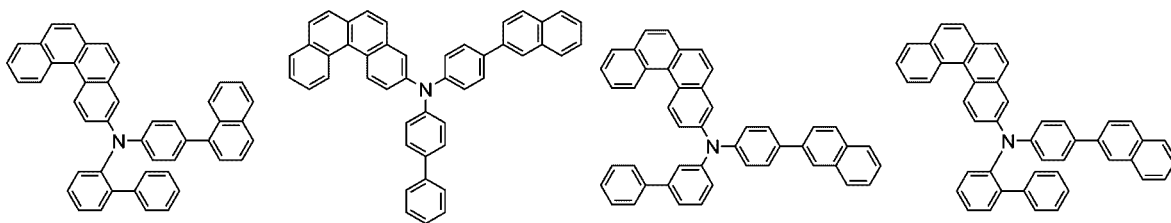
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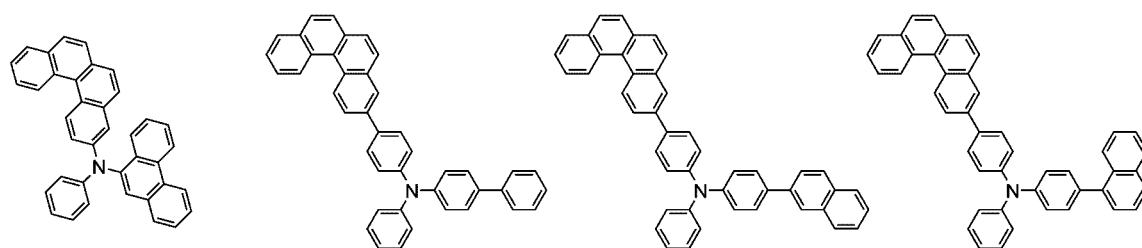
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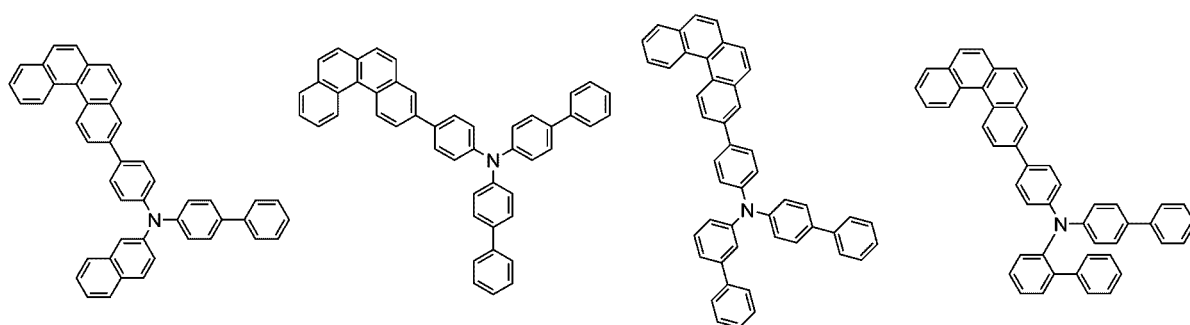
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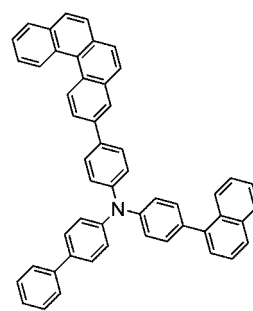
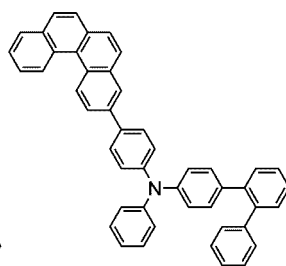
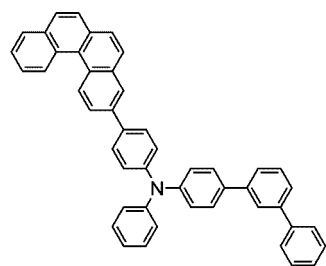
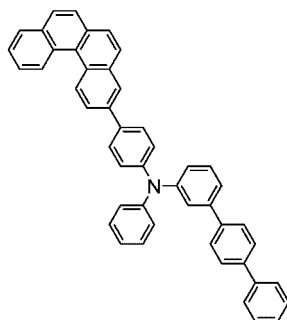


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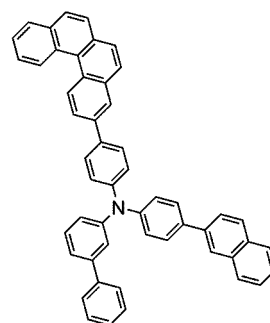
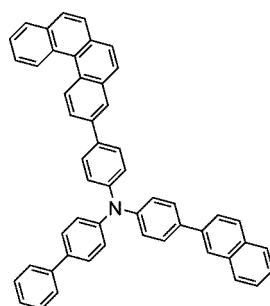
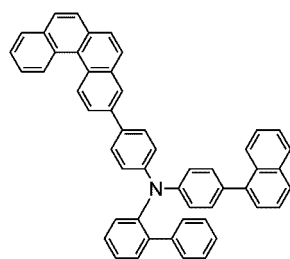
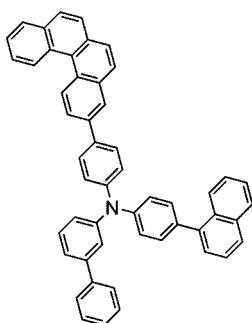
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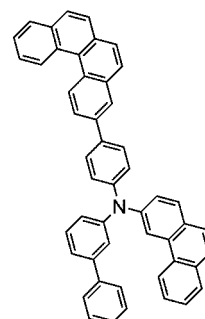
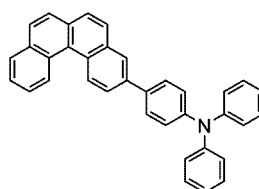
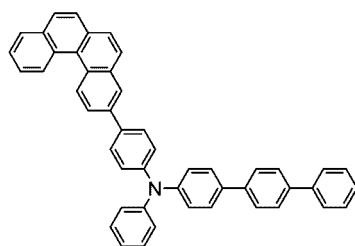
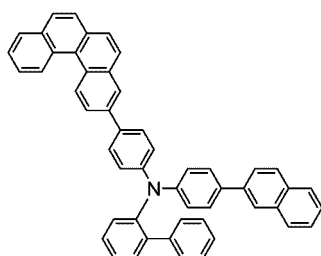
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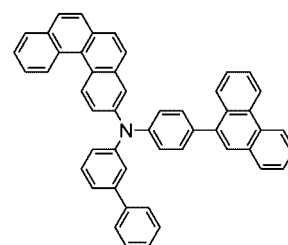
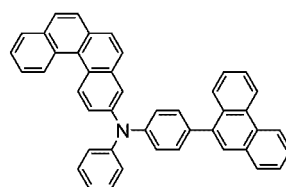
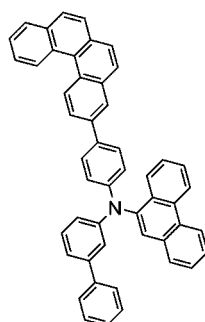
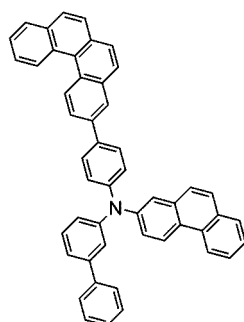
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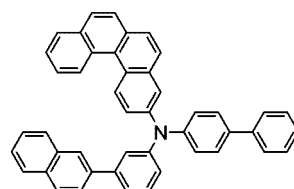
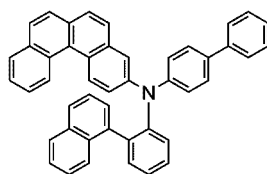
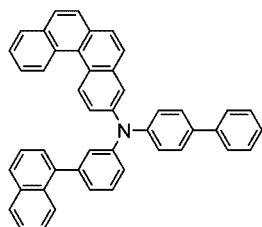
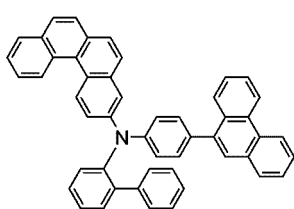
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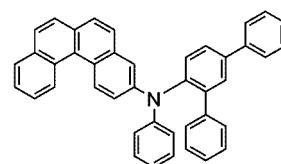
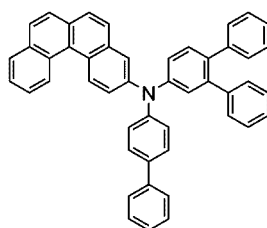
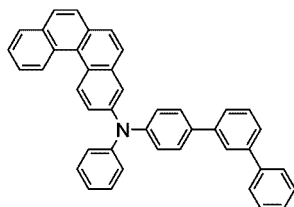
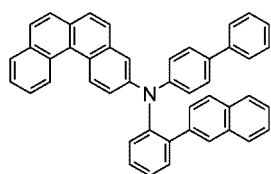
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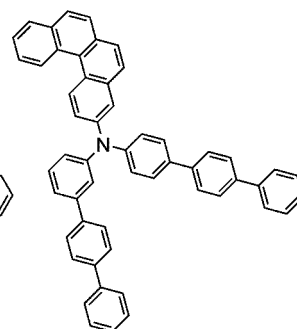
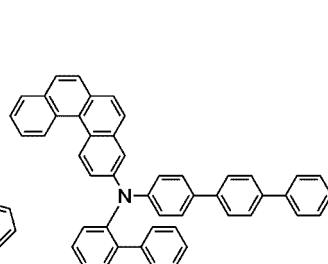
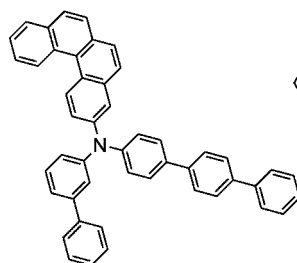
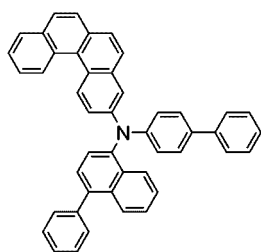
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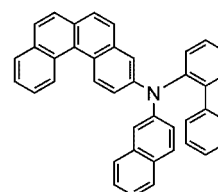
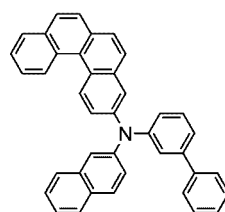
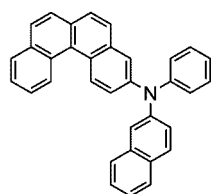
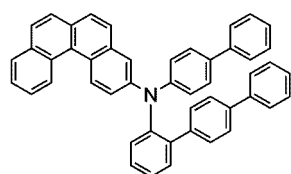
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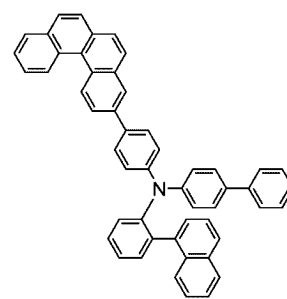
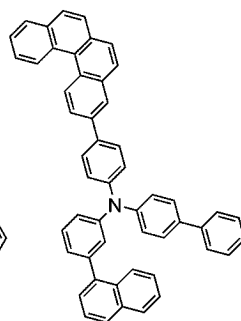
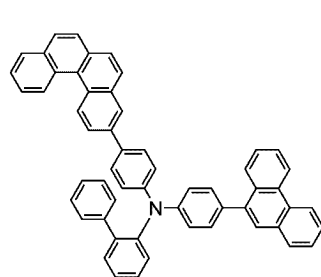
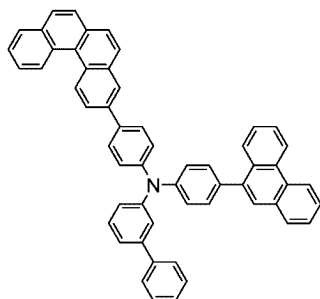
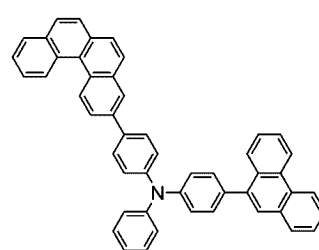
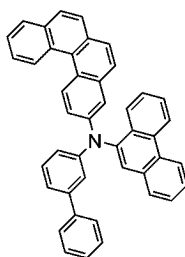
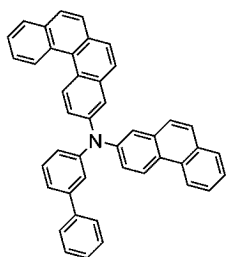
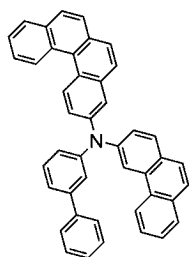
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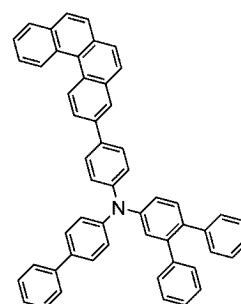
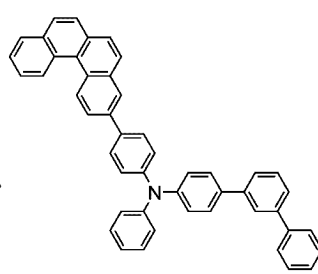
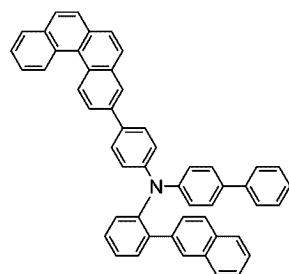
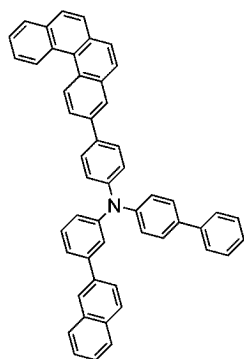
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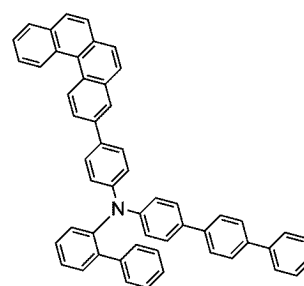
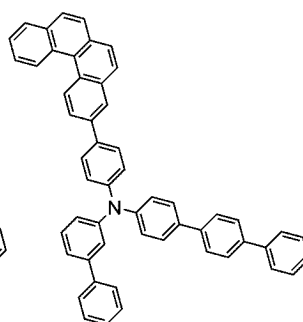
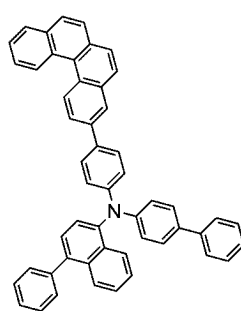
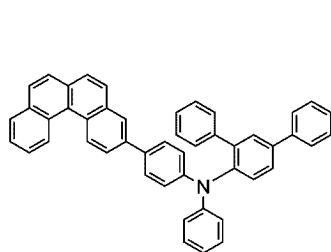
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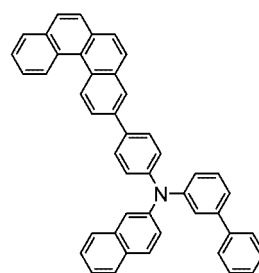
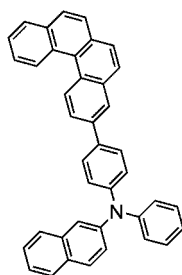
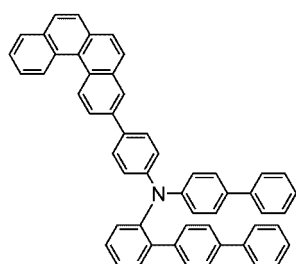
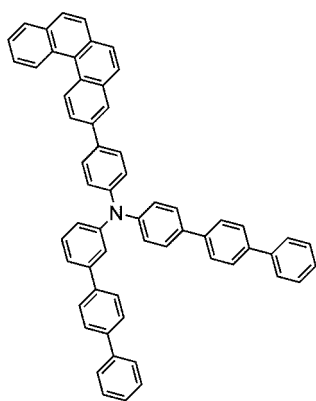


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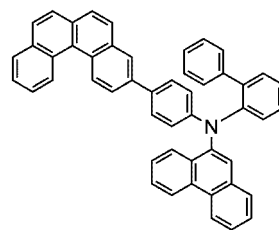
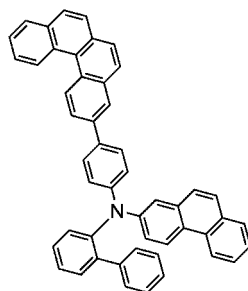
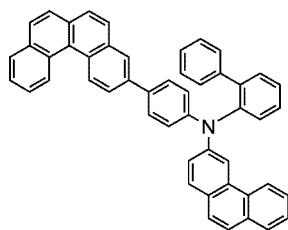
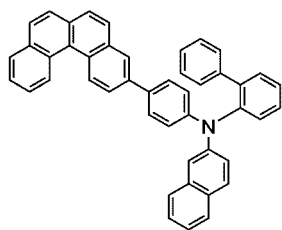
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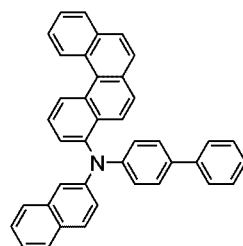
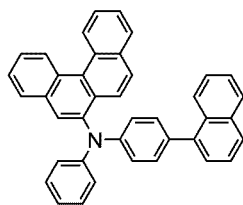
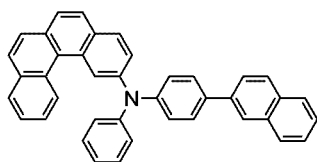
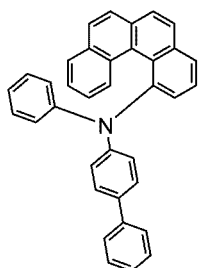


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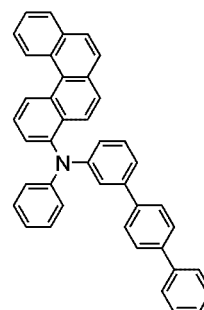
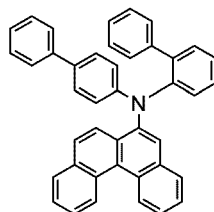
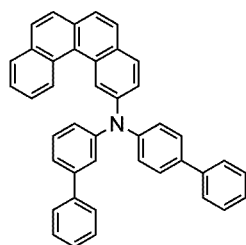
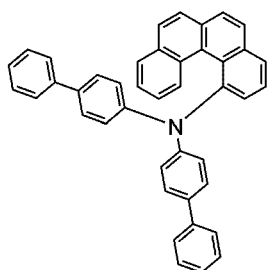


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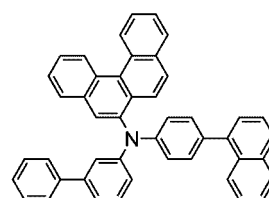
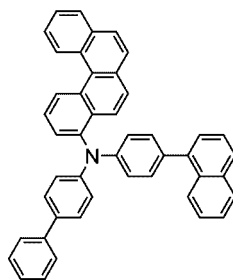
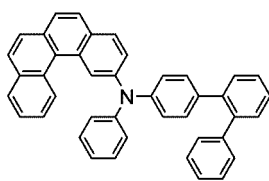
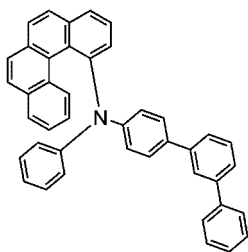


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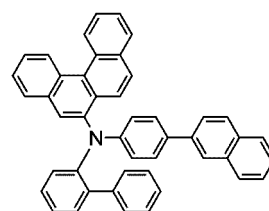
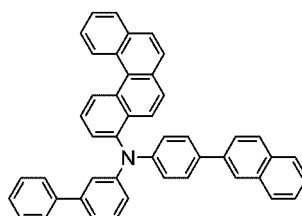
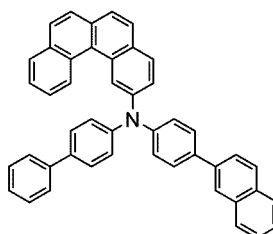
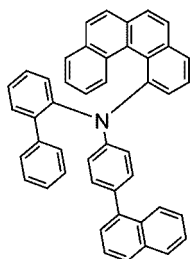


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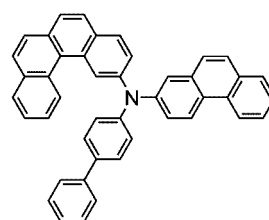
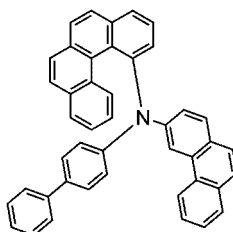
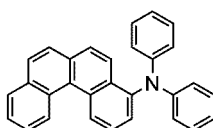
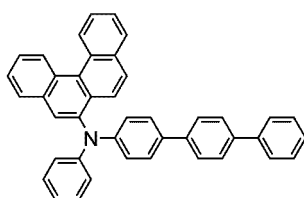
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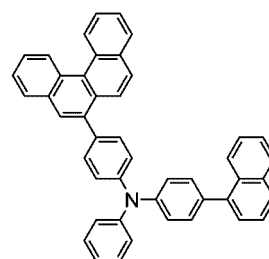
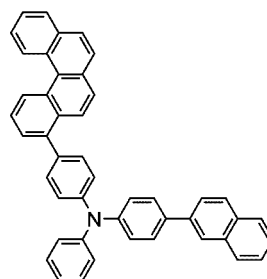
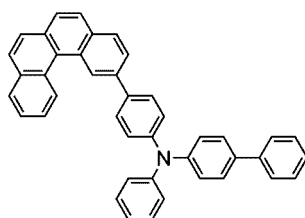
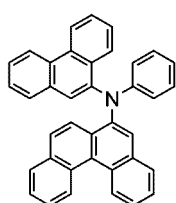
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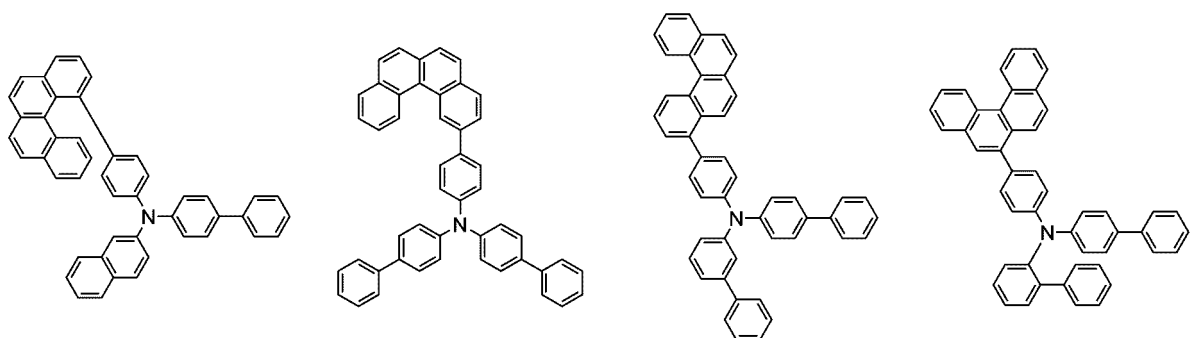
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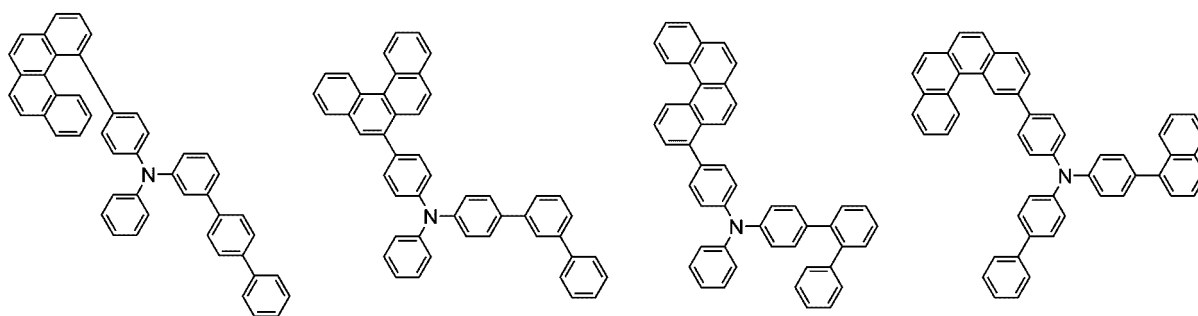
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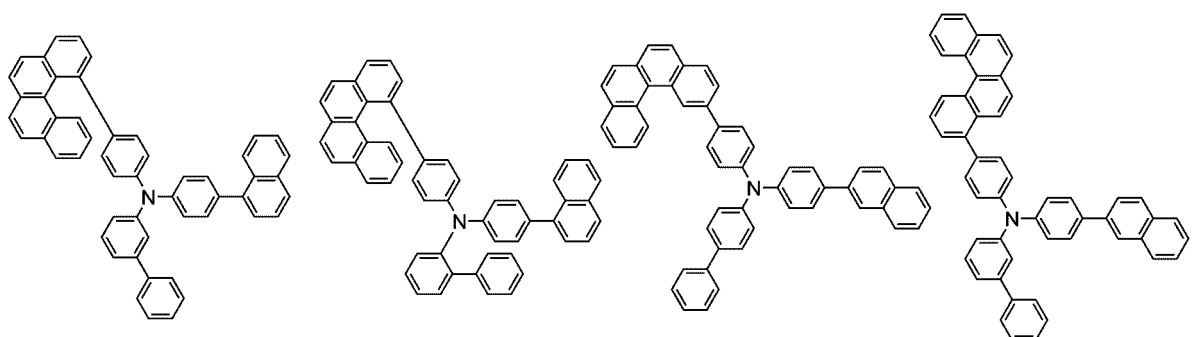
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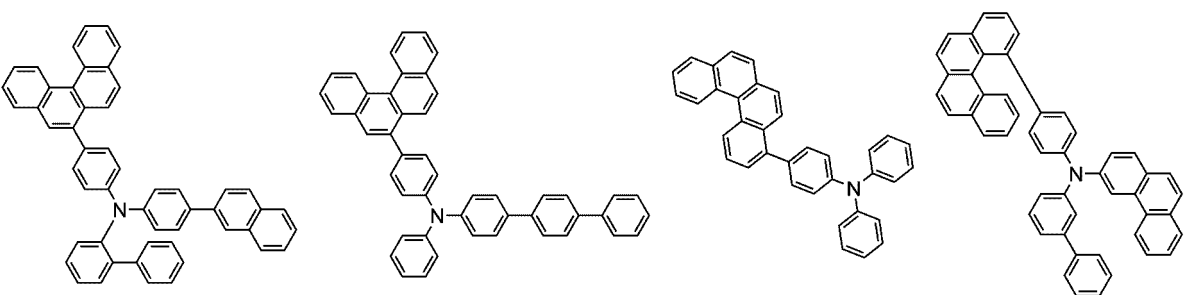
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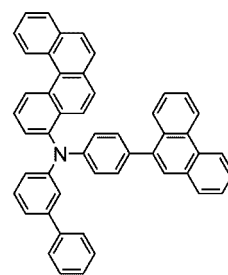
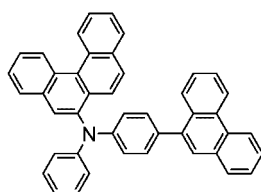
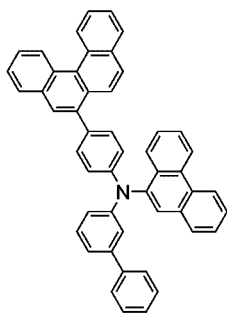
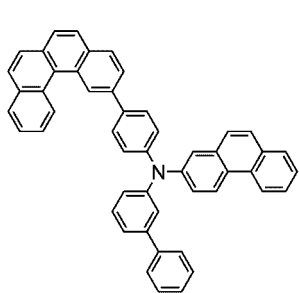
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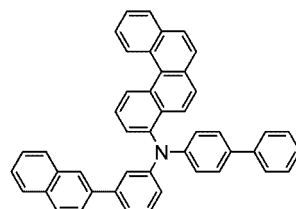
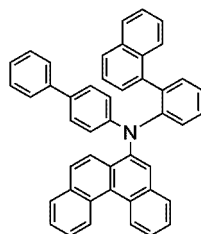
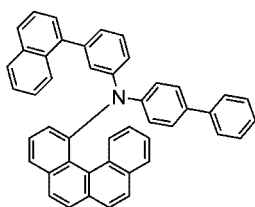
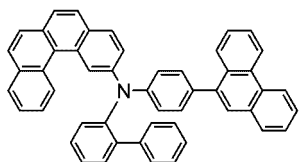
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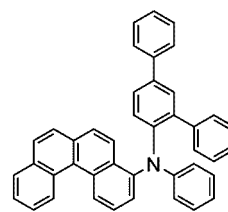
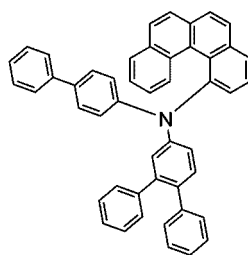
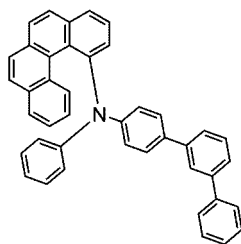
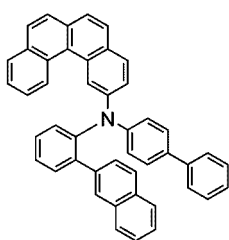
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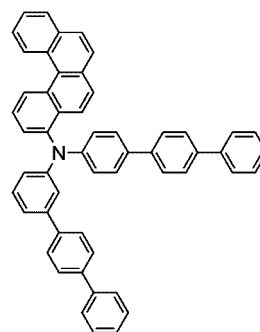
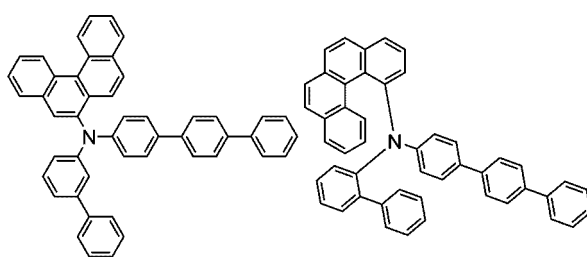
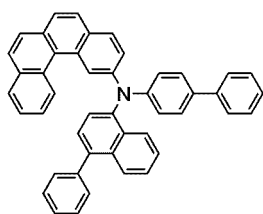
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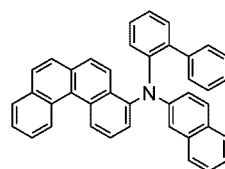
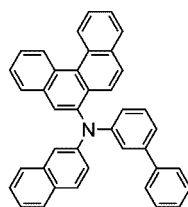
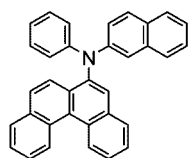
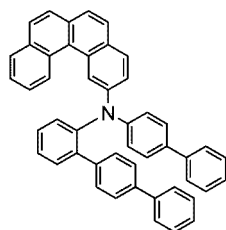
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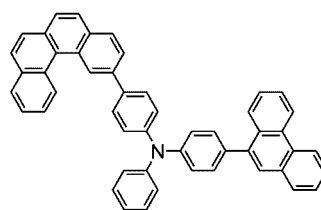
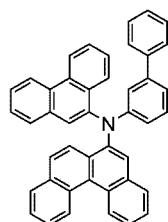
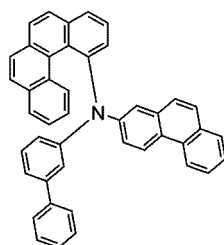
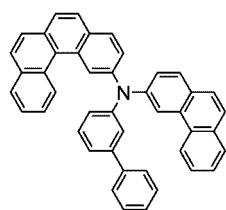
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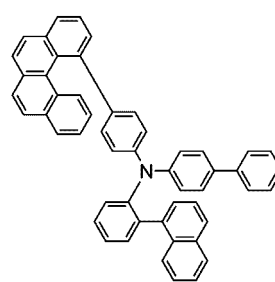
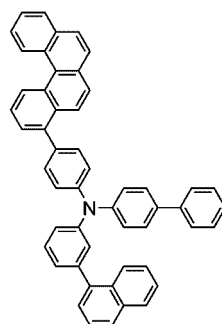
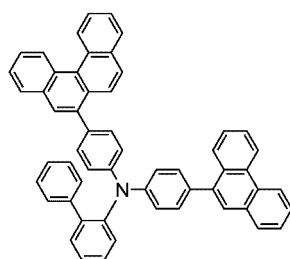
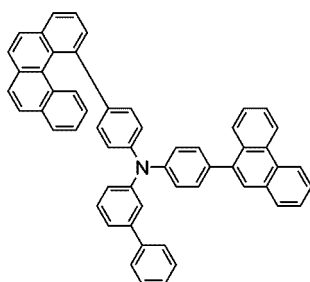
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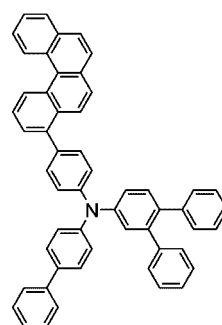
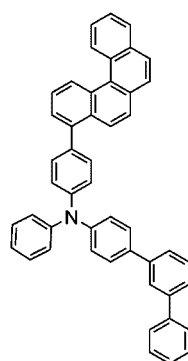
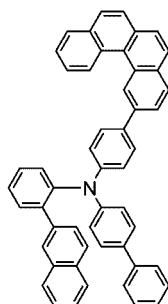
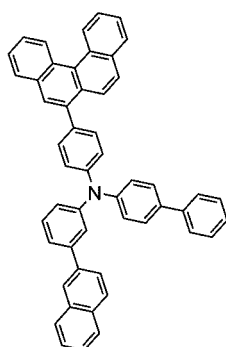
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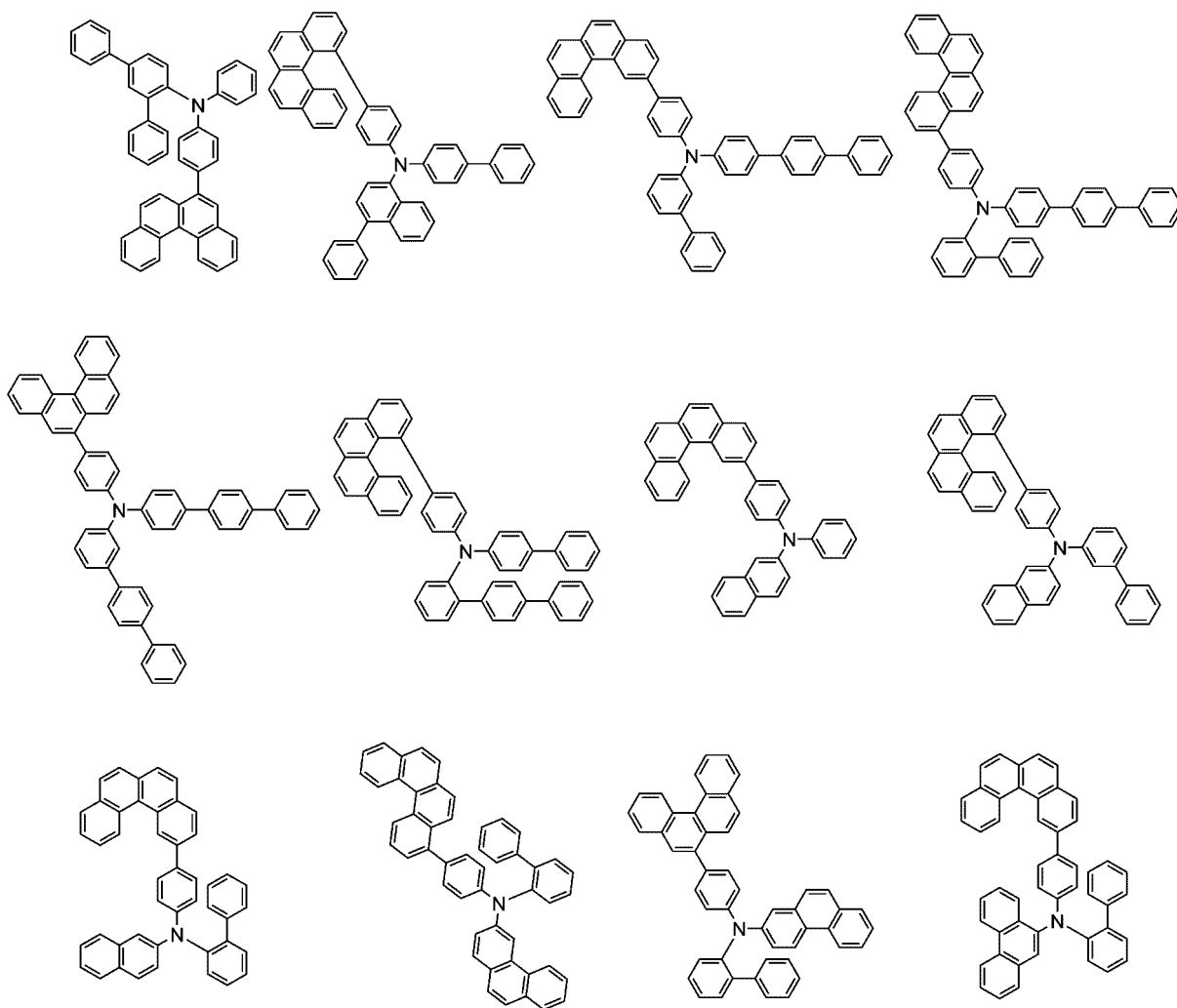
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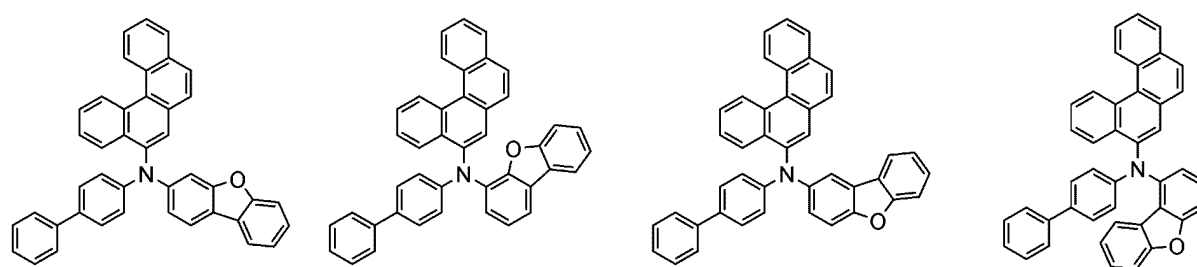
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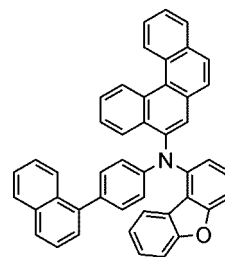
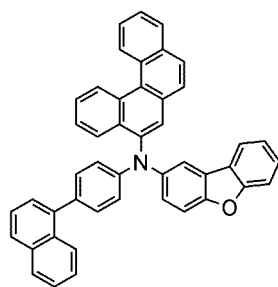
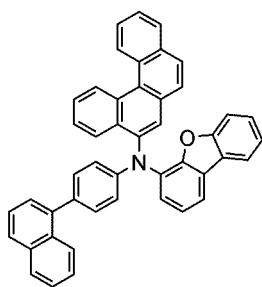
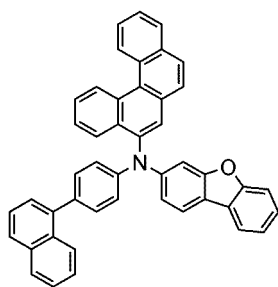


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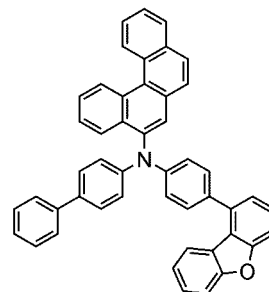
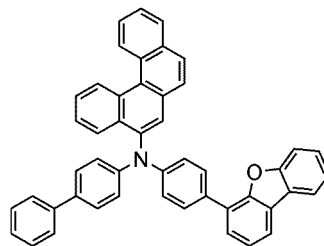
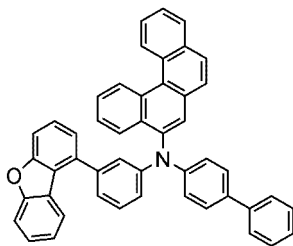
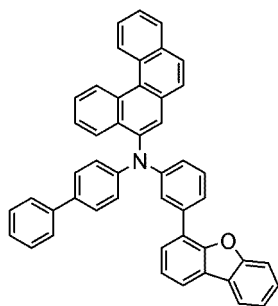
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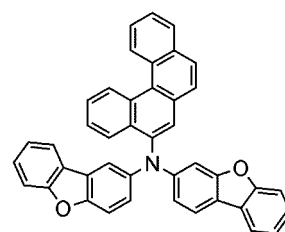
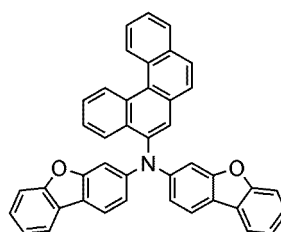
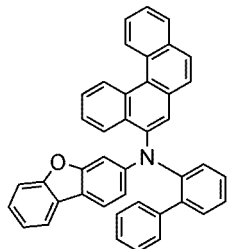
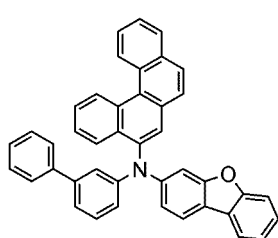
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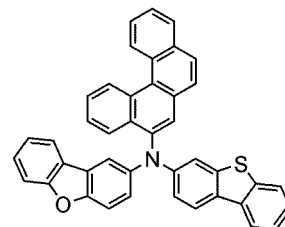
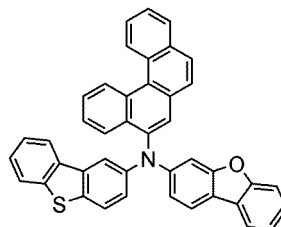
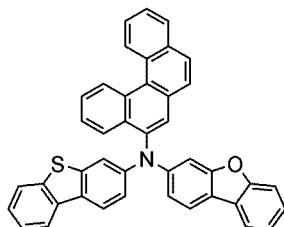
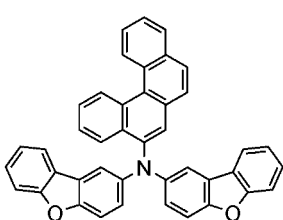
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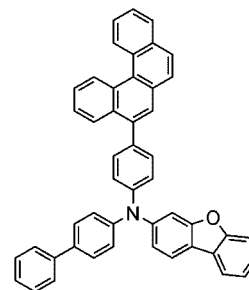
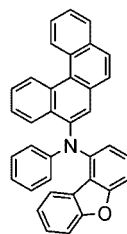
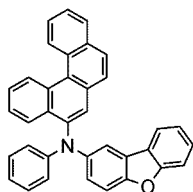
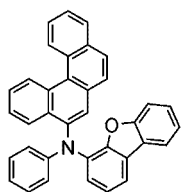
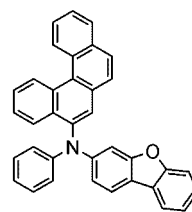
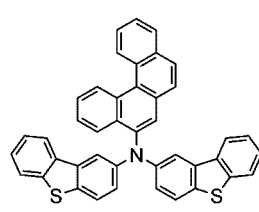
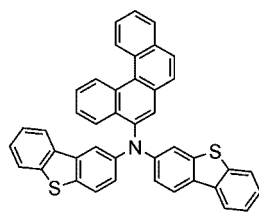
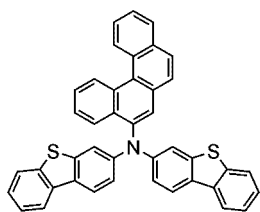
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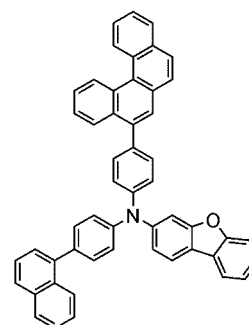
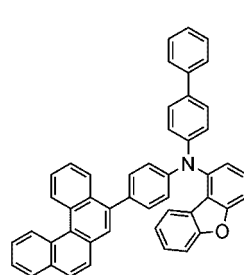
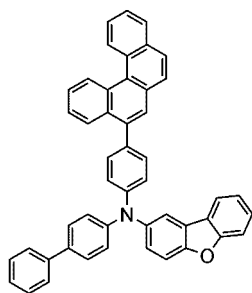
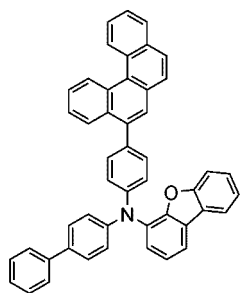
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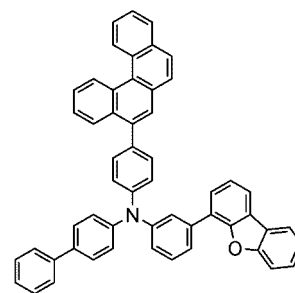
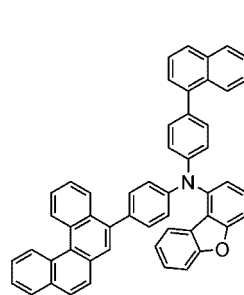
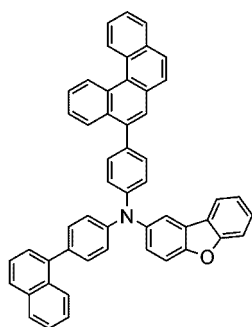
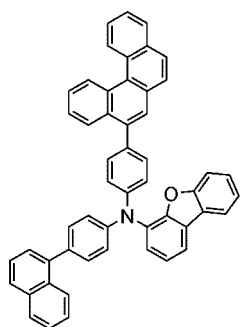
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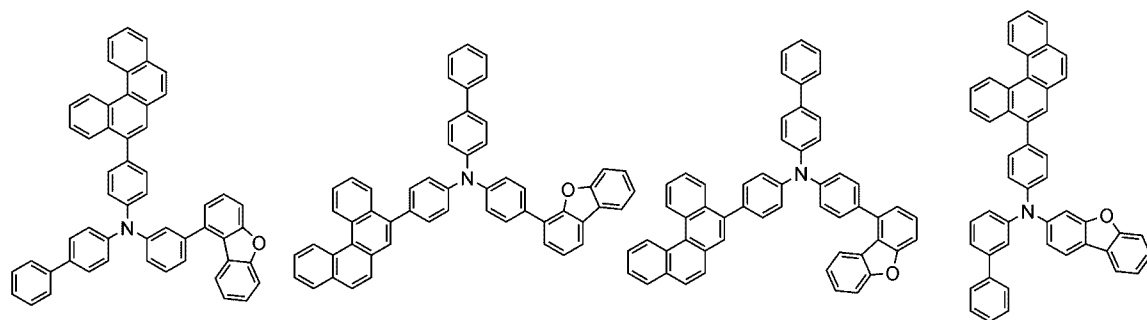


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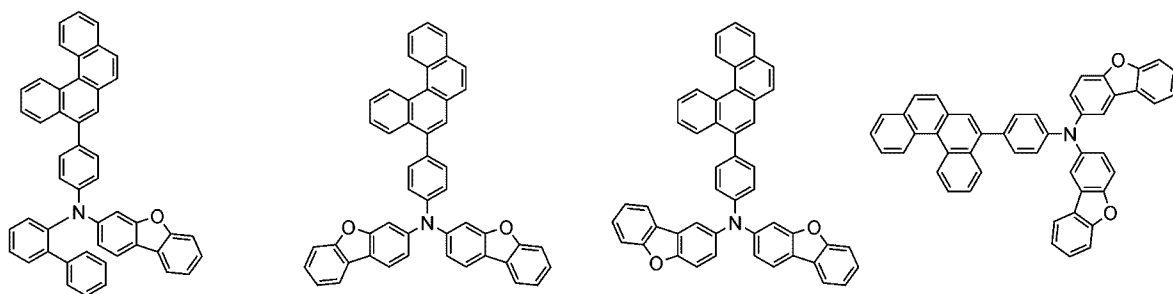
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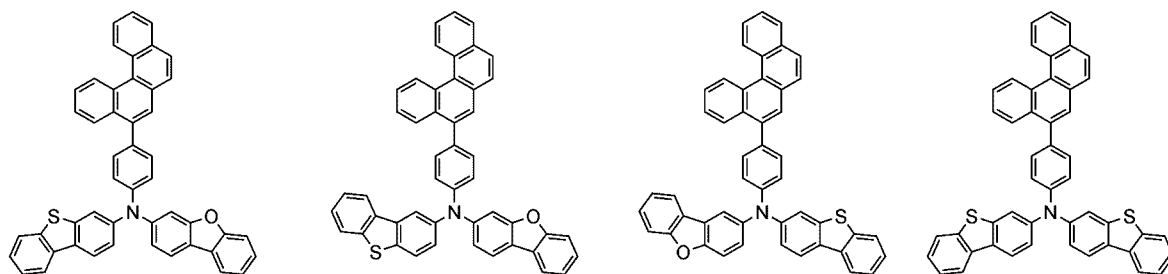
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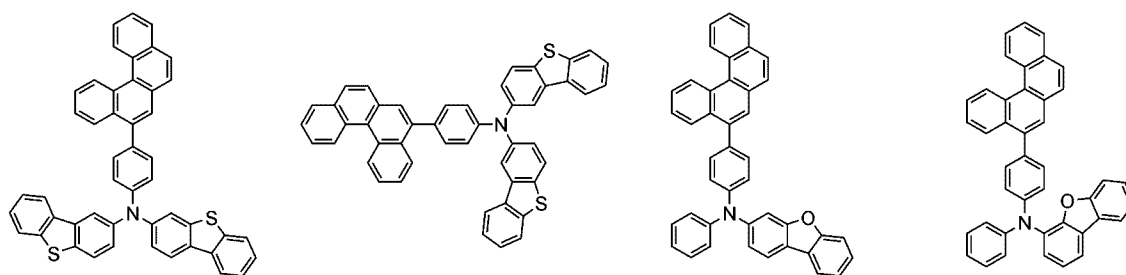
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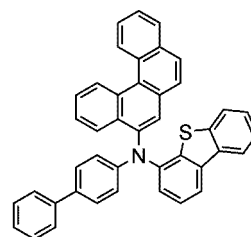
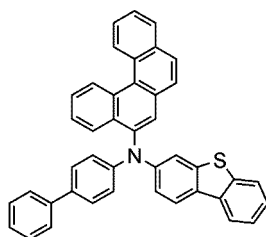
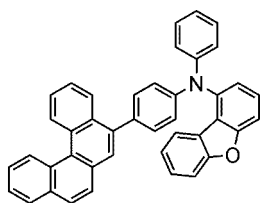
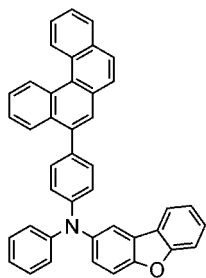
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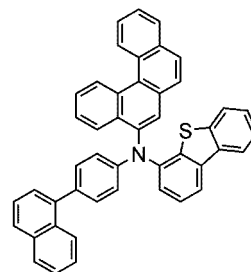
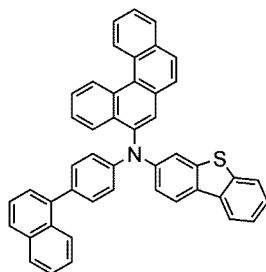
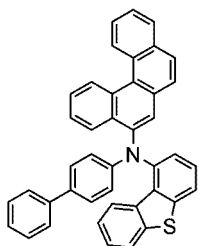
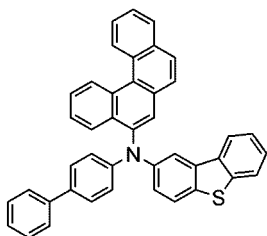
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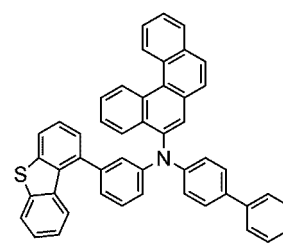
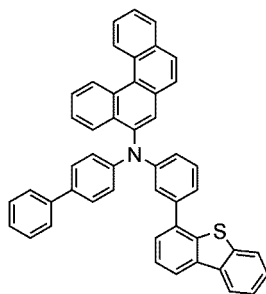
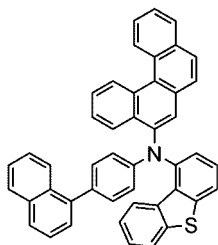
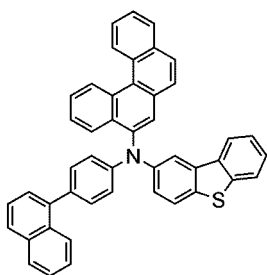
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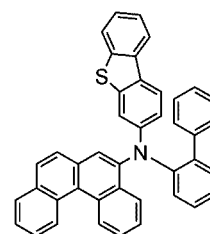
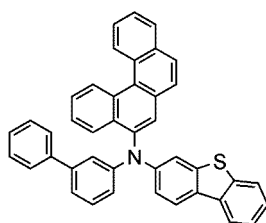
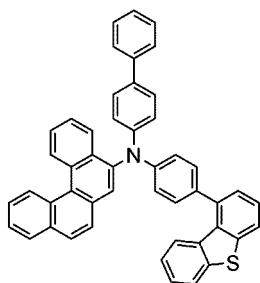
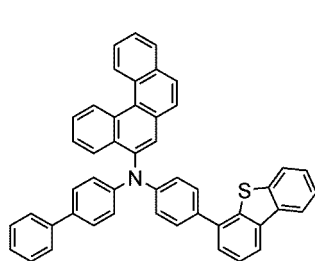
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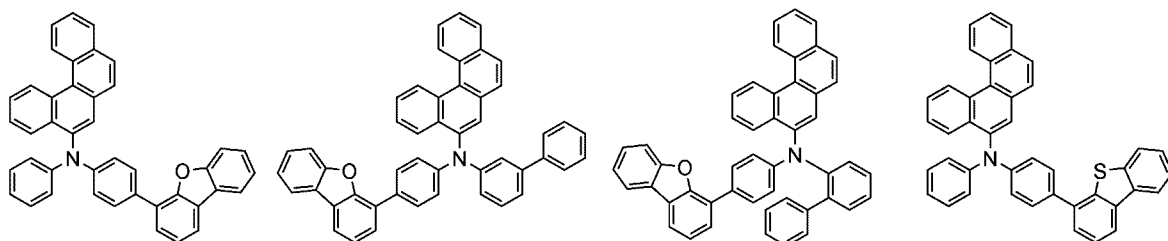
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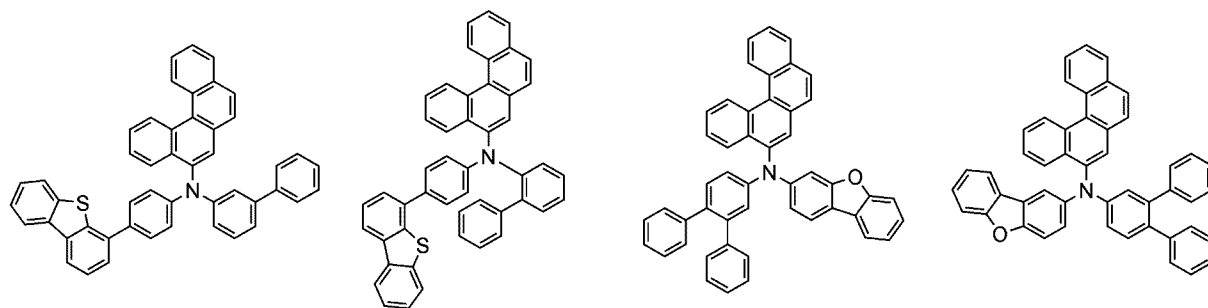
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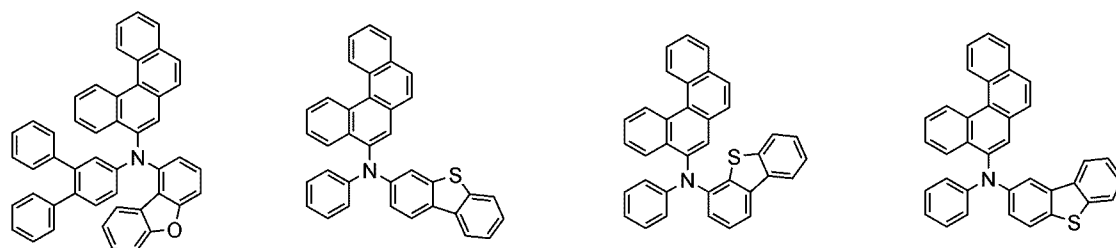
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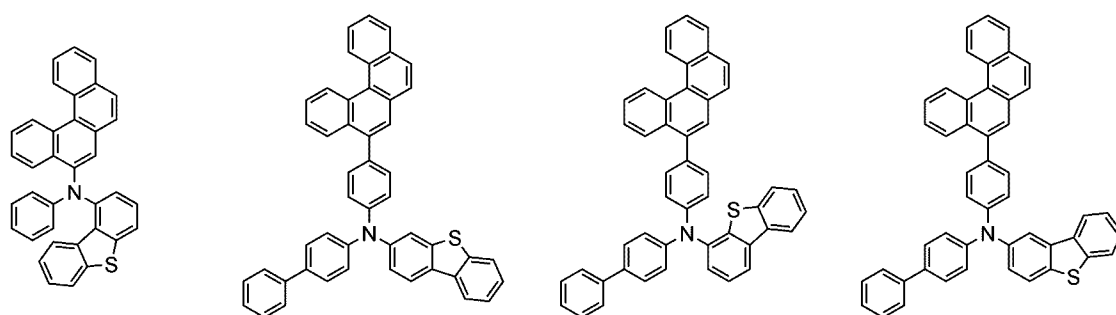
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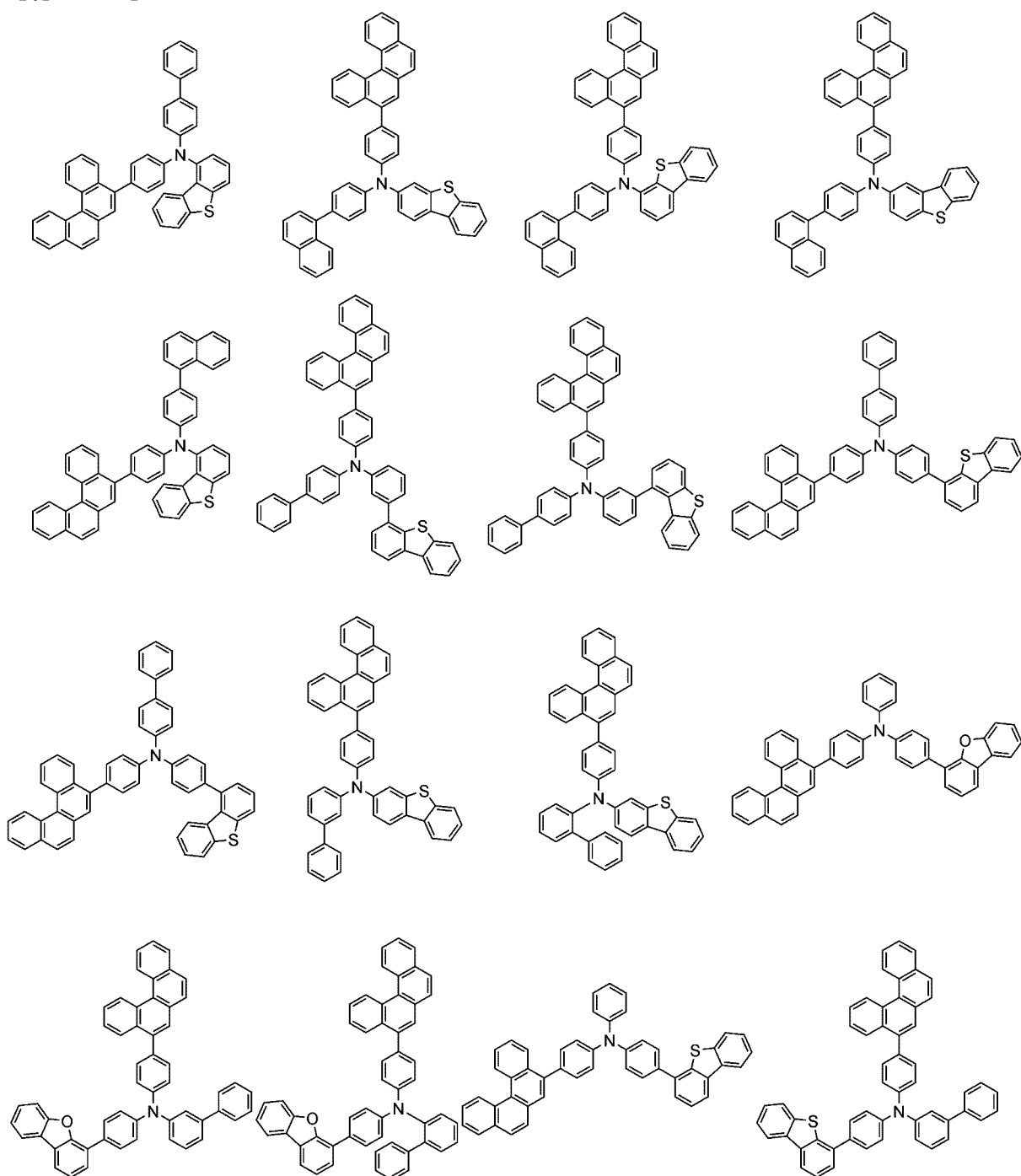
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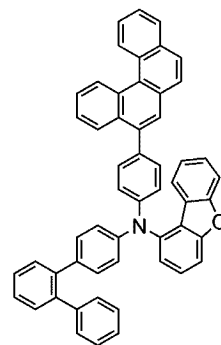
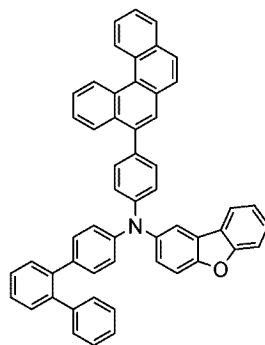
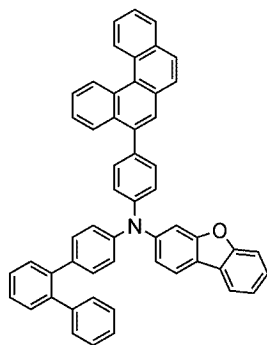
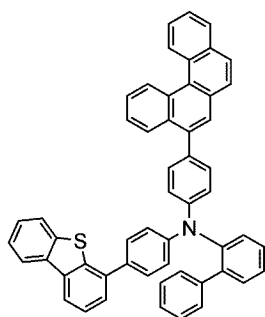
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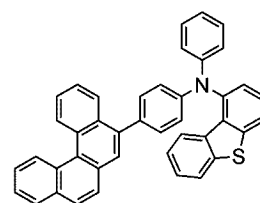
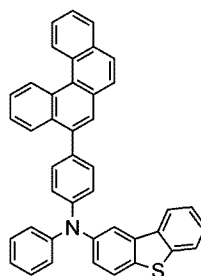
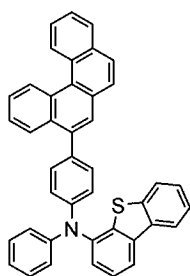
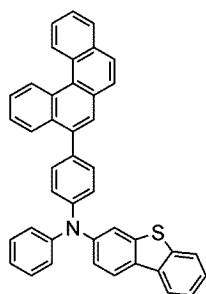
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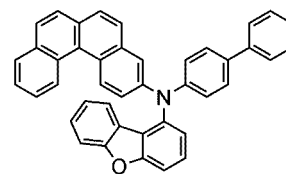
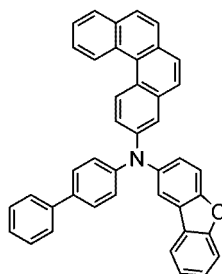
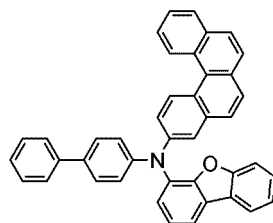
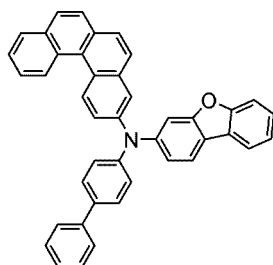


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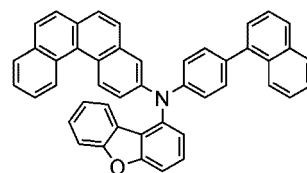
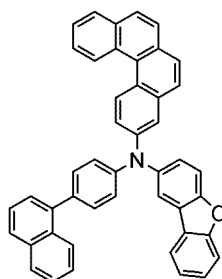
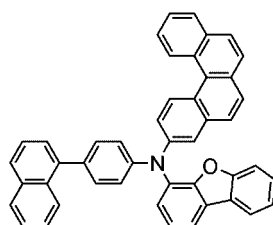
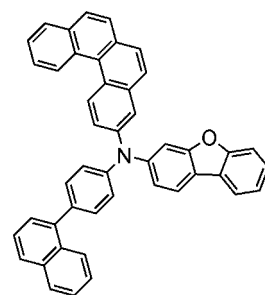


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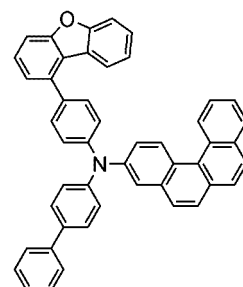
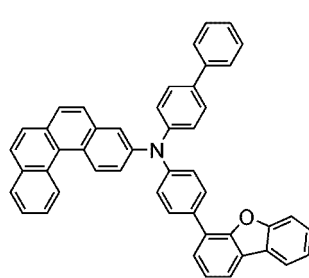
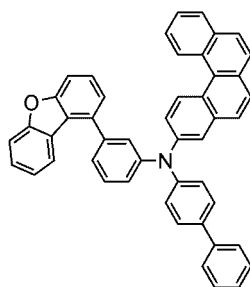
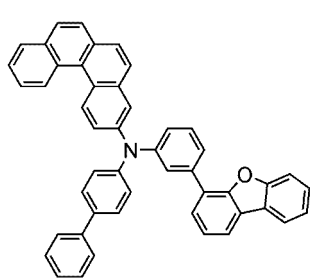
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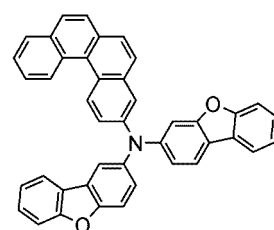
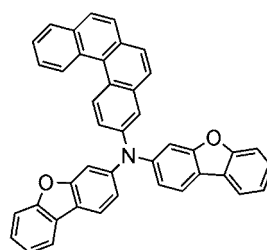
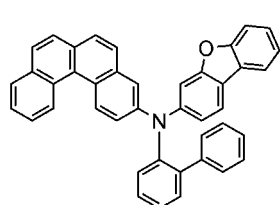
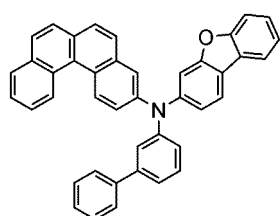
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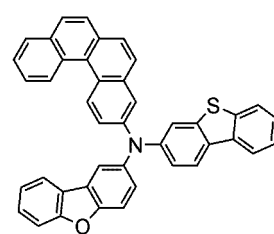
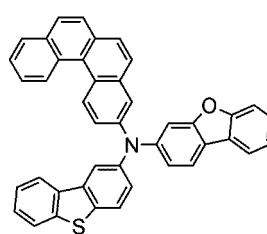
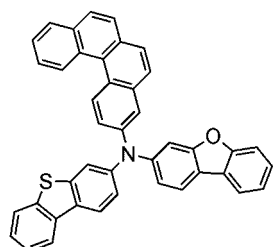
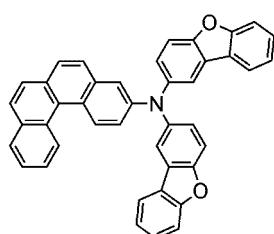
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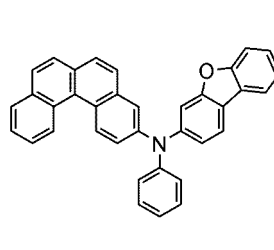
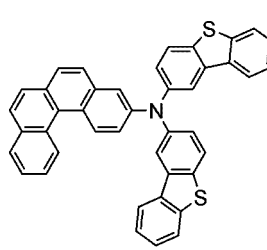
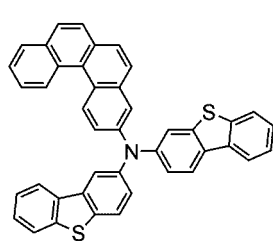
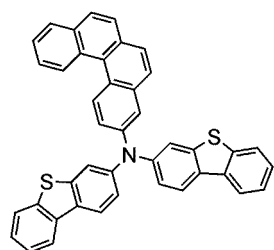
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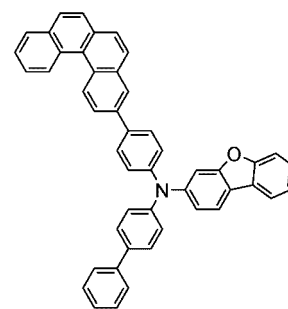
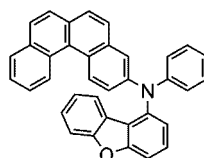
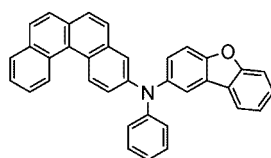
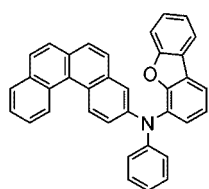
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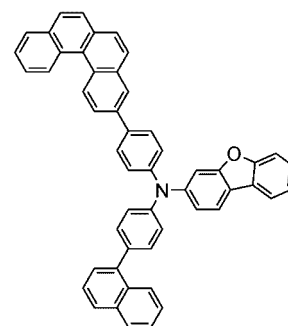
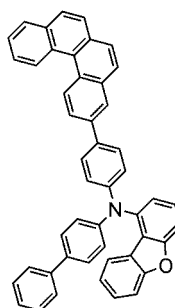
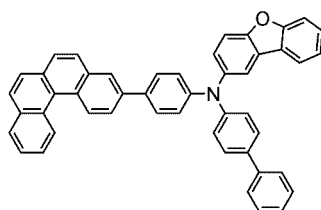
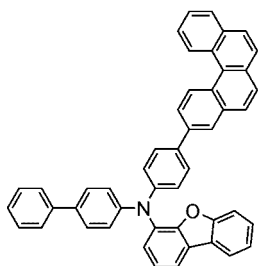
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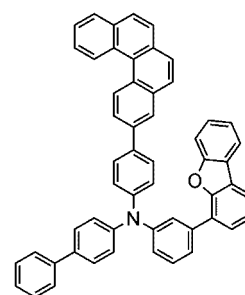
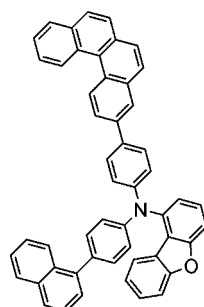
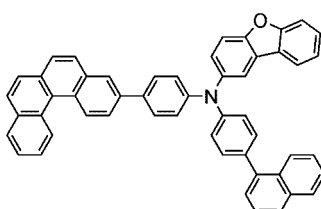
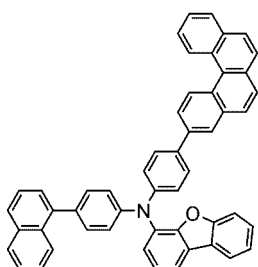
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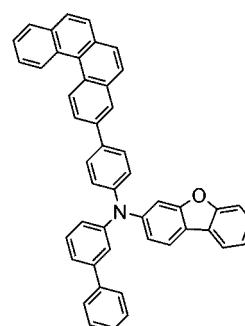
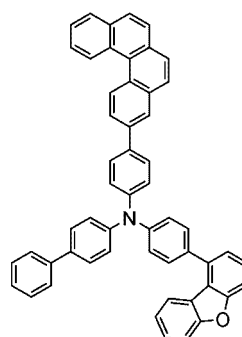
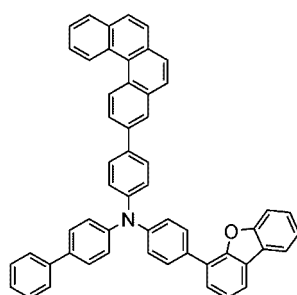
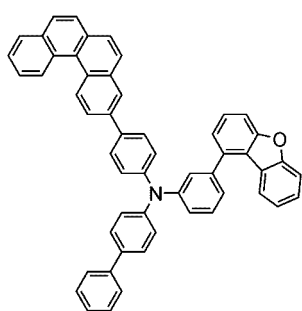
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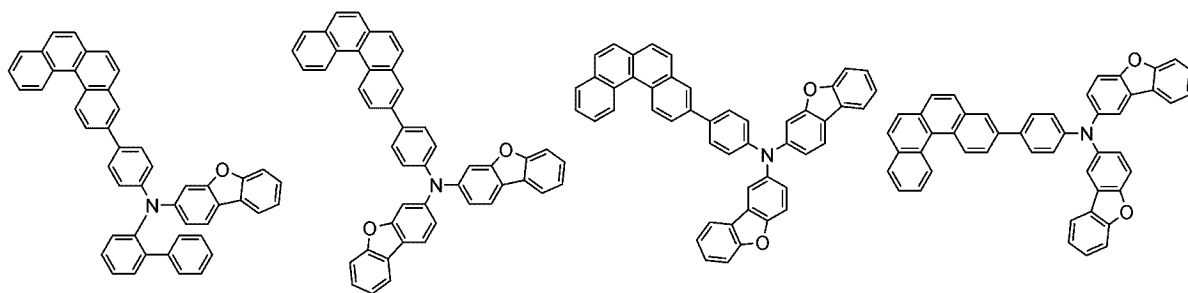
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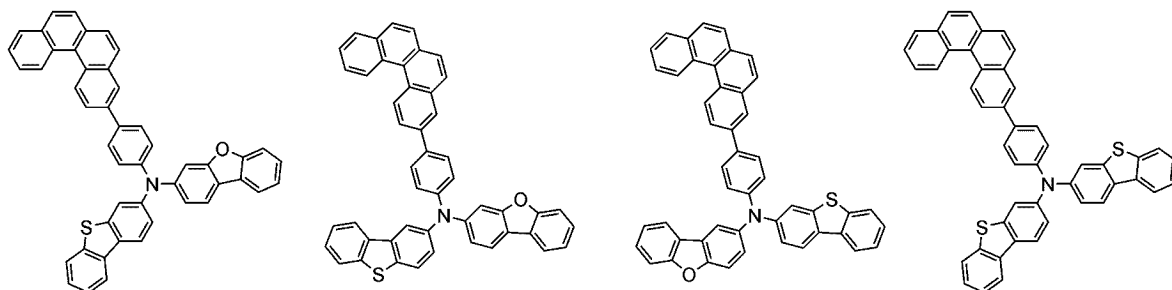
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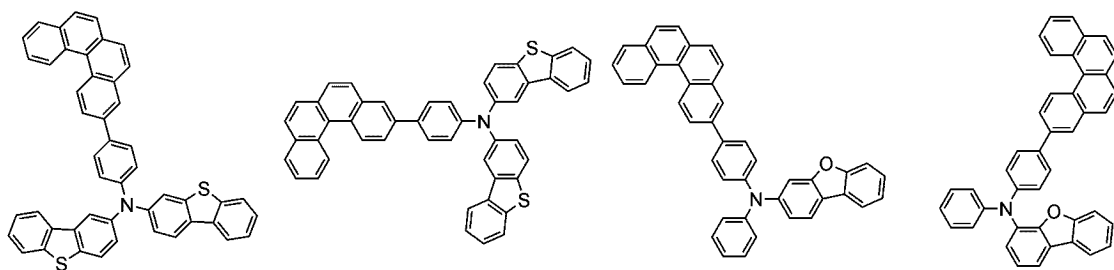
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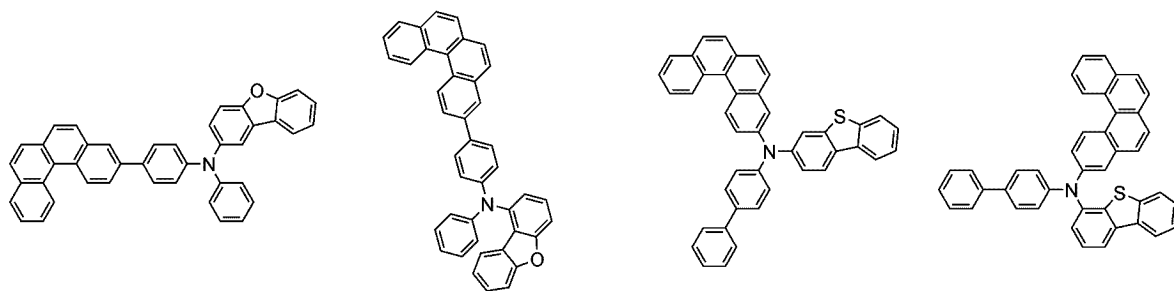
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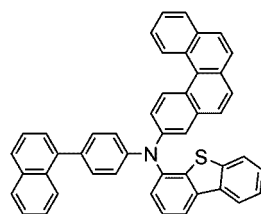
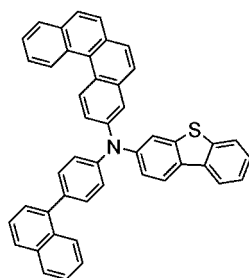
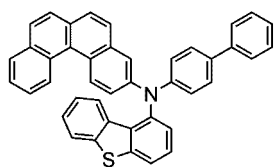
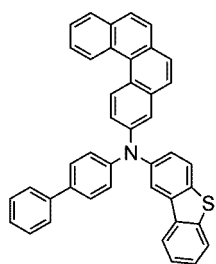
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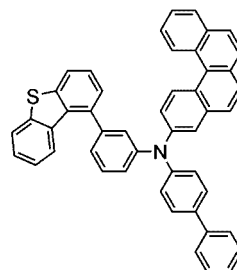
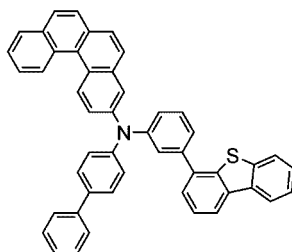
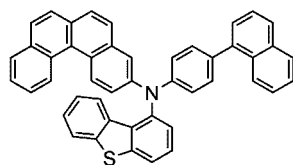
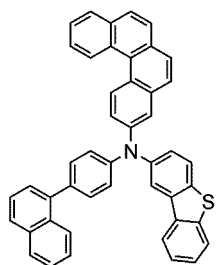
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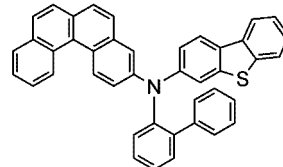
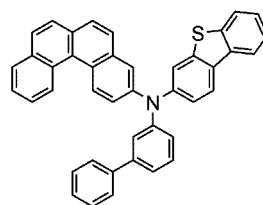
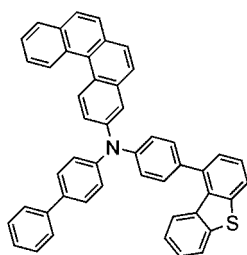
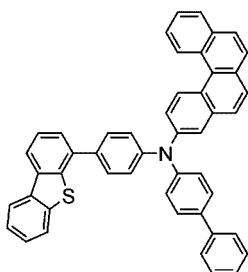
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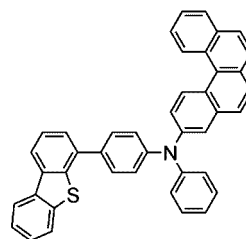
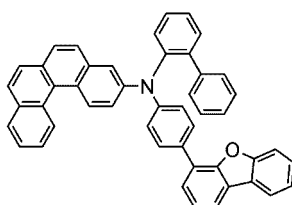
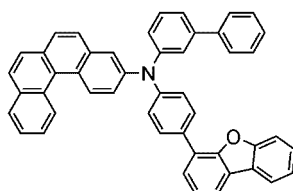
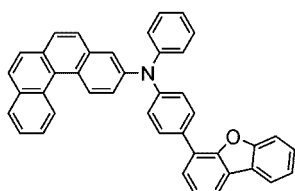
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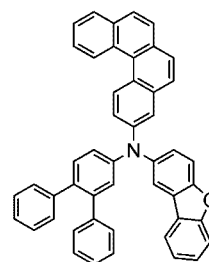
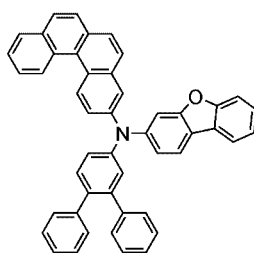
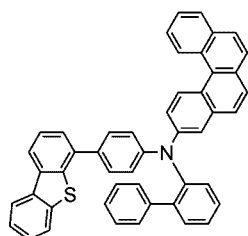
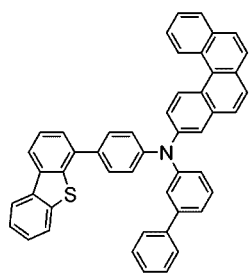
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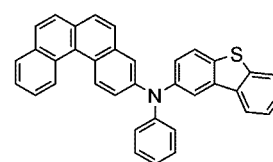
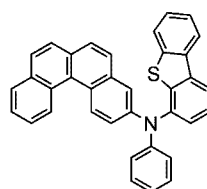
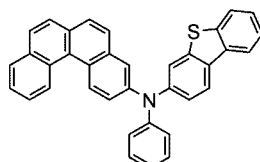
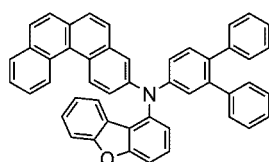
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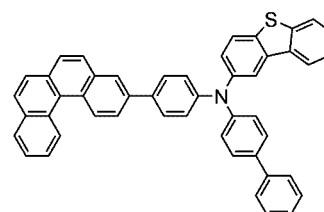
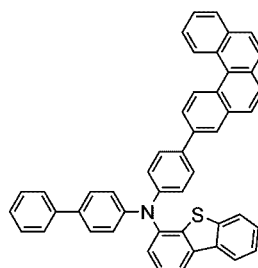
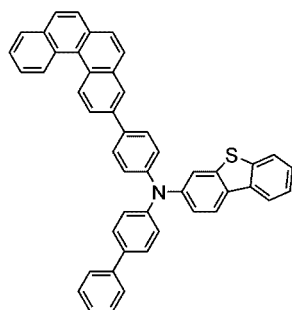
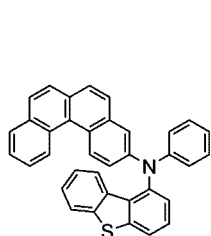
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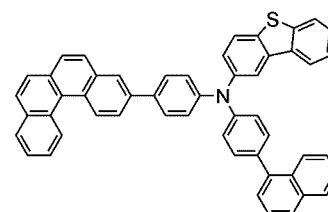
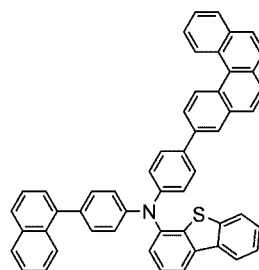
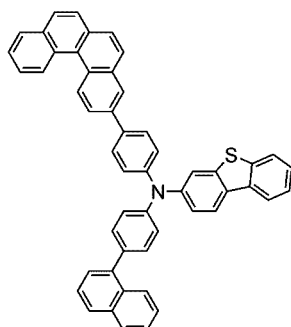
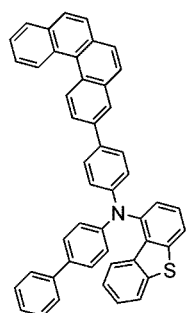
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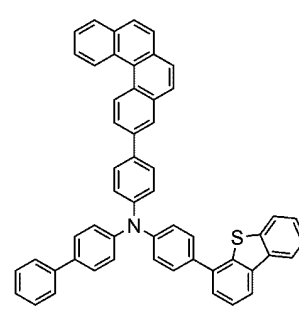
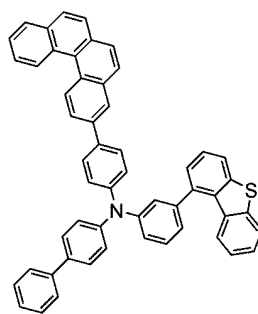
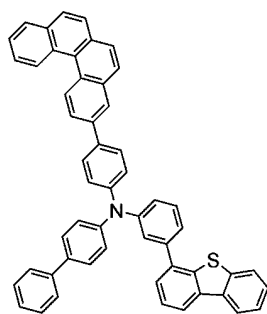
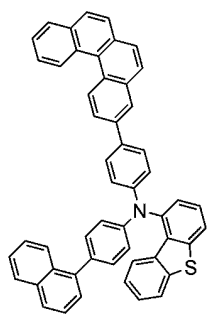
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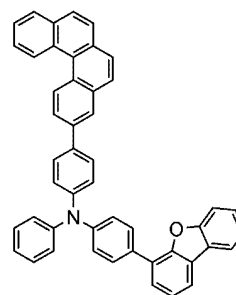
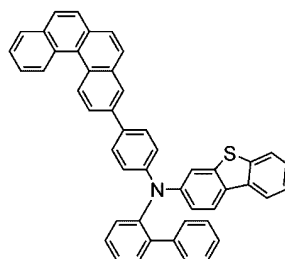
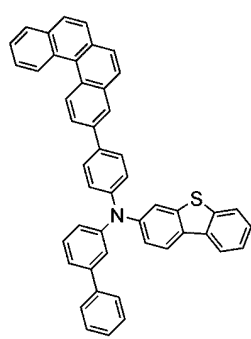
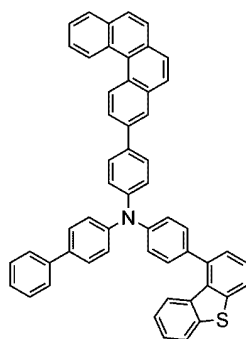
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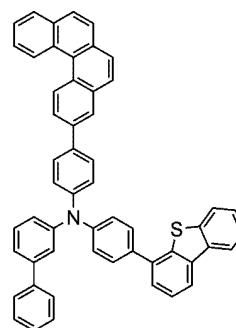
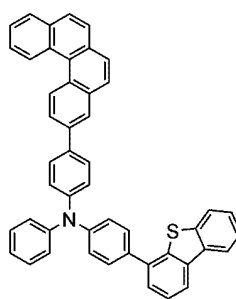
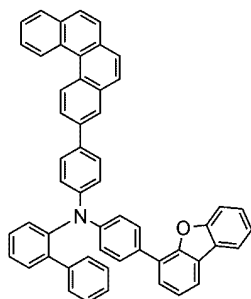
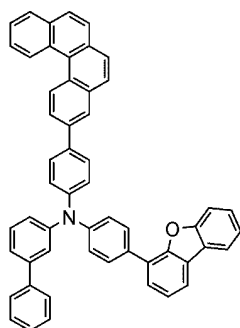
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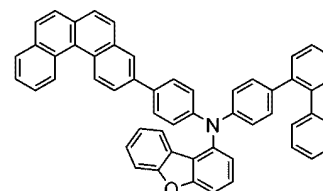
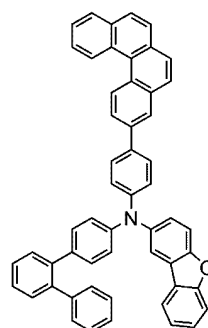
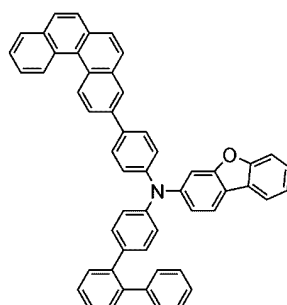
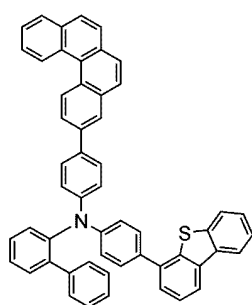
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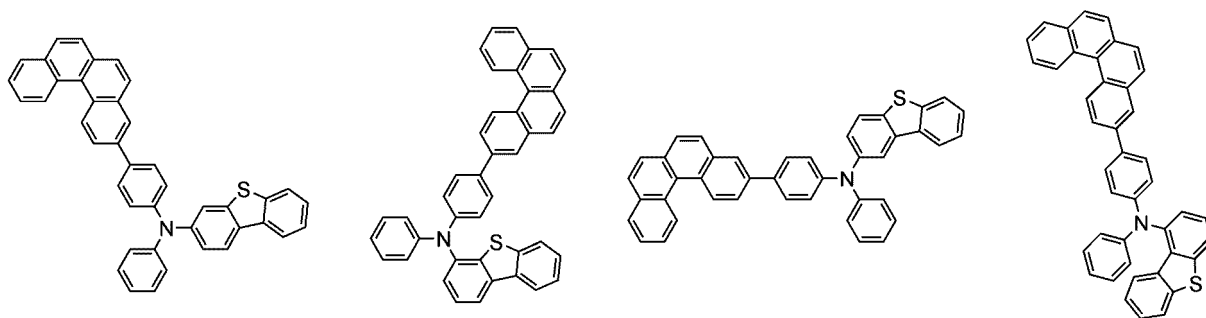
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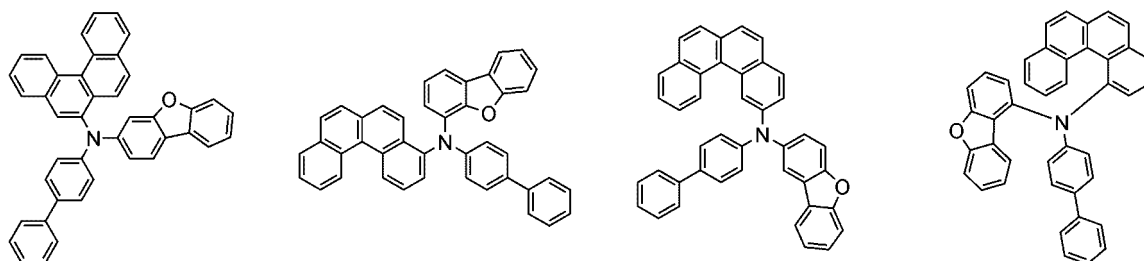
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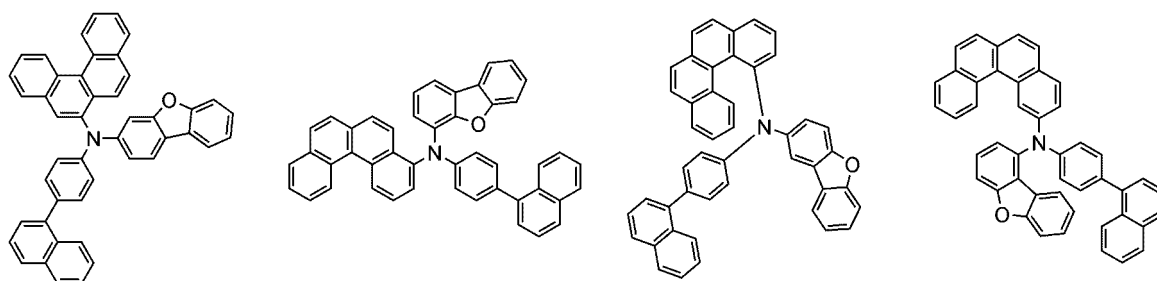


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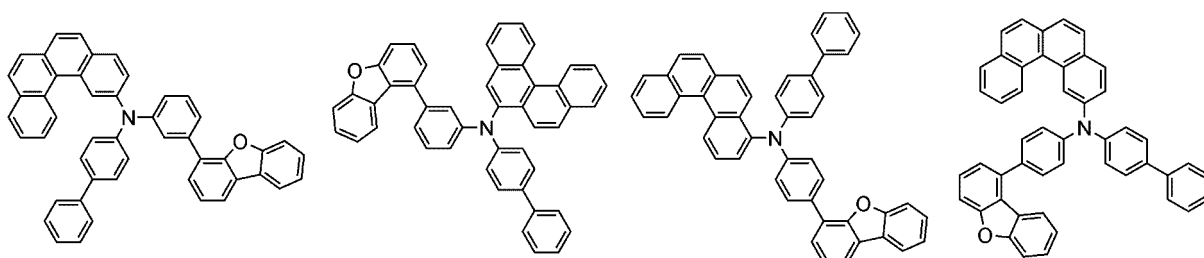
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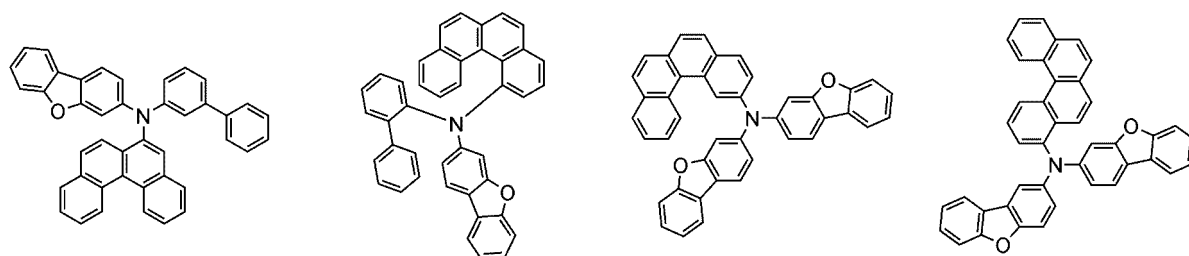
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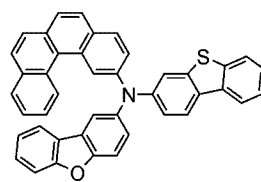
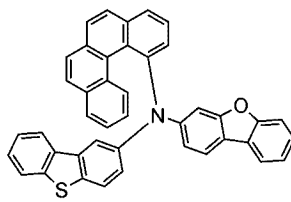
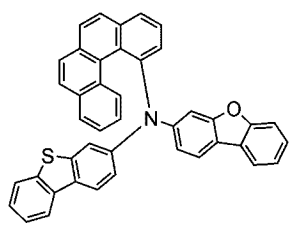
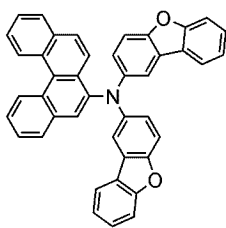


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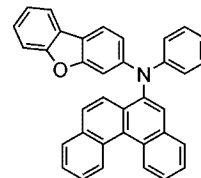
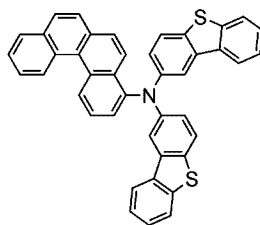
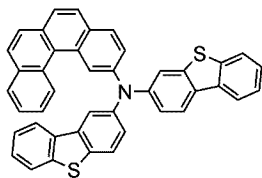
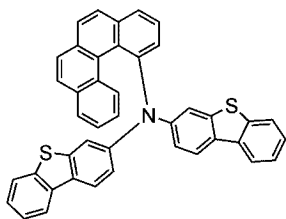


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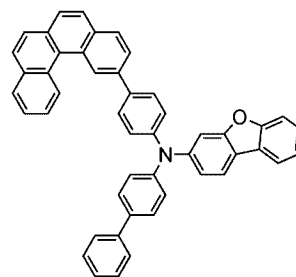
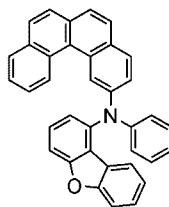
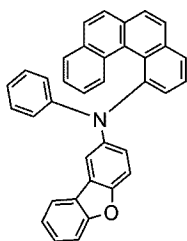
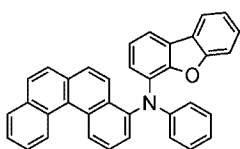
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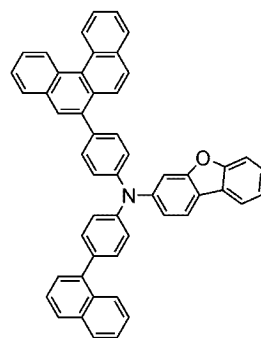
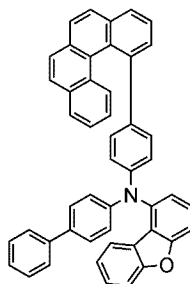
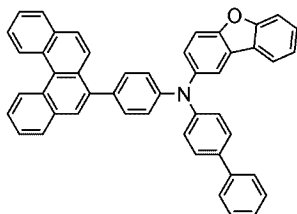
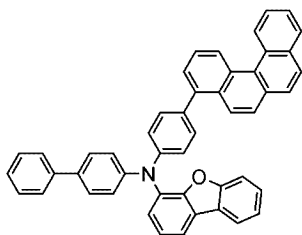
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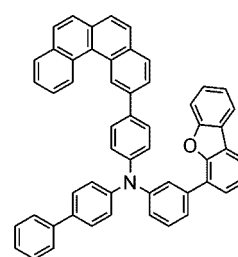
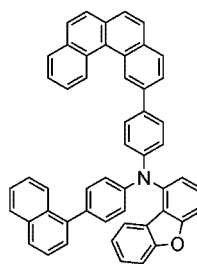
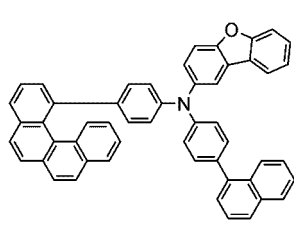
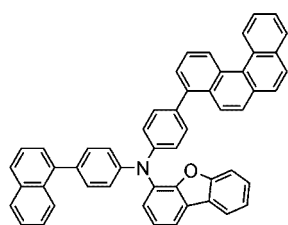
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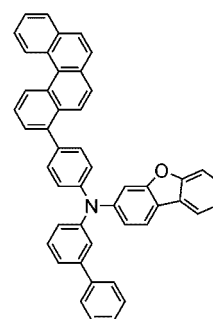
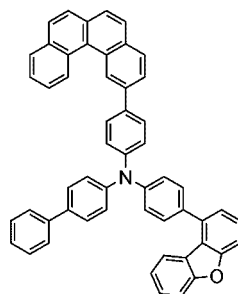
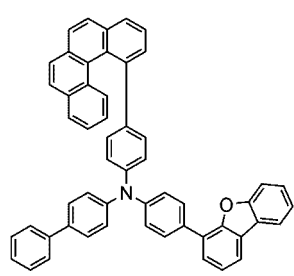
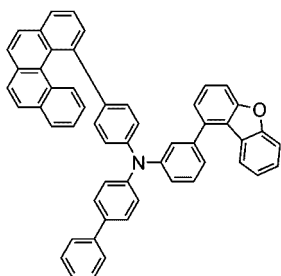
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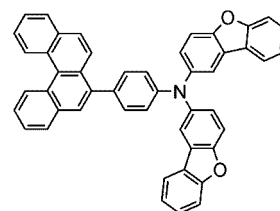
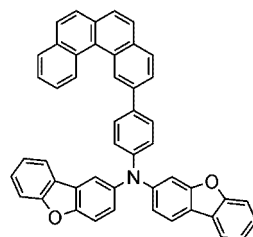
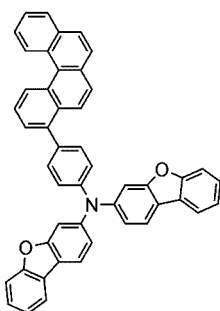
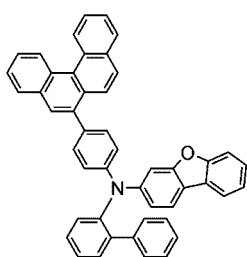
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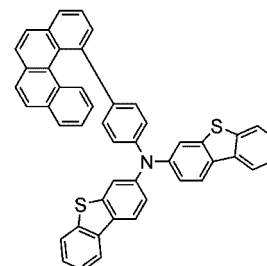
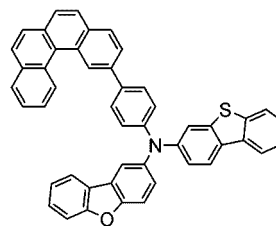
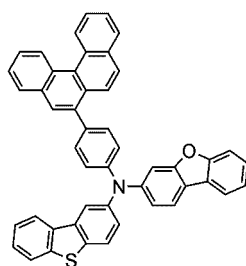
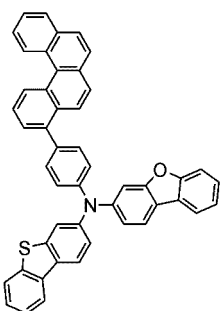
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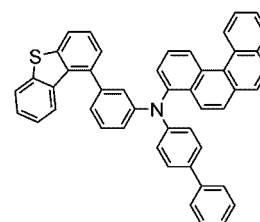
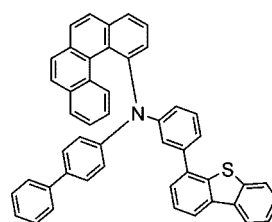
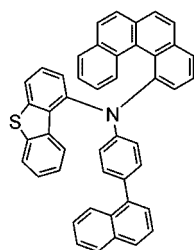
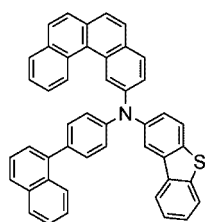
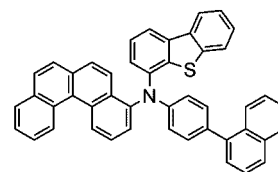
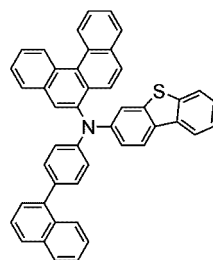
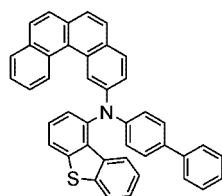
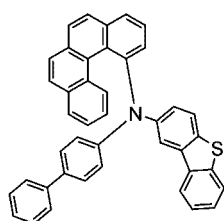
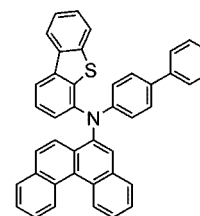
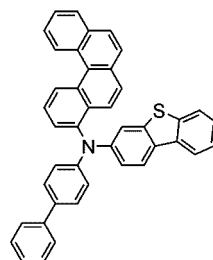
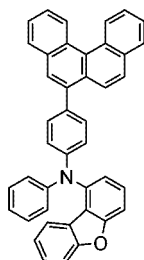
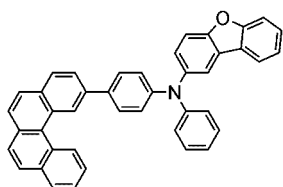
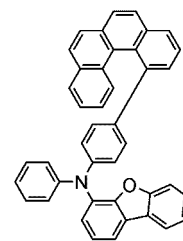
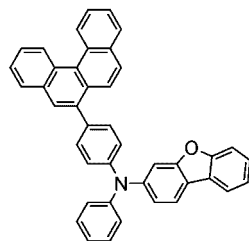
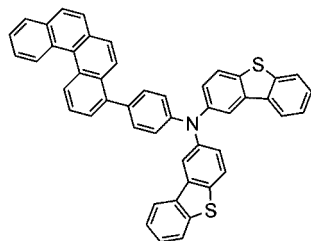
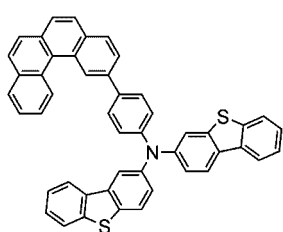
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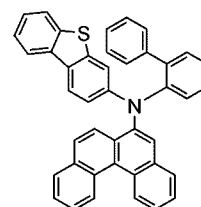
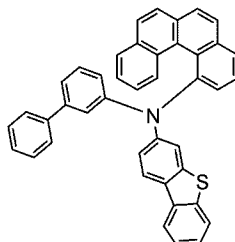
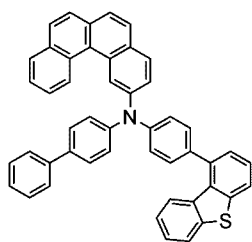
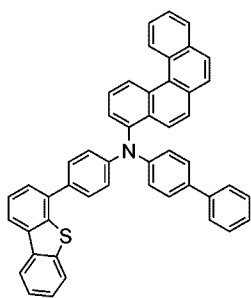
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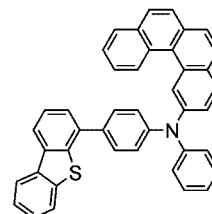
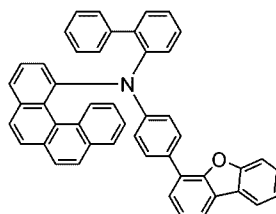
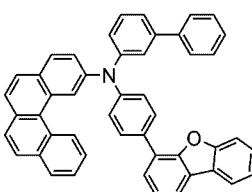
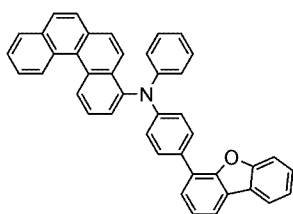
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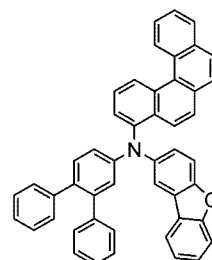
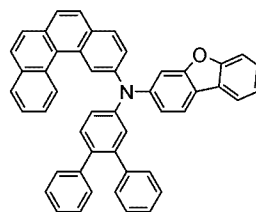
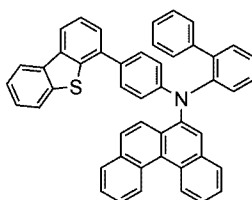
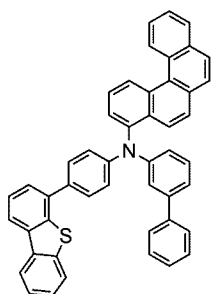
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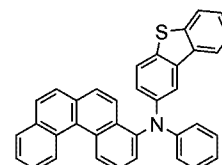
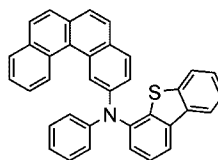
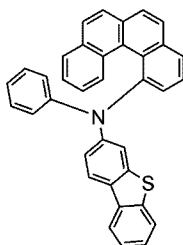
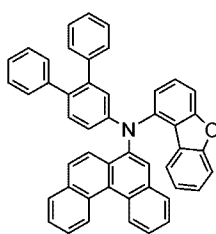
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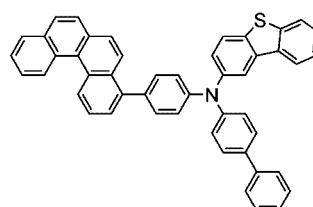
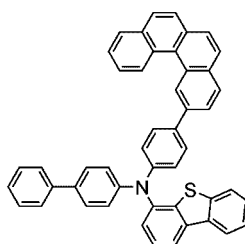
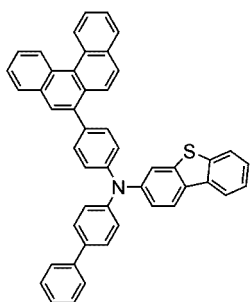
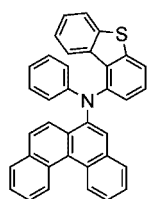
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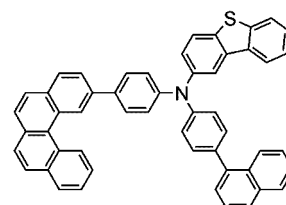
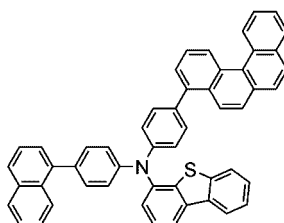
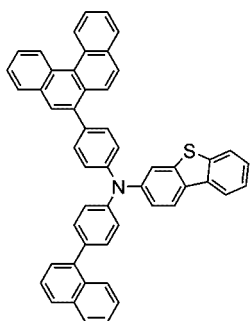
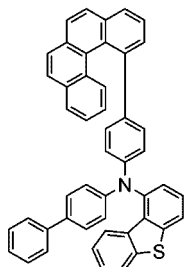
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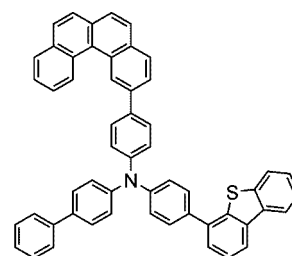
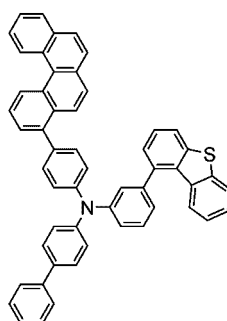
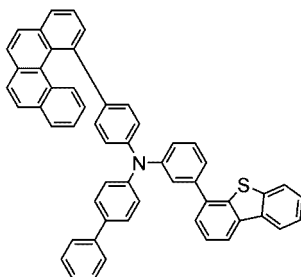
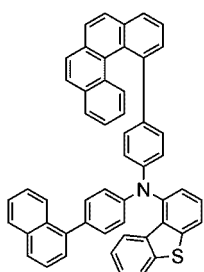
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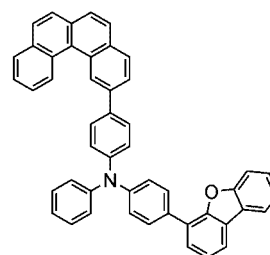
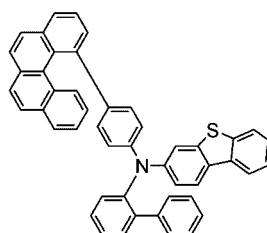
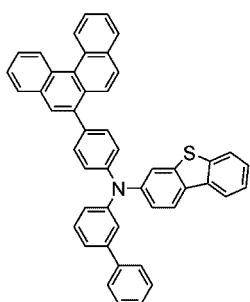
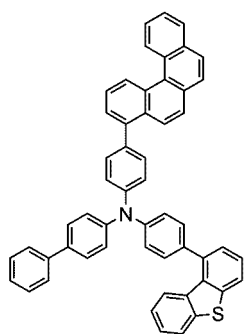
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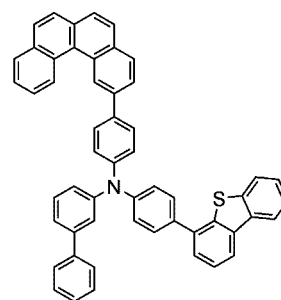
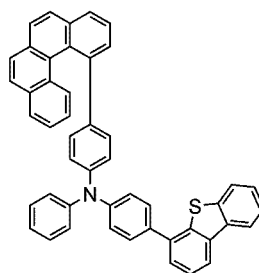
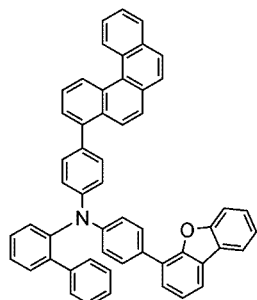
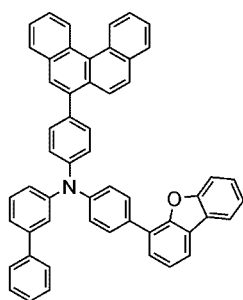
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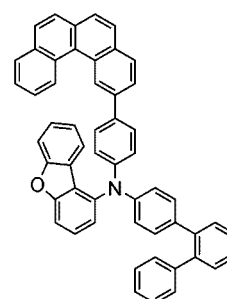
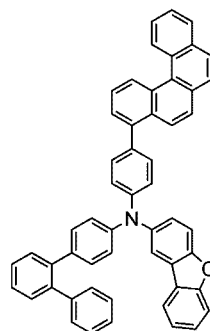
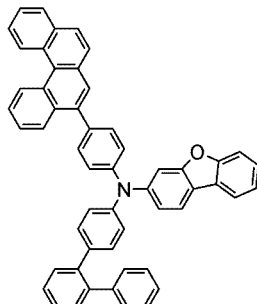
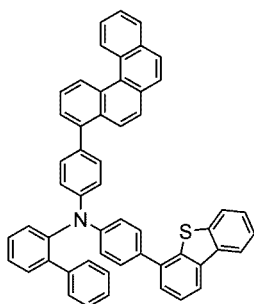
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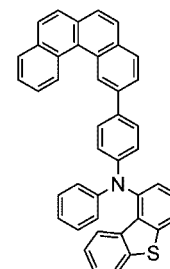
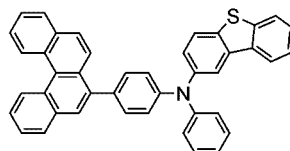
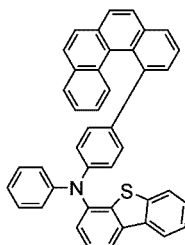
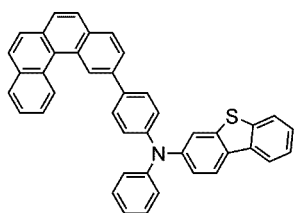
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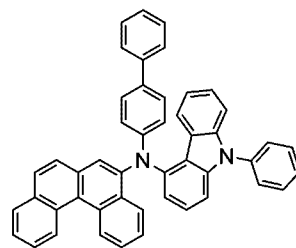
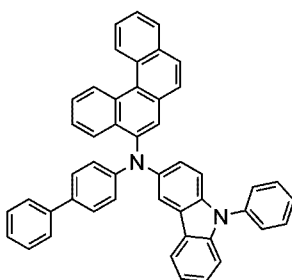
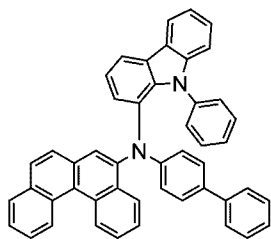
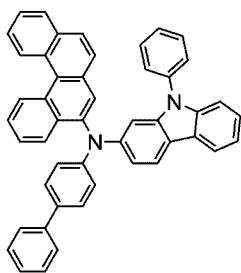


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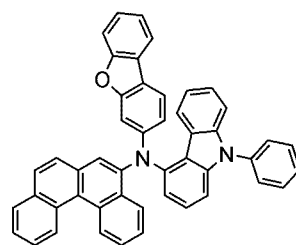
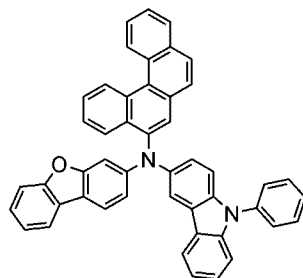
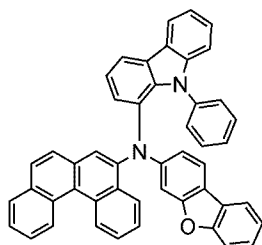
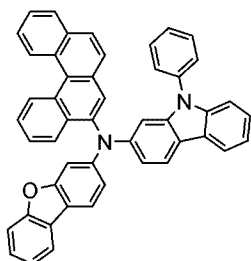
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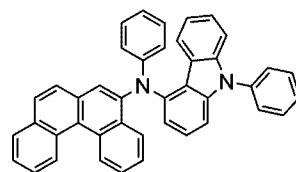
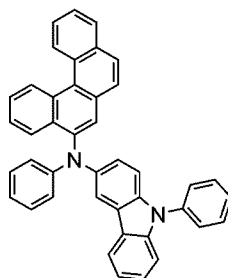
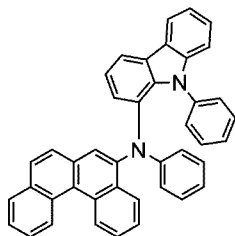
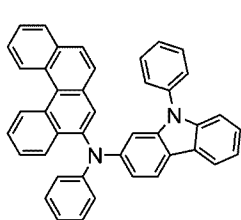
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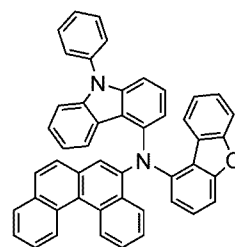
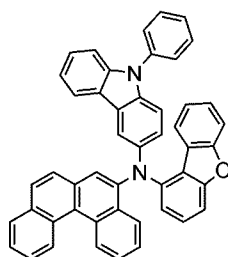
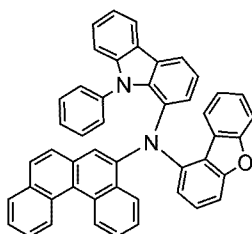
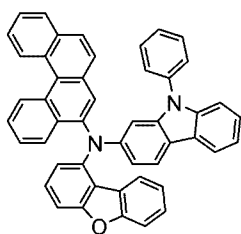
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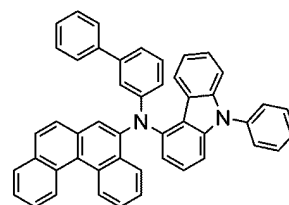
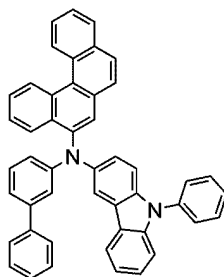
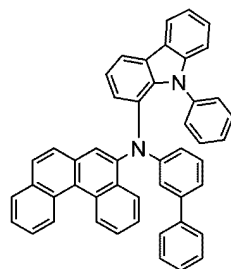
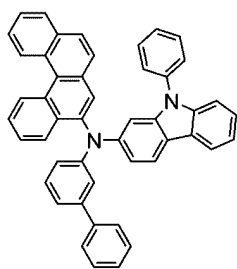
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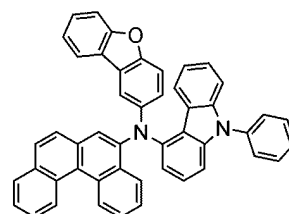
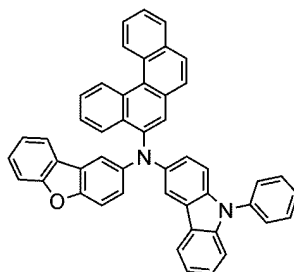
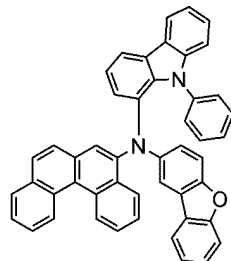
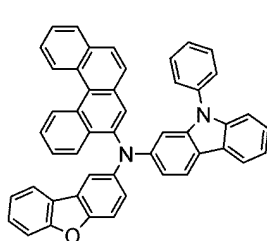
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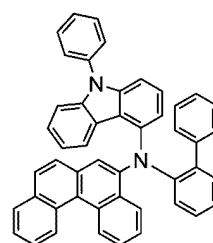
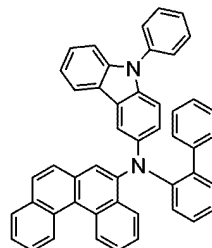
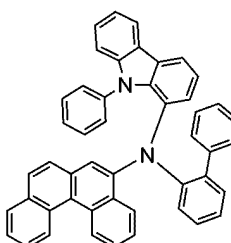
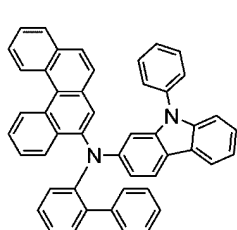
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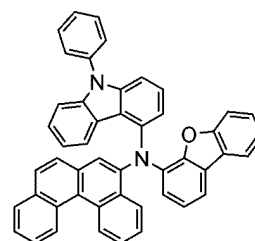
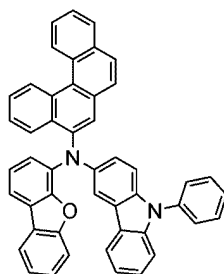
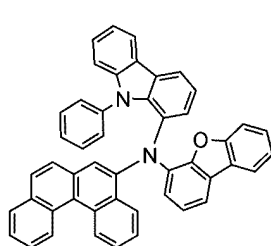
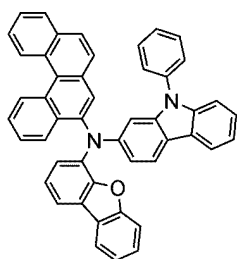
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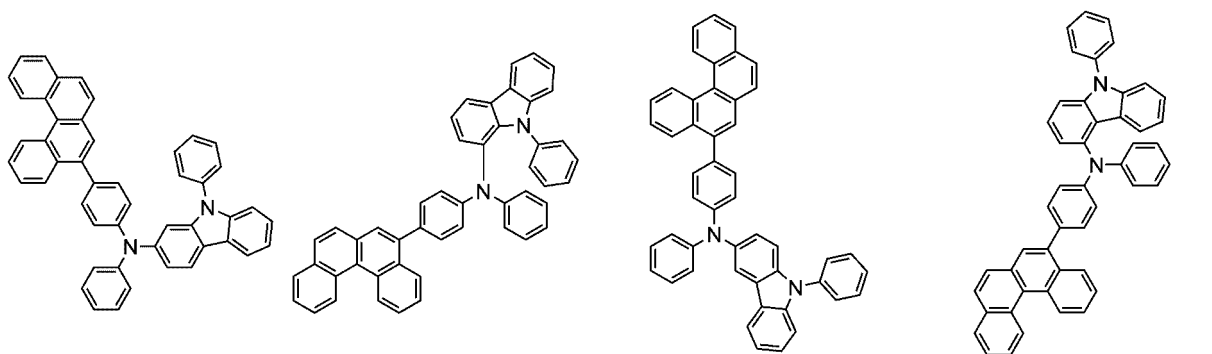
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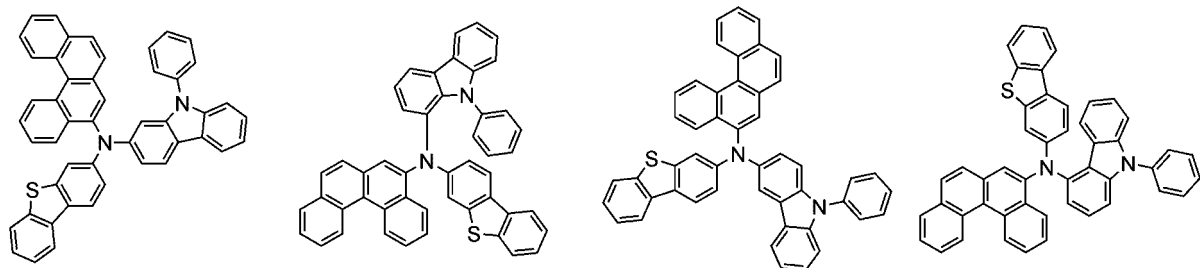
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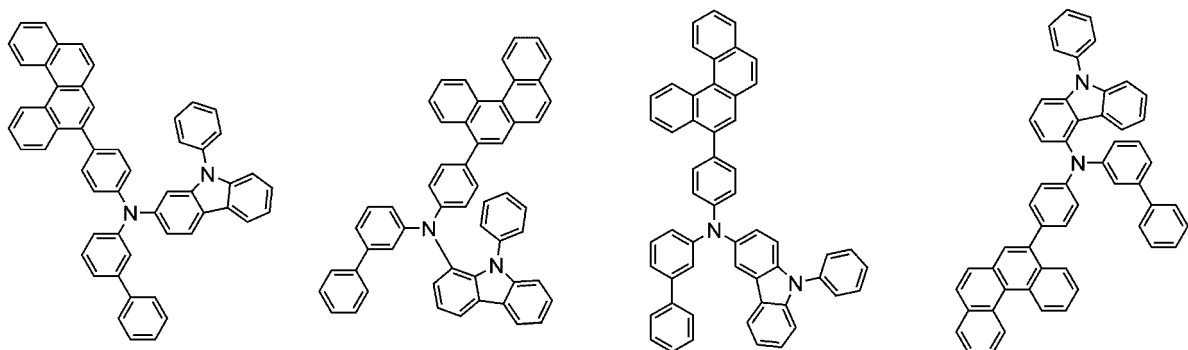
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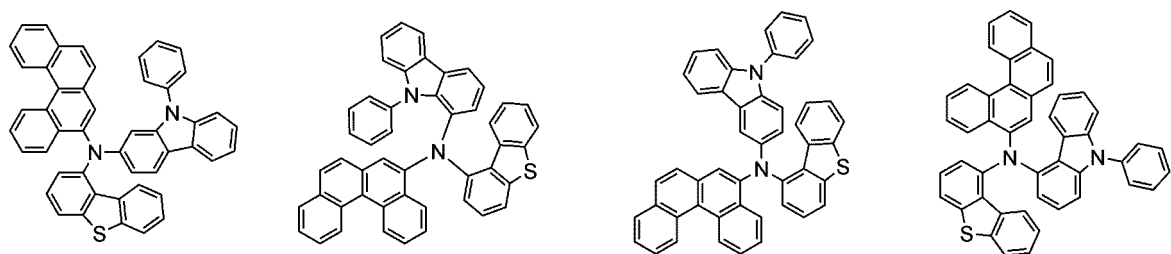
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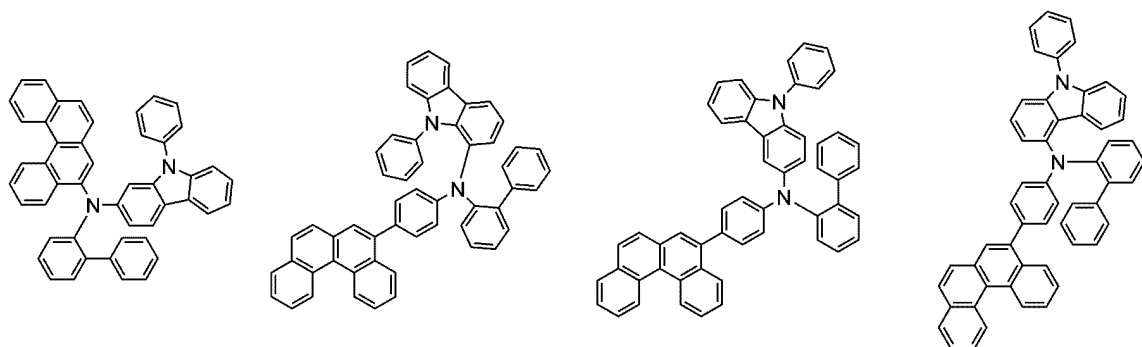
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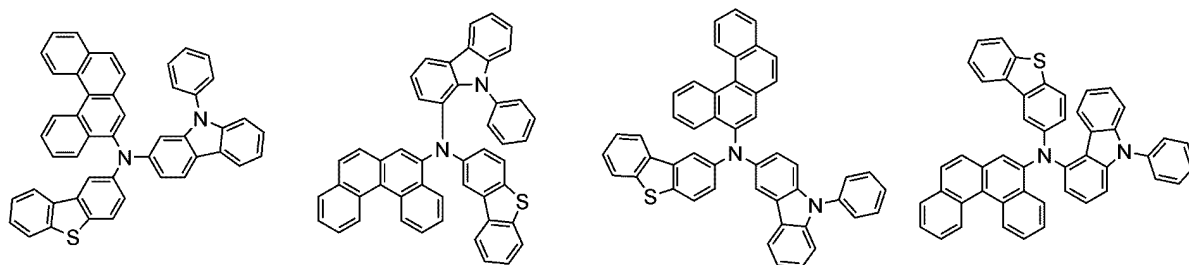
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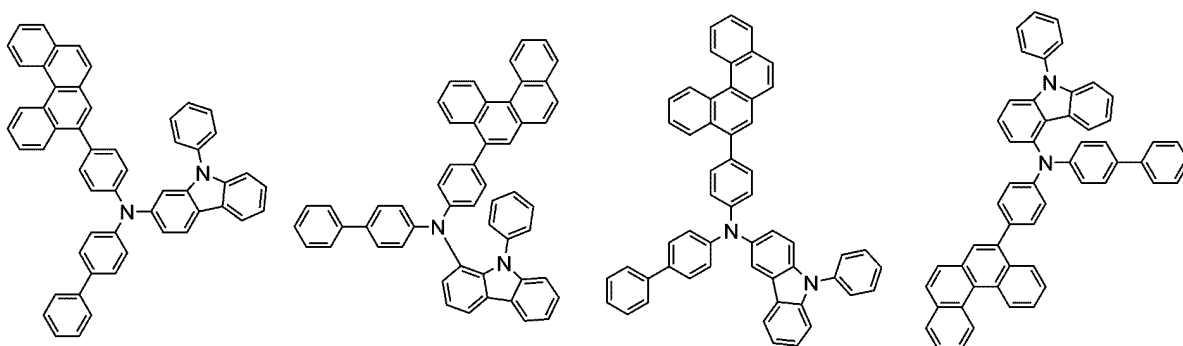
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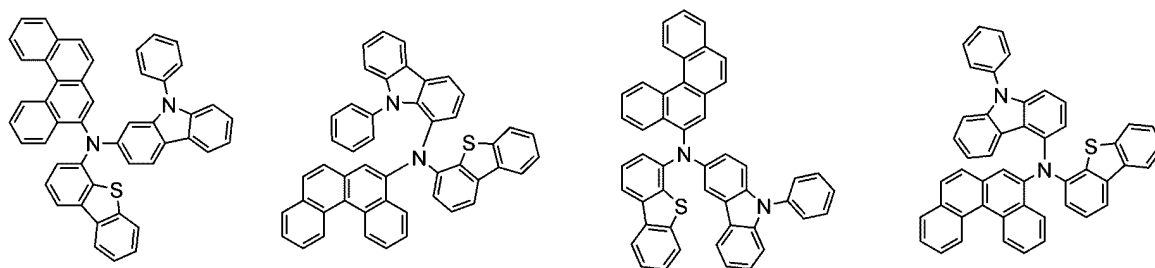
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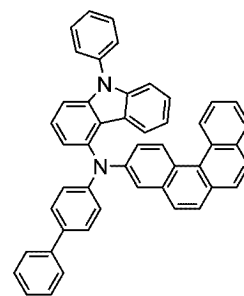
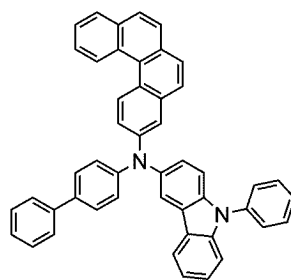
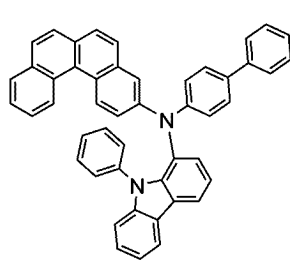
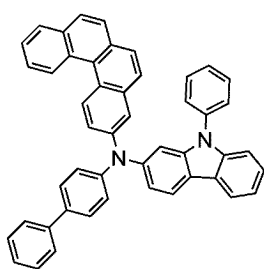
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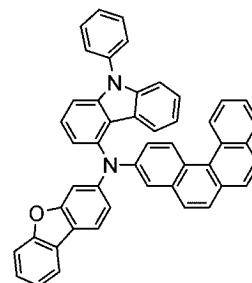
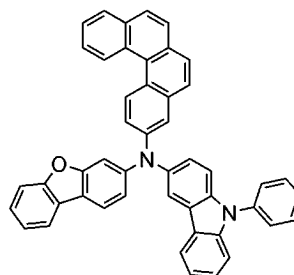
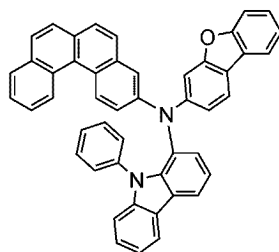
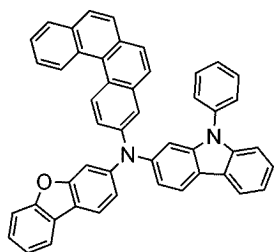
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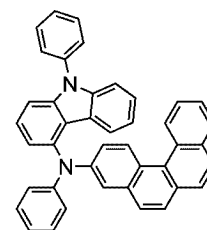
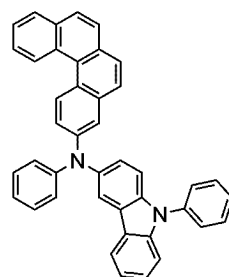
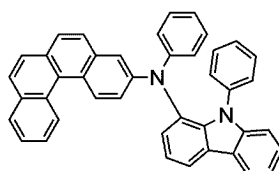
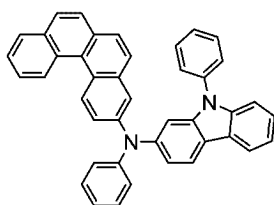
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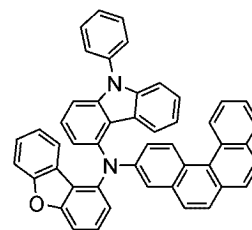
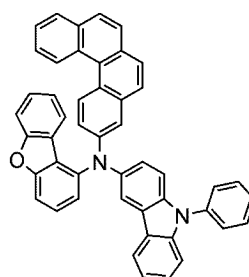
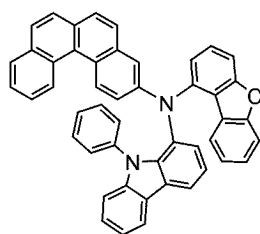
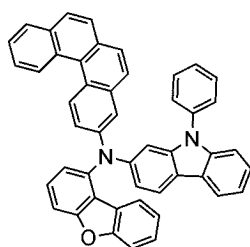
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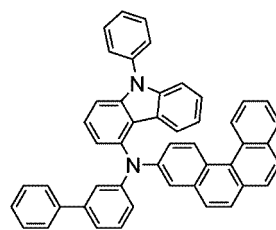
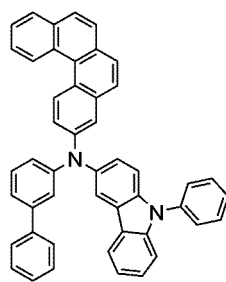
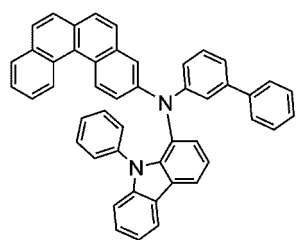
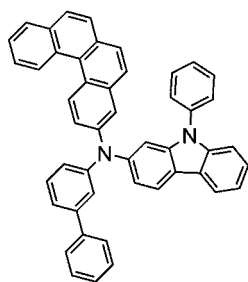
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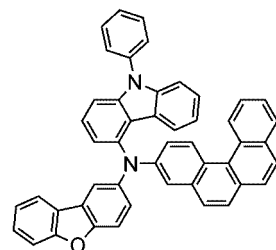
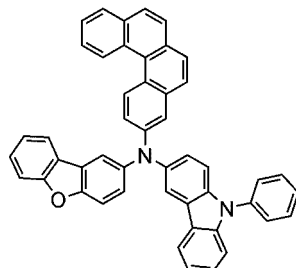
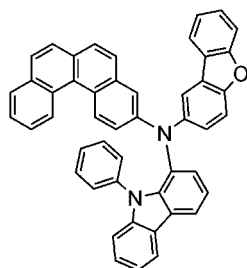
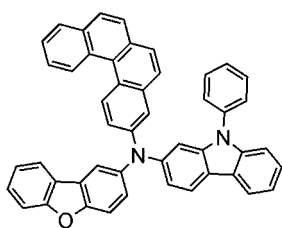
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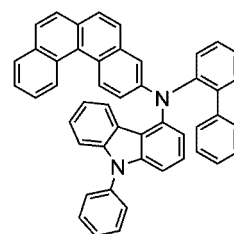
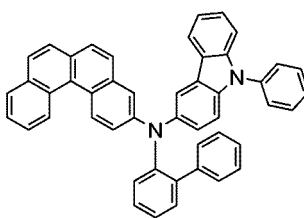
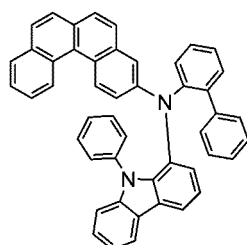
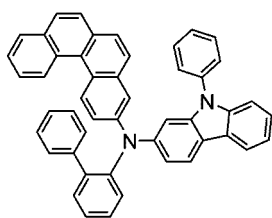
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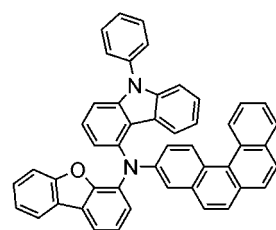
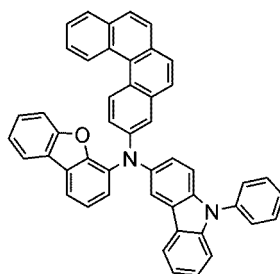
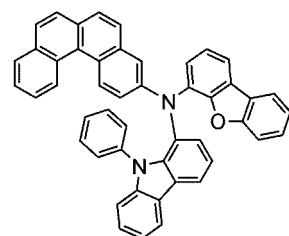
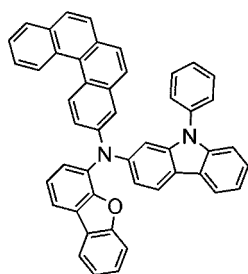
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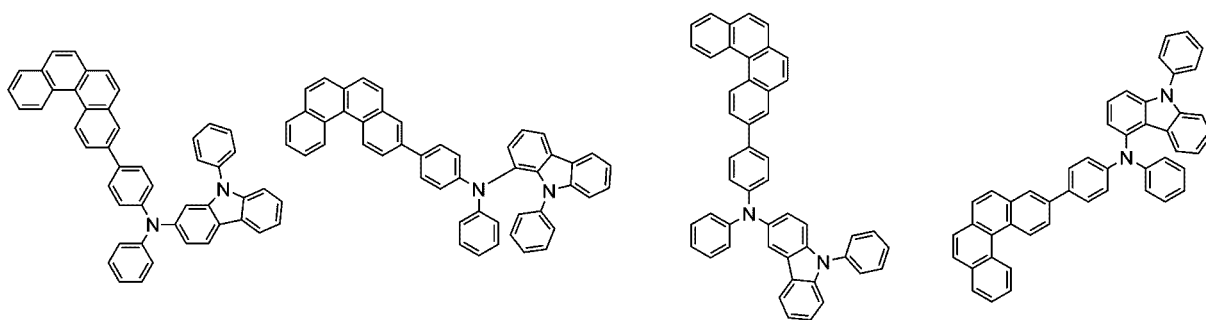
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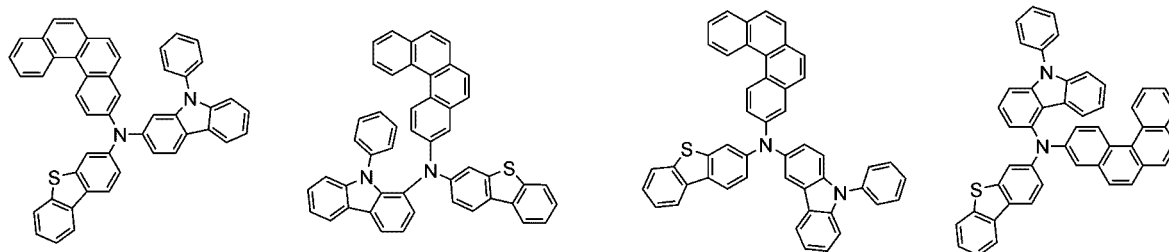
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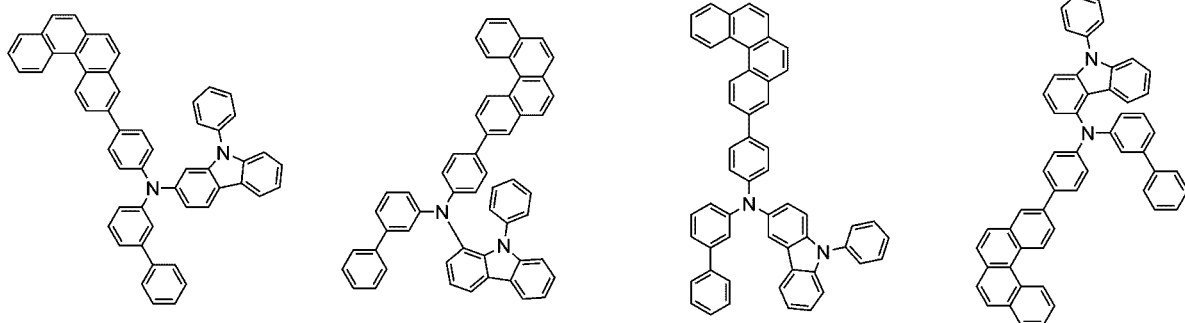
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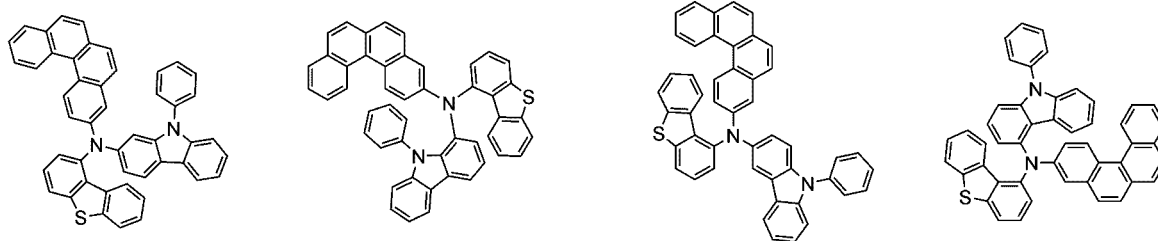
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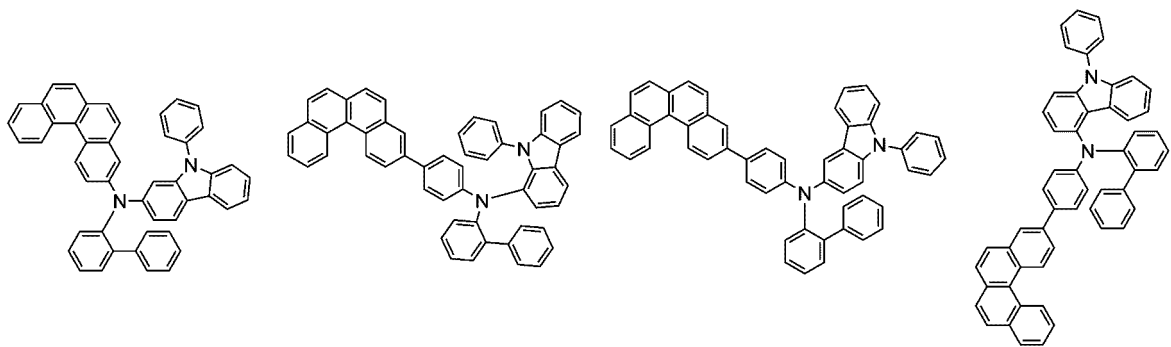
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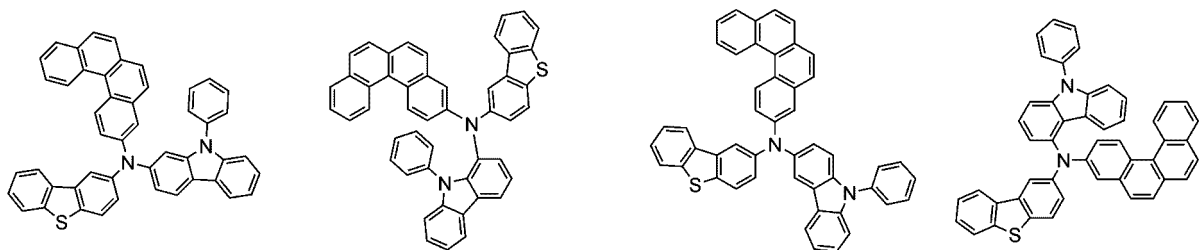
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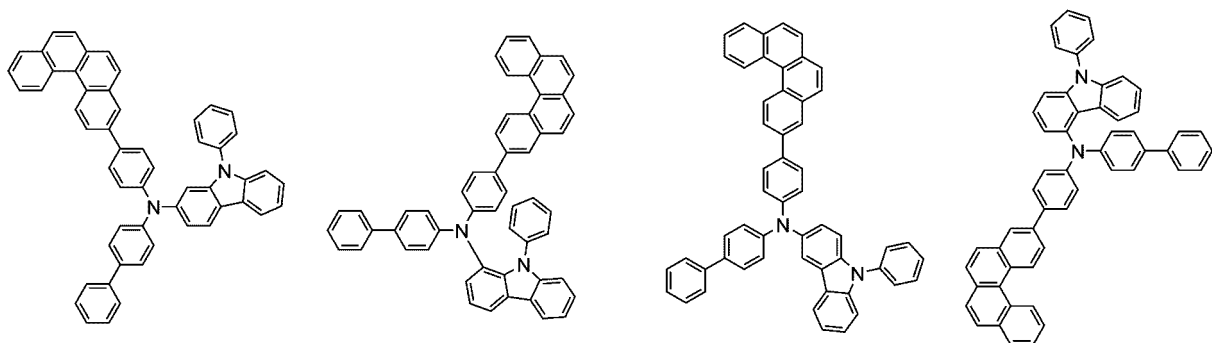
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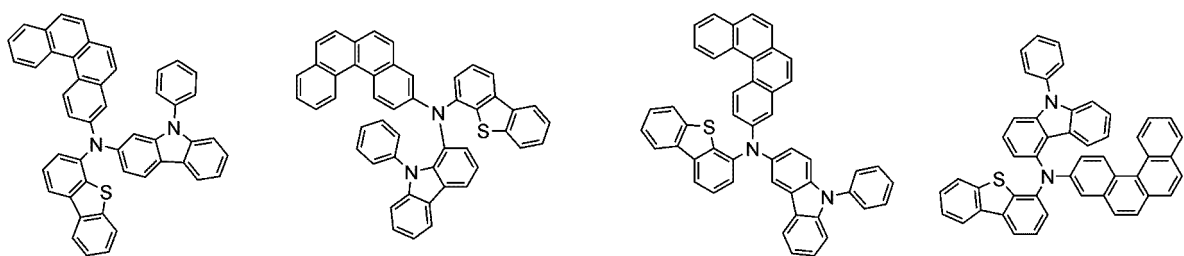
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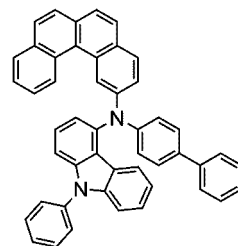
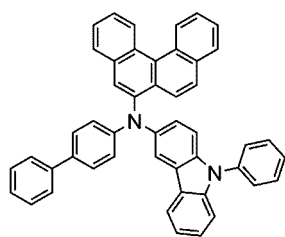
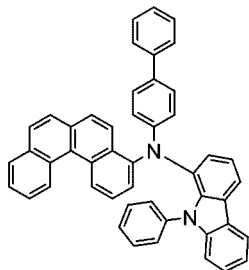
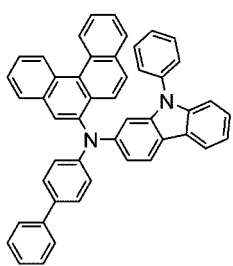
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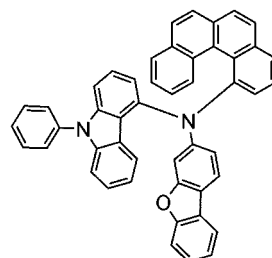
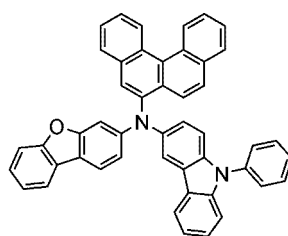
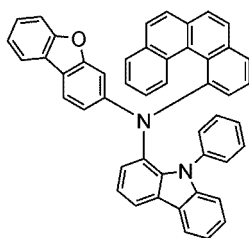
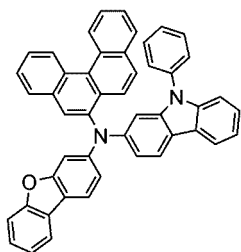
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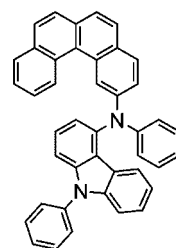
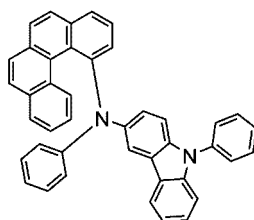
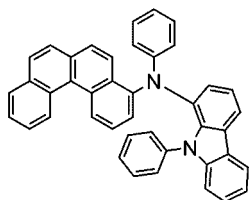
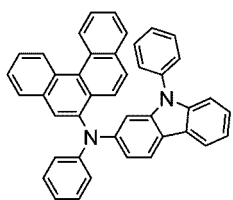
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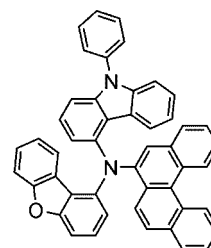
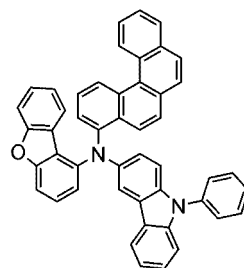
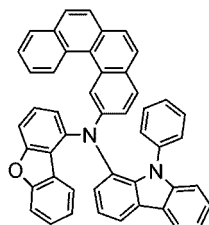
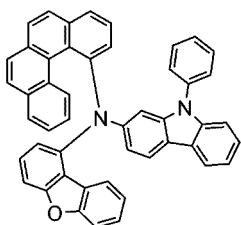
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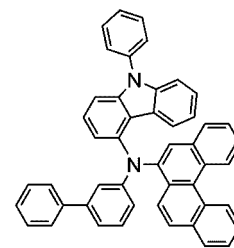
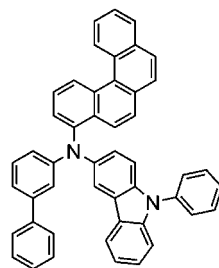
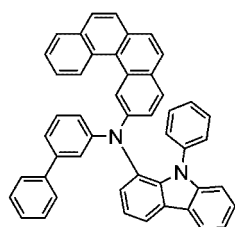
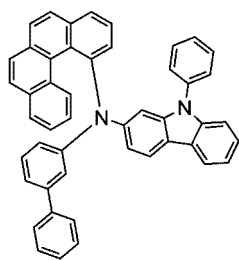
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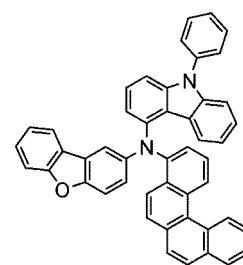
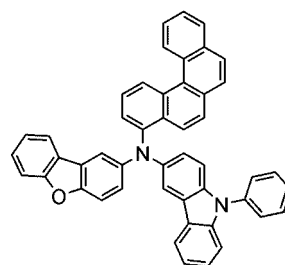
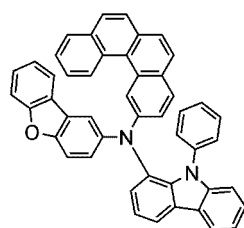
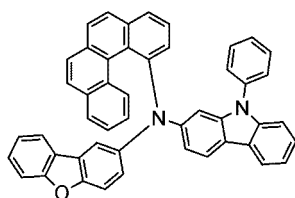
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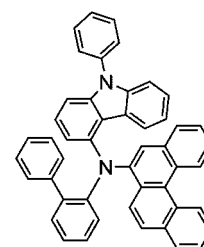
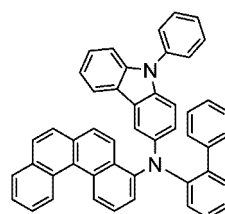
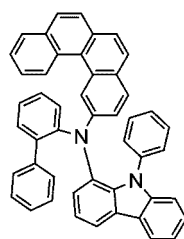
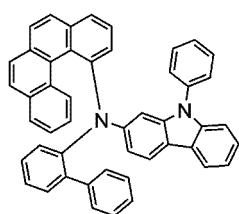
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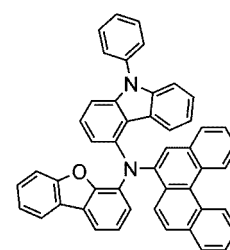
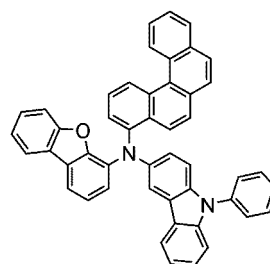
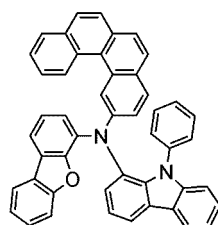
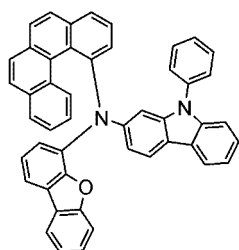
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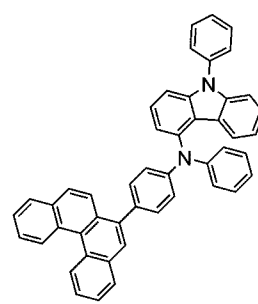
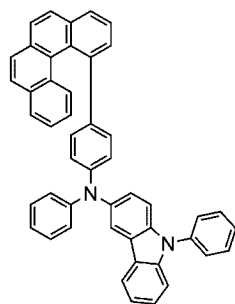
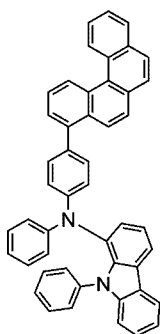
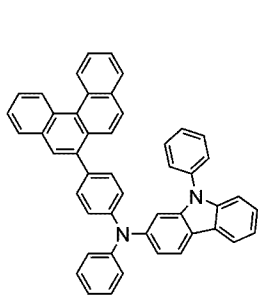
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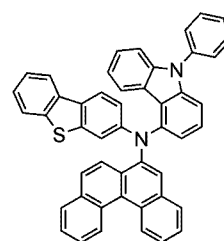
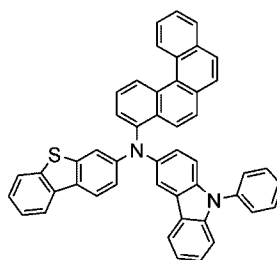
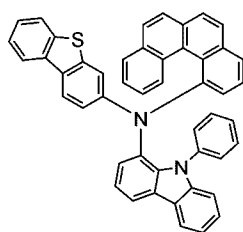
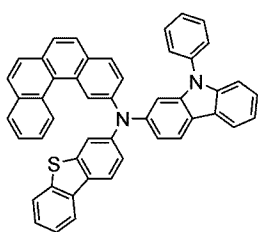
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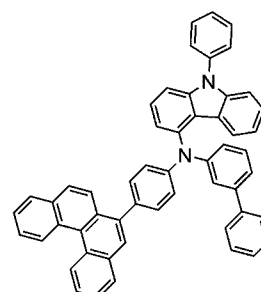
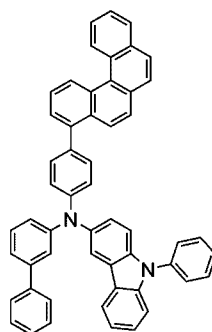
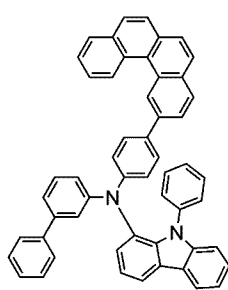
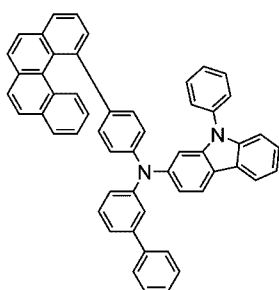
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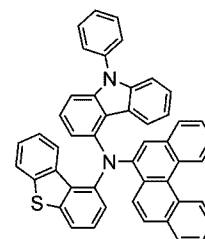
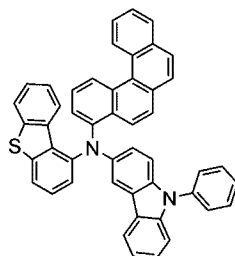
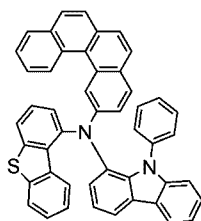
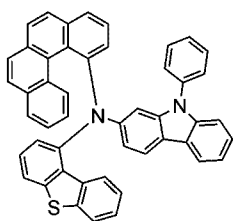
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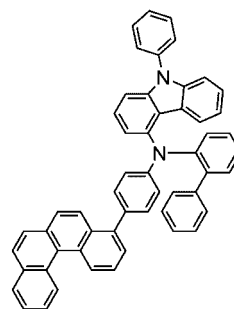
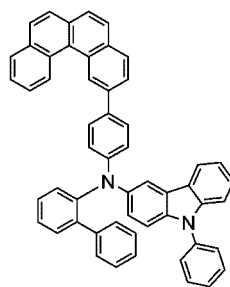
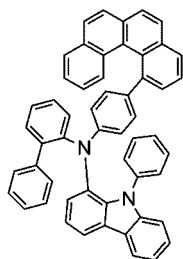
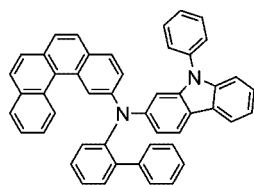
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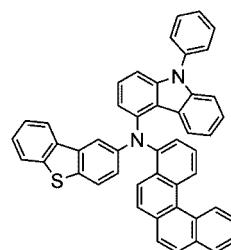
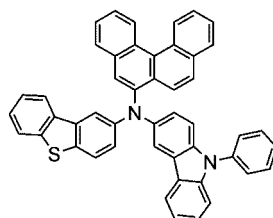
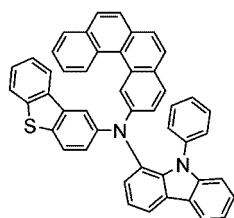
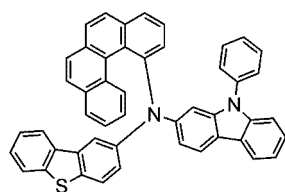
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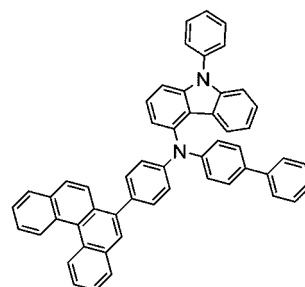
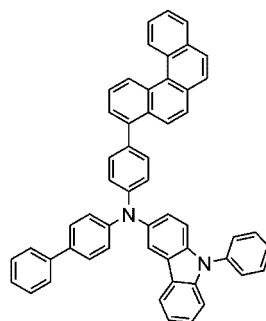
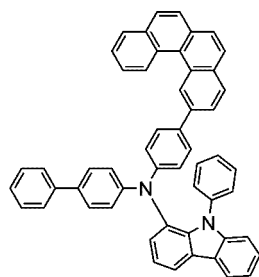
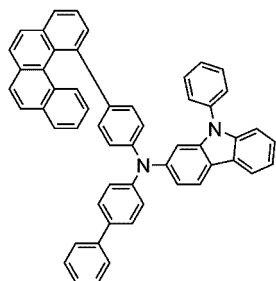
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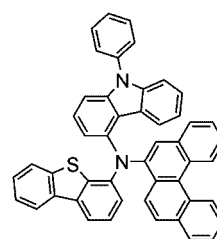
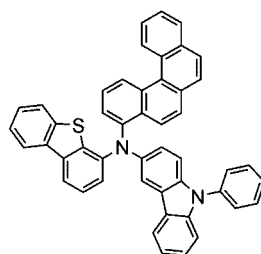
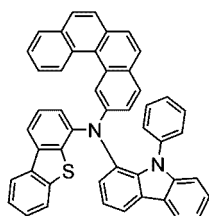
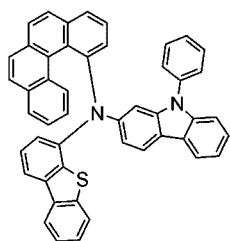
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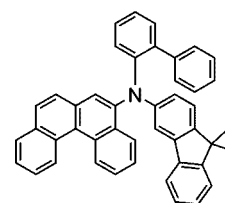
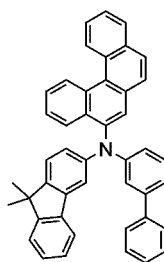
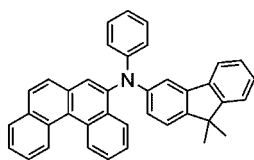
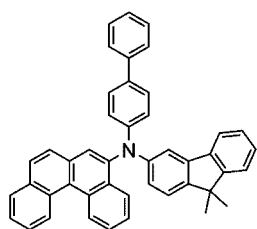
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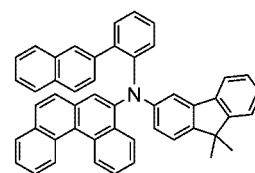
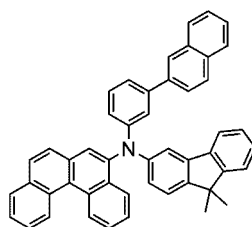
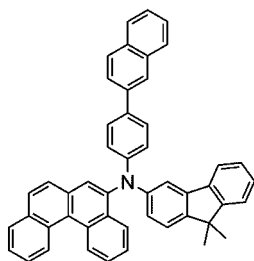
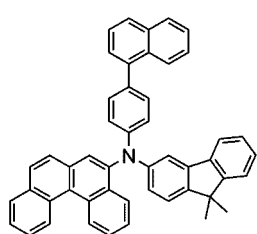
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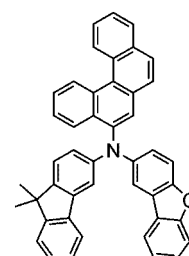
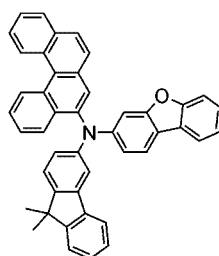
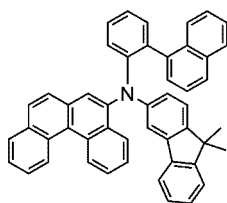
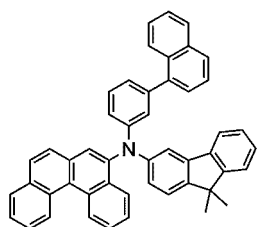
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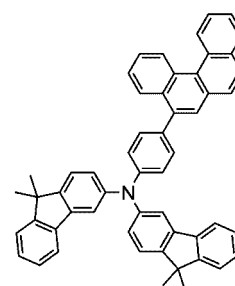
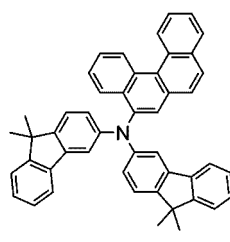
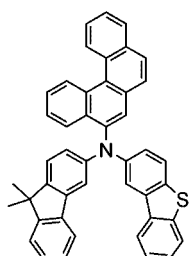
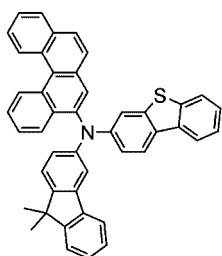
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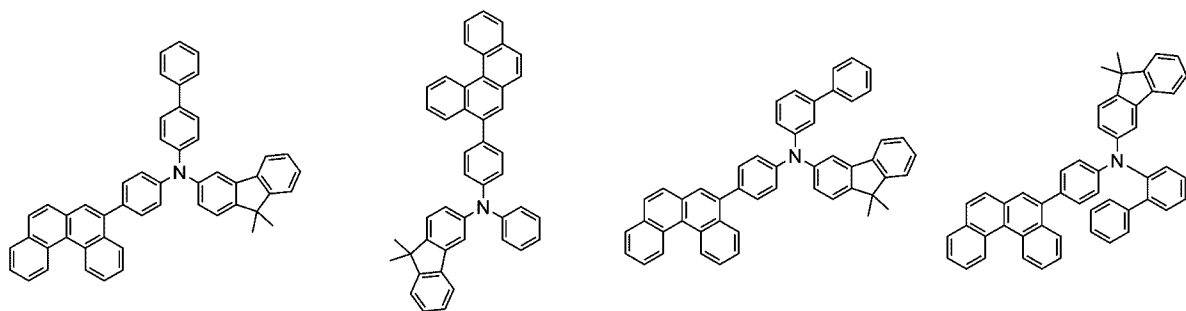
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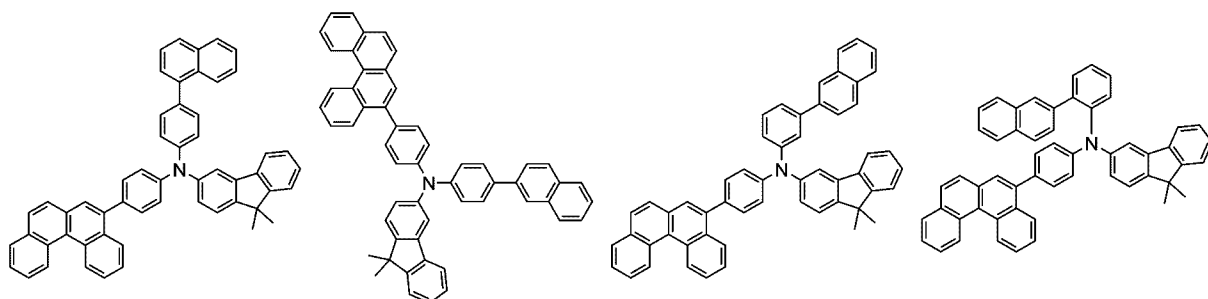
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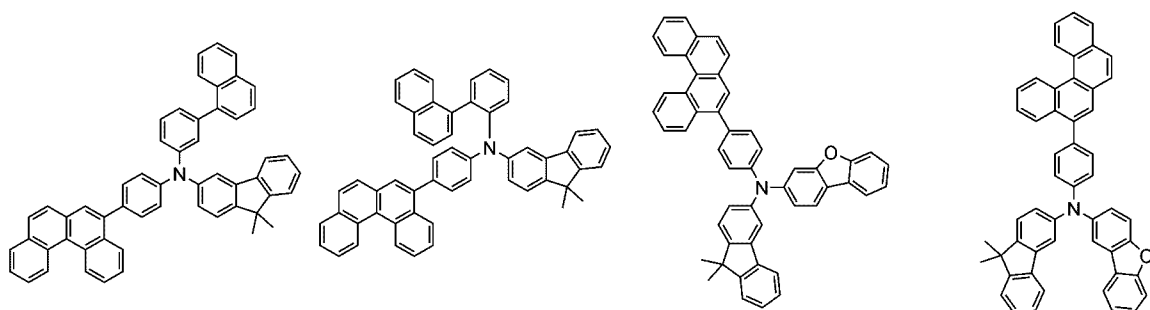
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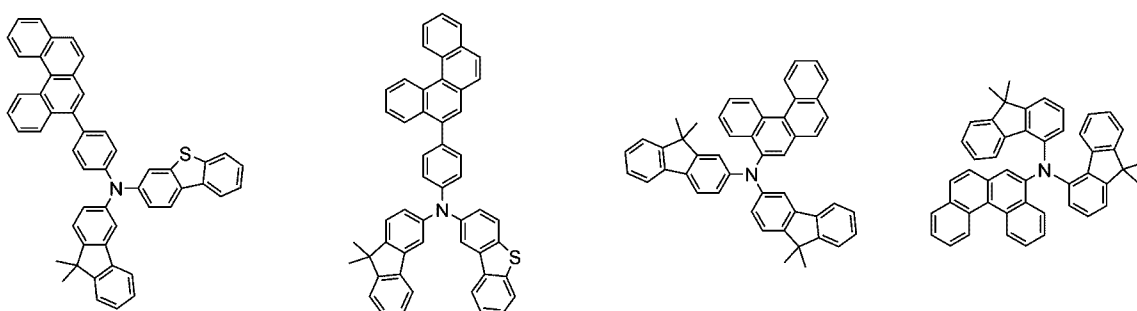
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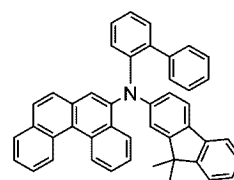
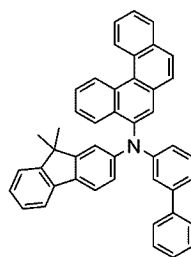
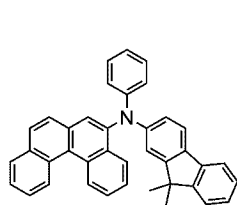
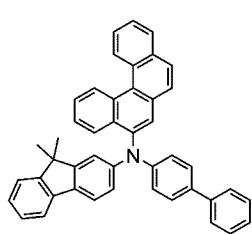
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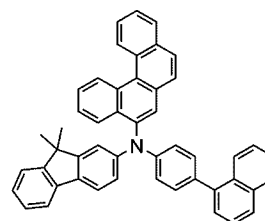
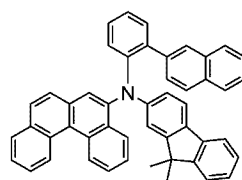
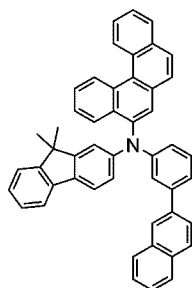
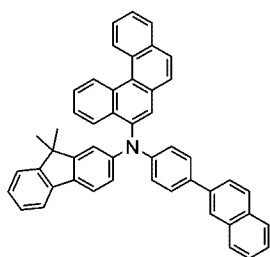
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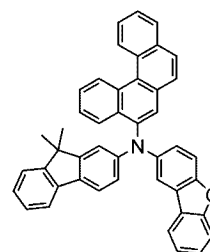
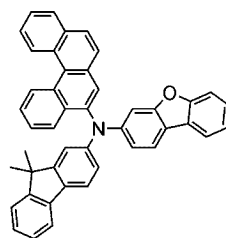
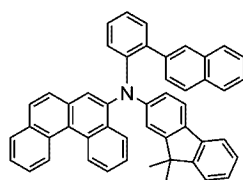
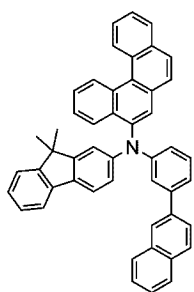
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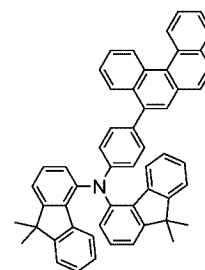
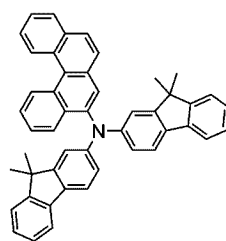
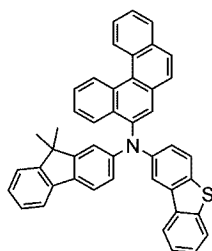
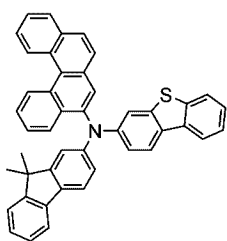
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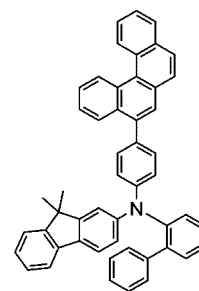
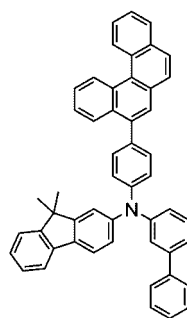
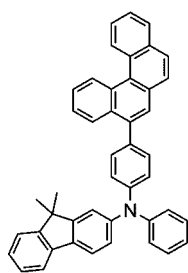
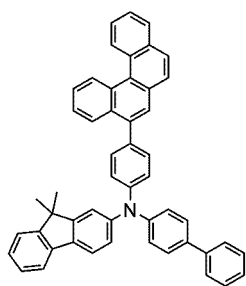
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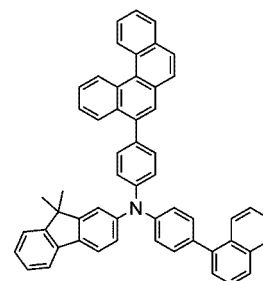
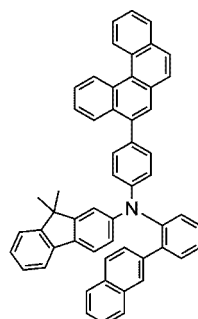
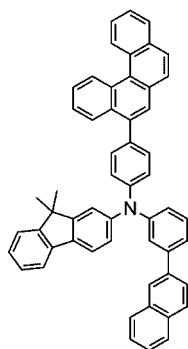
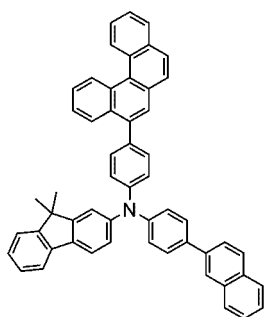
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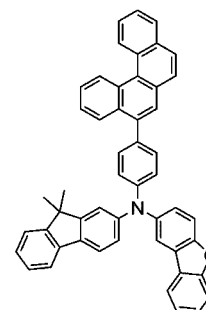
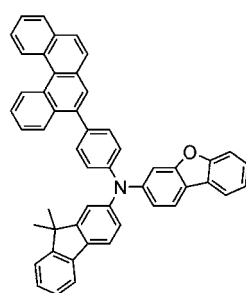
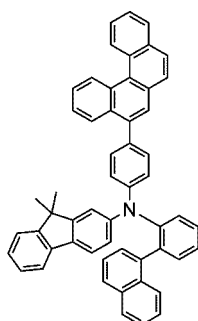
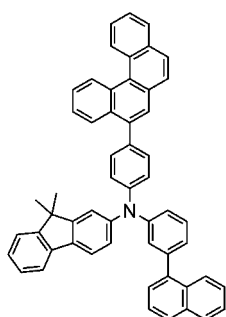
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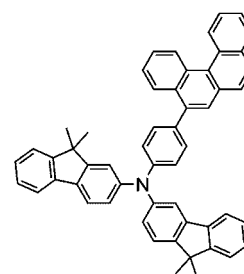
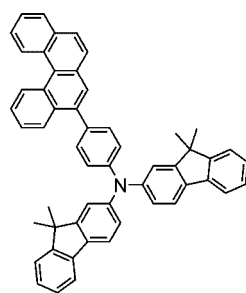
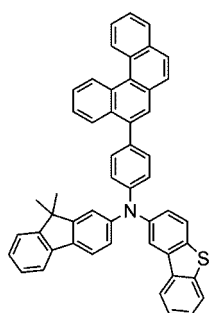
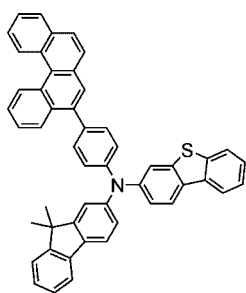
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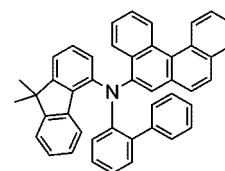
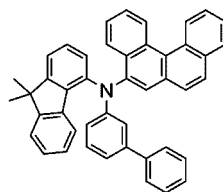
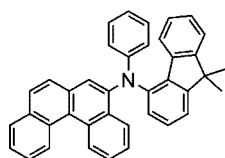
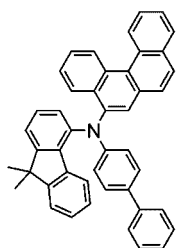
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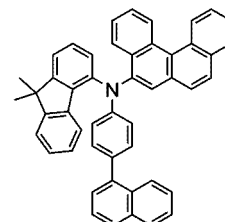
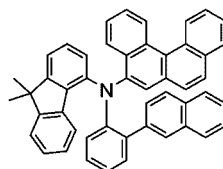
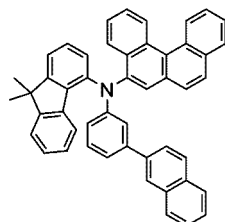
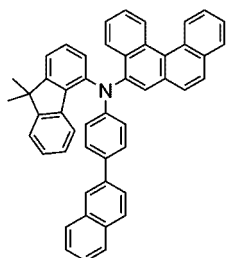
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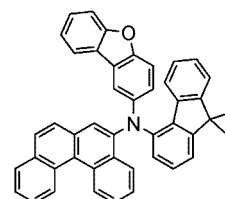
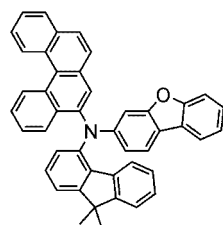
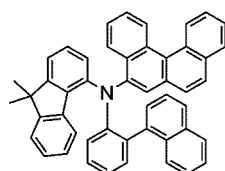
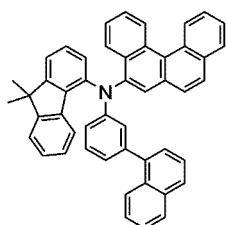
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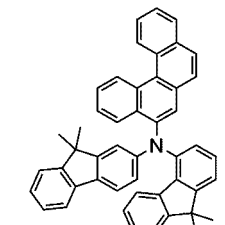
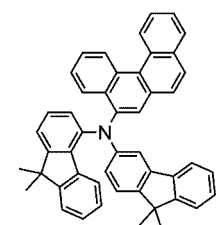
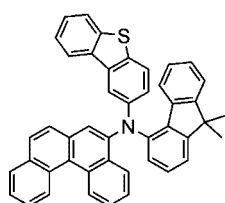
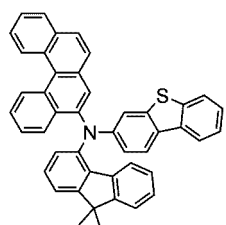
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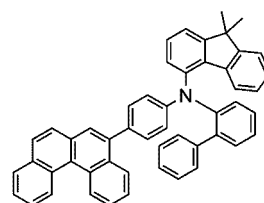
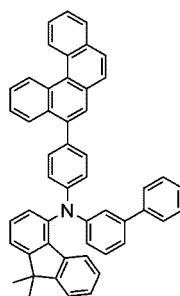
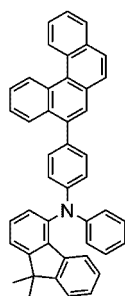
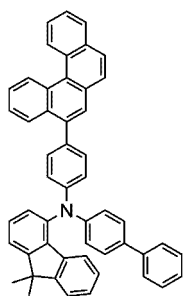
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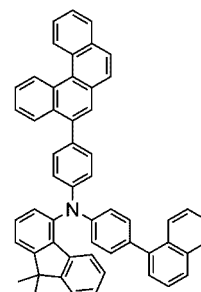
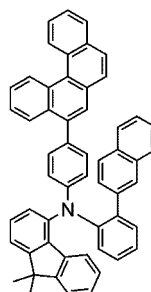
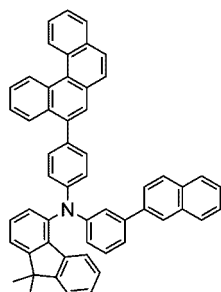
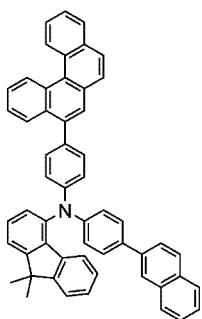
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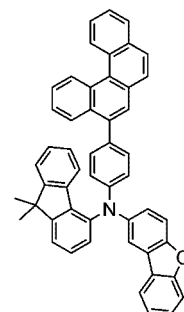
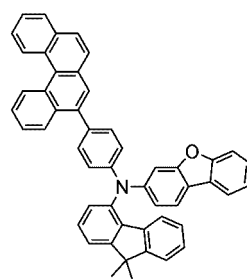
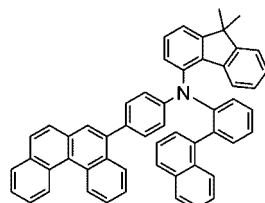
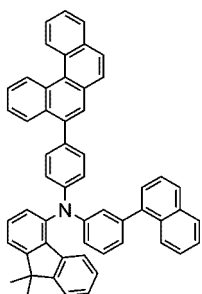
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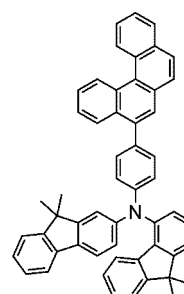
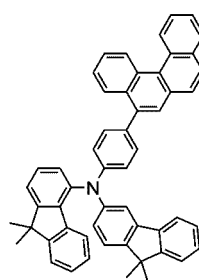
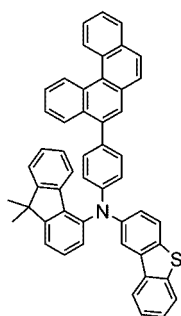
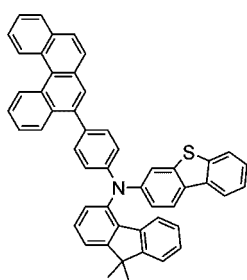
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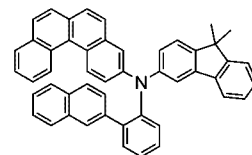
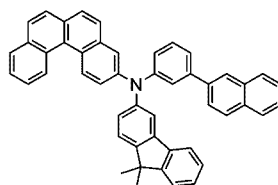
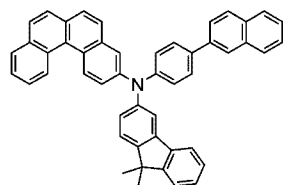
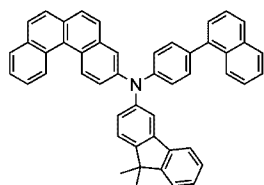
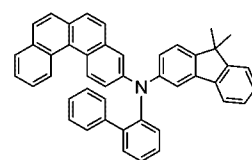
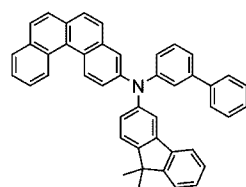
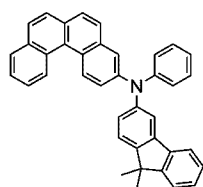
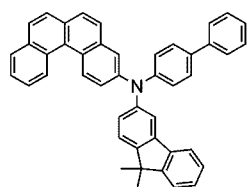
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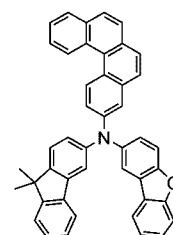
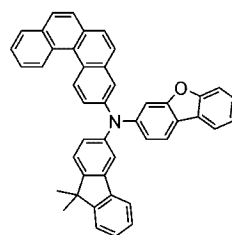
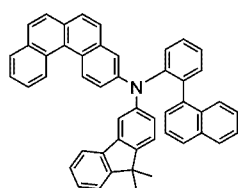
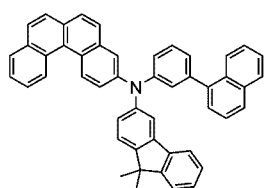
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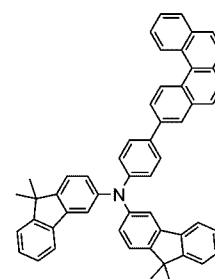
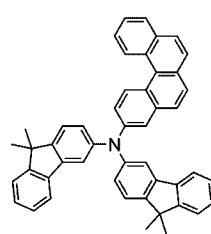
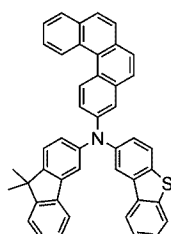
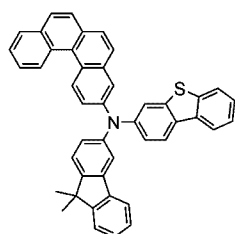
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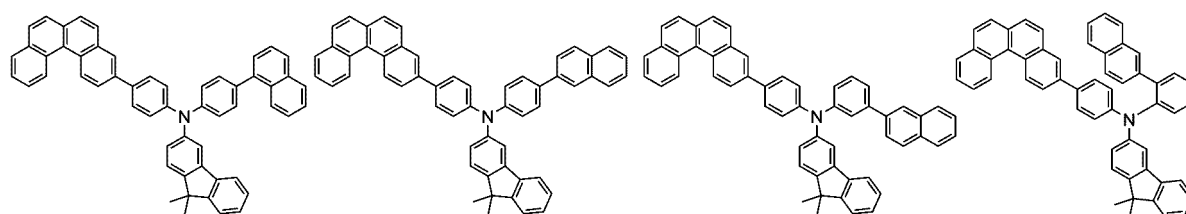
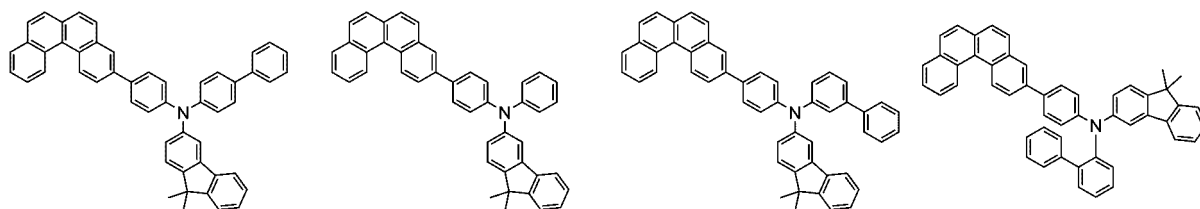


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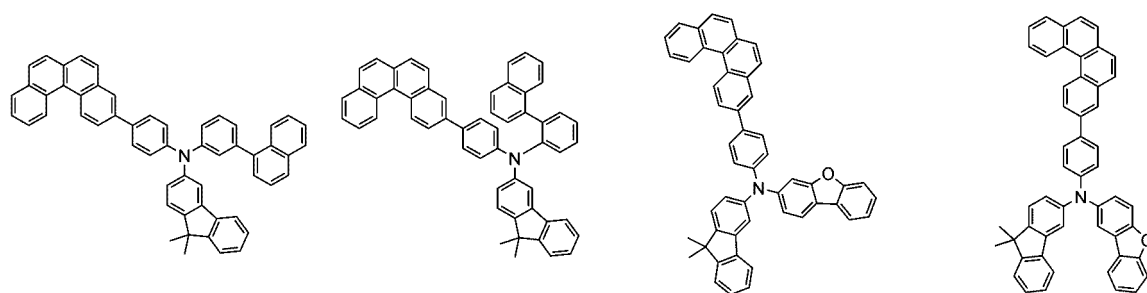
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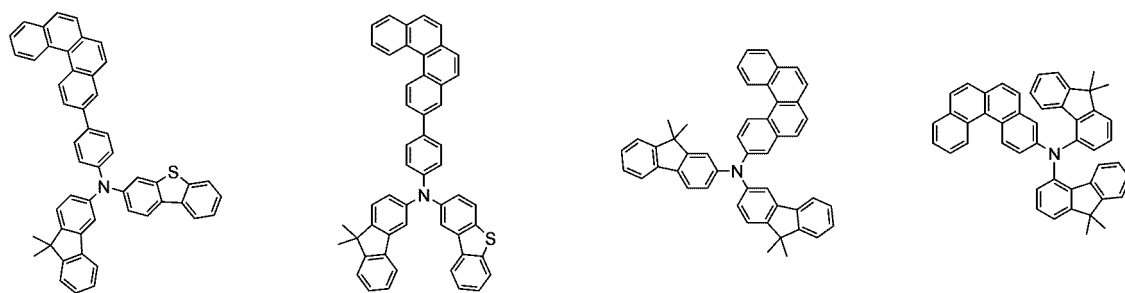
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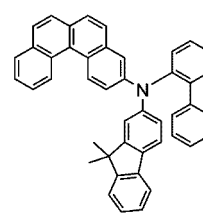
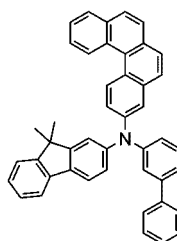
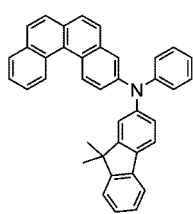
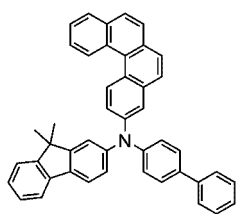


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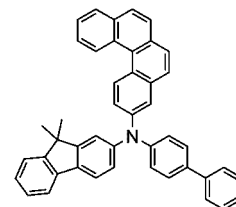
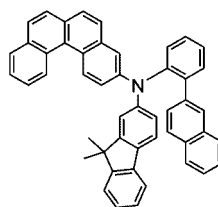
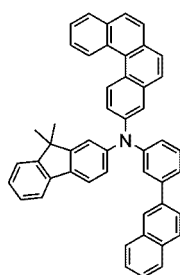
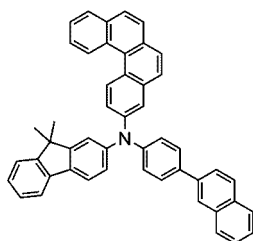
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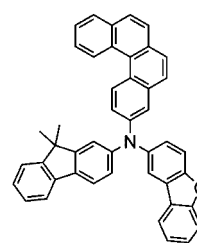
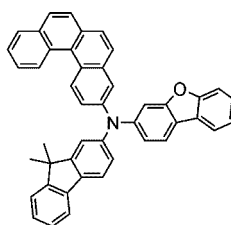
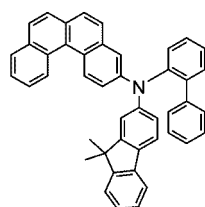
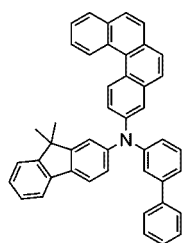
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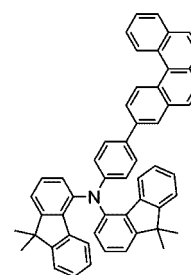
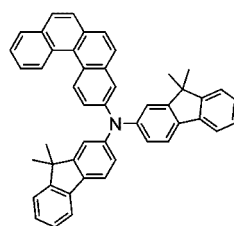
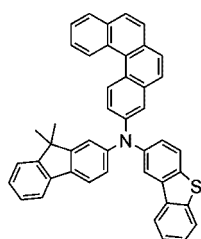
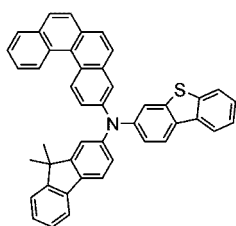
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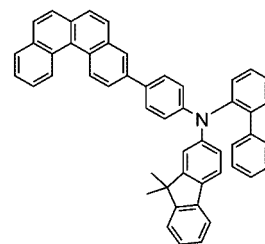
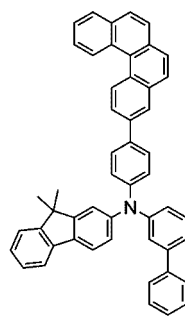
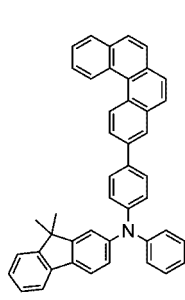
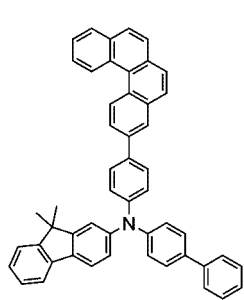
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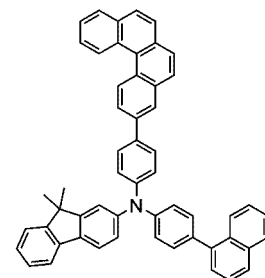
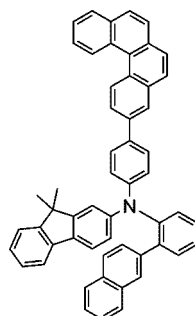
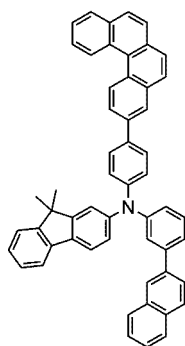
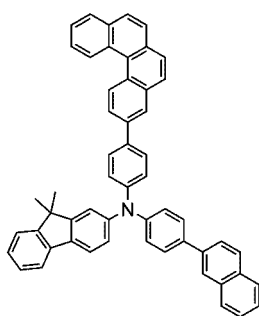
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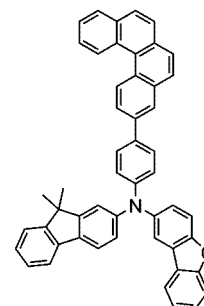
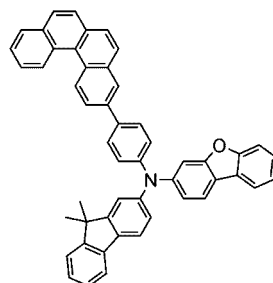
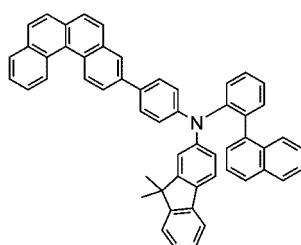
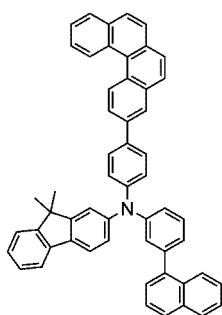
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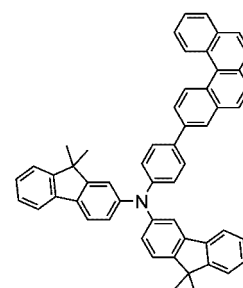
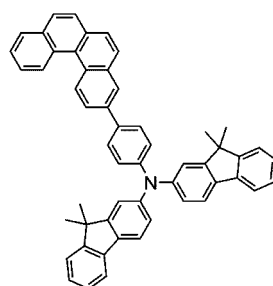
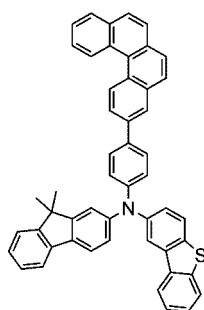
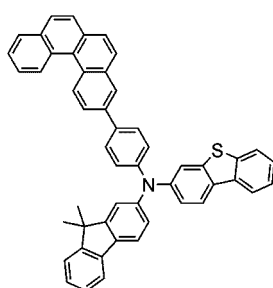
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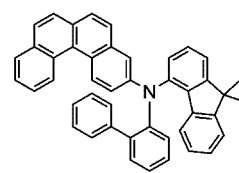
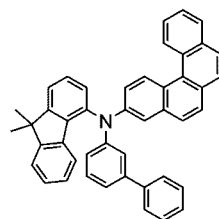
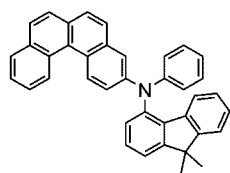
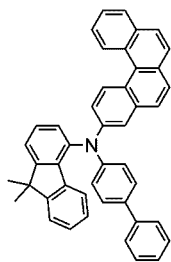
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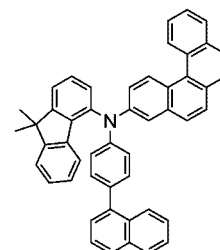
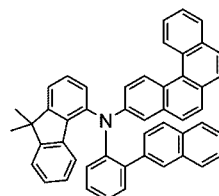
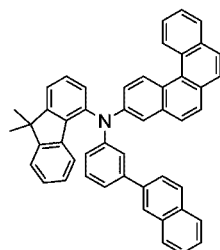
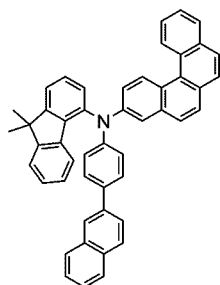
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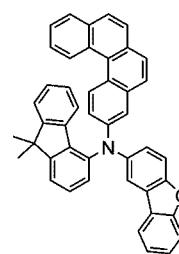
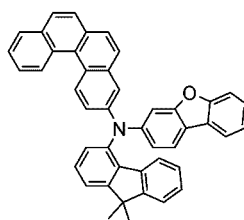
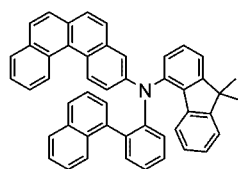
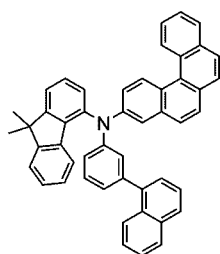
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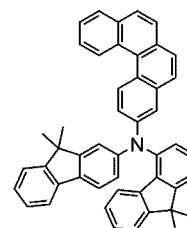
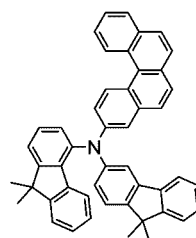
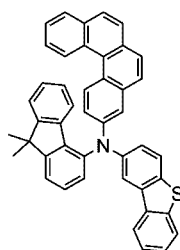
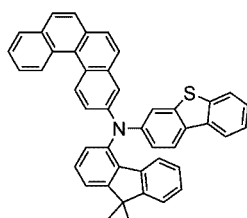
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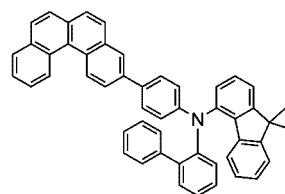
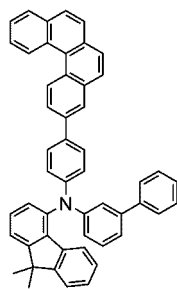
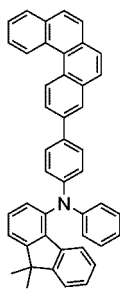
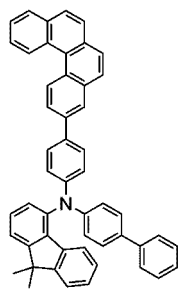
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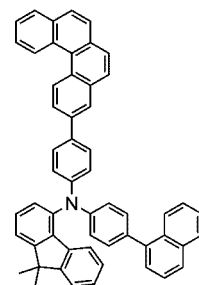
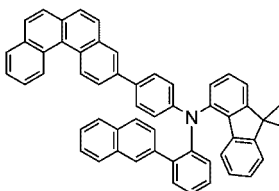
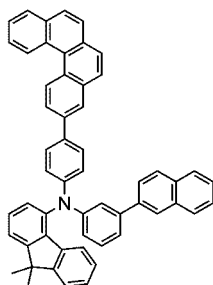
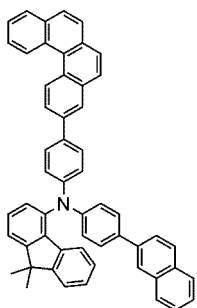
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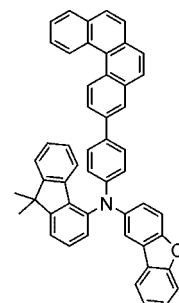
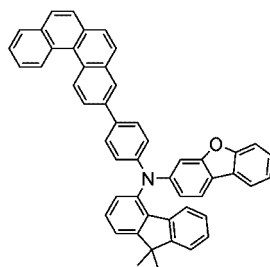
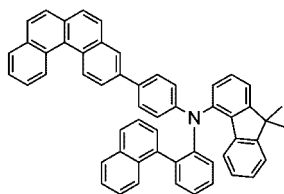
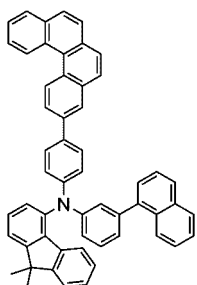
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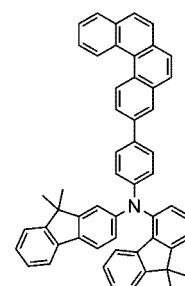
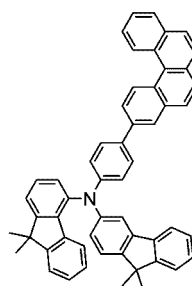
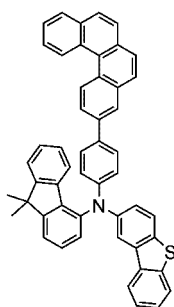
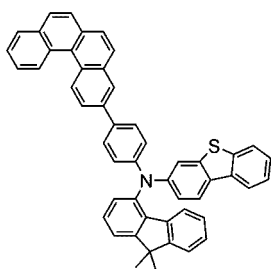
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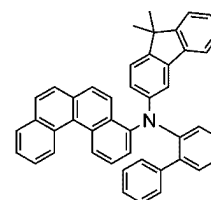
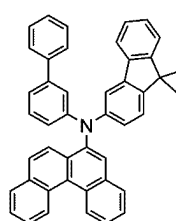
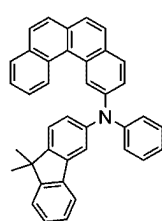
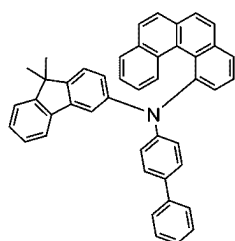
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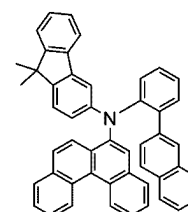
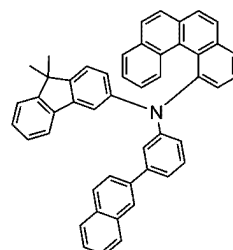
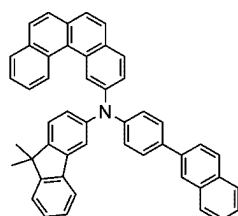
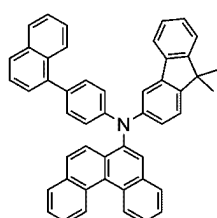
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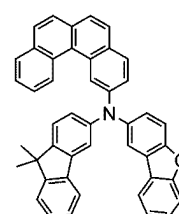
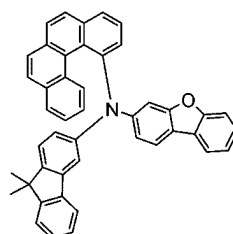
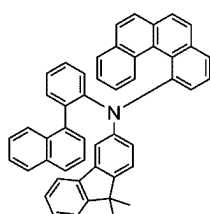
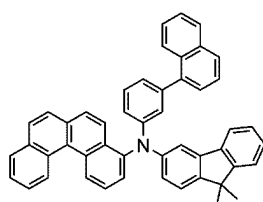
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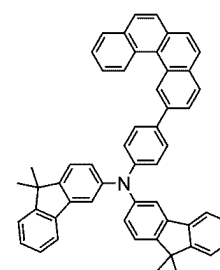
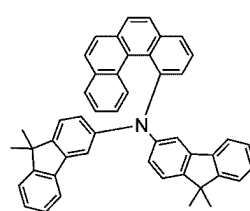
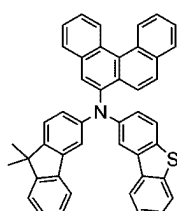
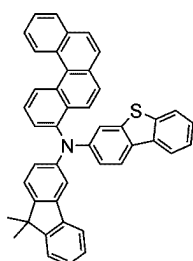
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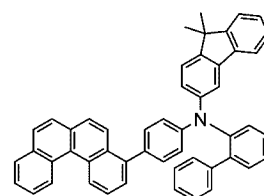
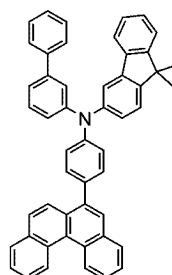
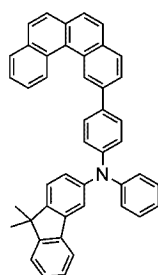
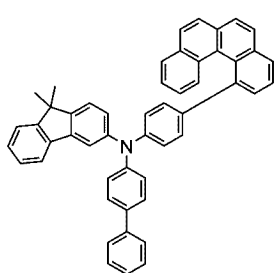
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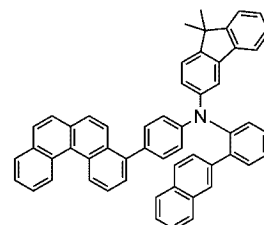
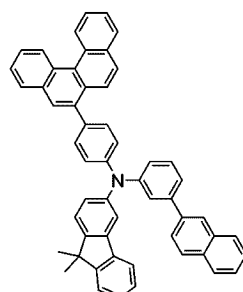
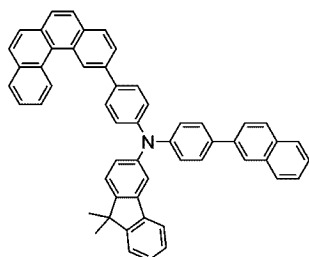
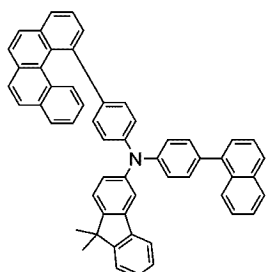
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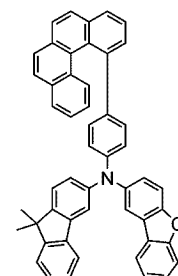
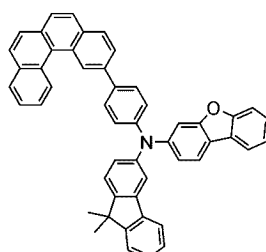
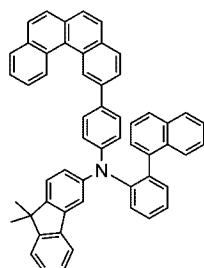
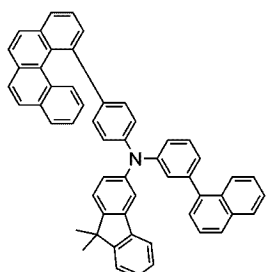
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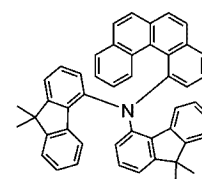
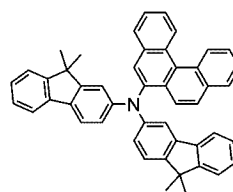
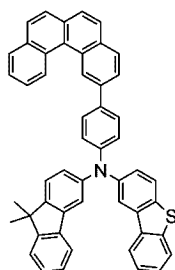
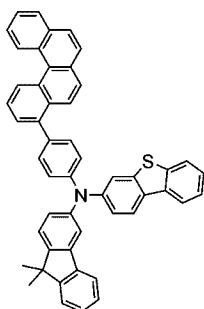
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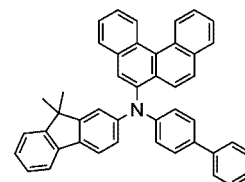
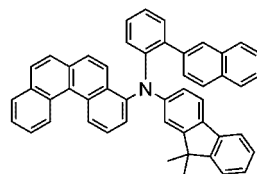
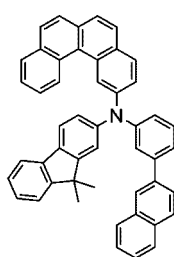
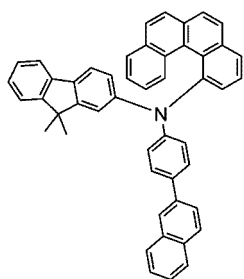
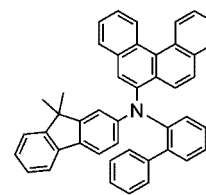
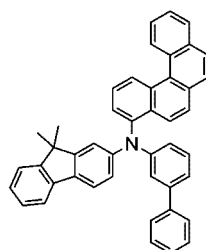
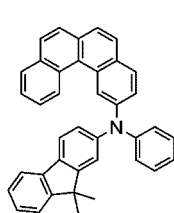
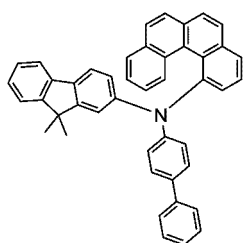
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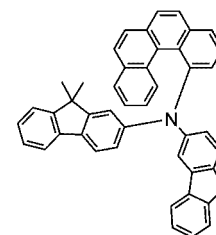
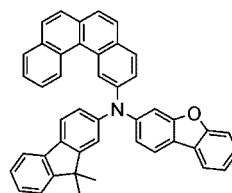
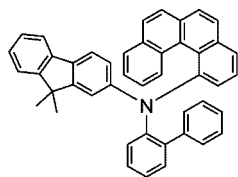
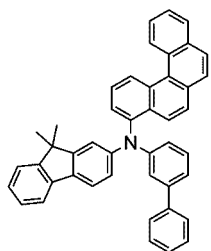
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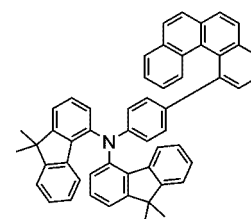
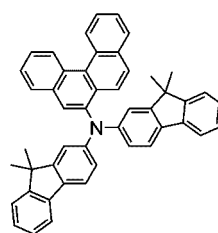
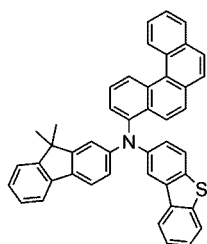
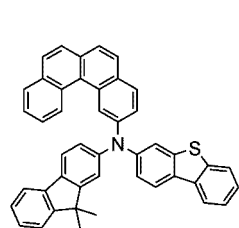
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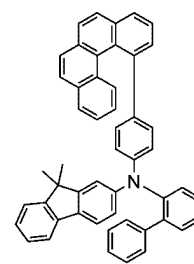
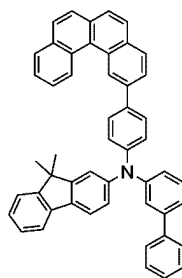
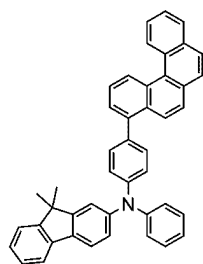
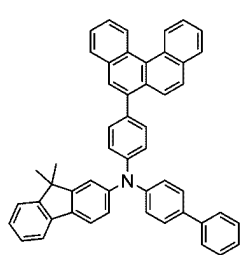


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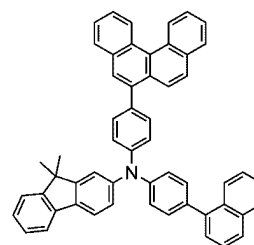
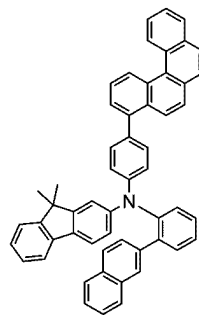
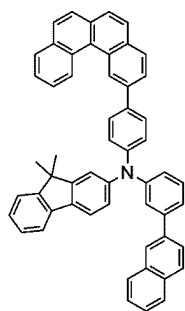
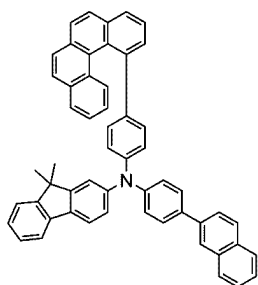
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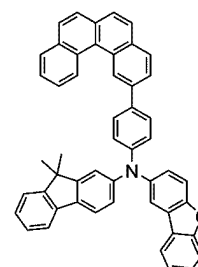
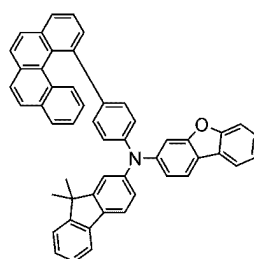
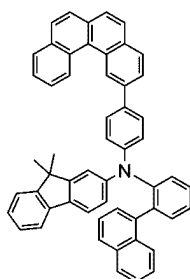
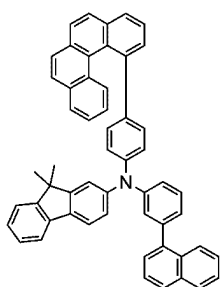
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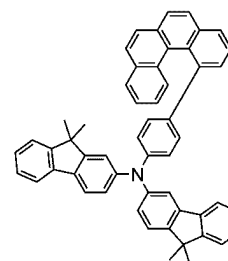
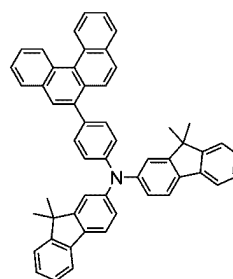
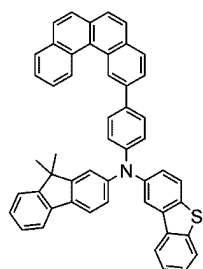
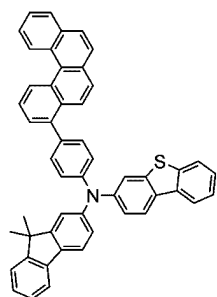
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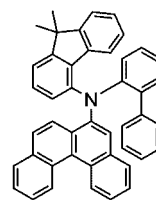
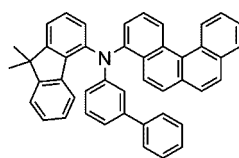
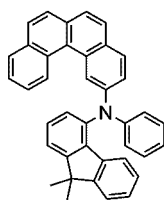
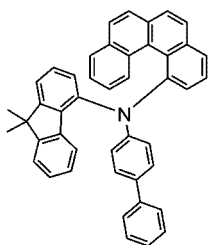
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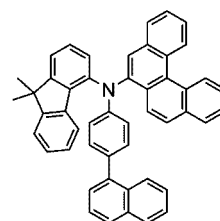
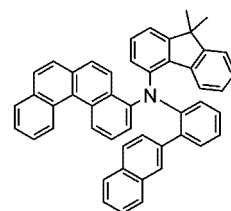
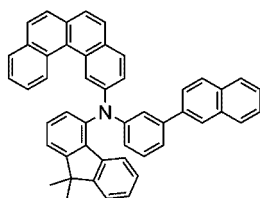
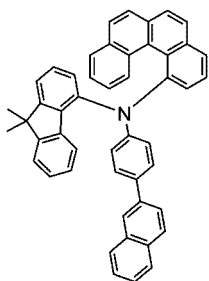
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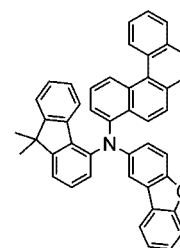
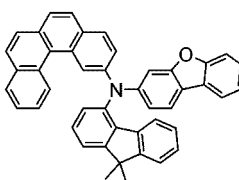
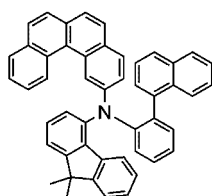
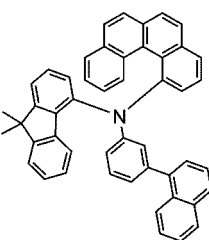
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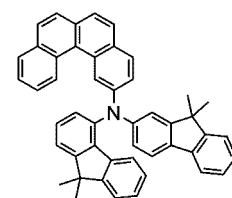
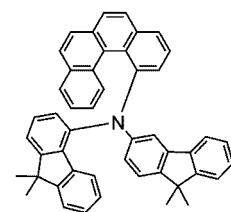
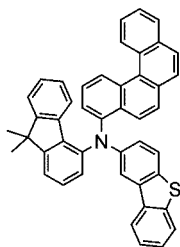
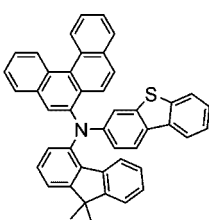
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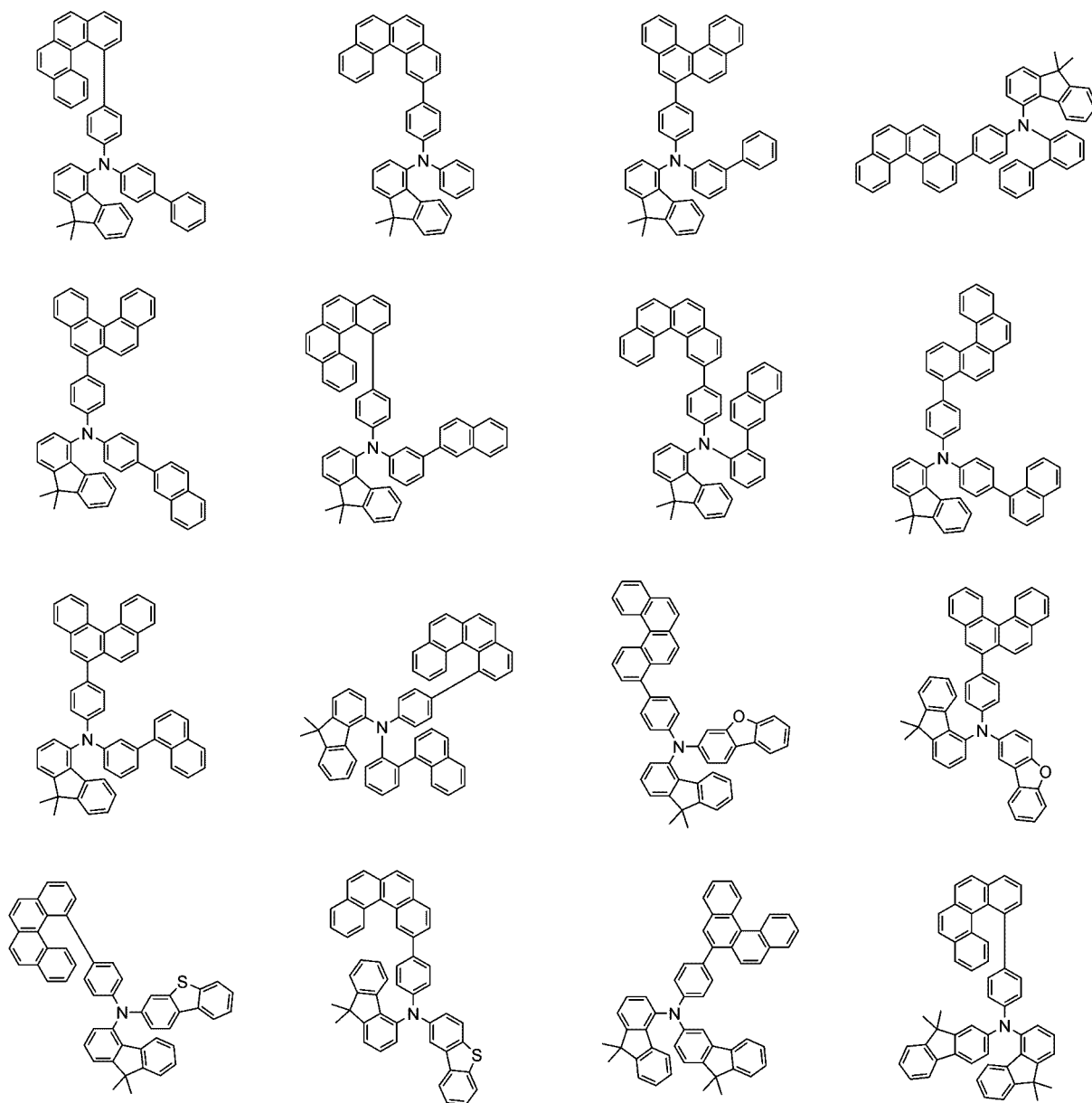
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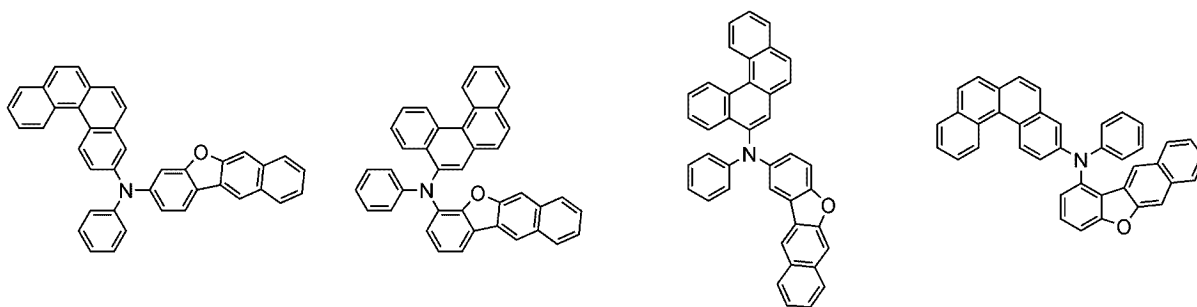
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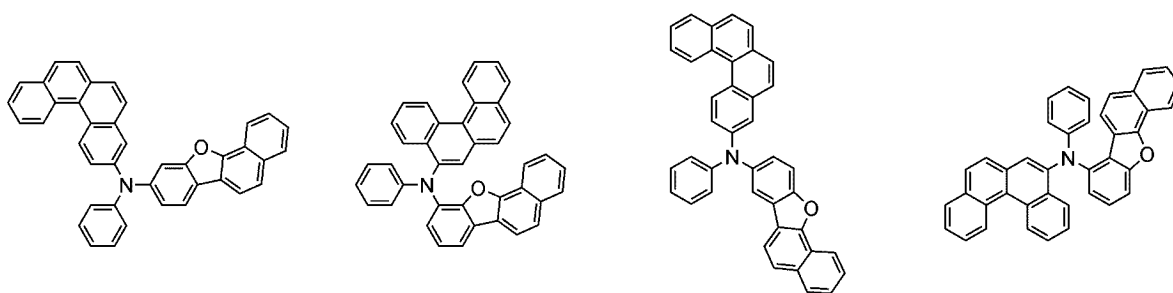
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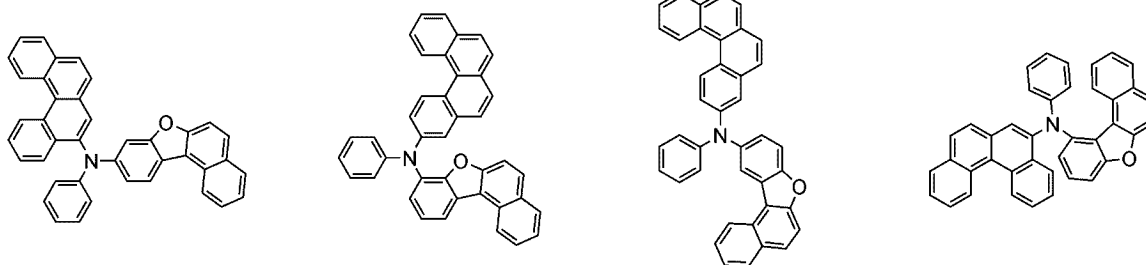
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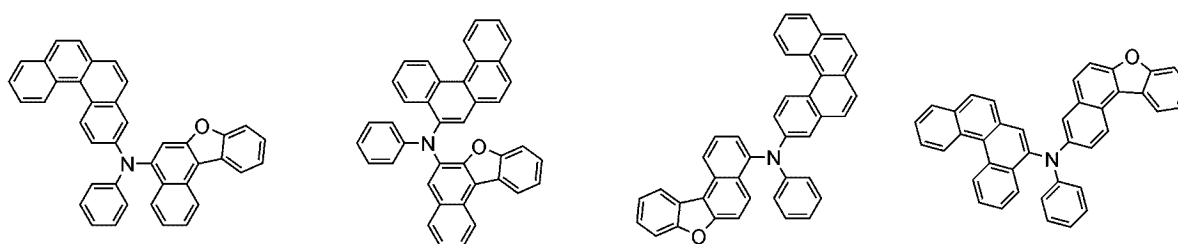
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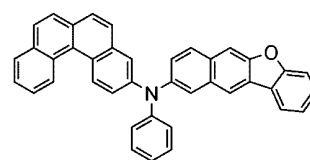
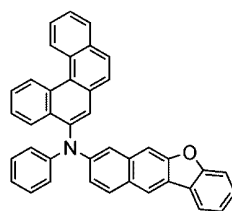
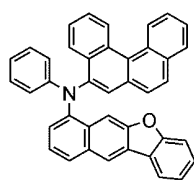
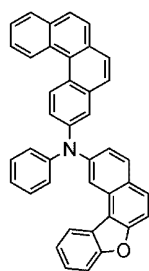
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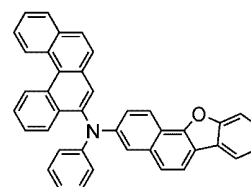
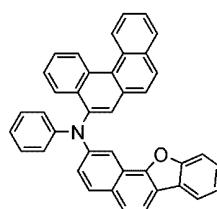
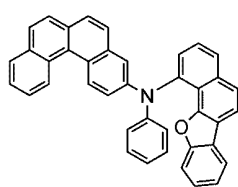
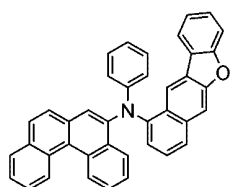
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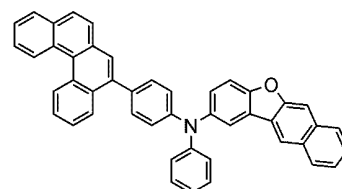
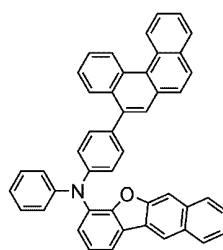
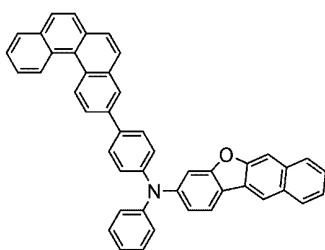
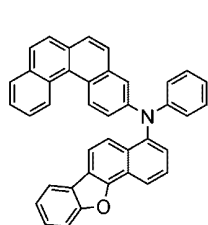
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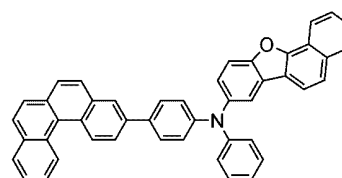
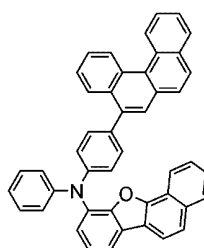
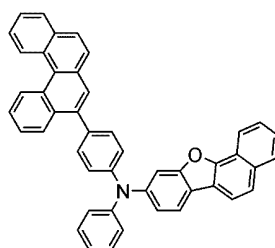
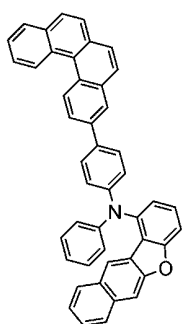
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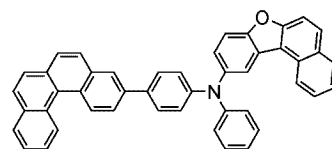
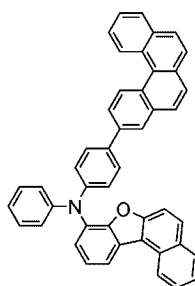
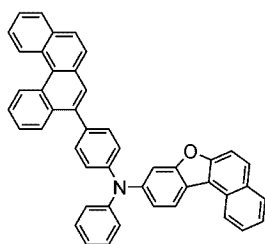
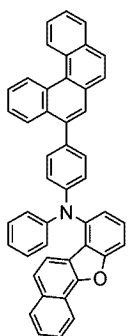
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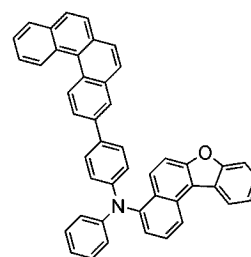
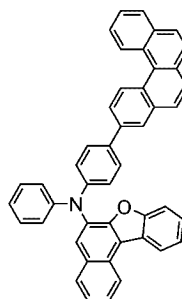
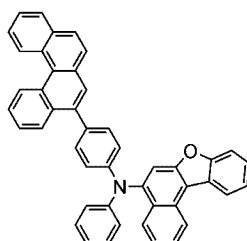
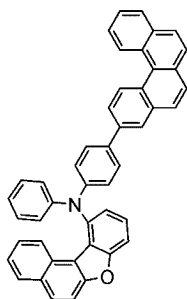
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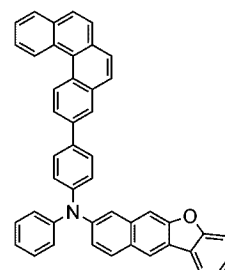
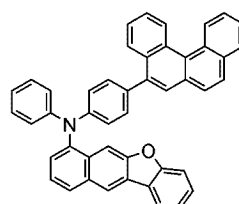
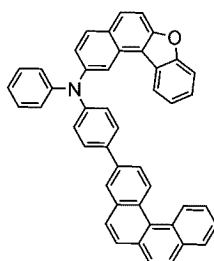
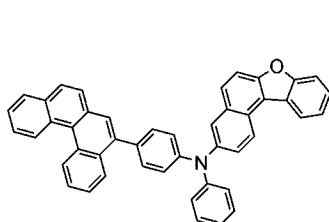
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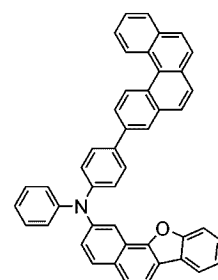
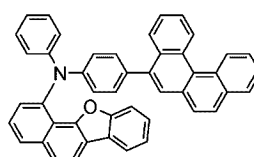
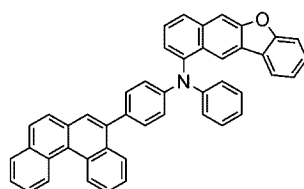
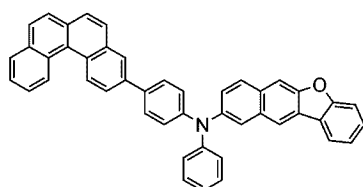
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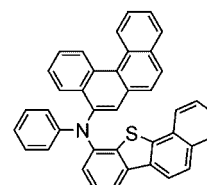
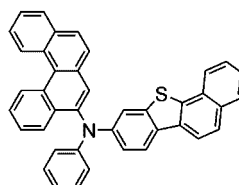
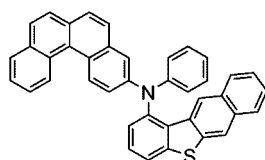
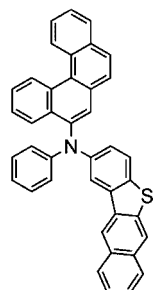
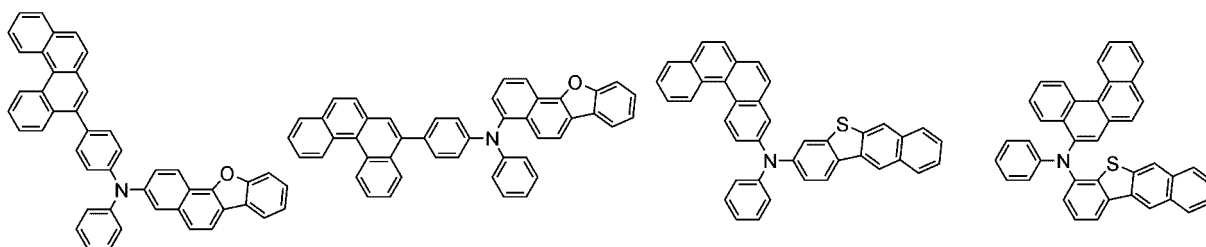
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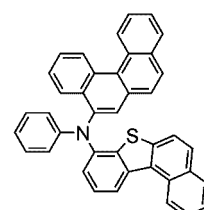
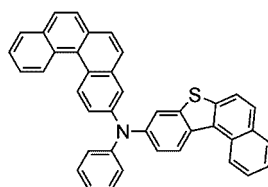
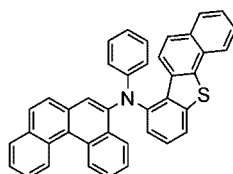
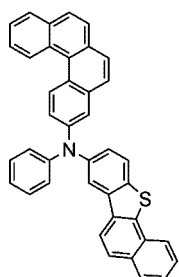
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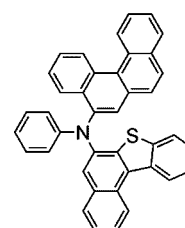
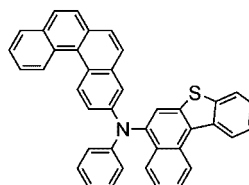
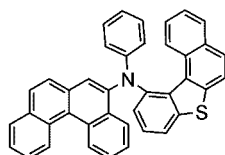
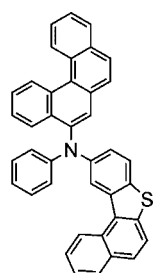
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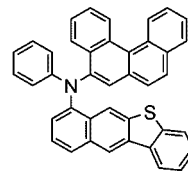
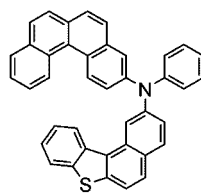
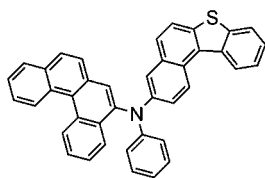
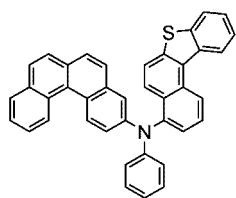


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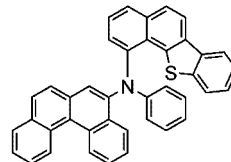
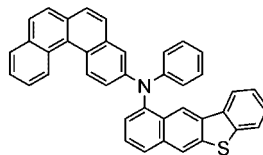
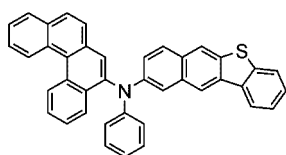
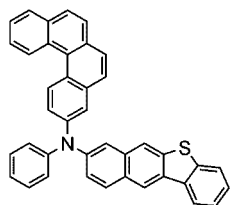
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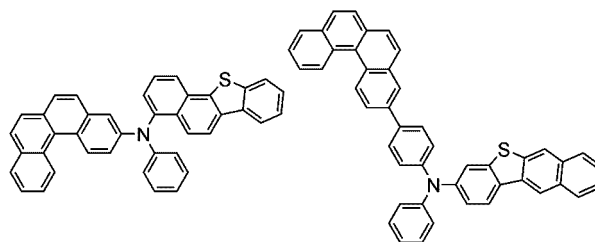
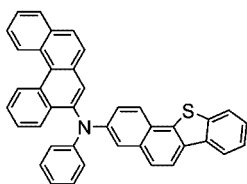
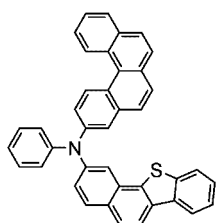
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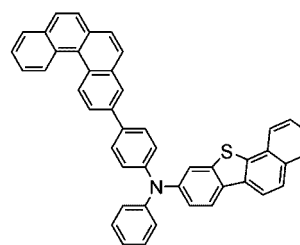
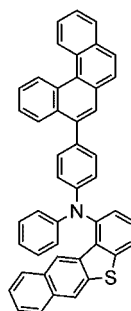
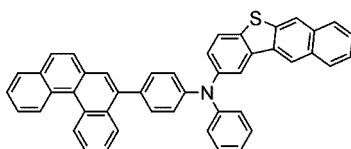
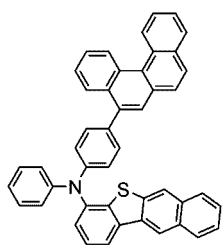
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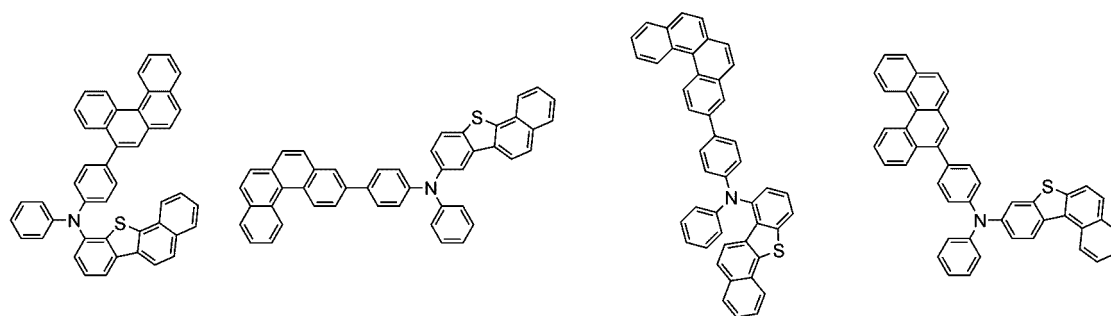
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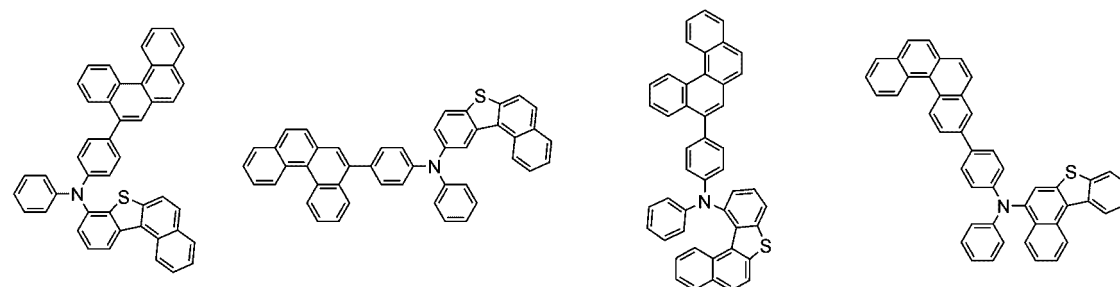
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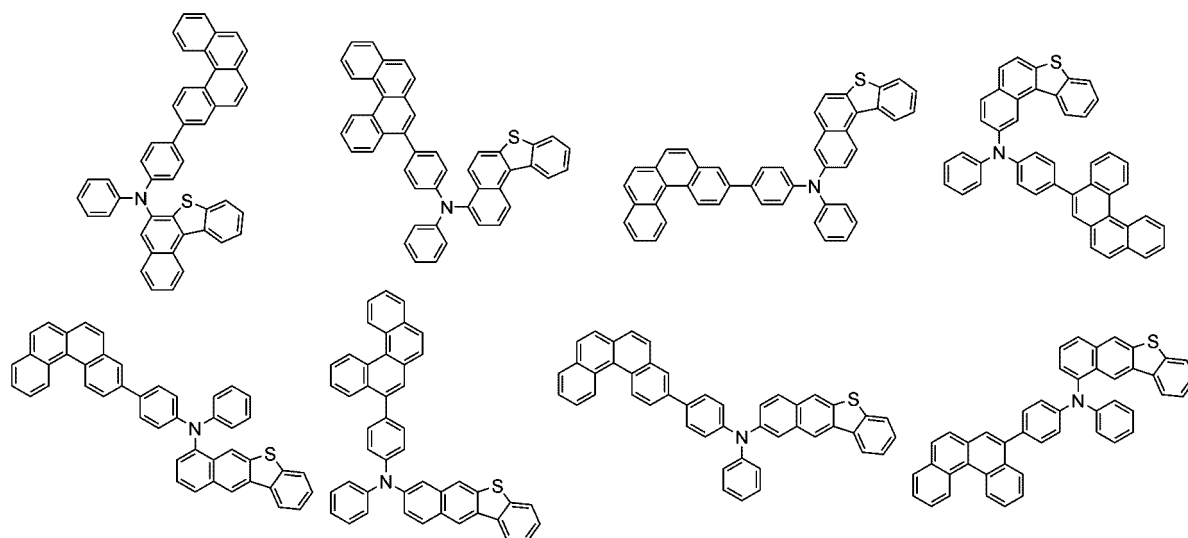
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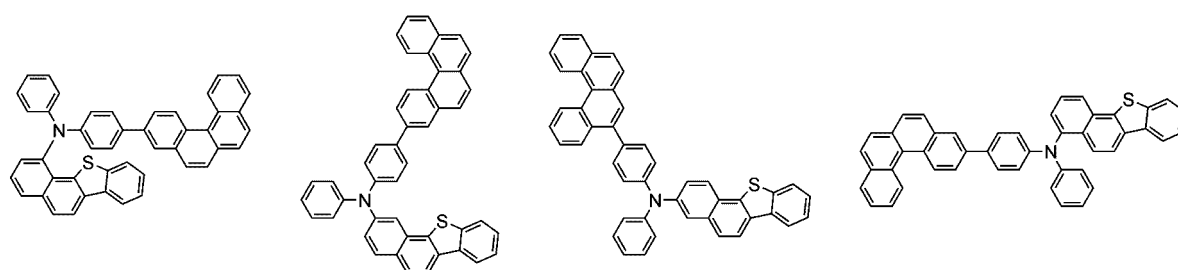
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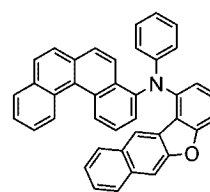
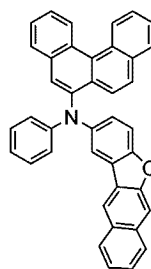
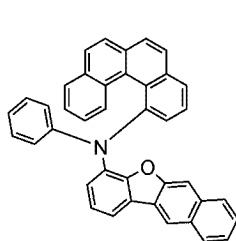
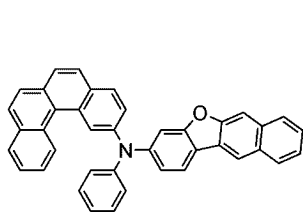
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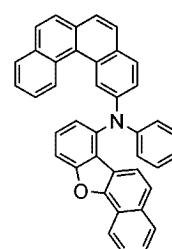
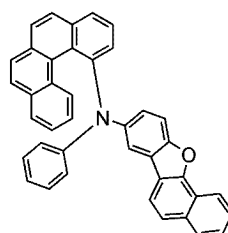
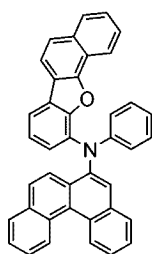
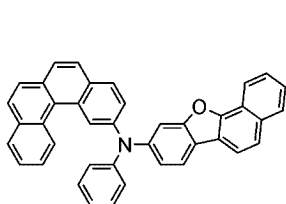
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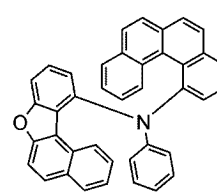
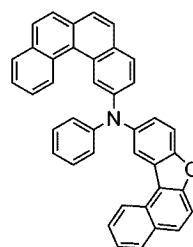
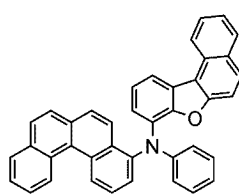
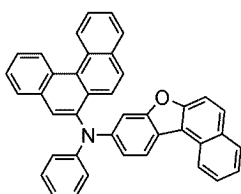
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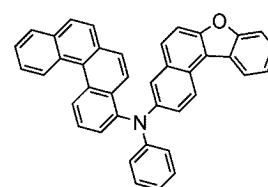
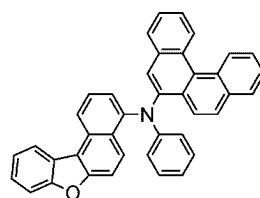
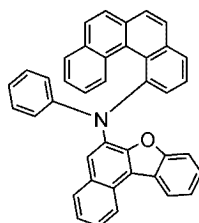
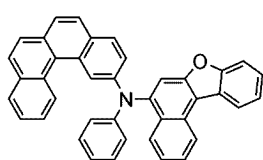
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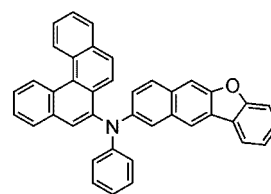
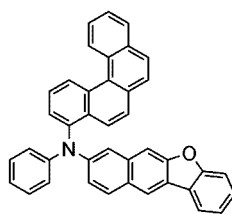
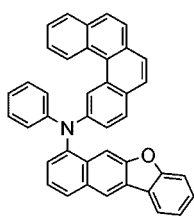
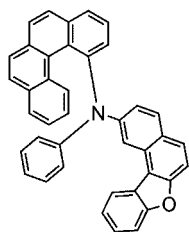
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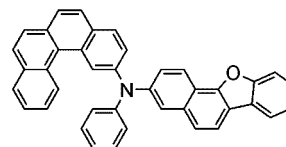
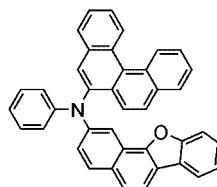
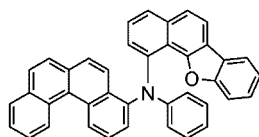
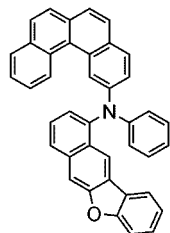
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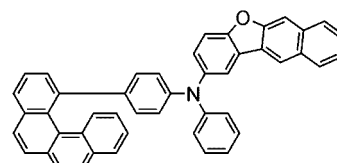
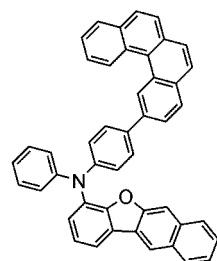
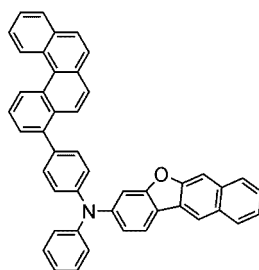
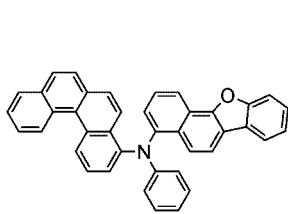
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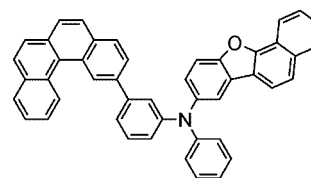
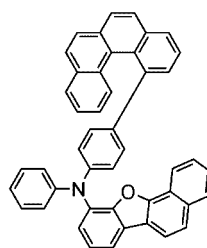
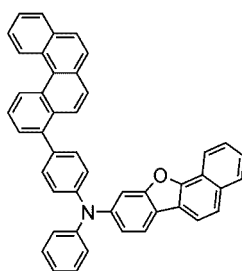
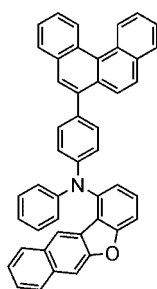
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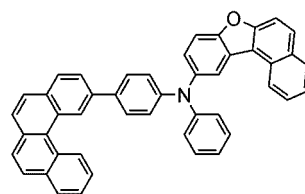
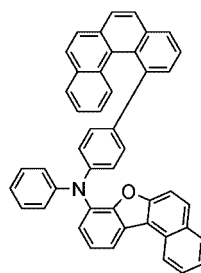
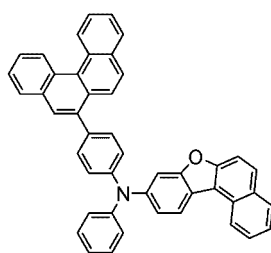
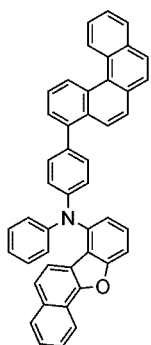
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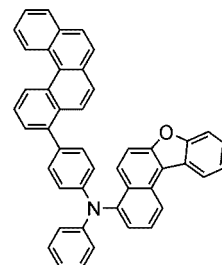
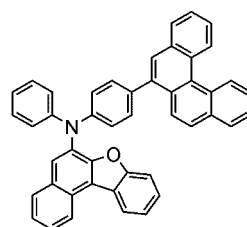
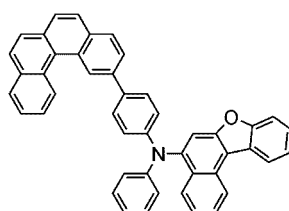
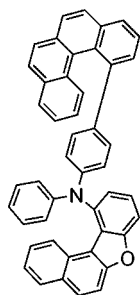
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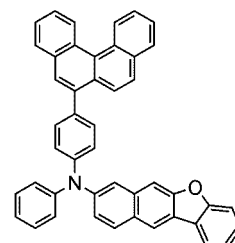
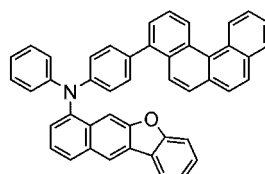
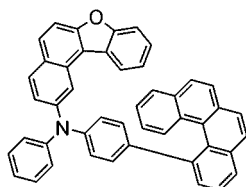
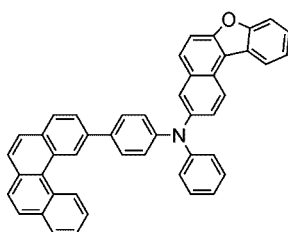
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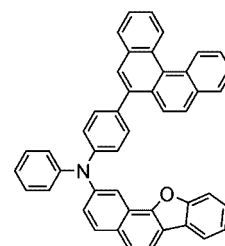
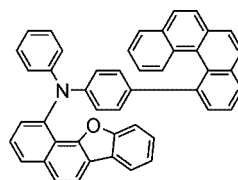
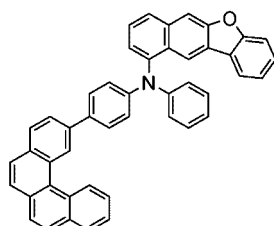
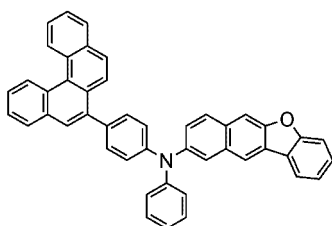
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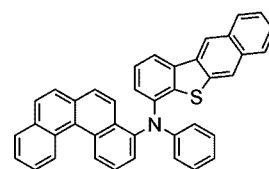
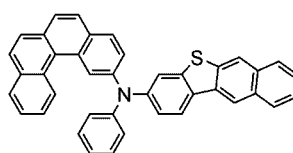
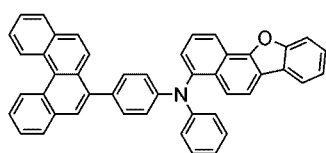
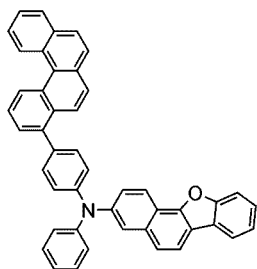
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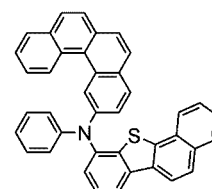
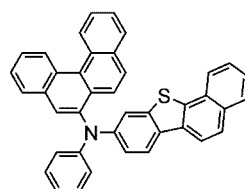
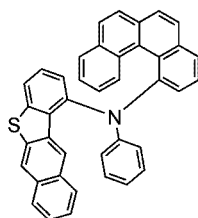
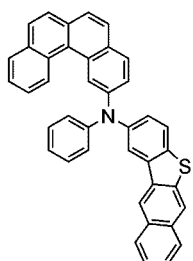
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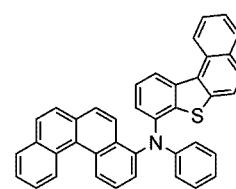
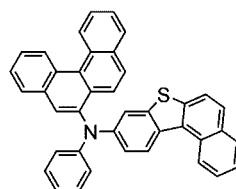
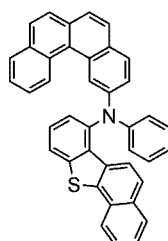
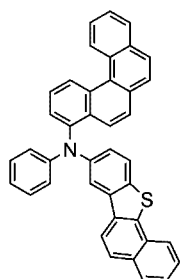
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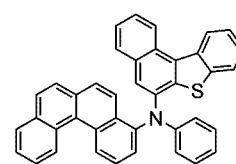
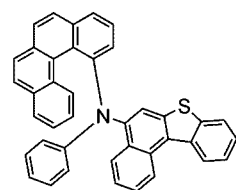
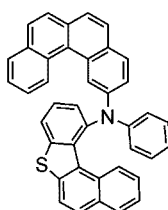
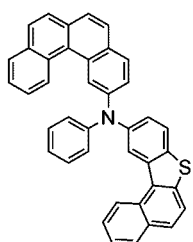
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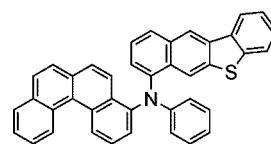
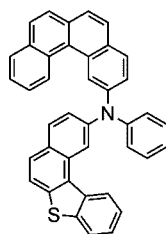
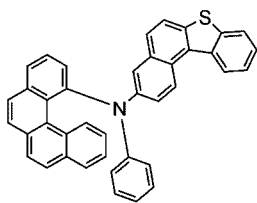
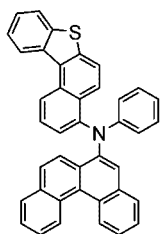
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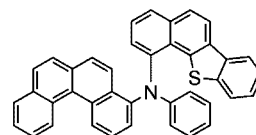
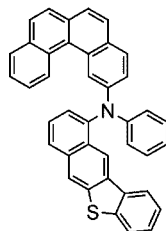
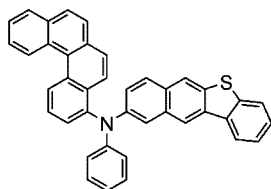
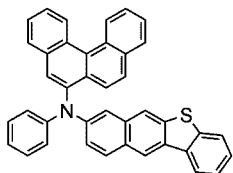
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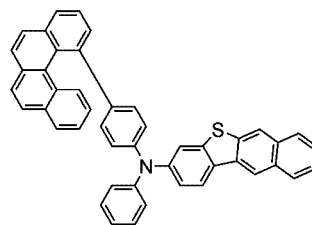
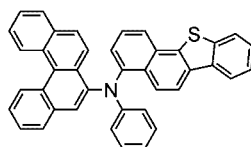
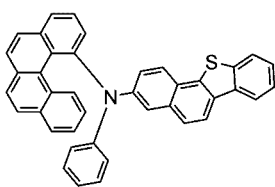
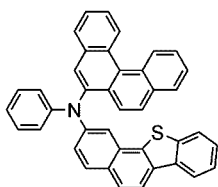
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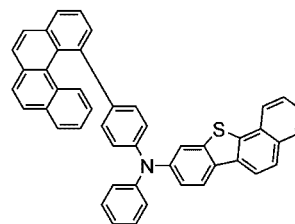
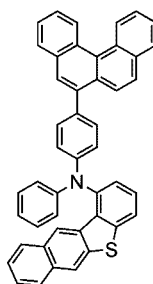
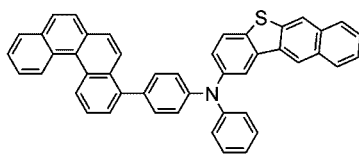
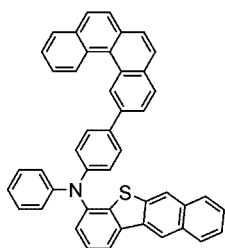
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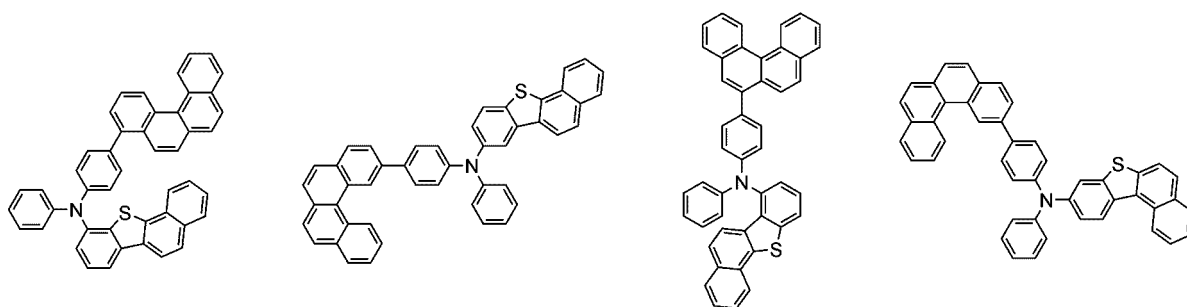
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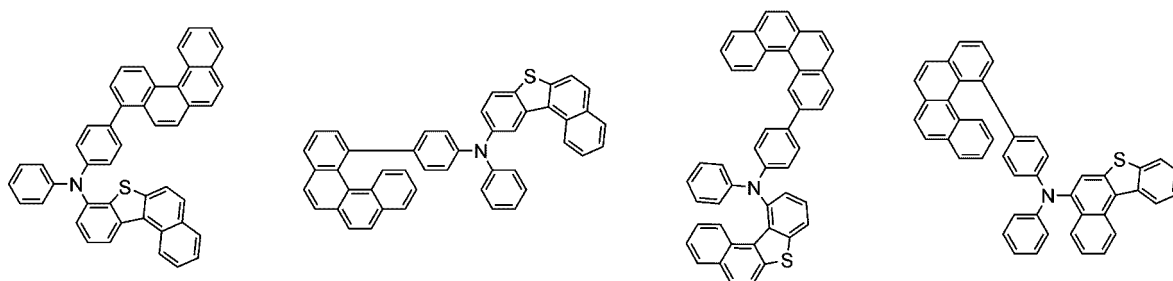
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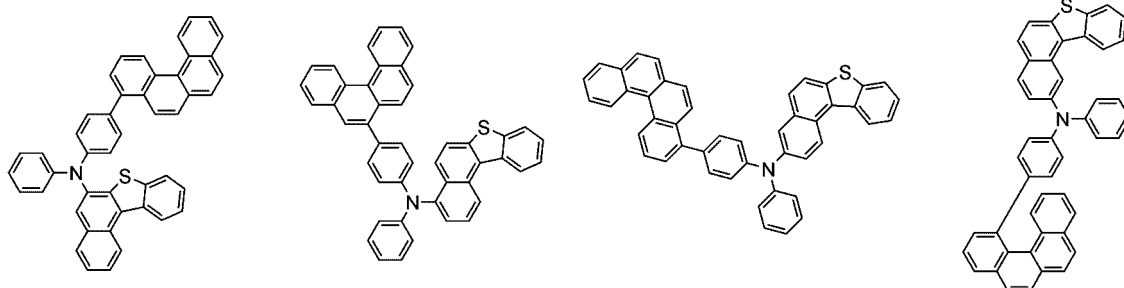
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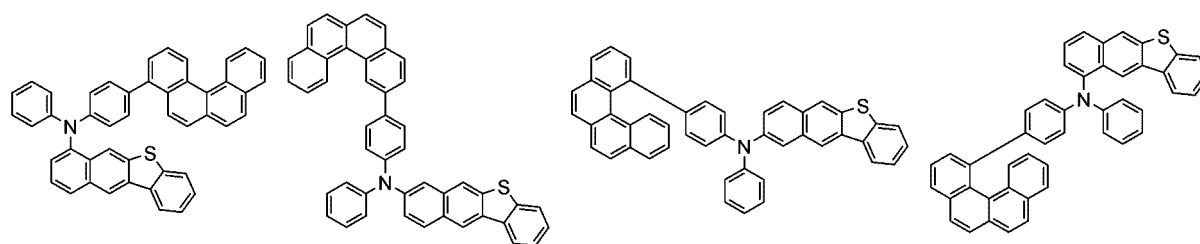
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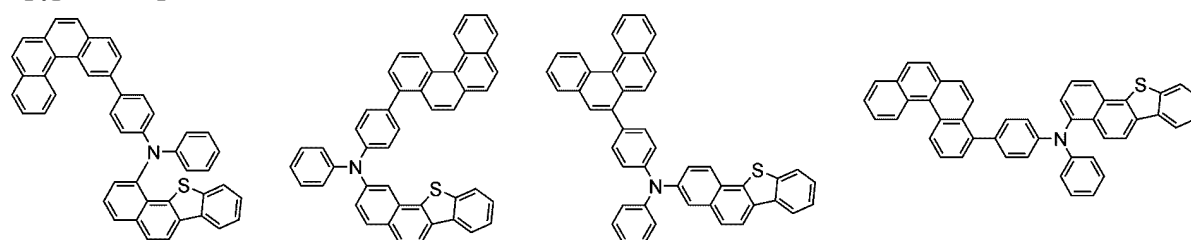
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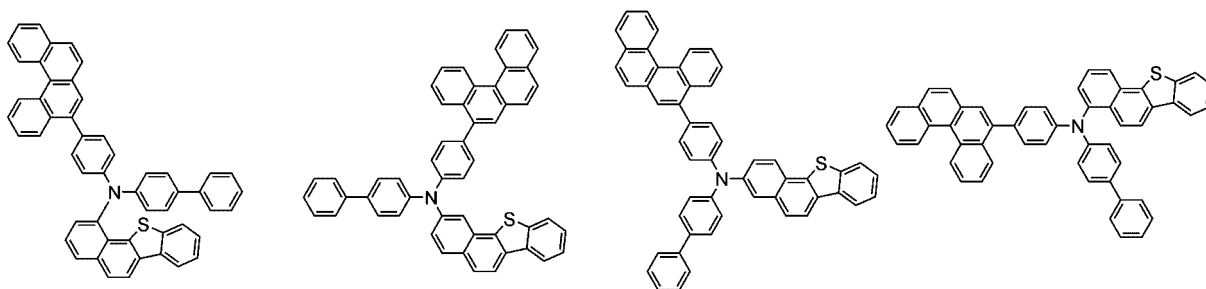
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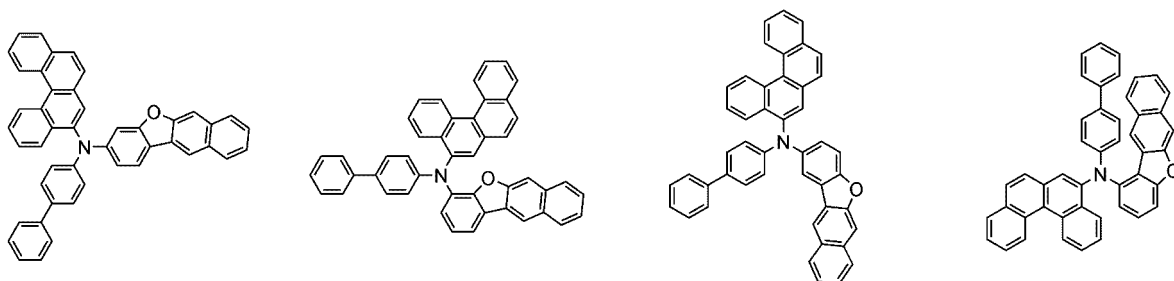
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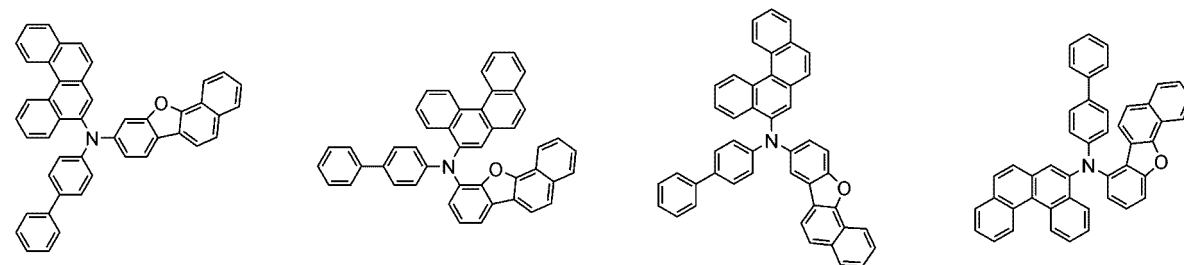


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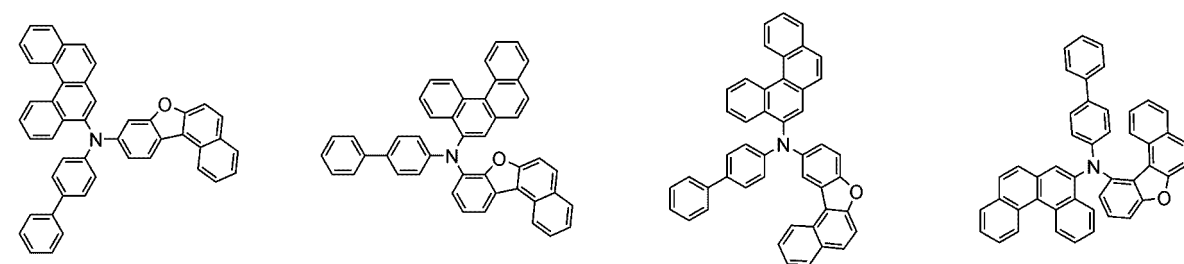
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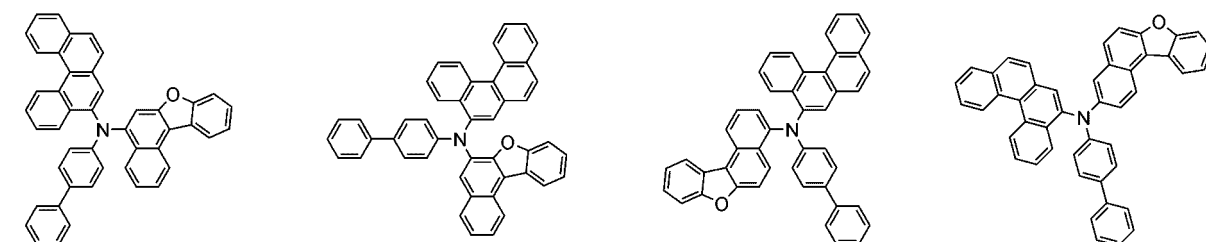
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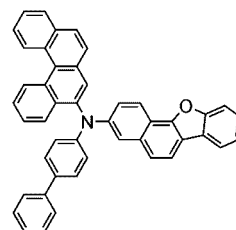
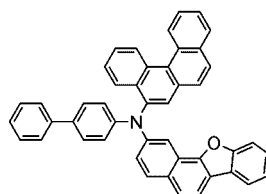
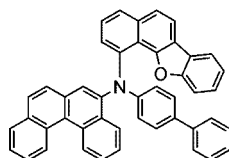
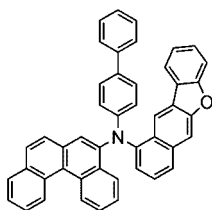
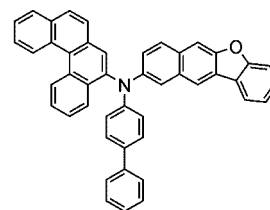
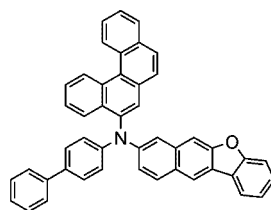
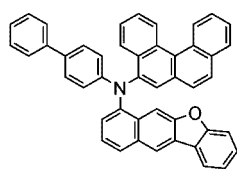
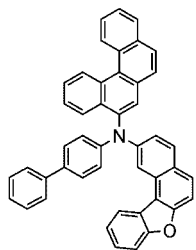


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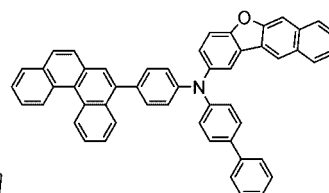
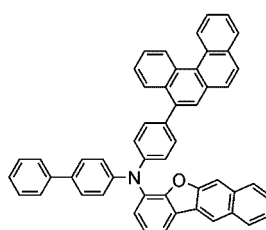
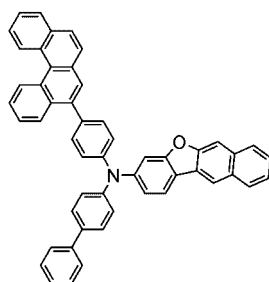
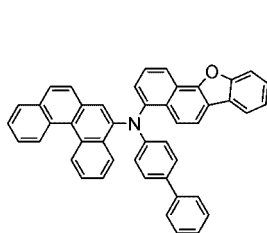


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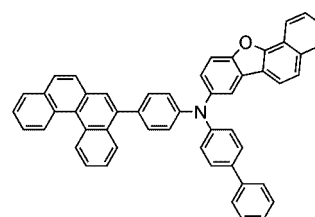
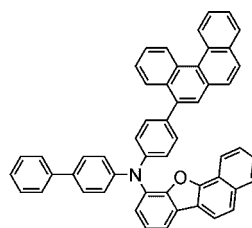
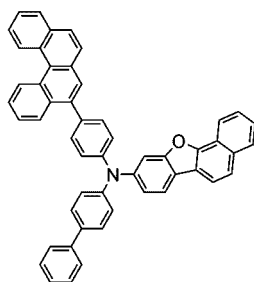
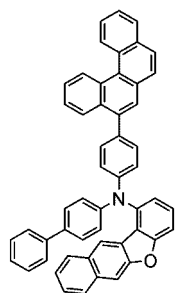
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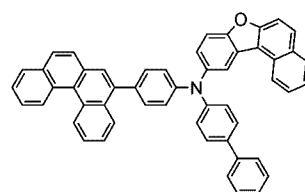
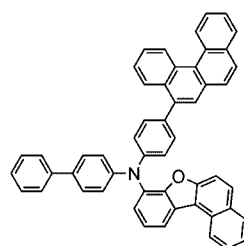
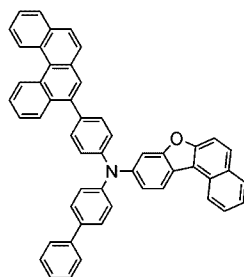
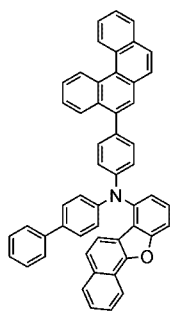


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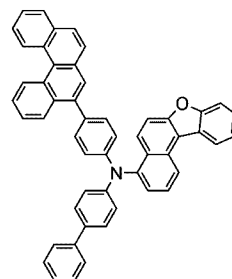
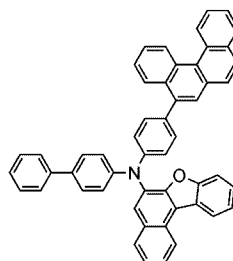
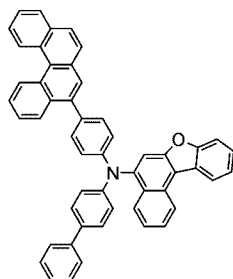
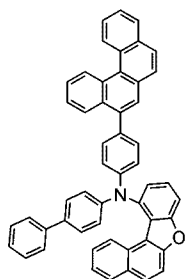
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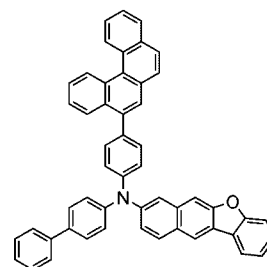
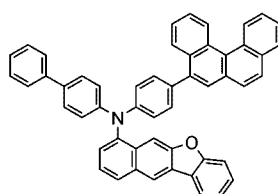
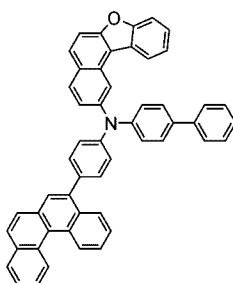
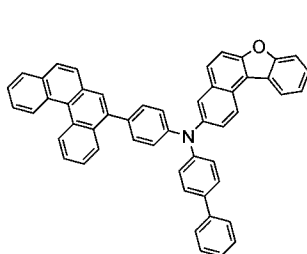
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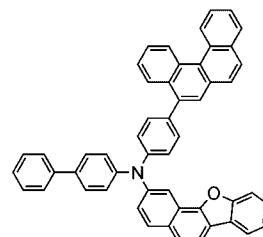
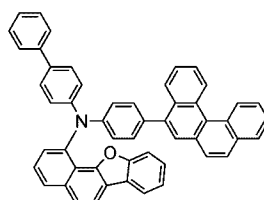
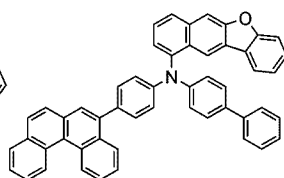
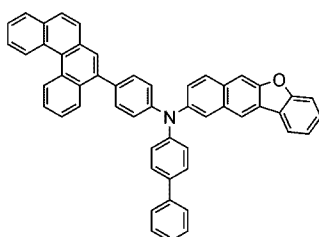
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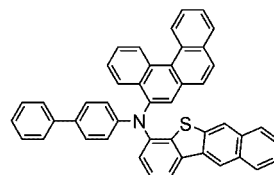
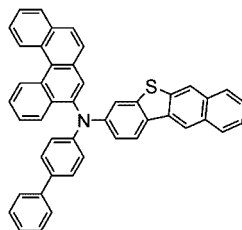
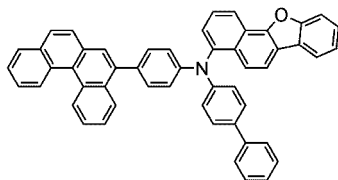
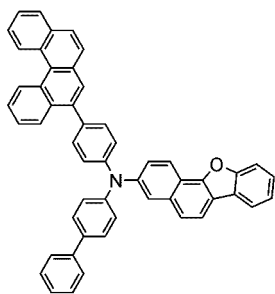
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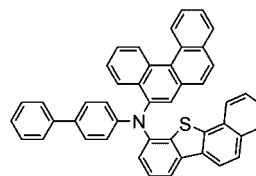
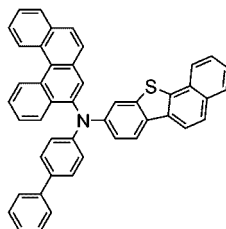
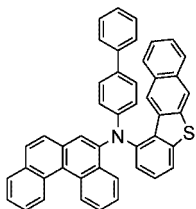
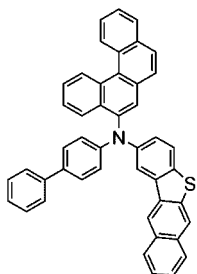
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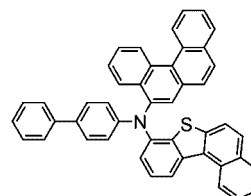
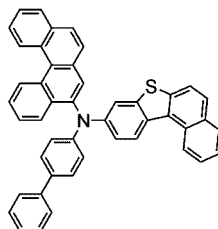
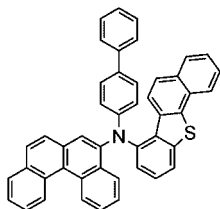
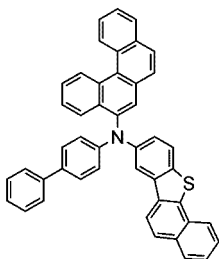
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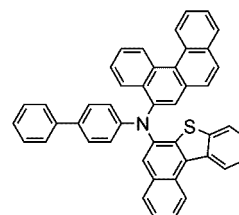
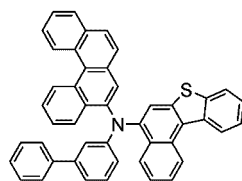
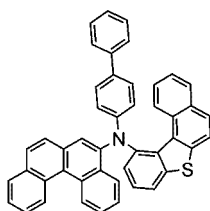
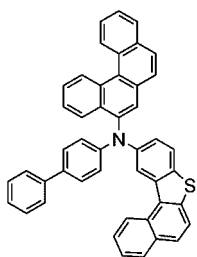
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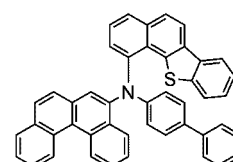
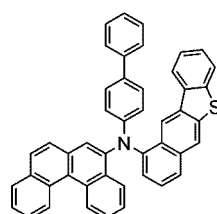
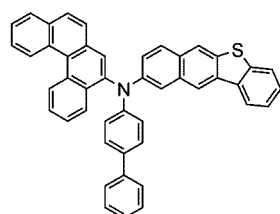
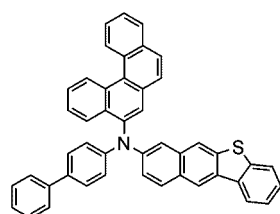
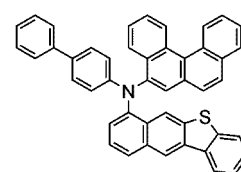
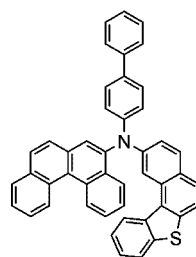
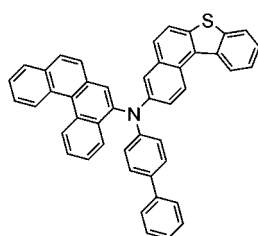
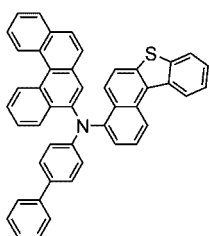
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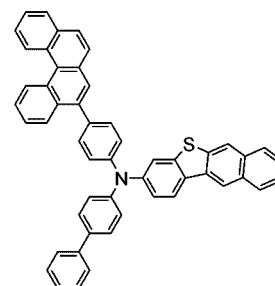
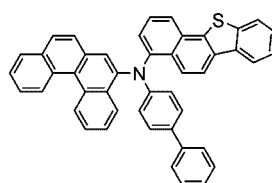
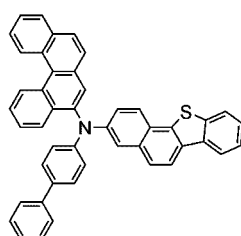
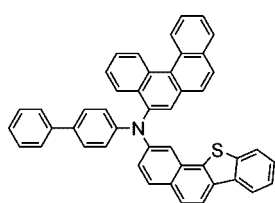
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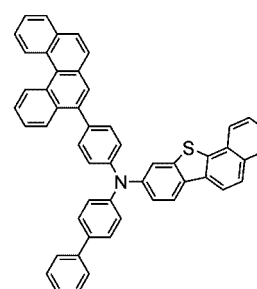
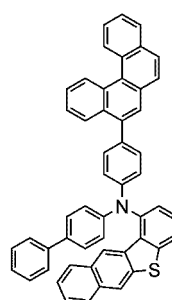
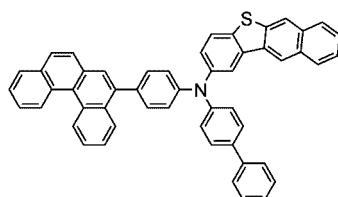
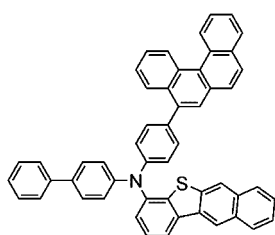
【化 3 0 3】



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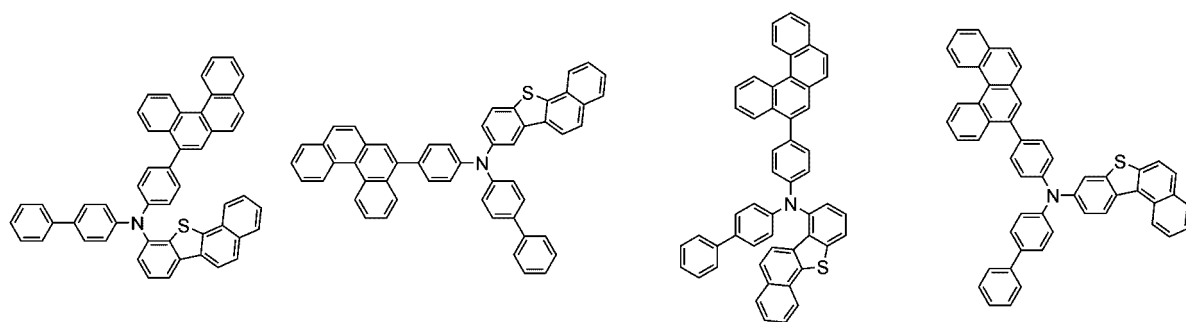


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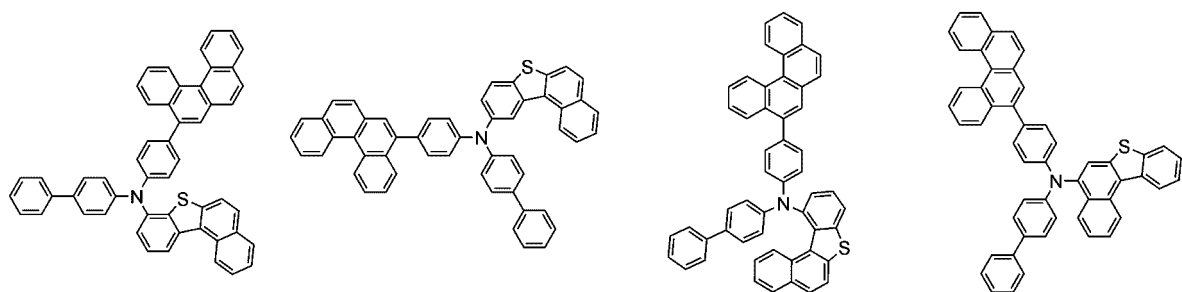
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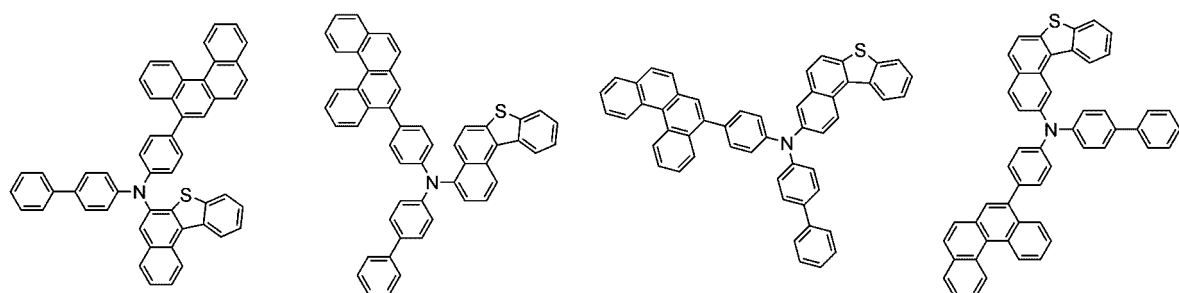
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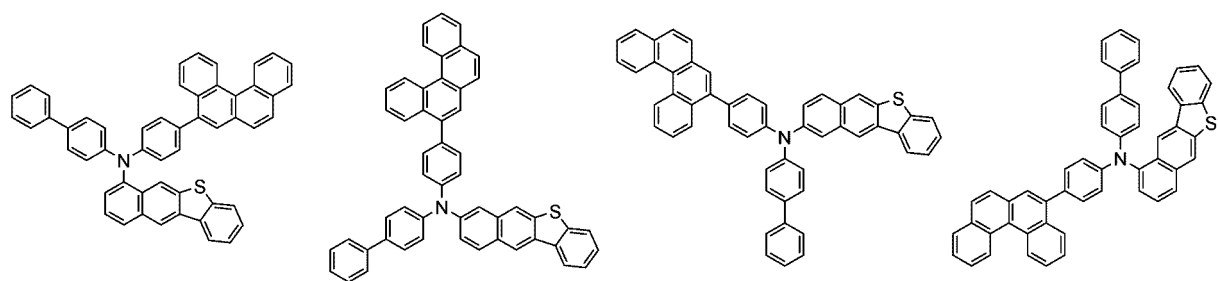
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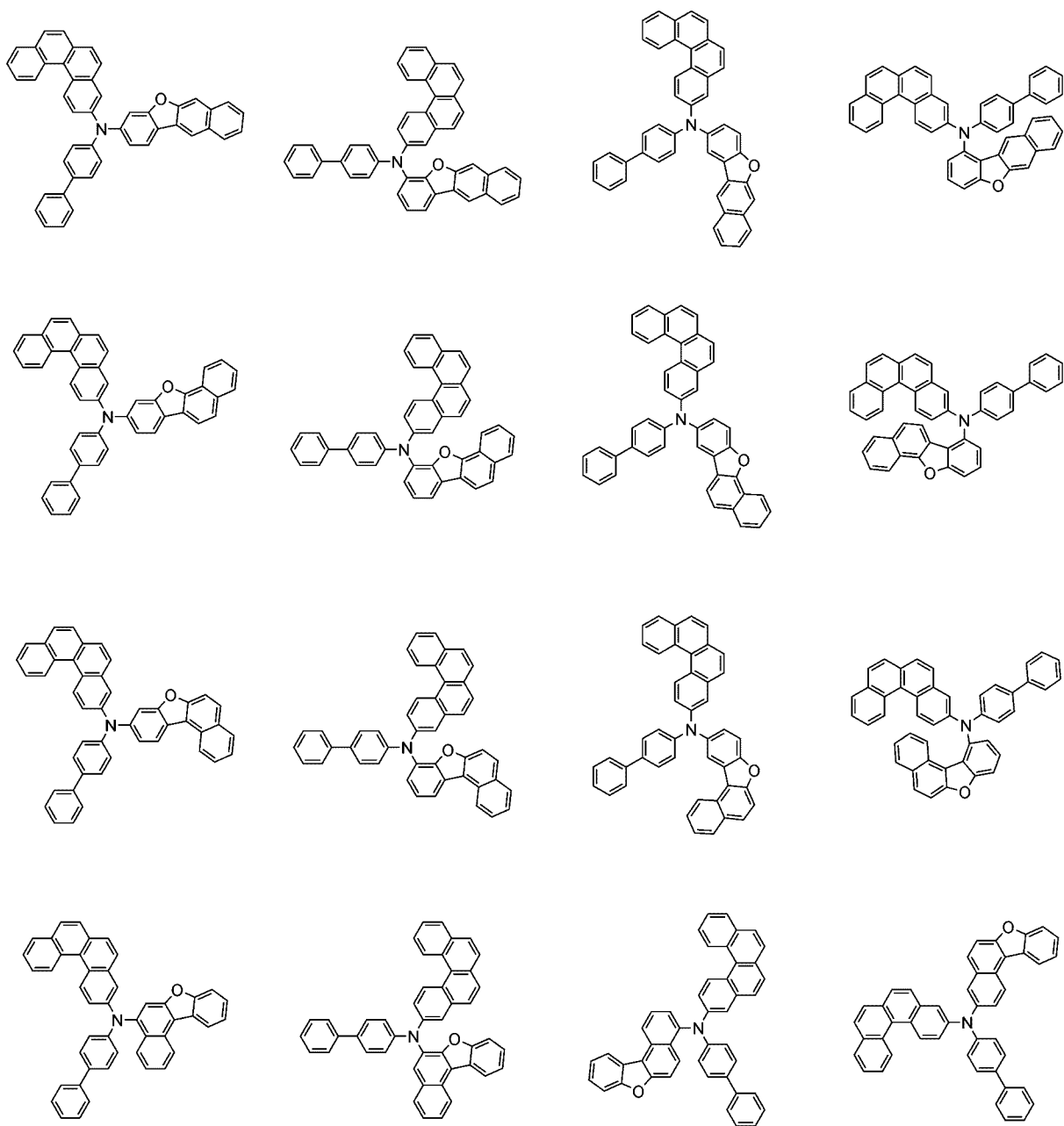
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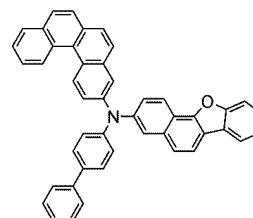
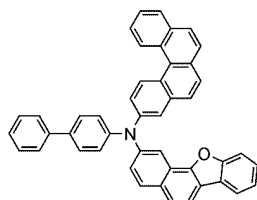
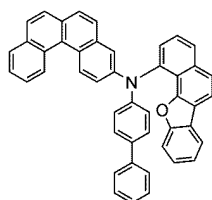
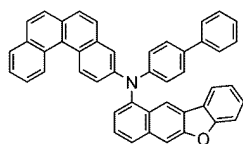
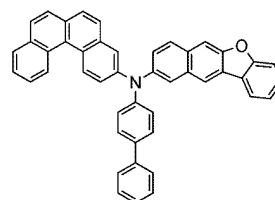
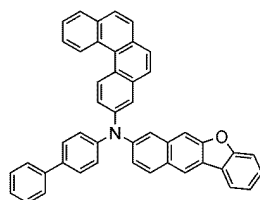
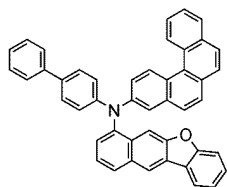
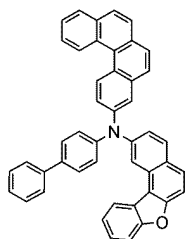
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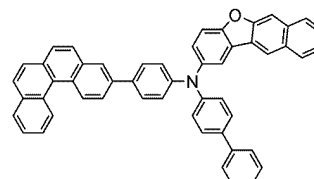
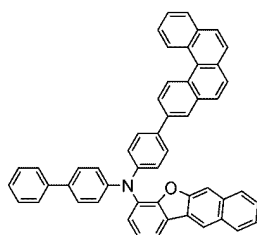
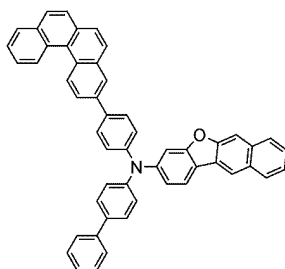
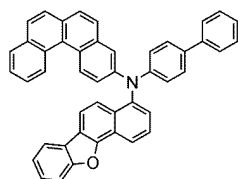
【化 3 0 5】



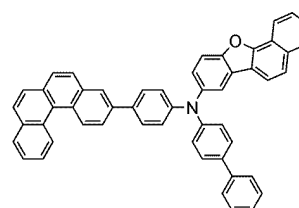
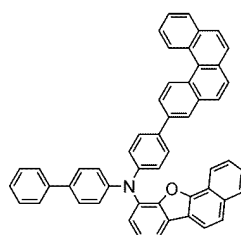
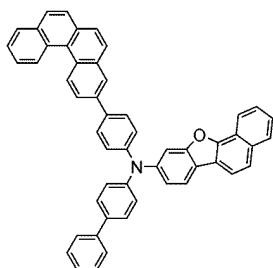
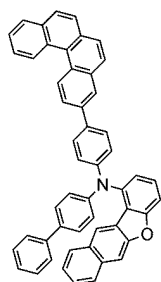
【化 3 0 6】



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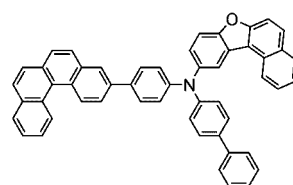
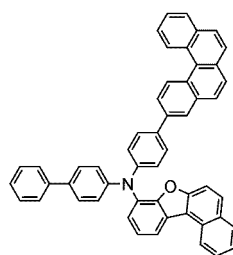
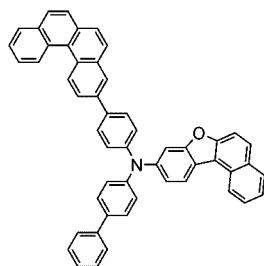
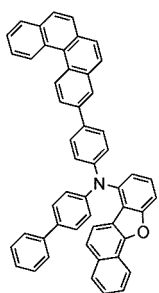


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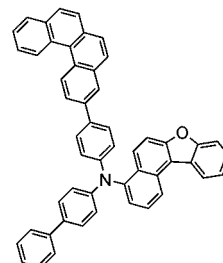
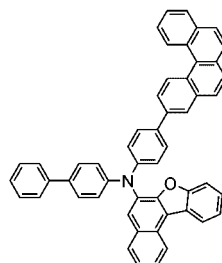
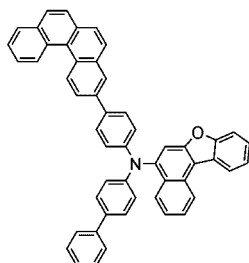
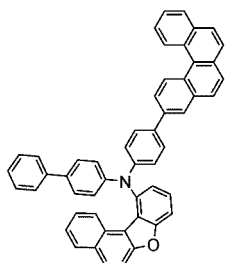
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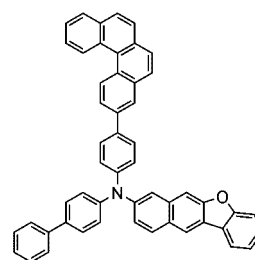
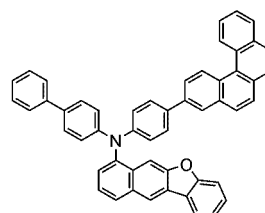
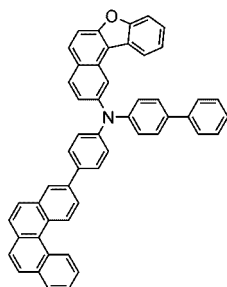
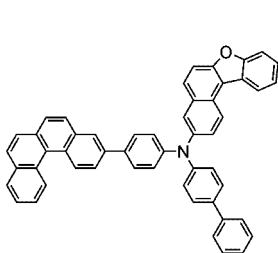
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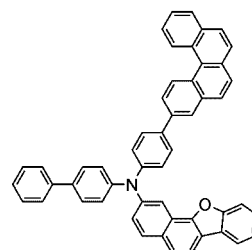
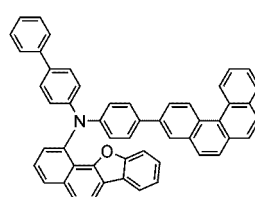
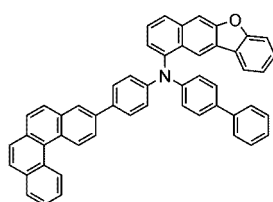
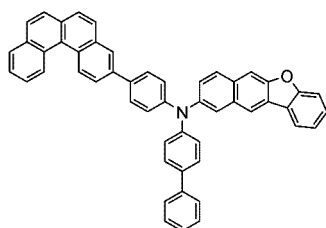
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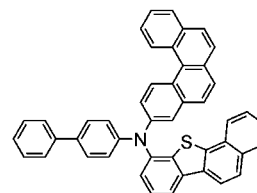
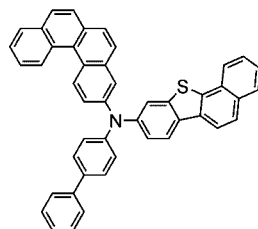
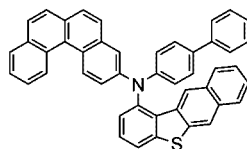
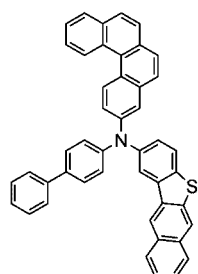
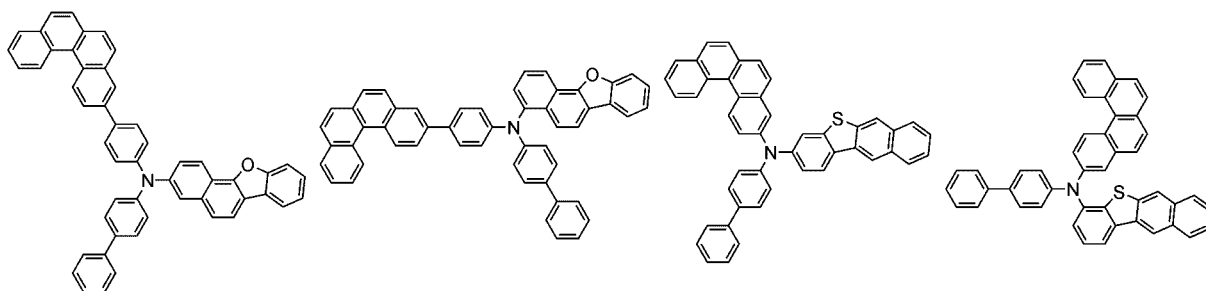
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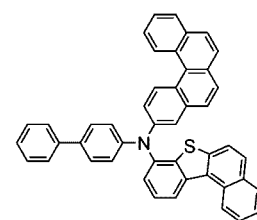
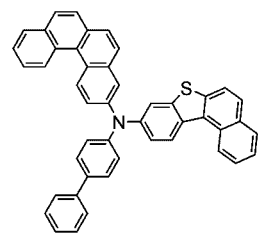
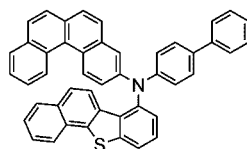
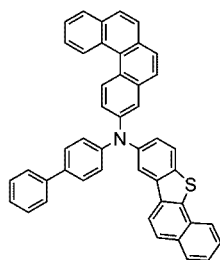
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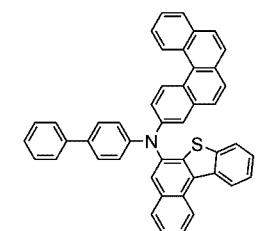
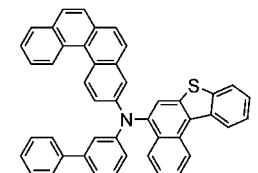
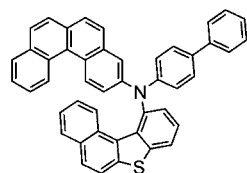
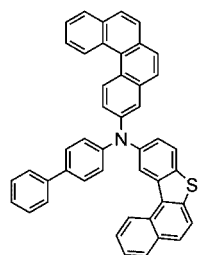
【化 3 0 8】



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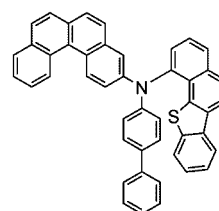
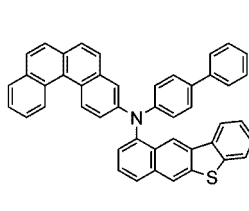
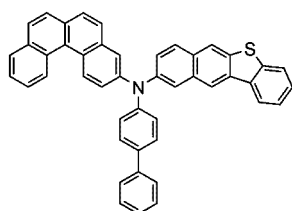
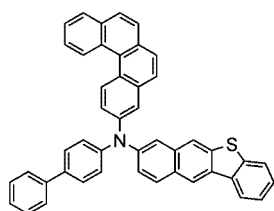
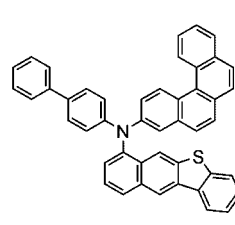
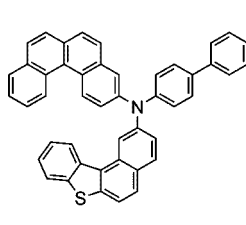
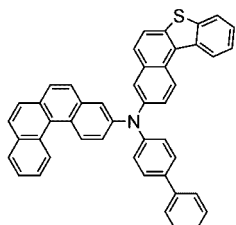
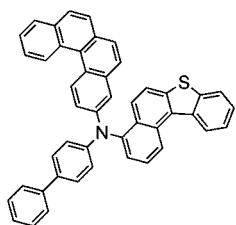


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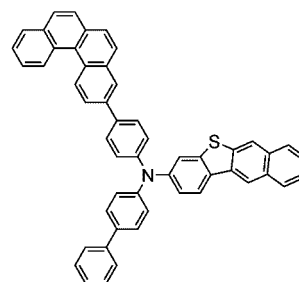
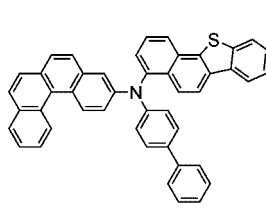
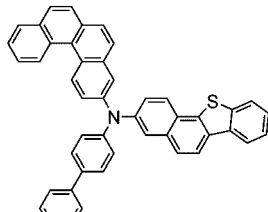
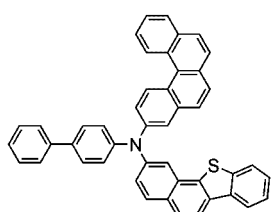
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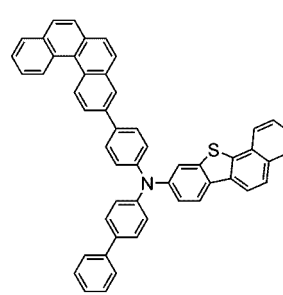
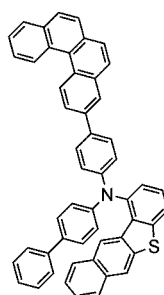
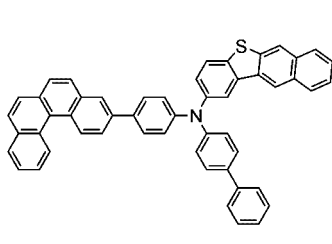
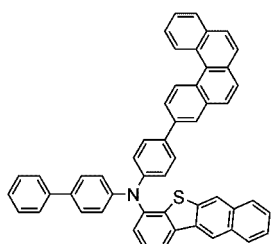
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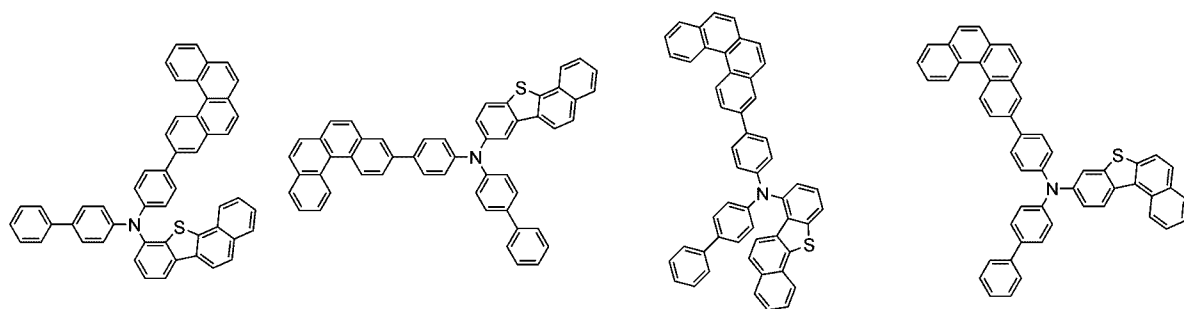


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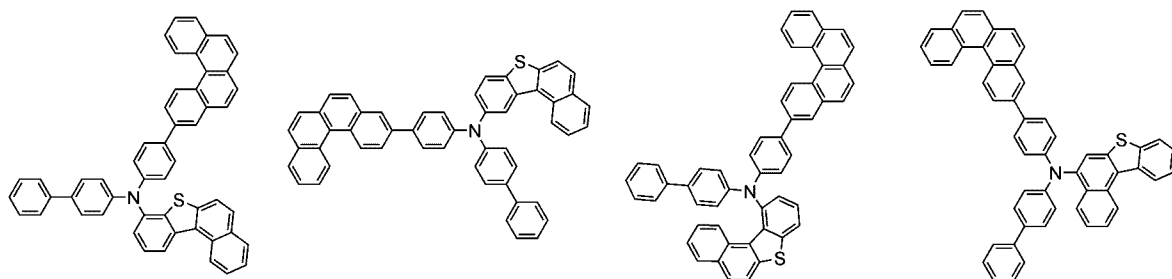
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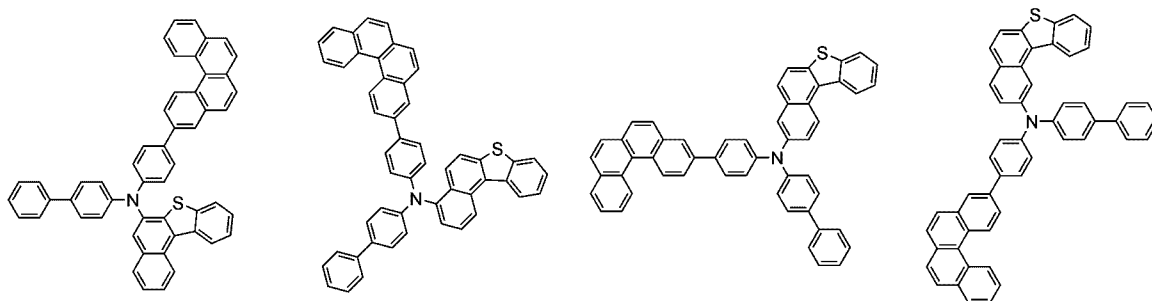
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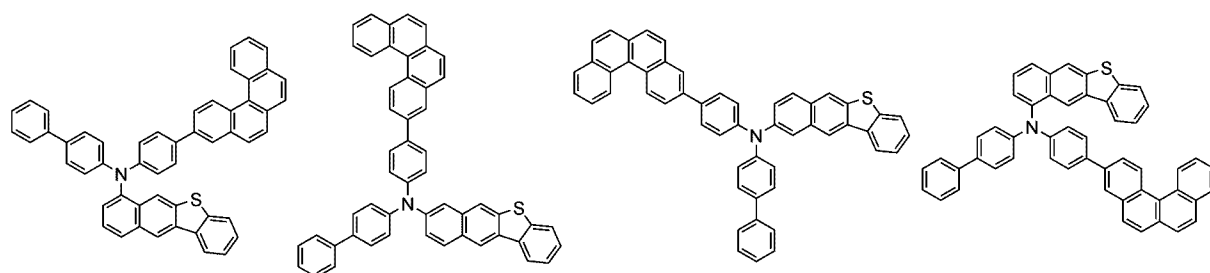
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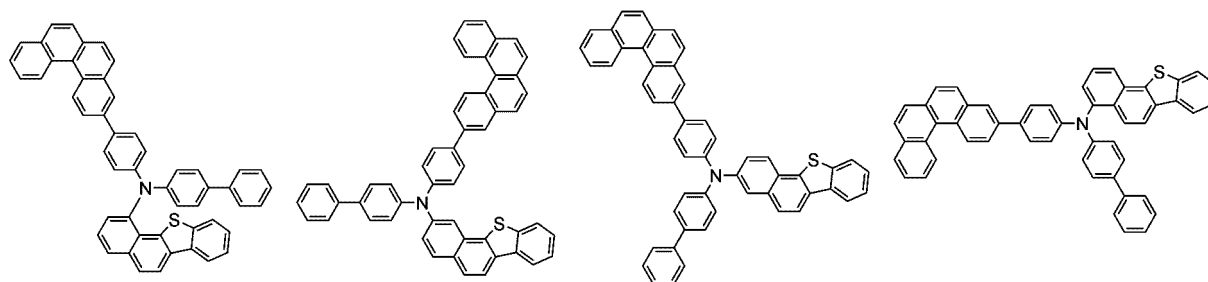
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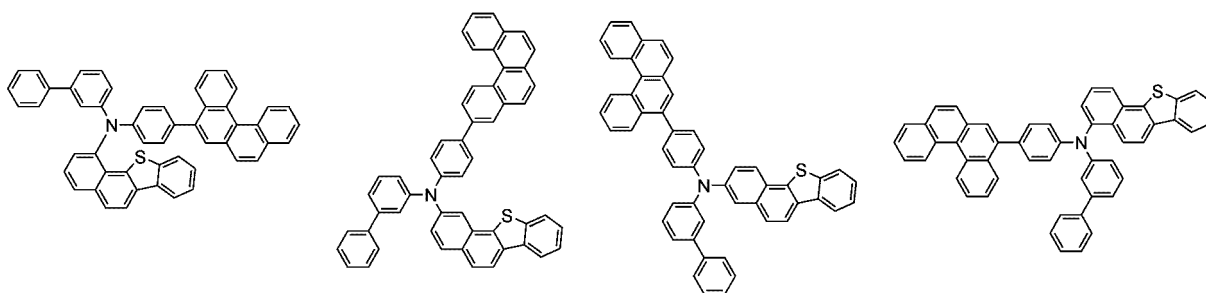
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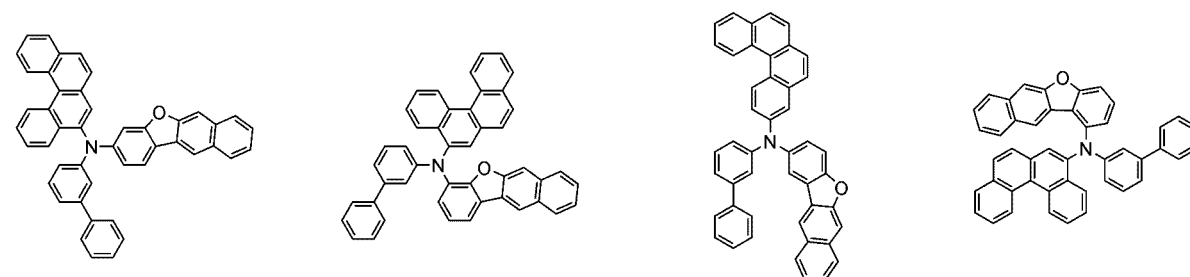
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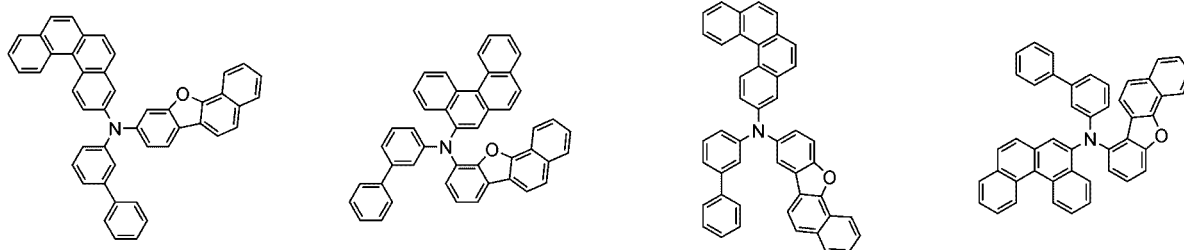


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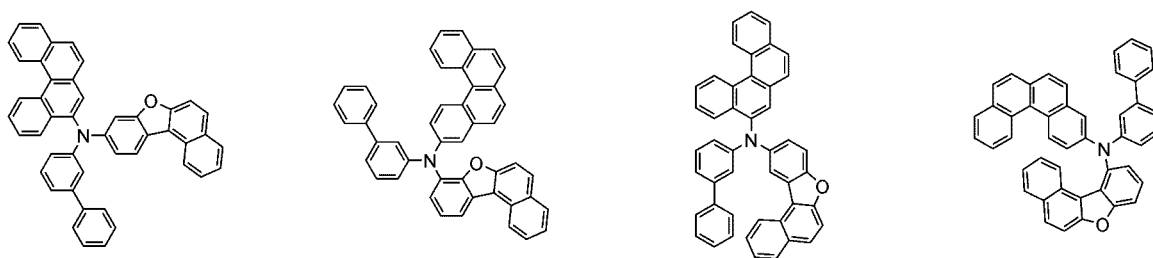
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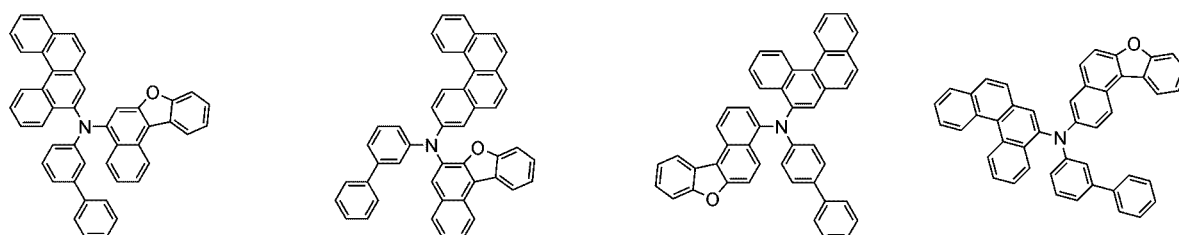
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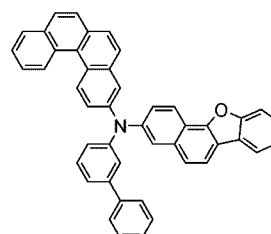
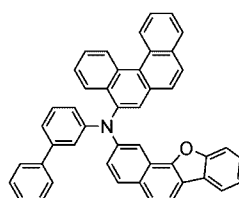
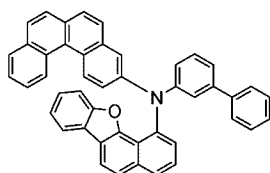
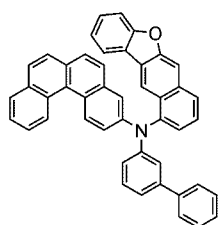
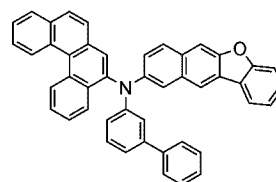
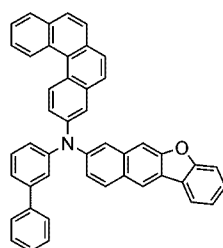
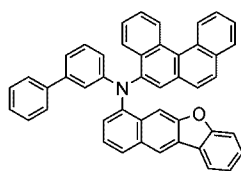
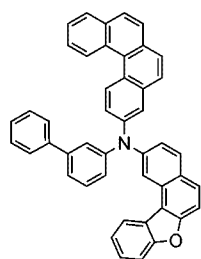


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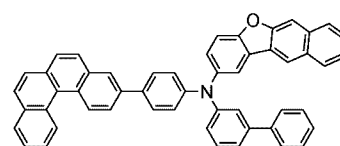
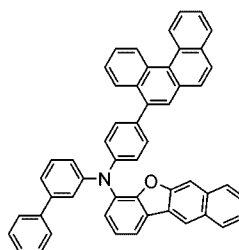
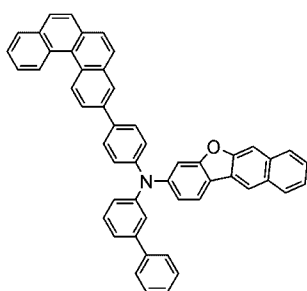
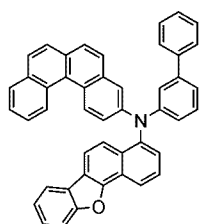


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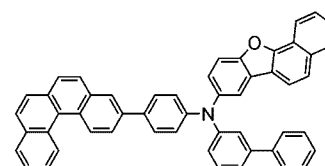
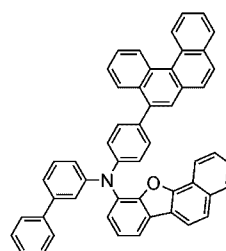
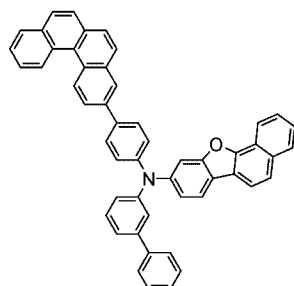
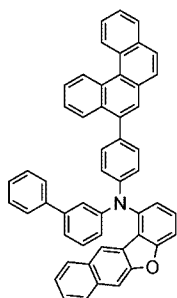
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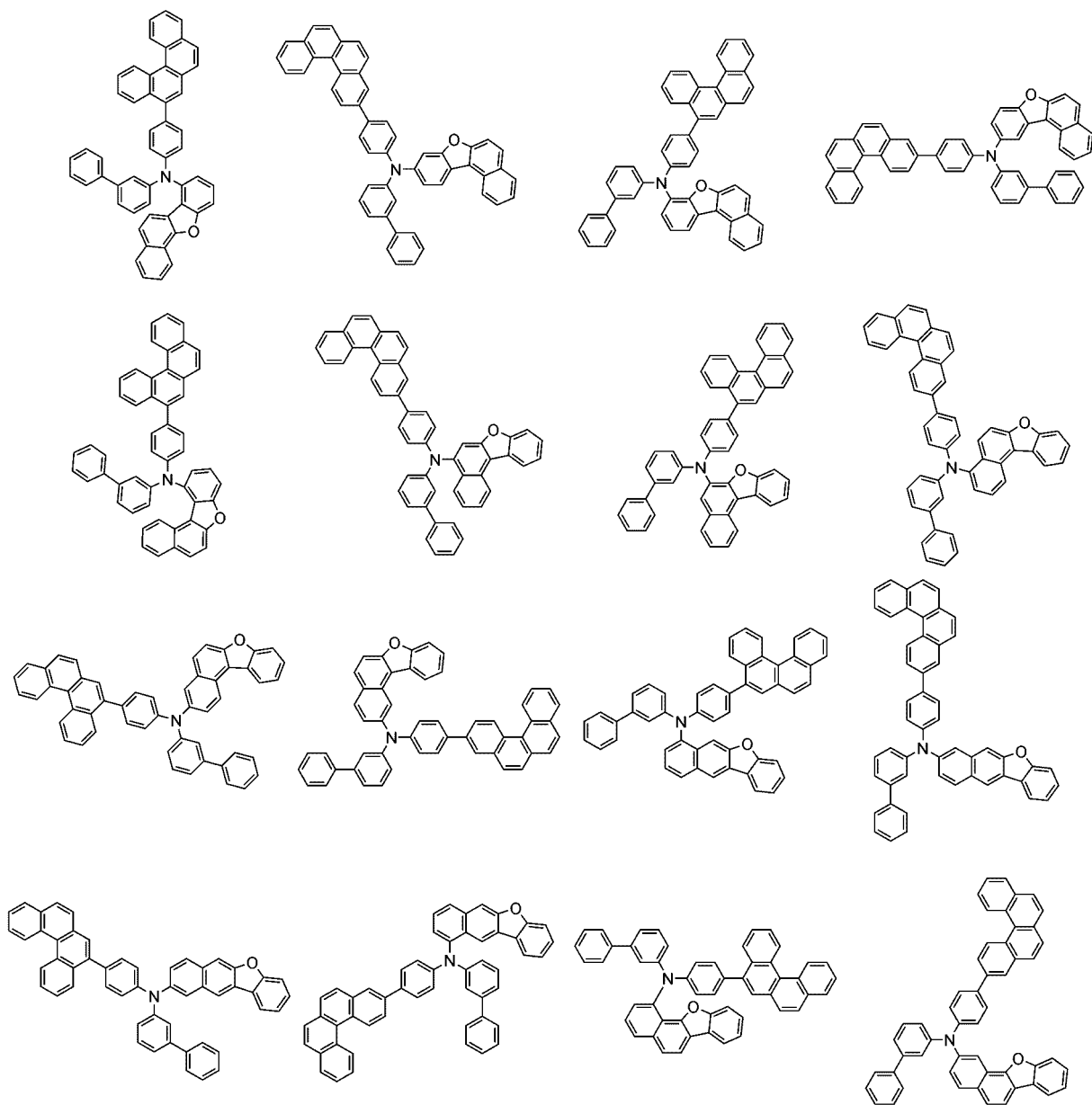


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【化 3 1 5】



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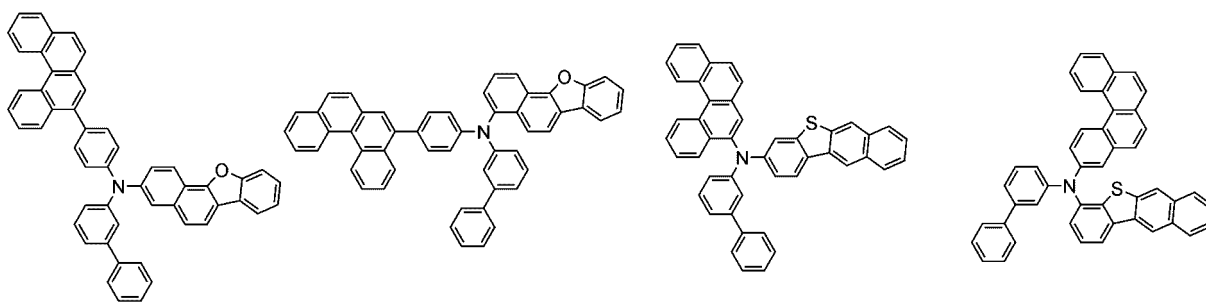
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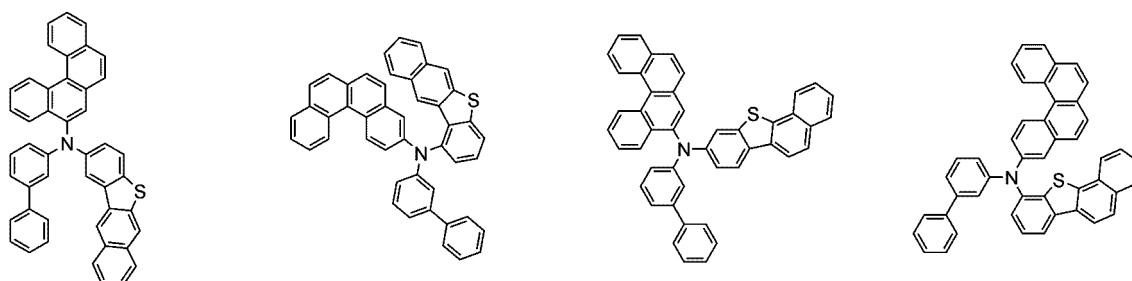
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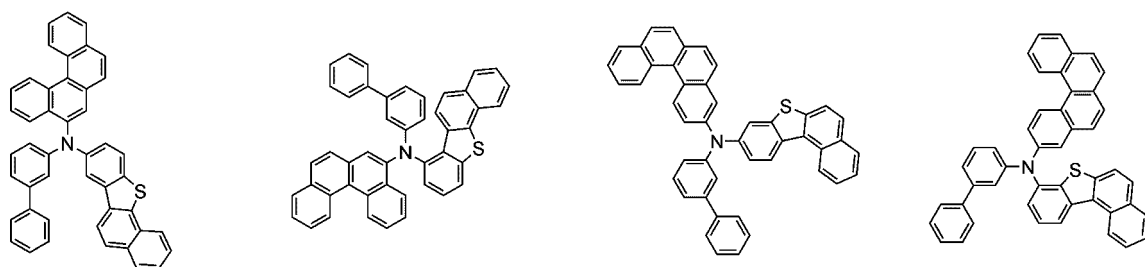
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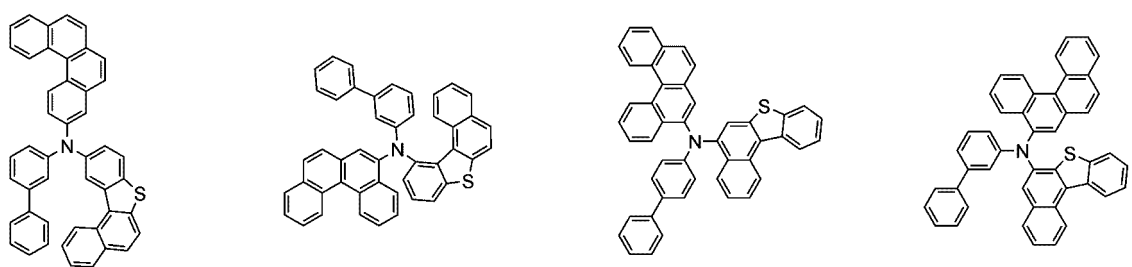
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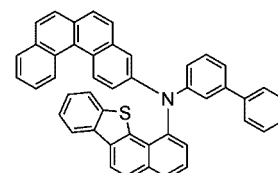
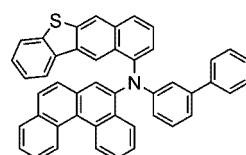
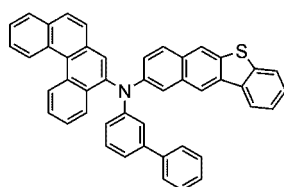
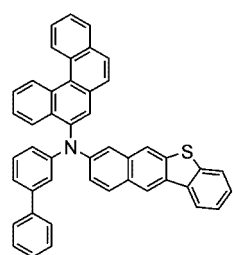
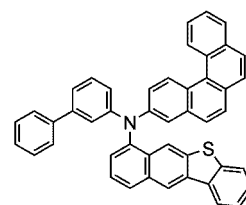
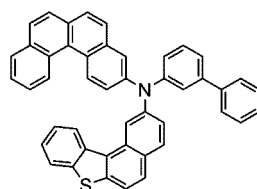
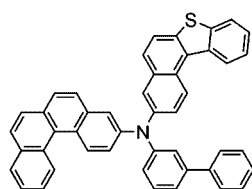
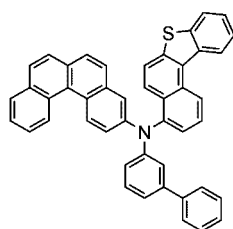
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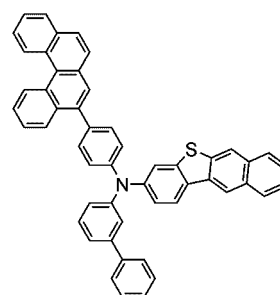
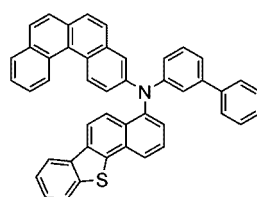
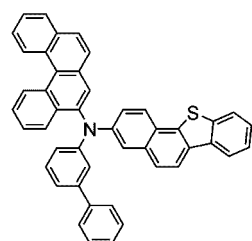
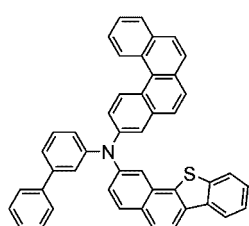
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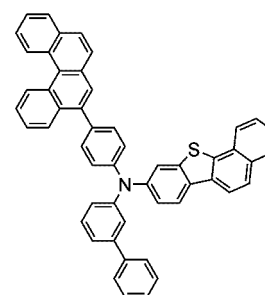
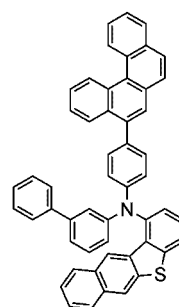
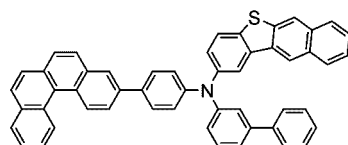
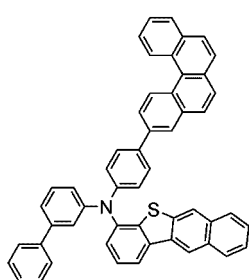
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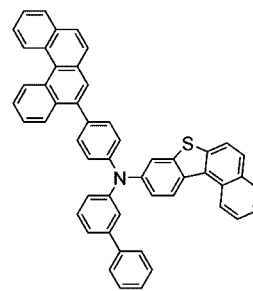
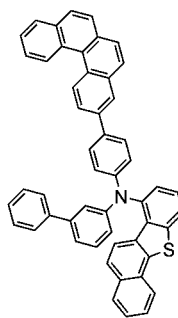
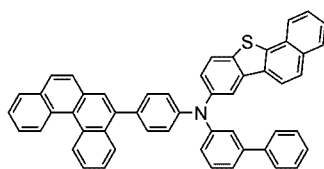
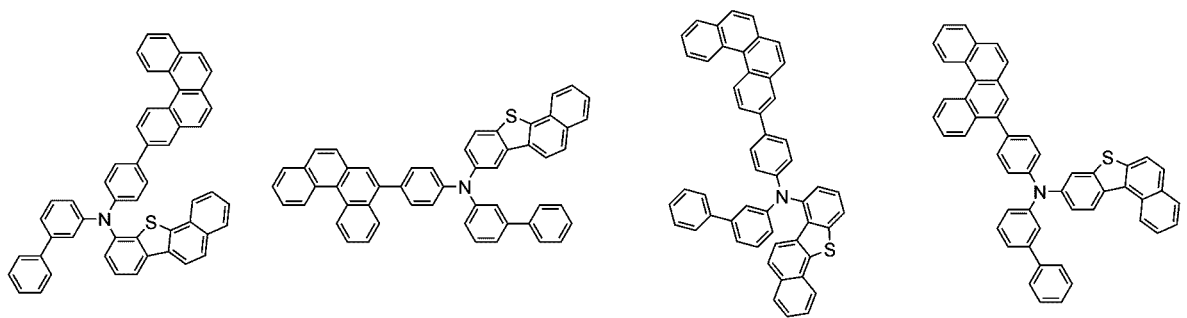


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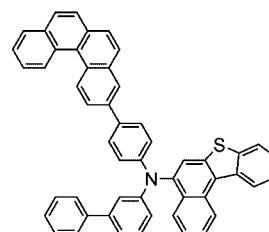
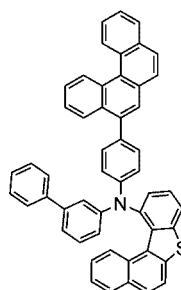
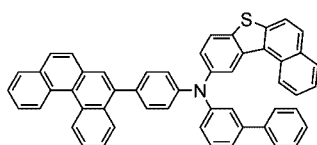
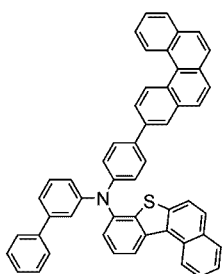
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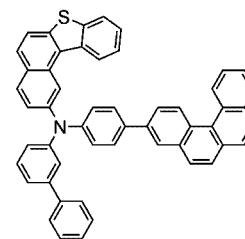
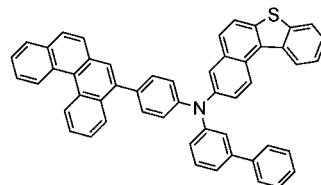
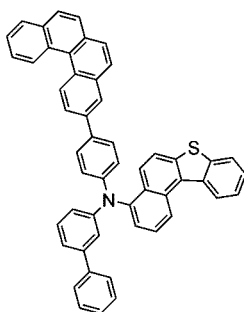
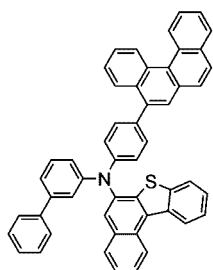
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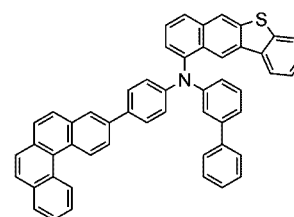
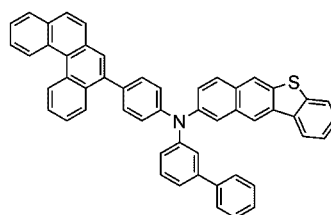
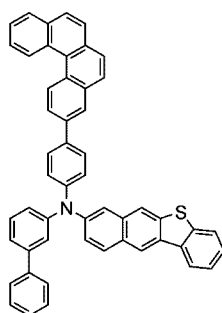
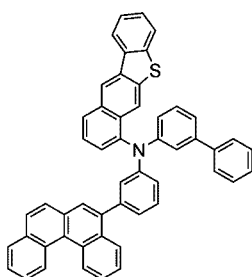
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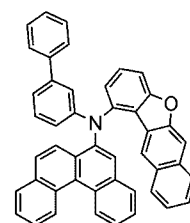
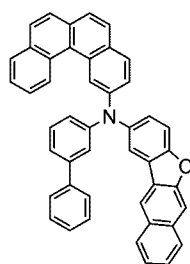
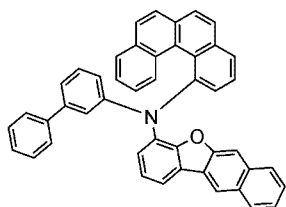
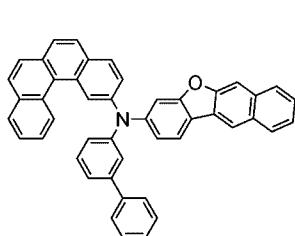
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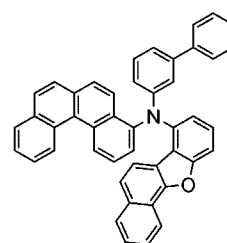
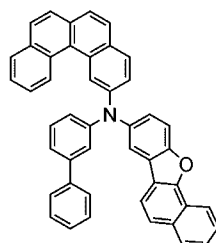
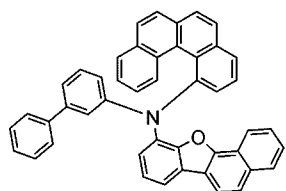
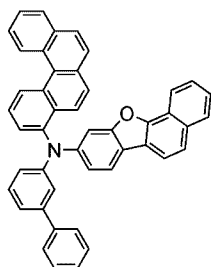
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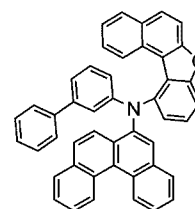
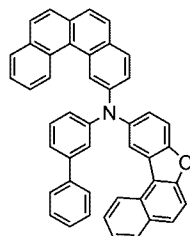
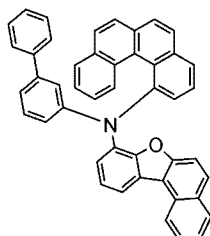
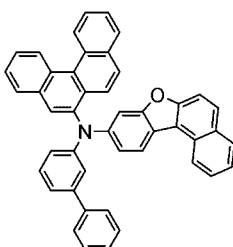
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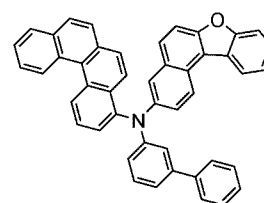
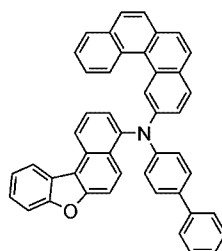
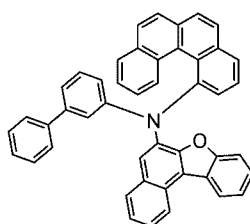
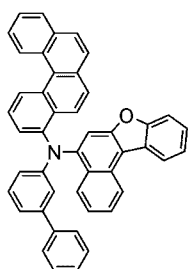
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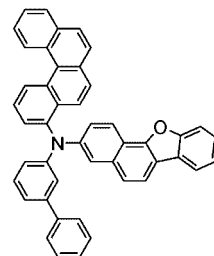
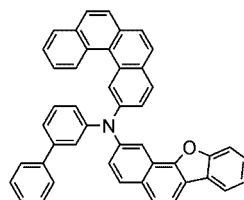
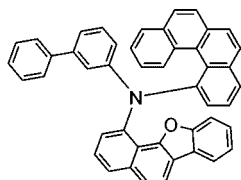
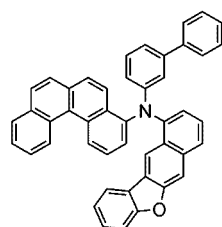
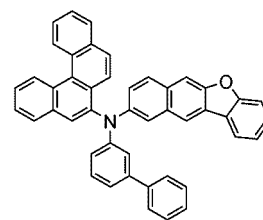
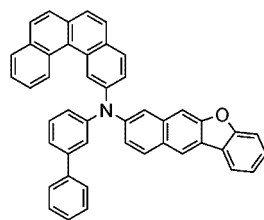
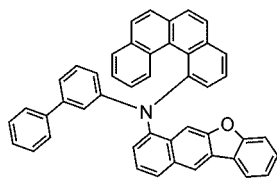
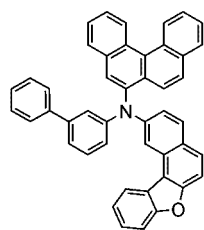
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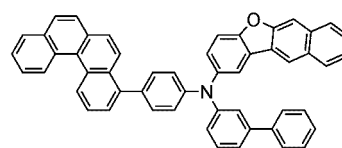
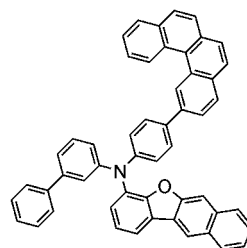
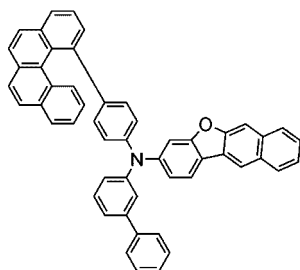
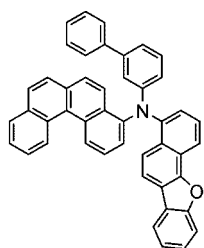
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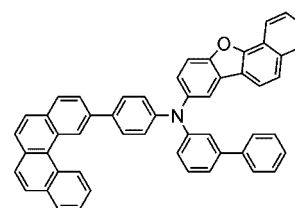
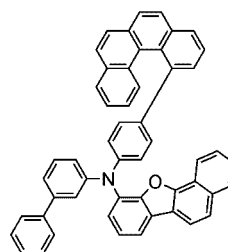
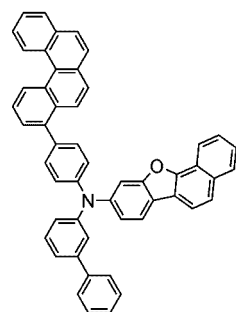
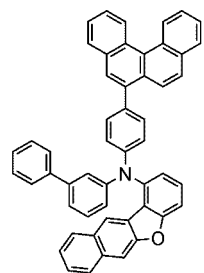
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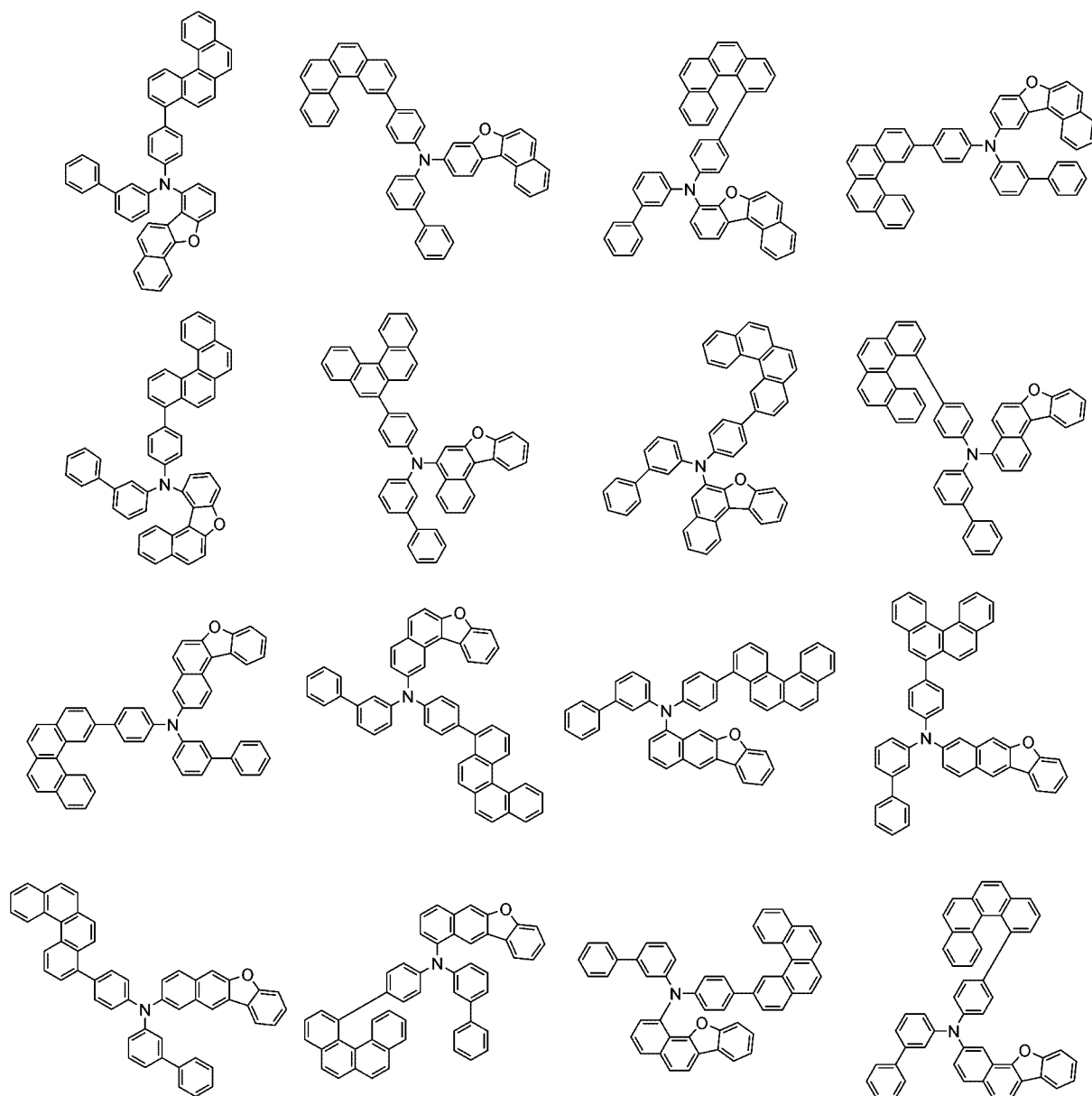


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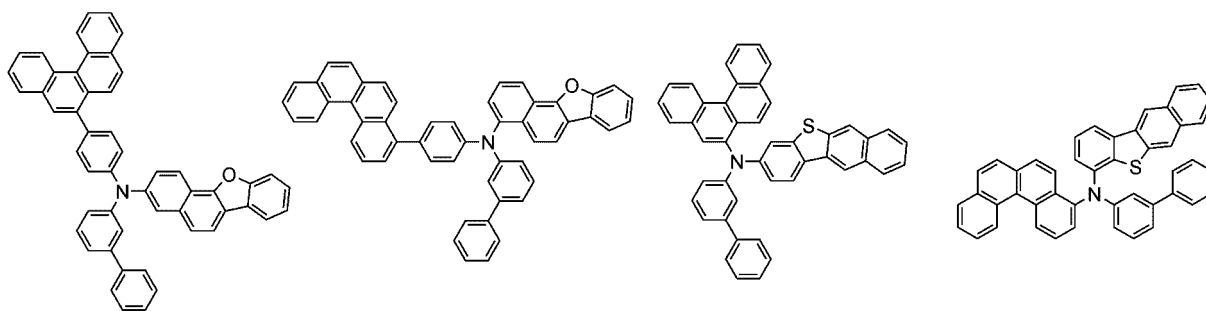
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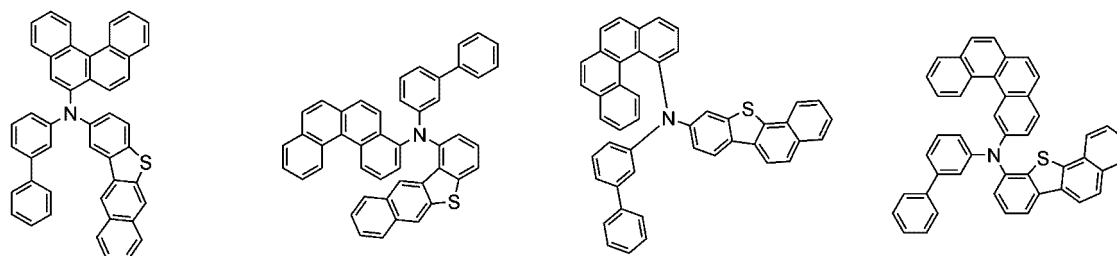
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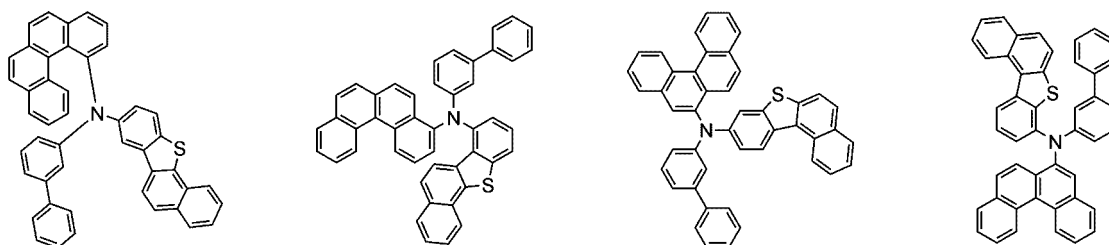
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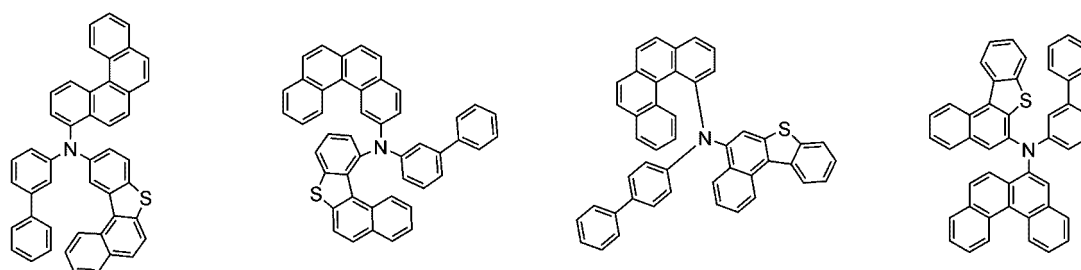
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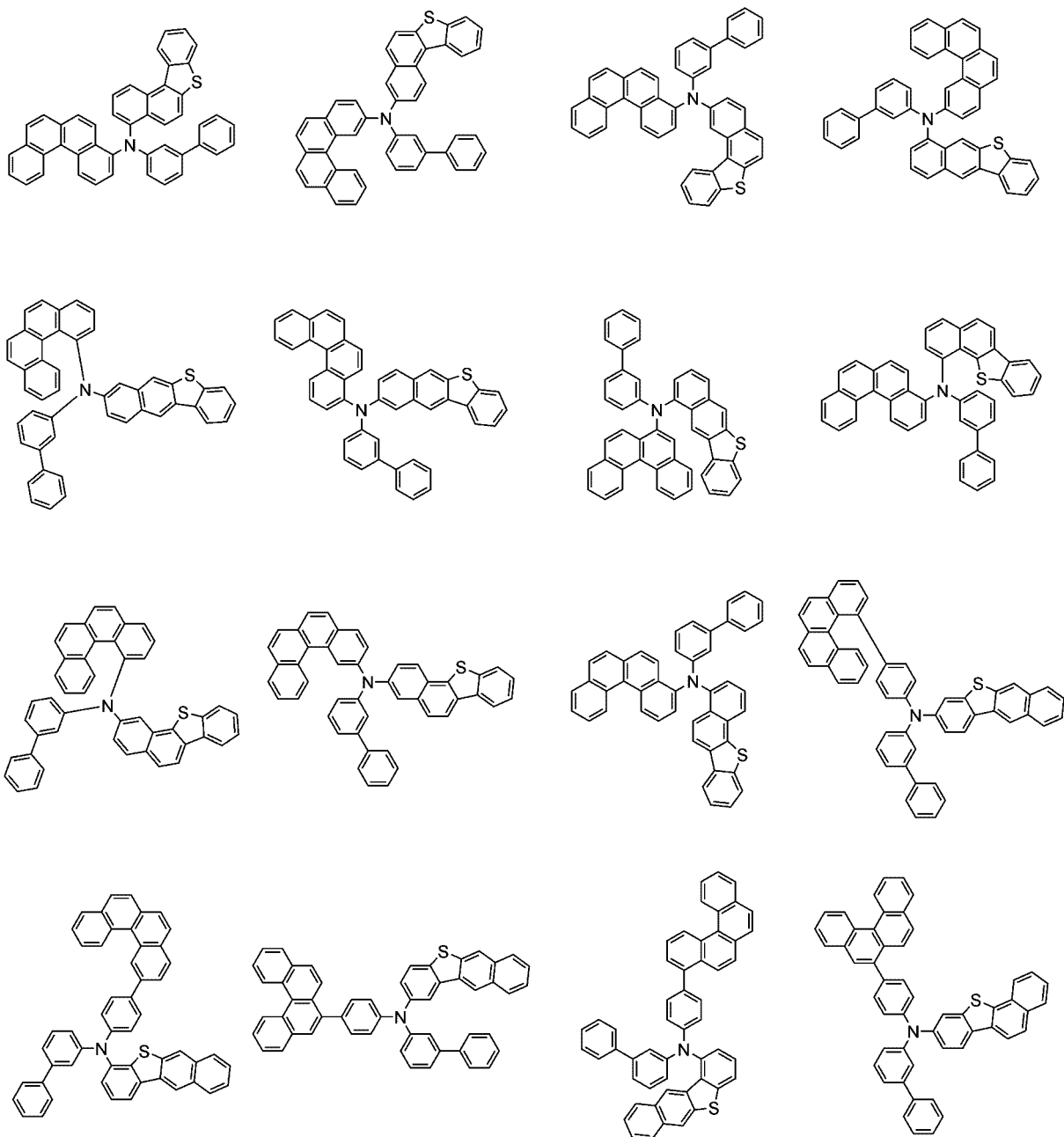
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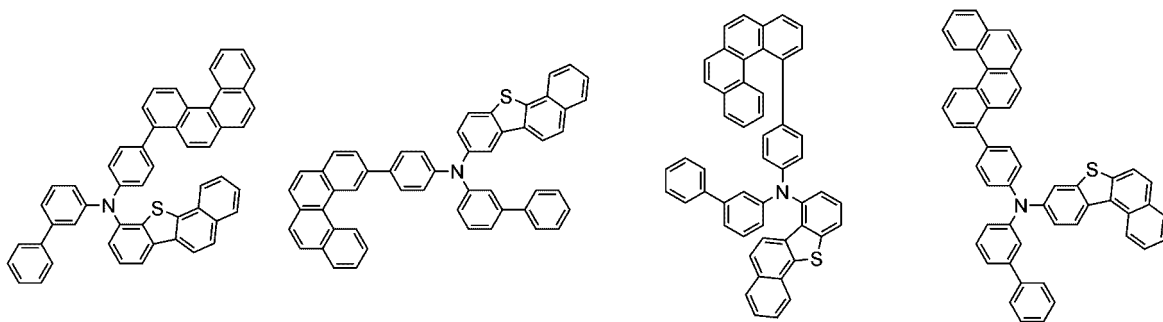
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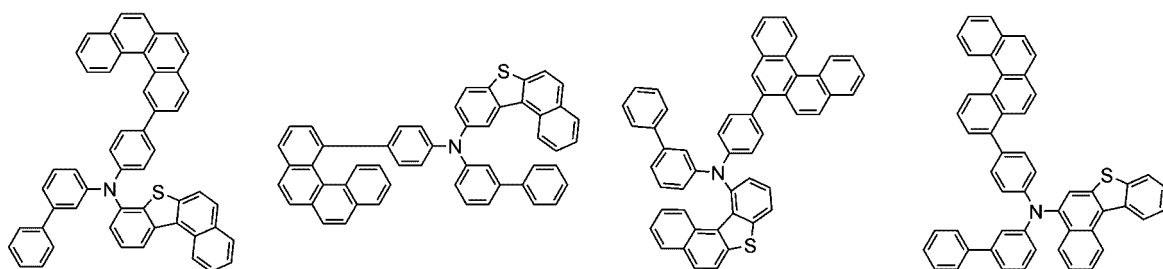
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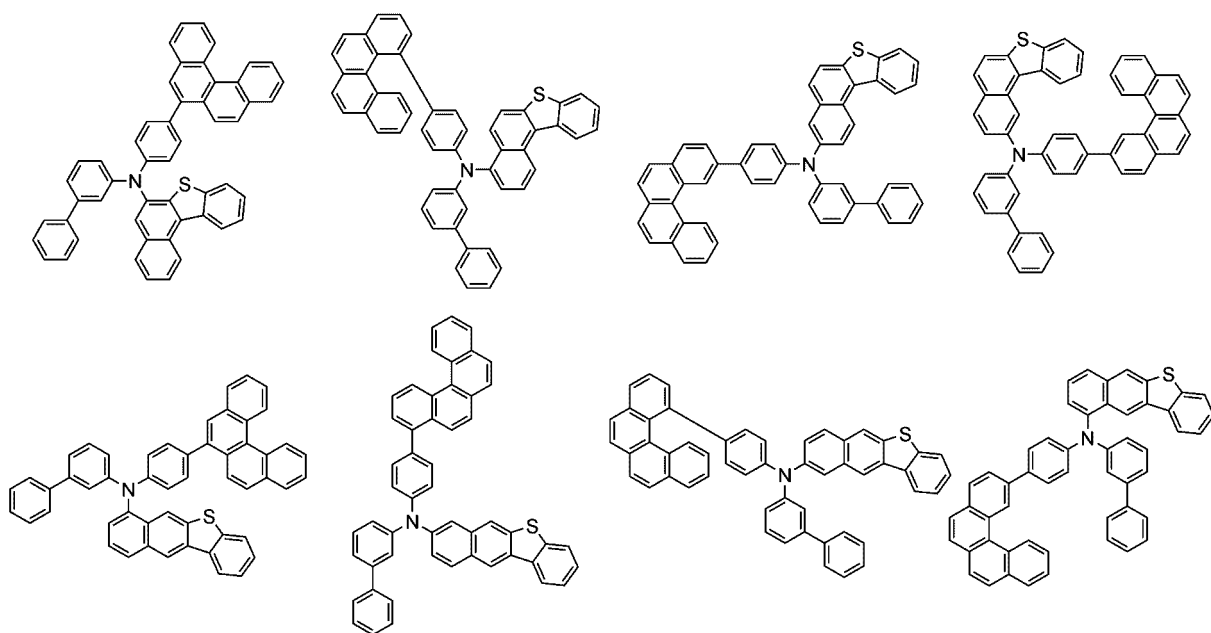
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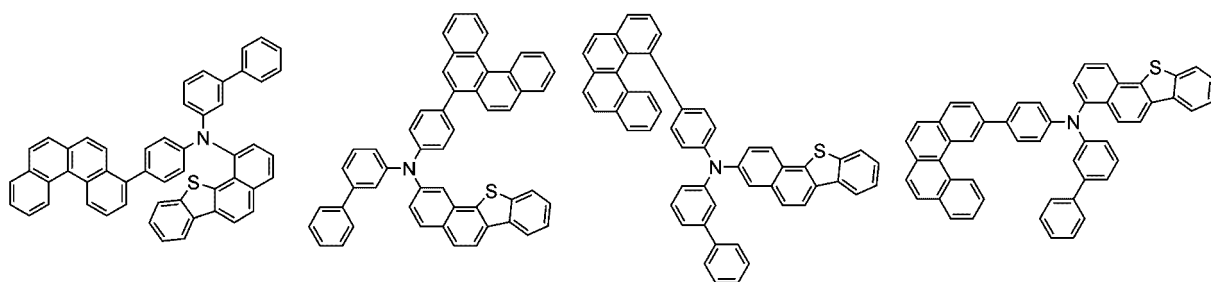


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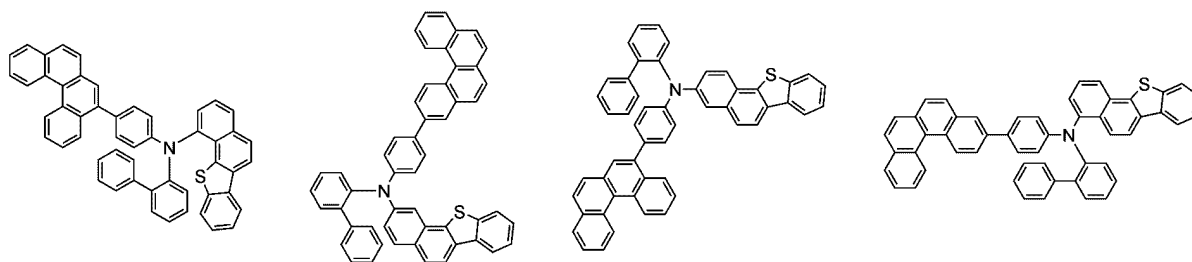
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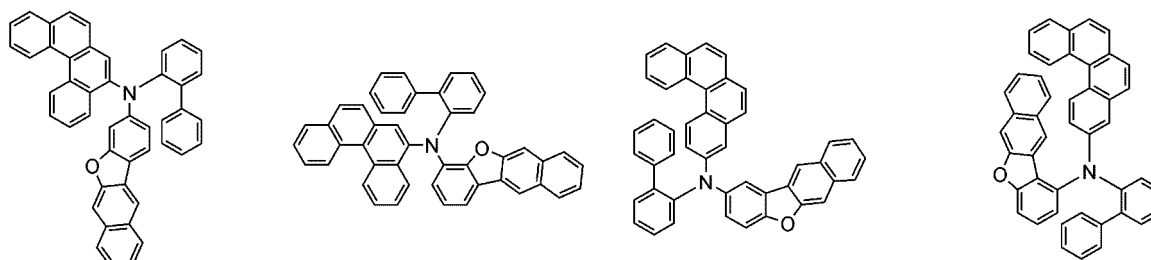
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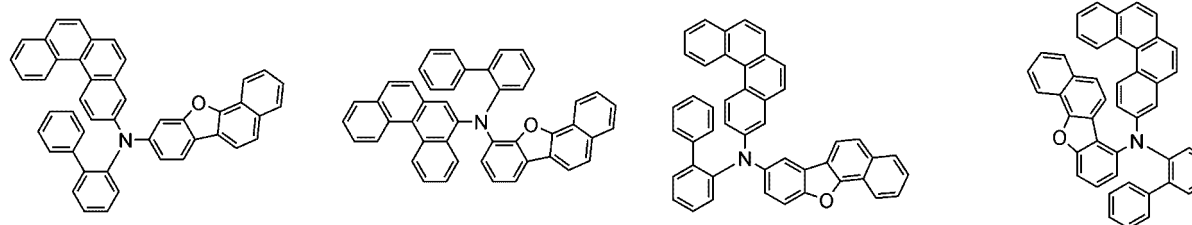


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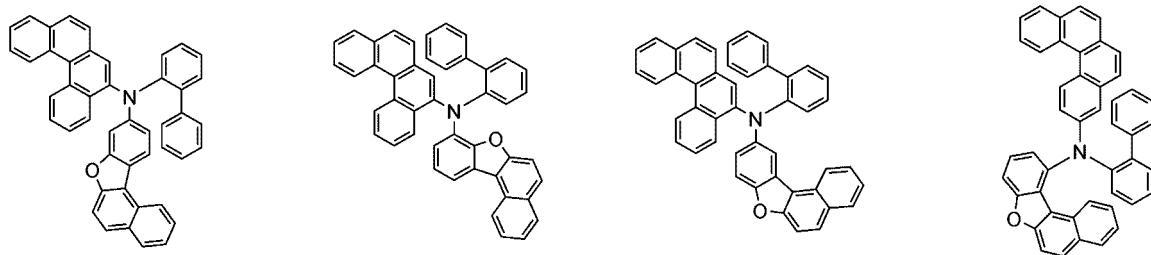
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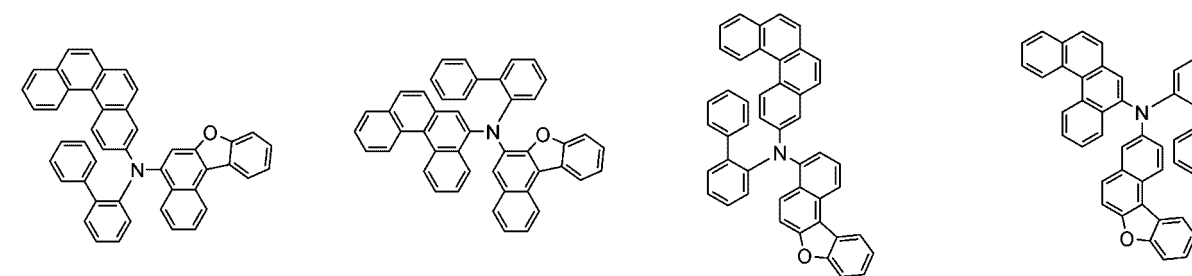
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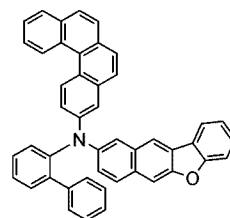
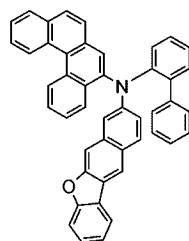
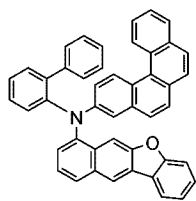
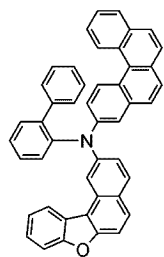


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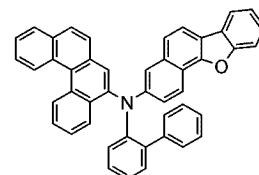
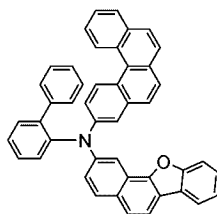
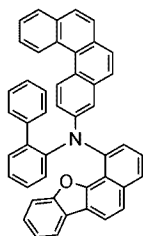
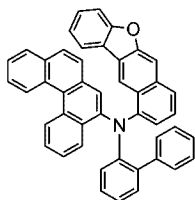


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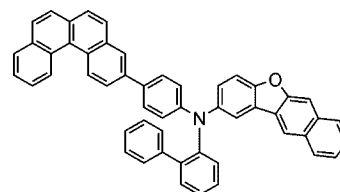
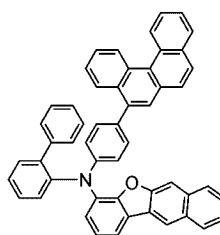
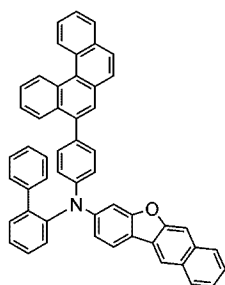
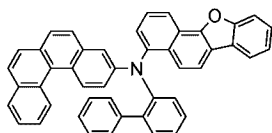
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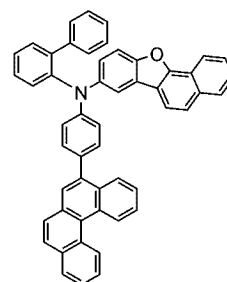
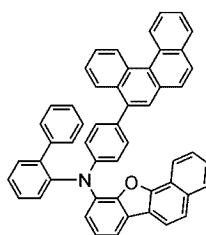
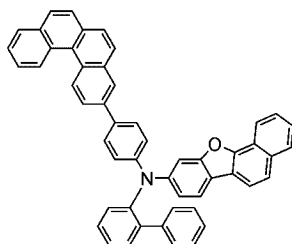
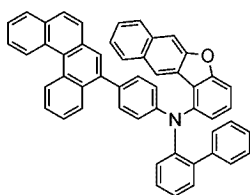
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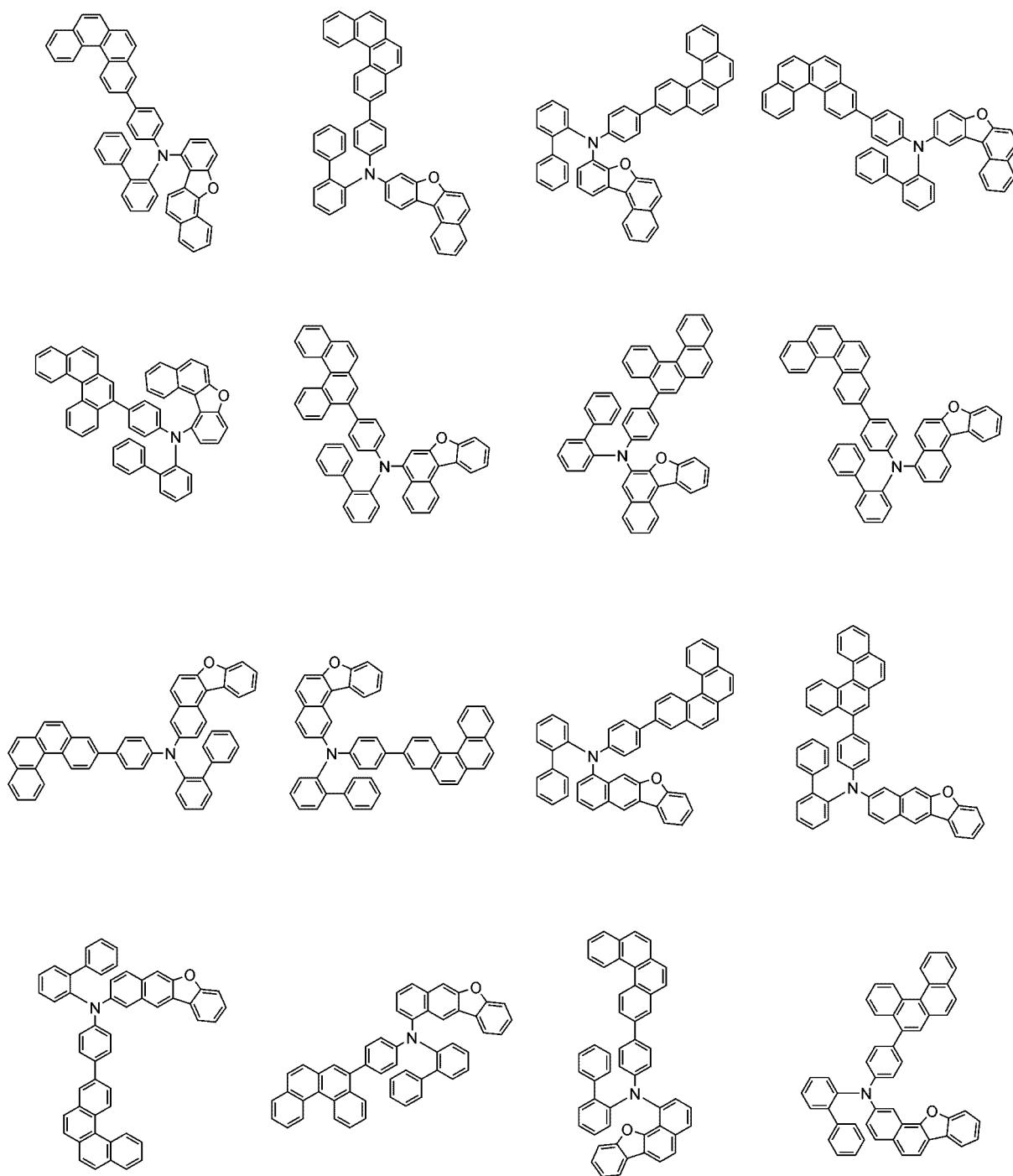
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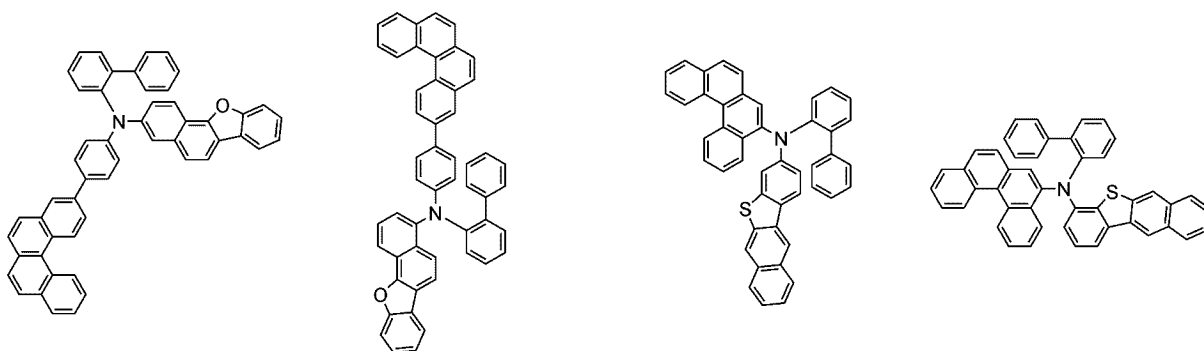
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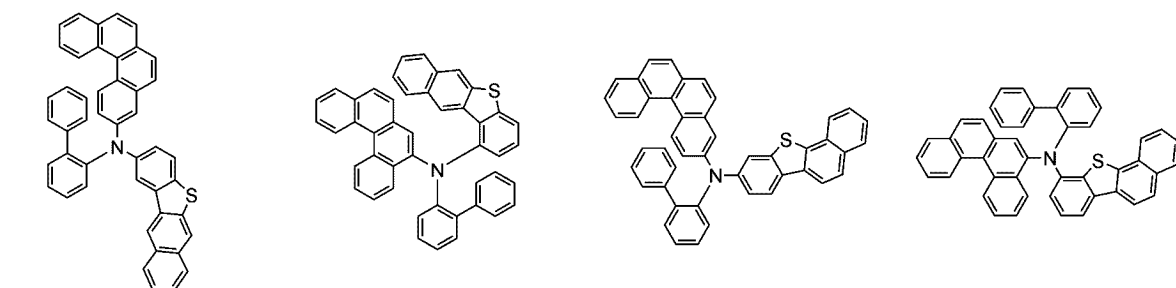
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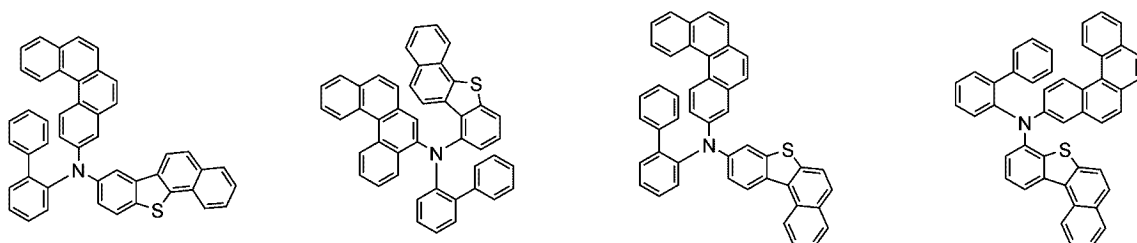
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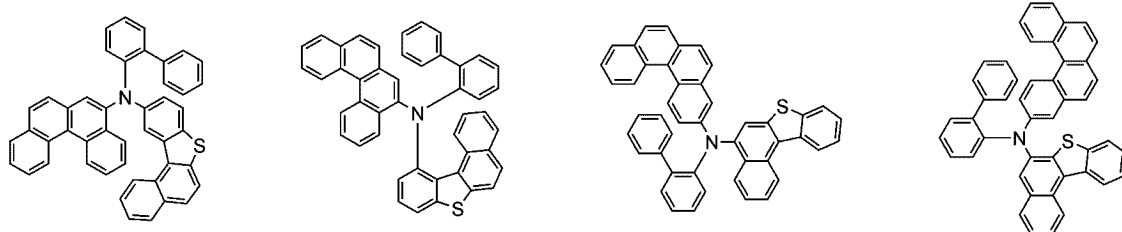
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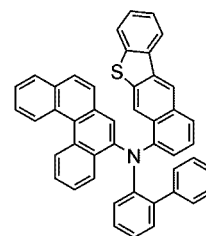
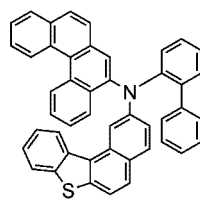
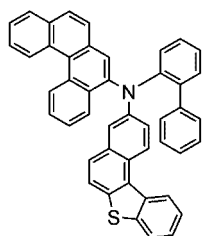
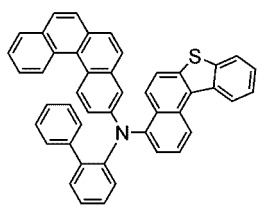
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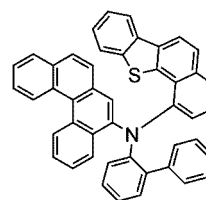
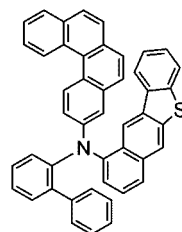
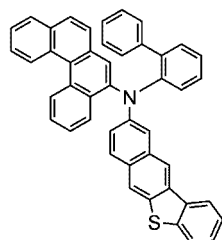
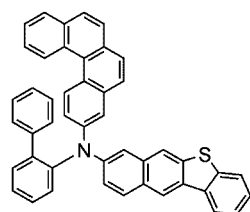
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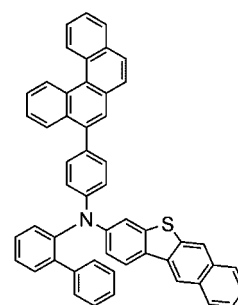
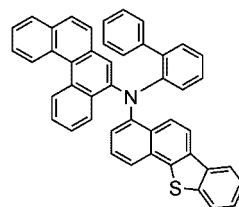
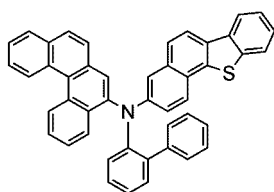
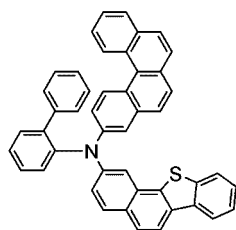
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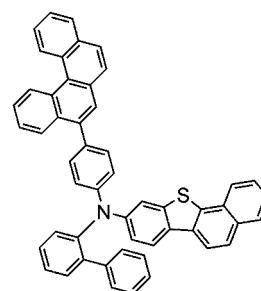
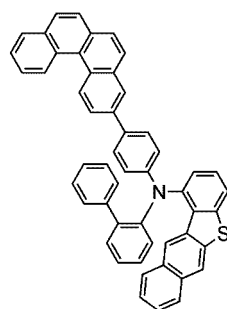
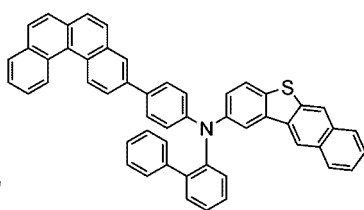
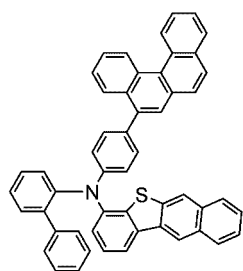
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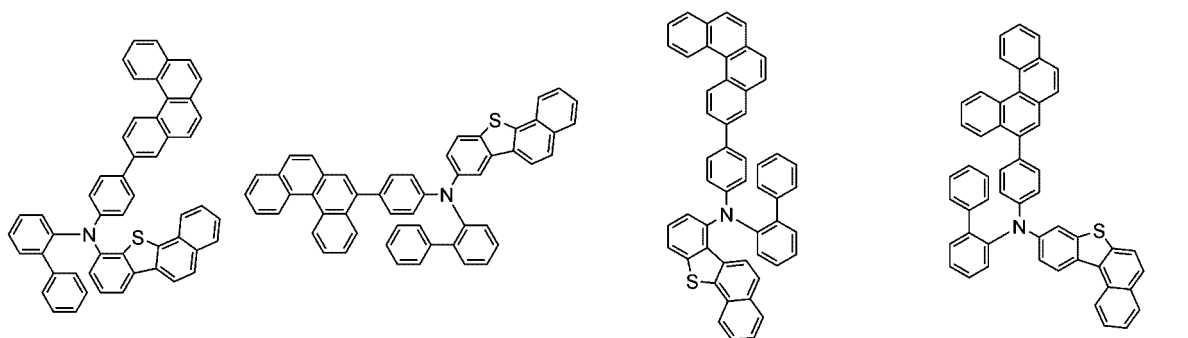
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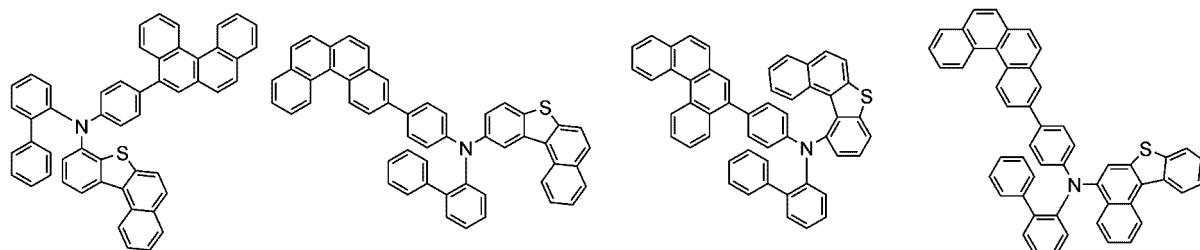
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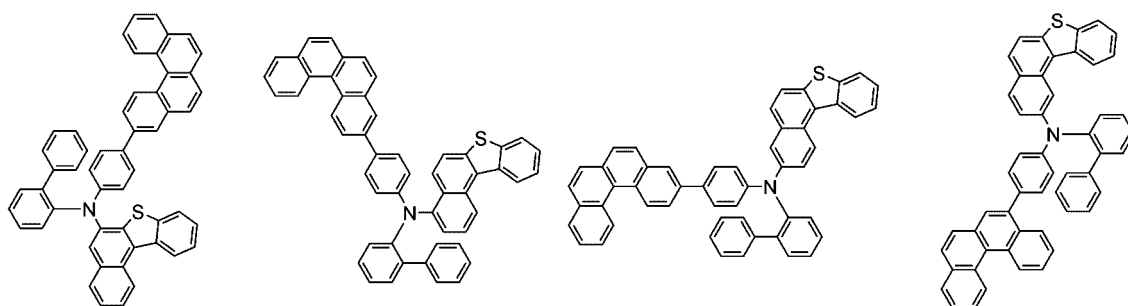
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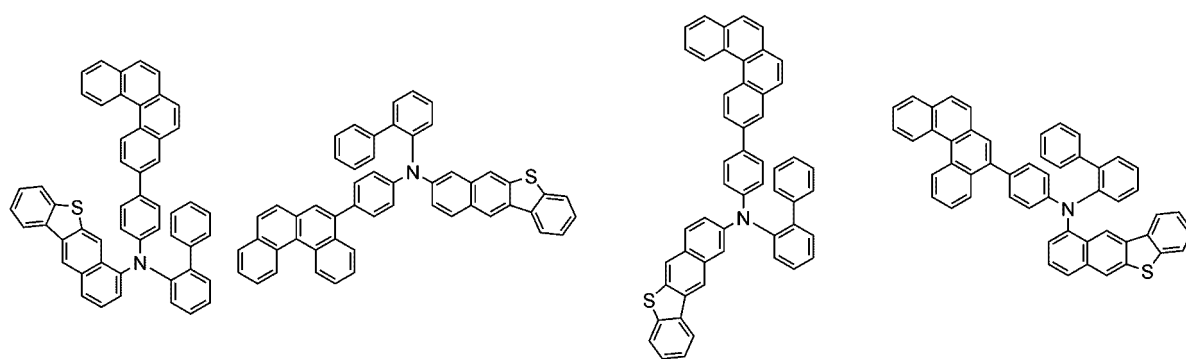
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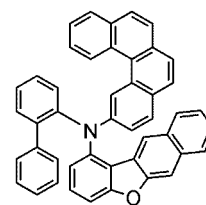
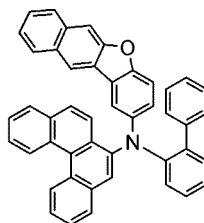
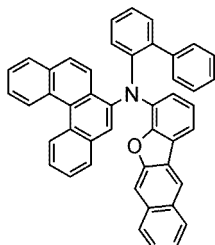
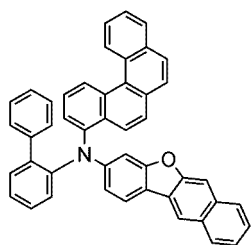
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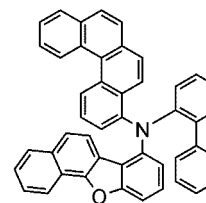
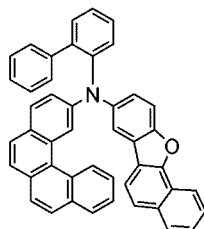
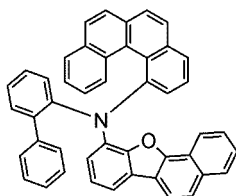
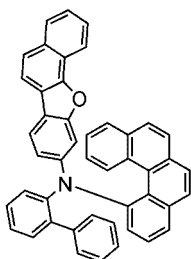
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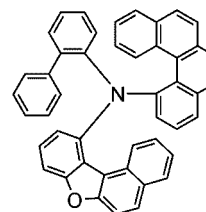
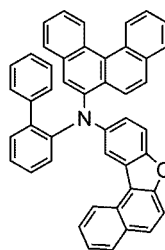
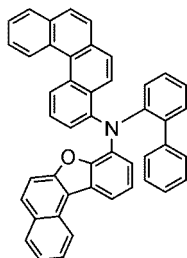
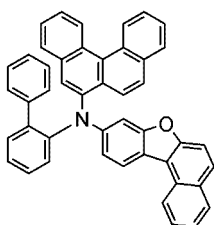
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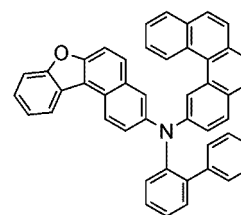
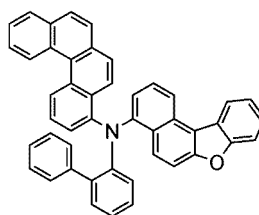
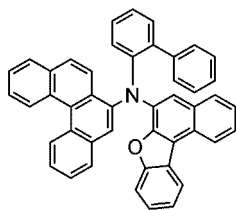
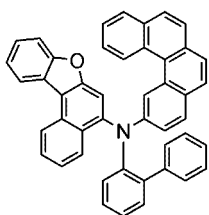
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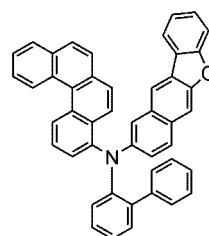
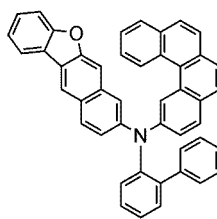
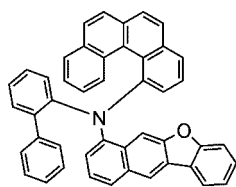
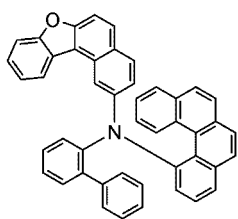
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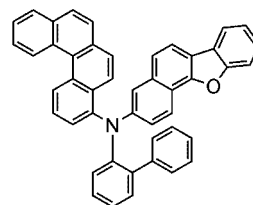
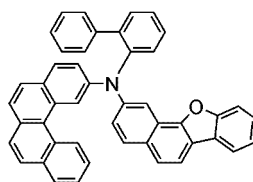
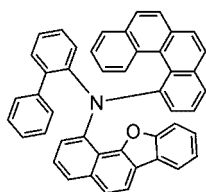
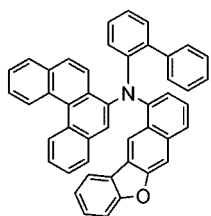
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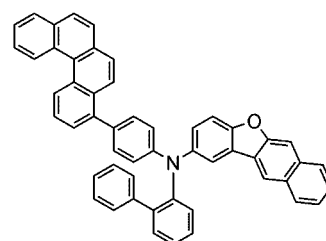
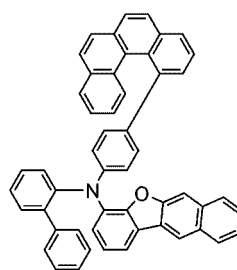
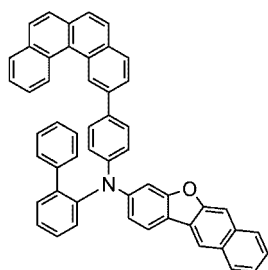
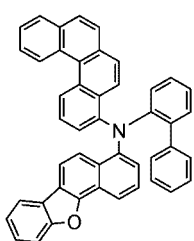
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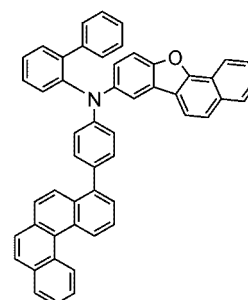
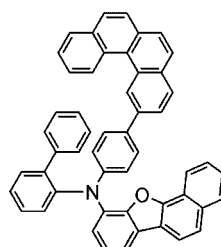
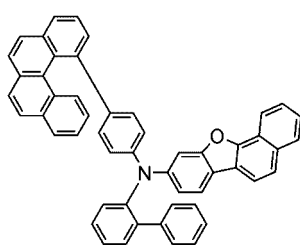
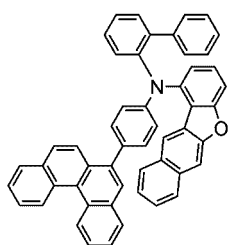
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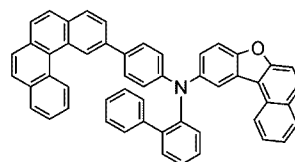
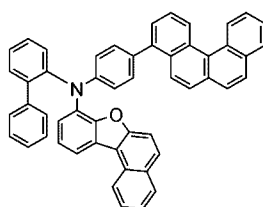
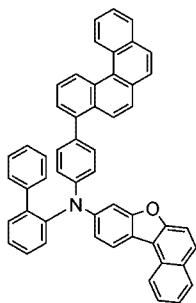
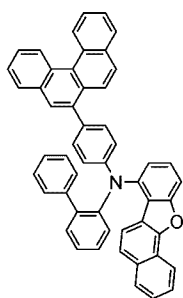
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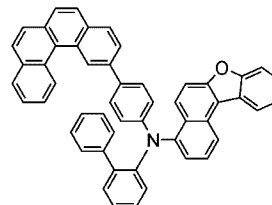
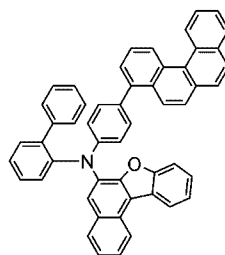
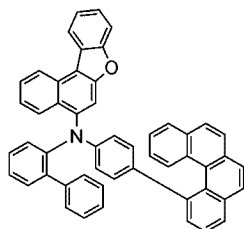
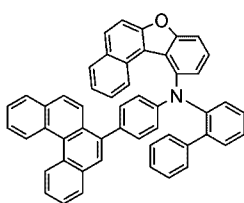
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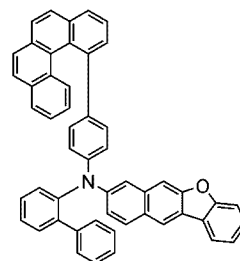
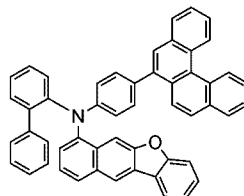
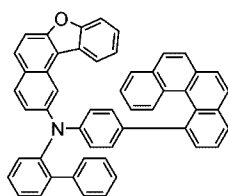
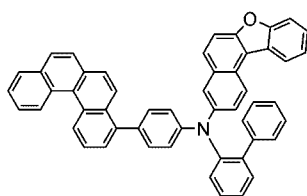
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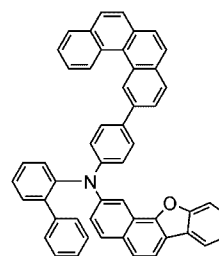
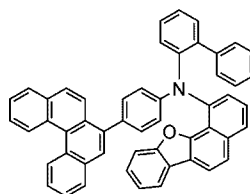
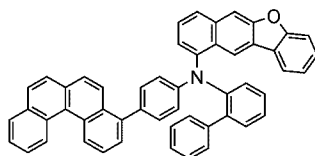
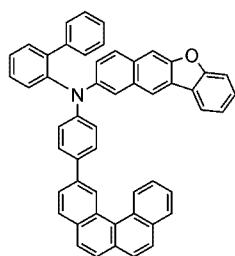
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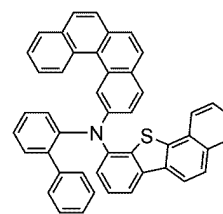
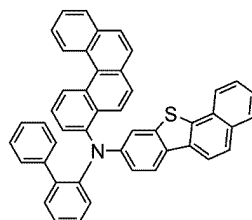
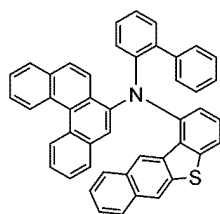
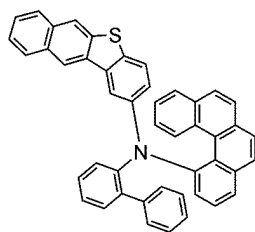
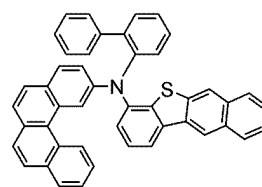
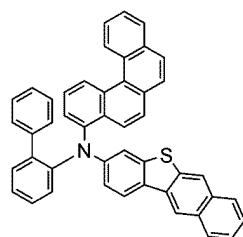
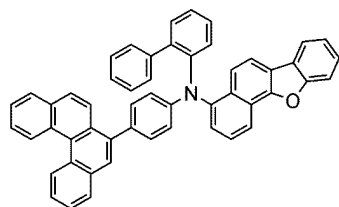
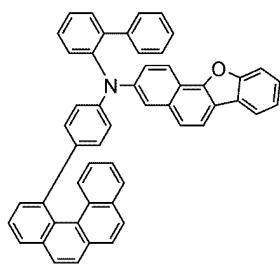
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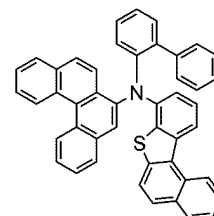
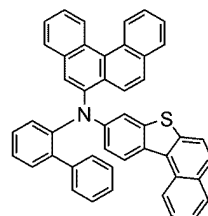
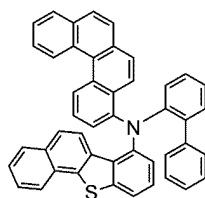
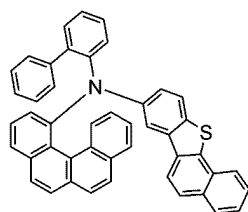
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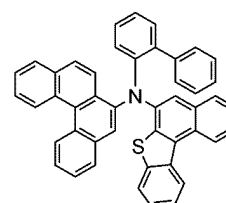
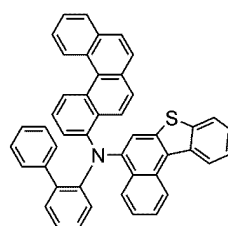
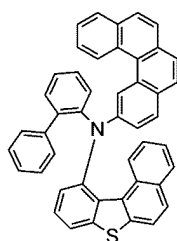
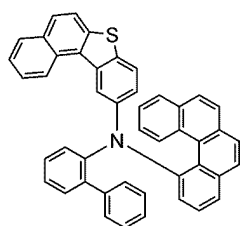
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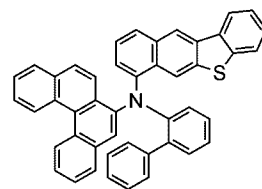
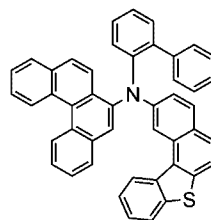
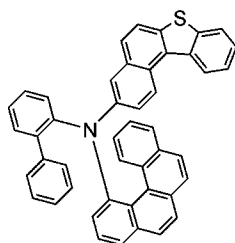
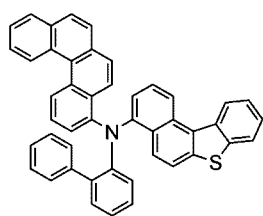


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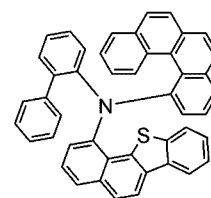
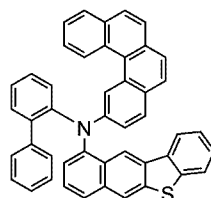
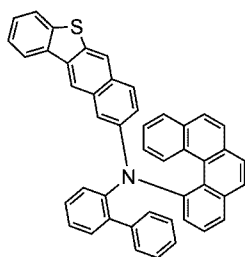
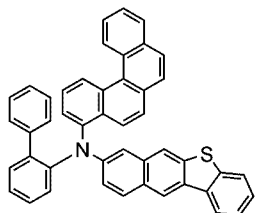
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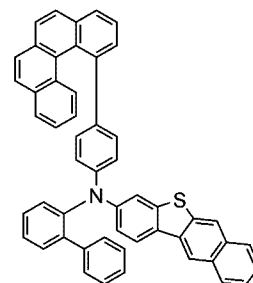
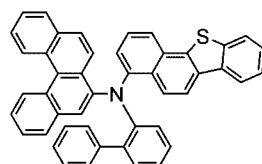
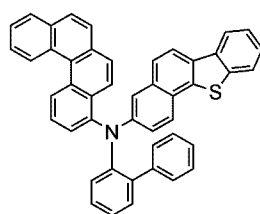
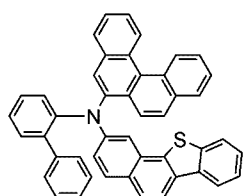
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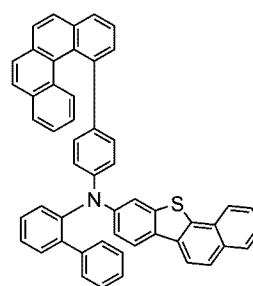
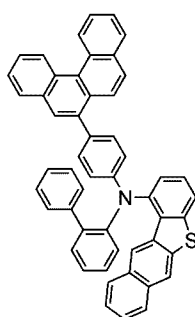
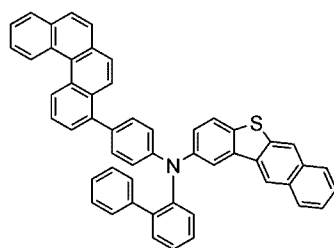
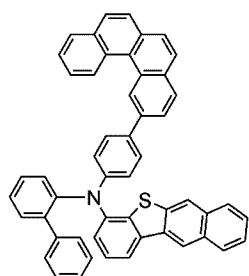
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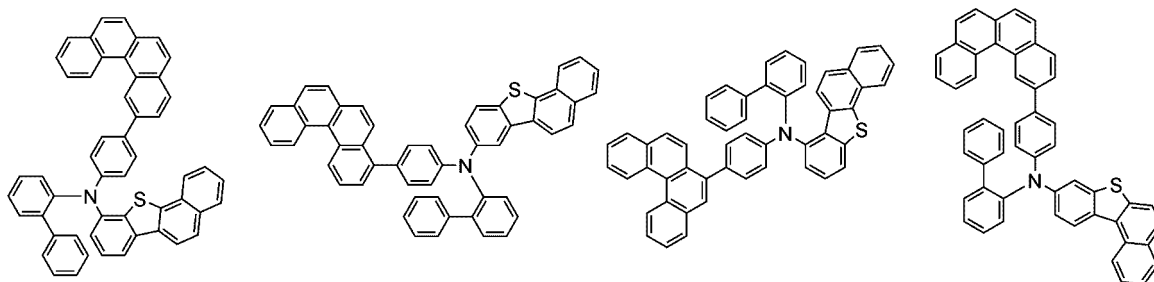
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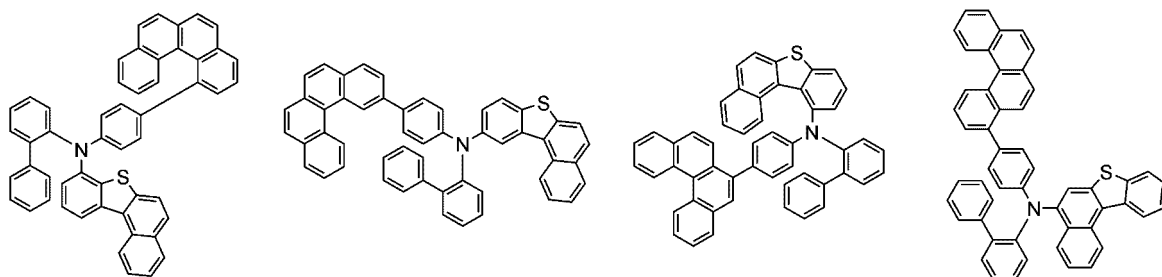
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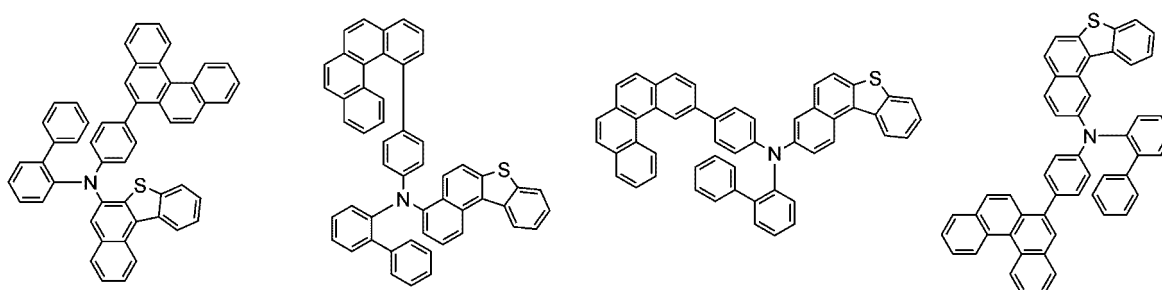
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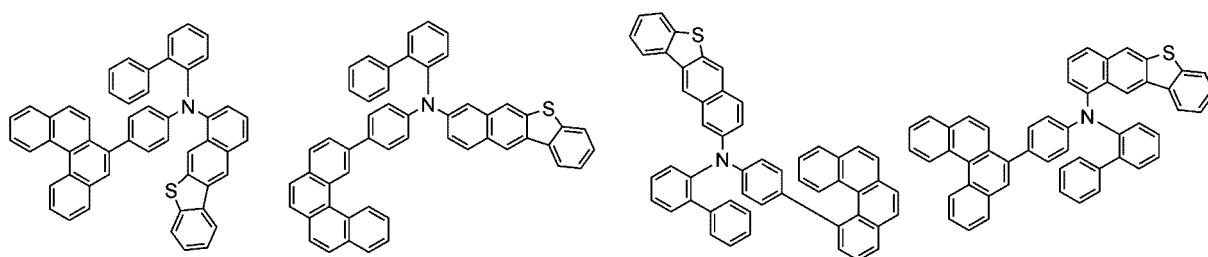
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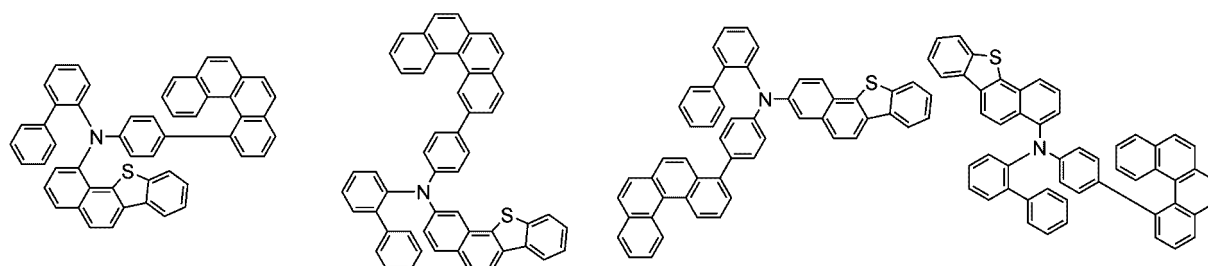


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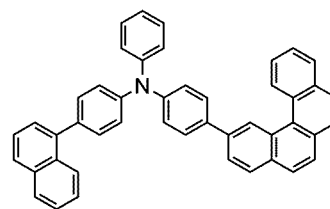
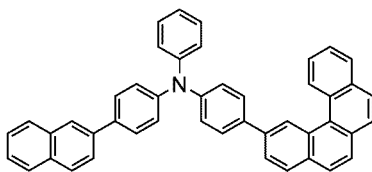
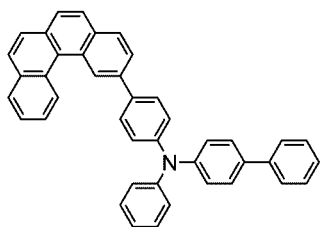
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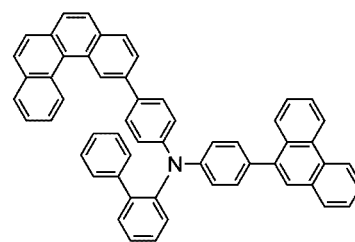
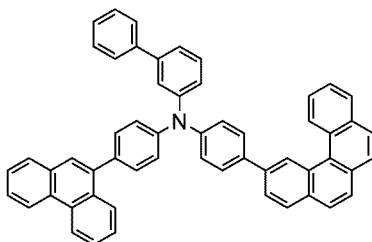
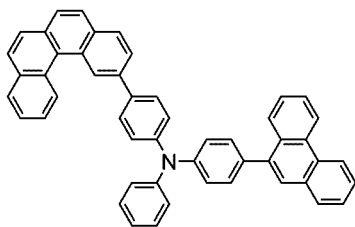


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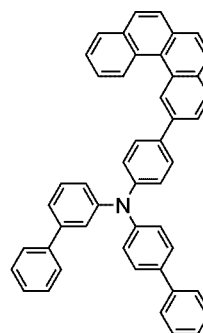
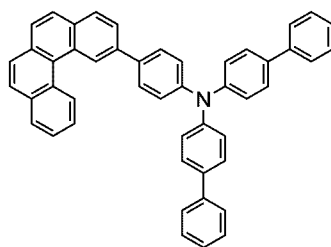
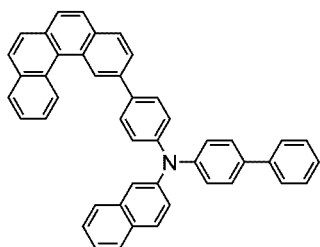
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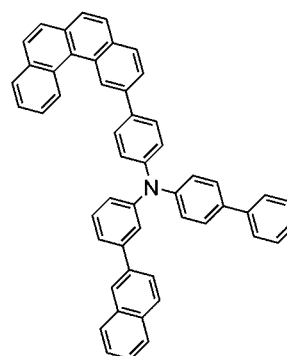
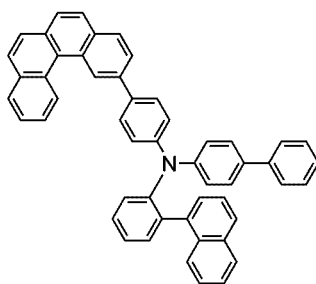
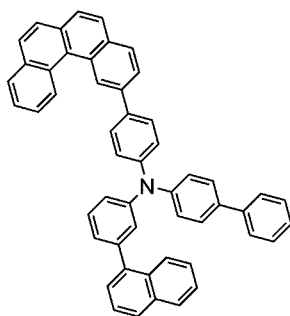
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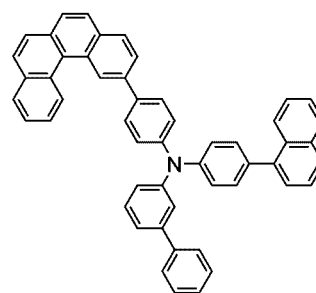
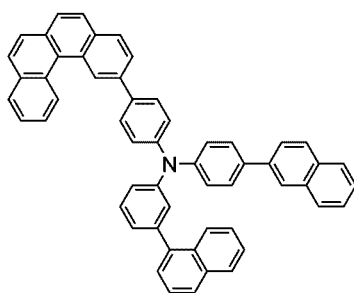
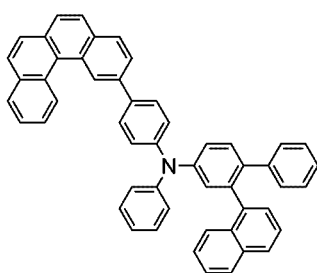
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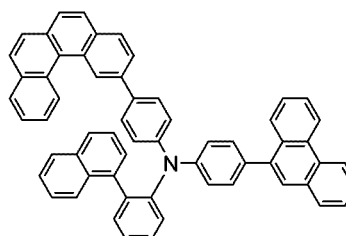
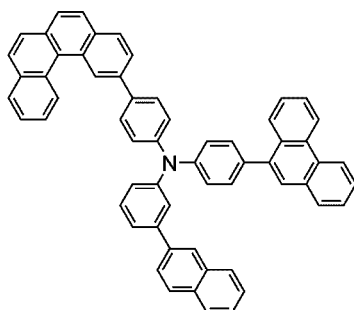
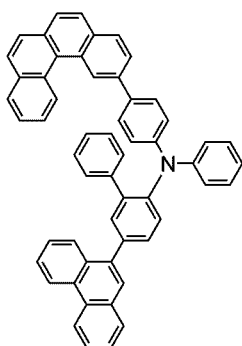
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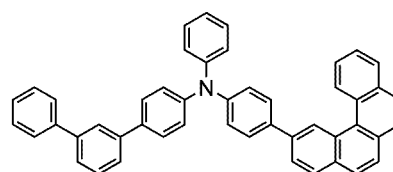
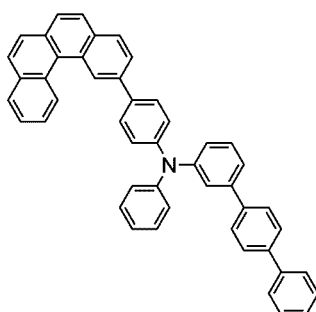
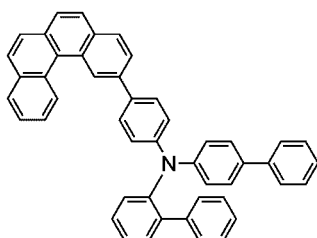
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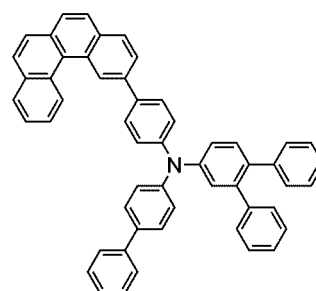
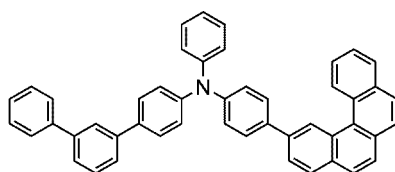
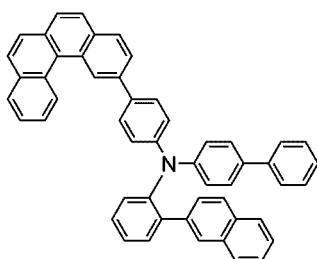
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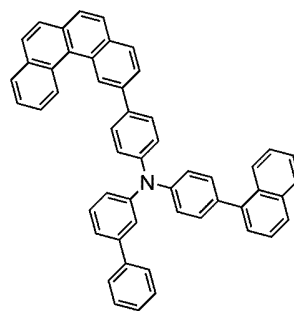
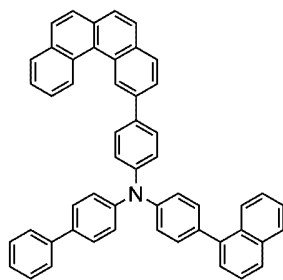
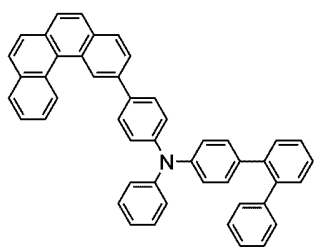
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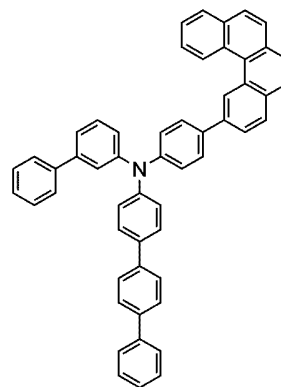
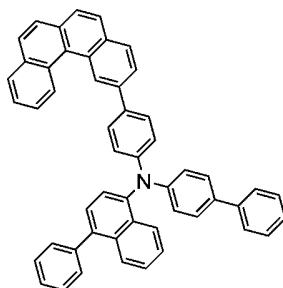
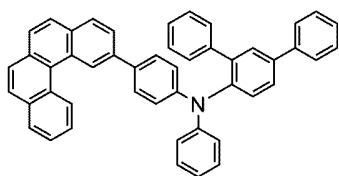
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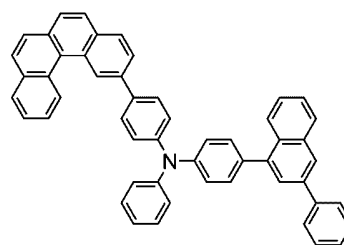
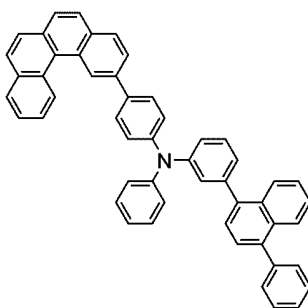
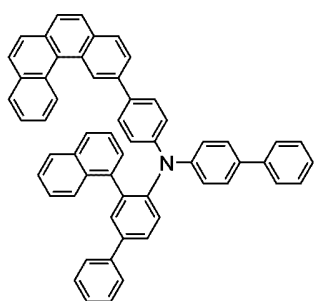
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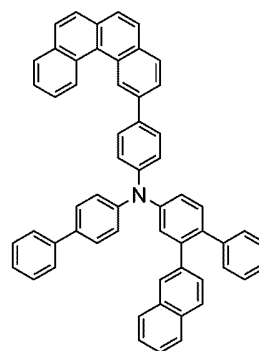
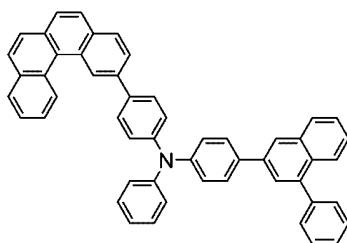
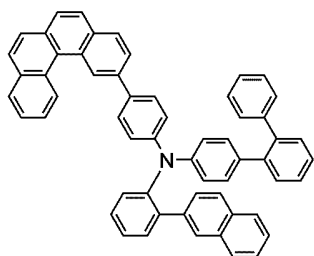
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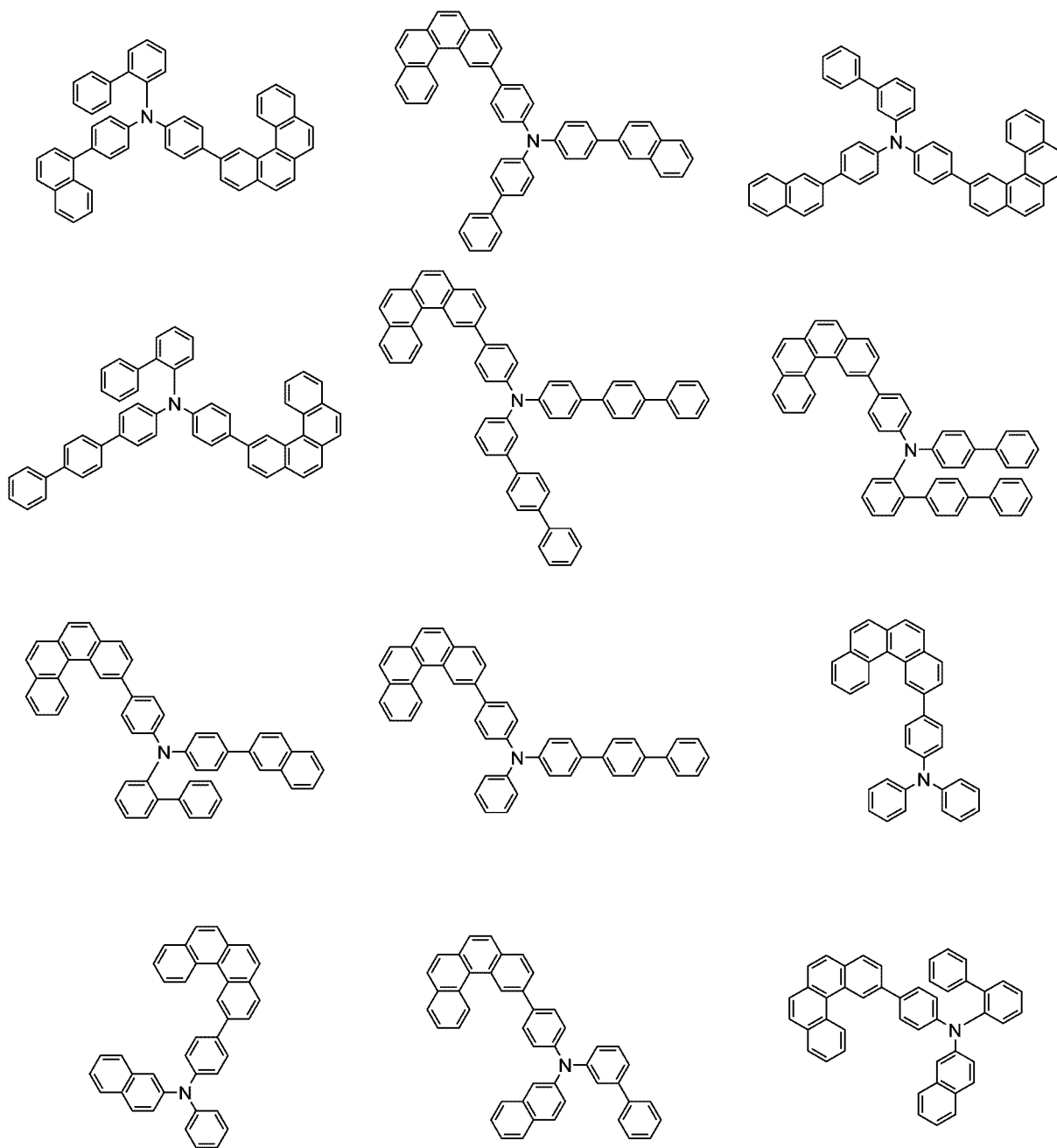
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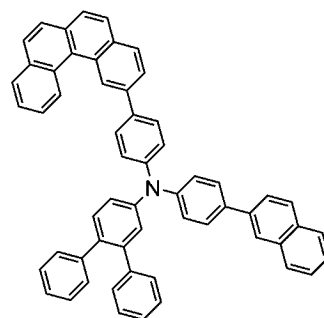
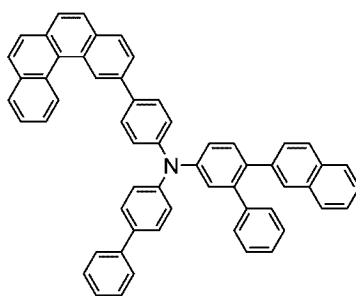
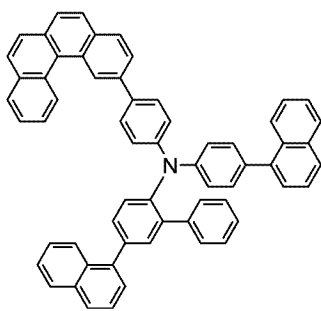
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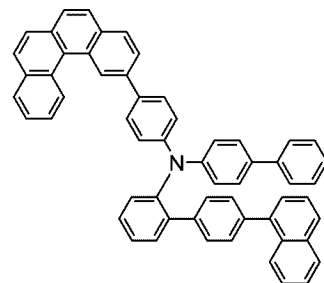
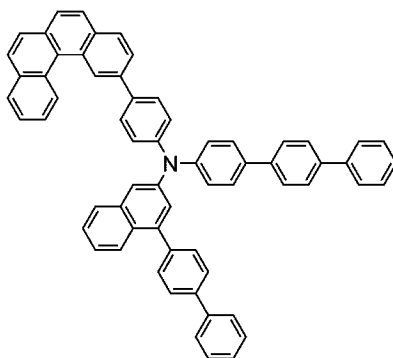
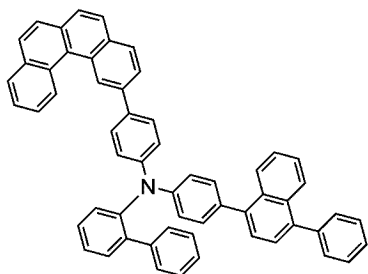
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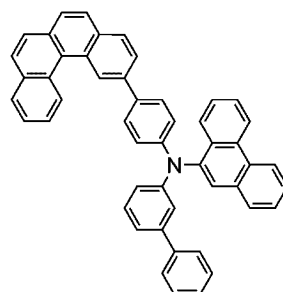
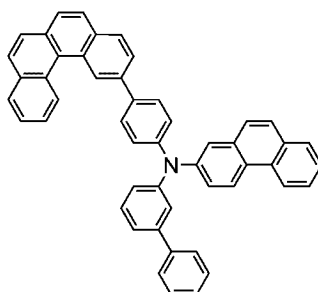
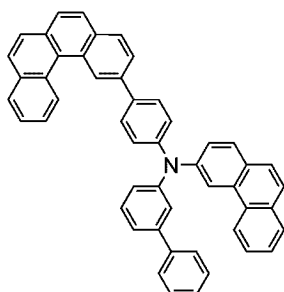
【化 3 4 4】



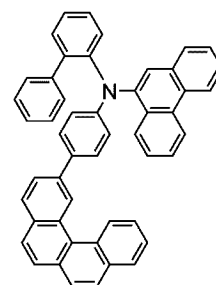
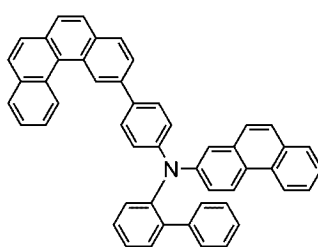
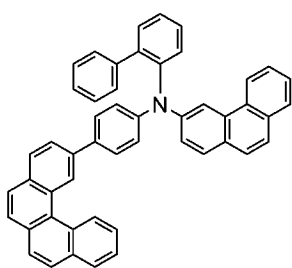
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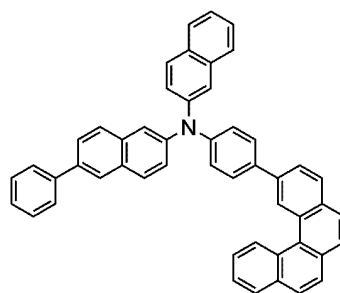
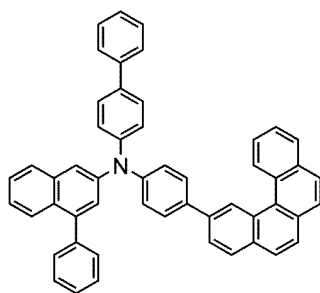
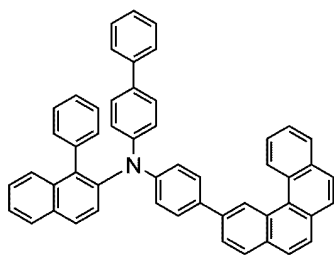
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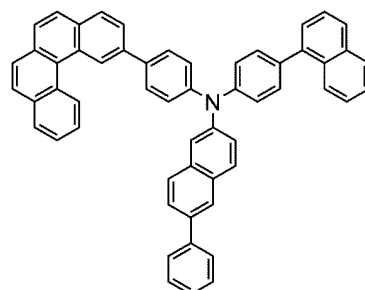
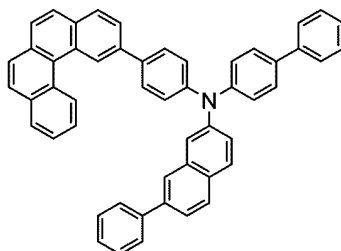
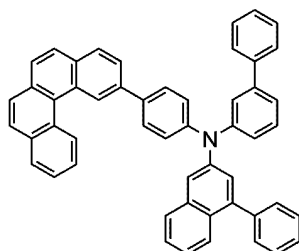
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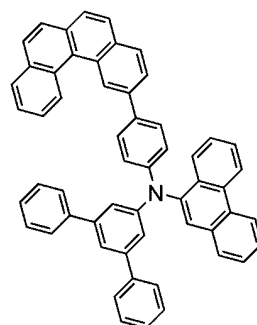
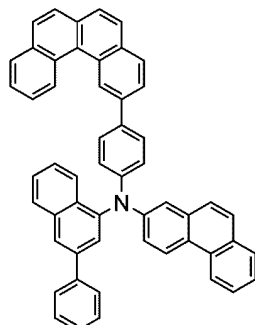
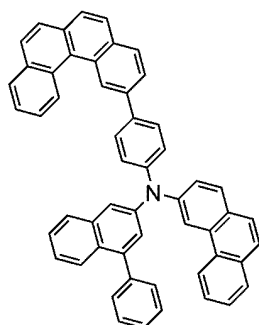
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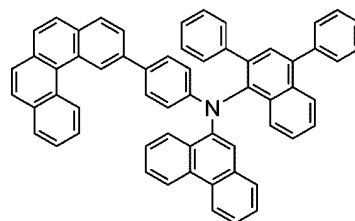
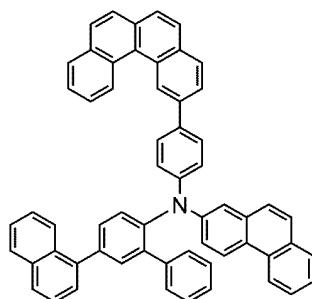
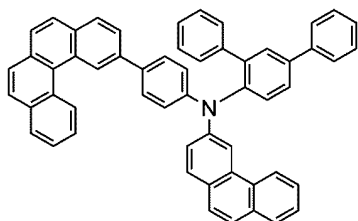
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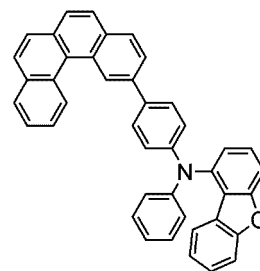
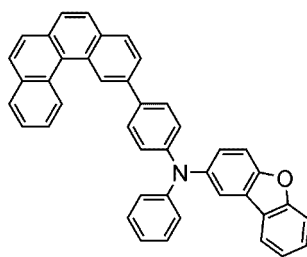
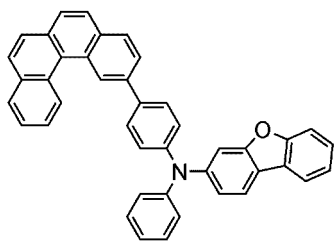
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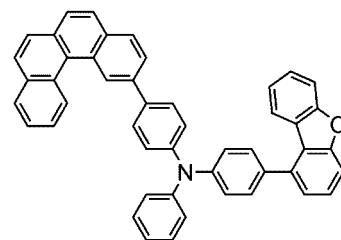
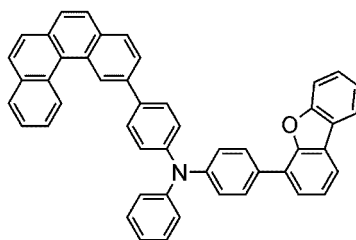
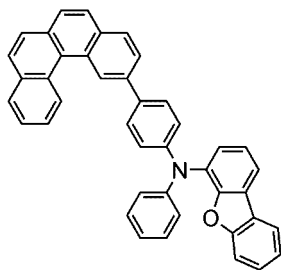
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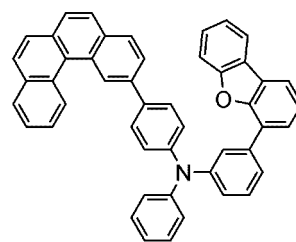
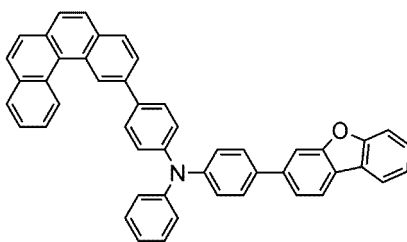
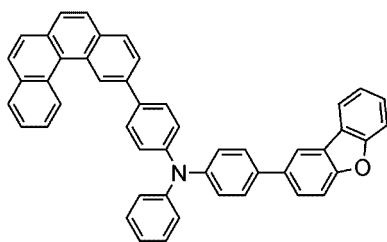
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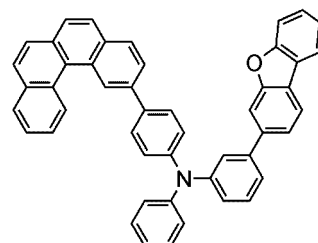
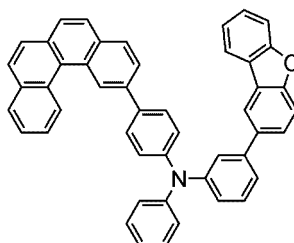
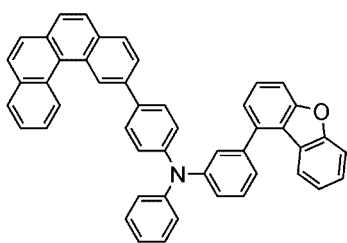
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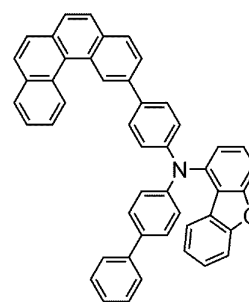
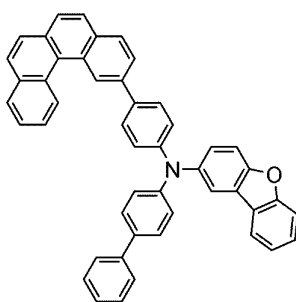
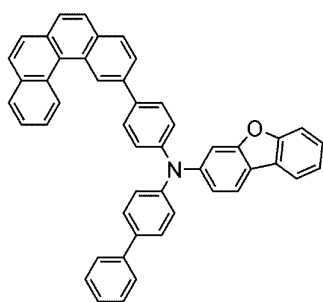
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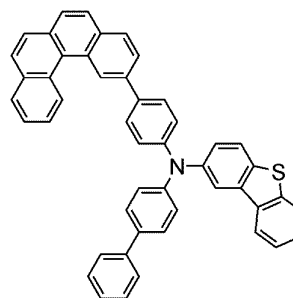
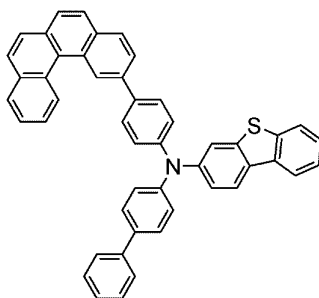
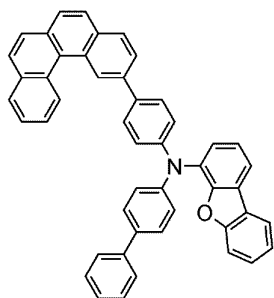
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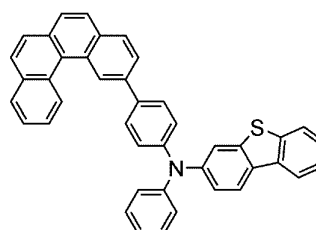
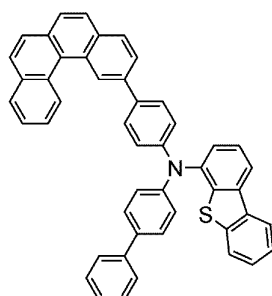
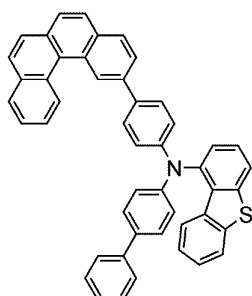
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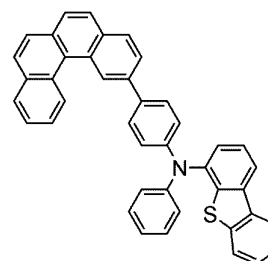
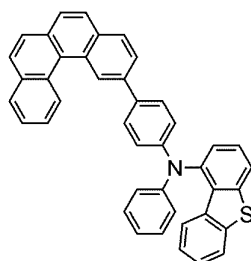
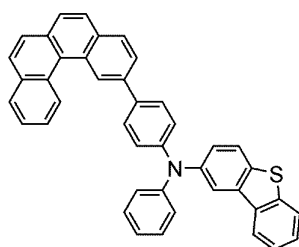
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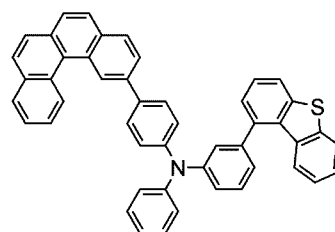
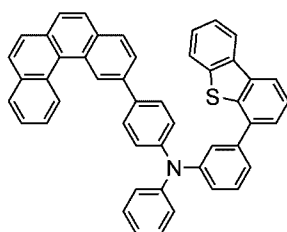
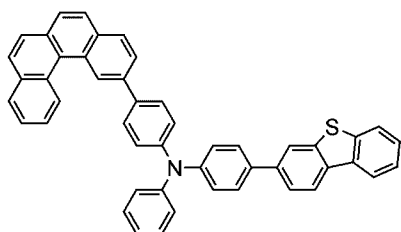
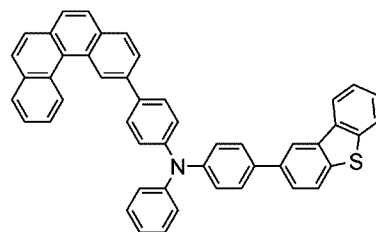
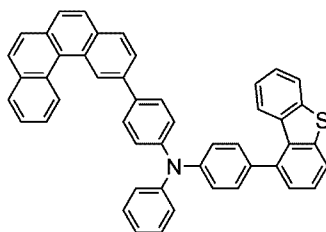
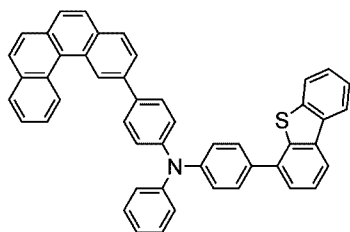
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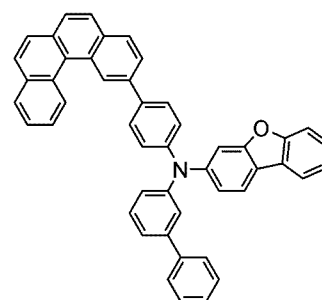
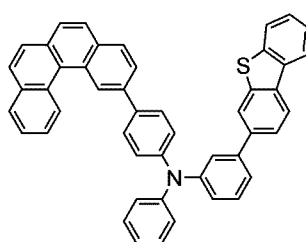
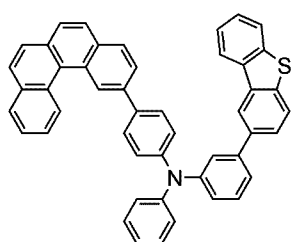
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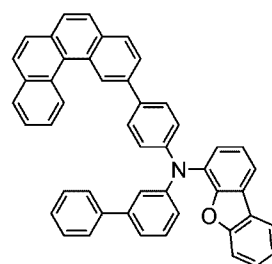
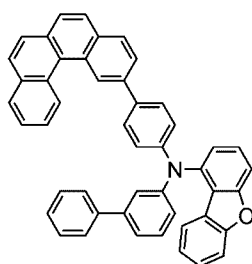
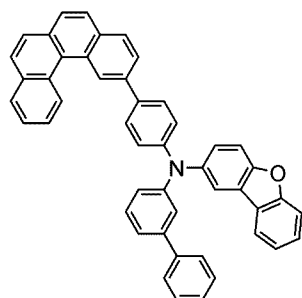
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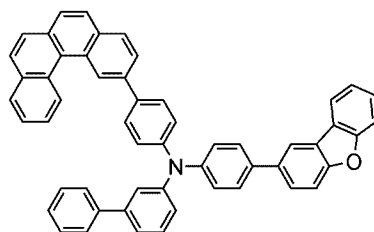
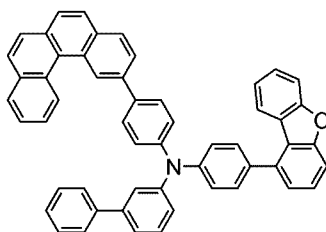
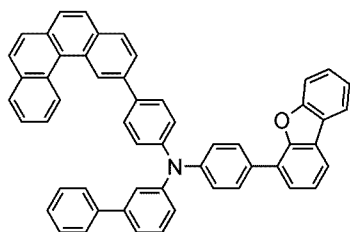


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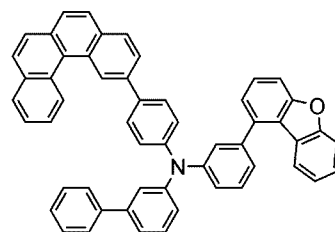
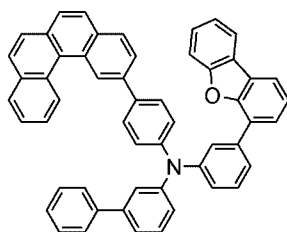
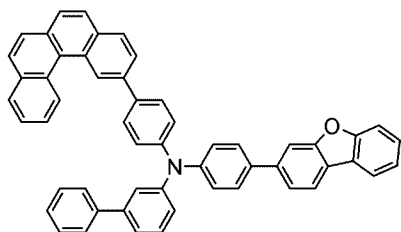
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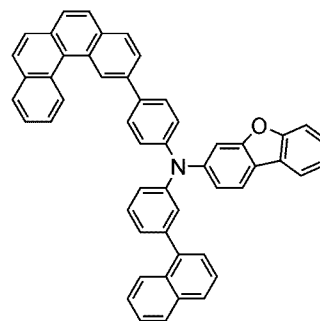
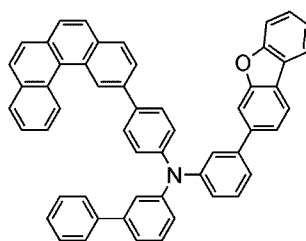
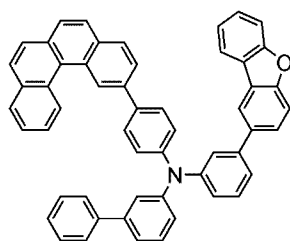
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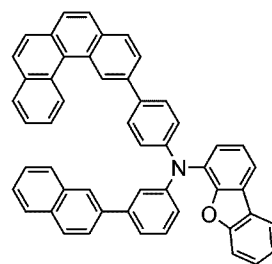
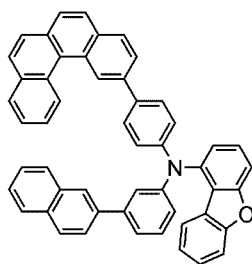
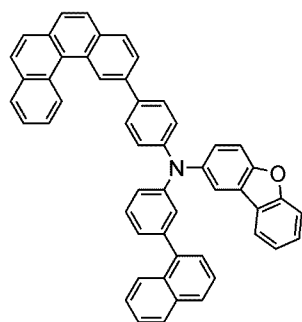
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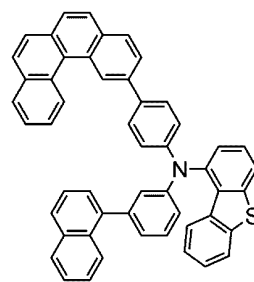
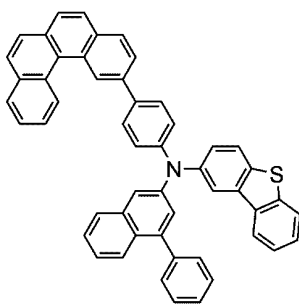
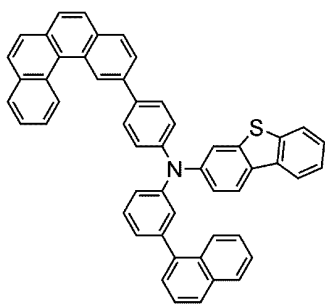
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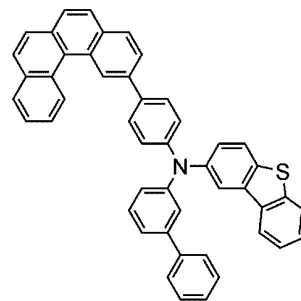
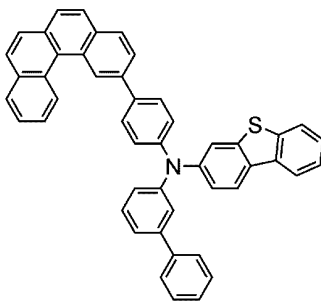
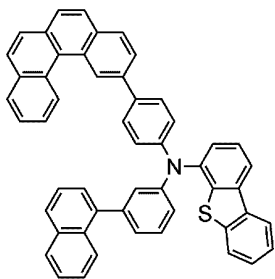
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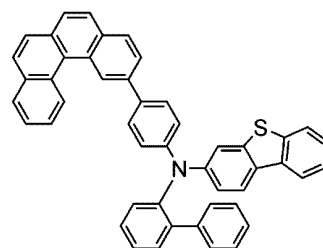
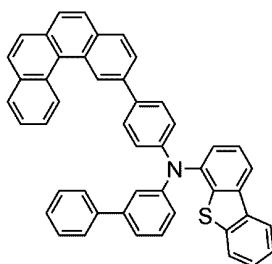
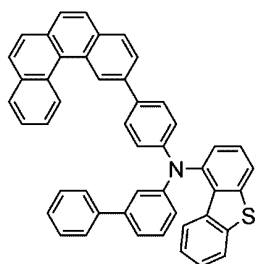
【化 3 5 0】



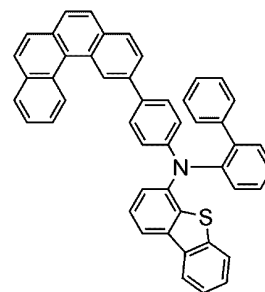
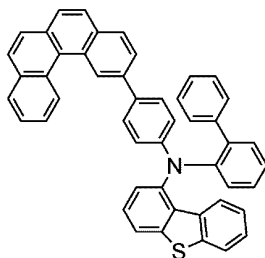
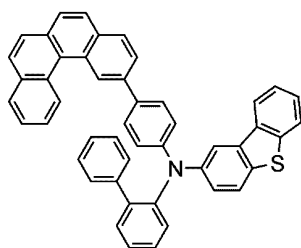
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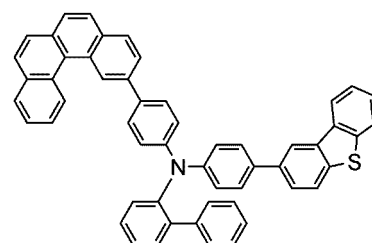
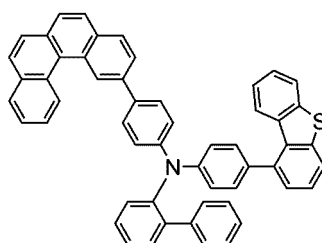
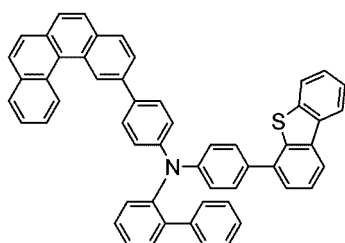
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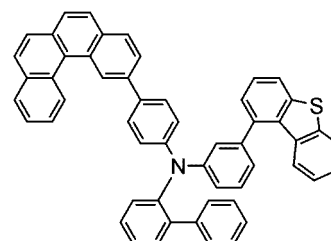
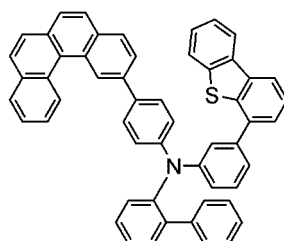
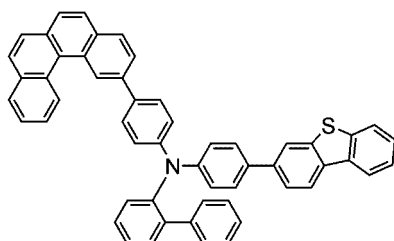
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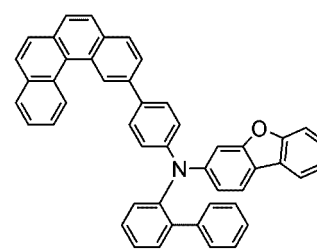
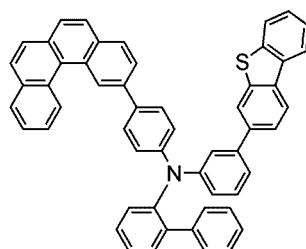
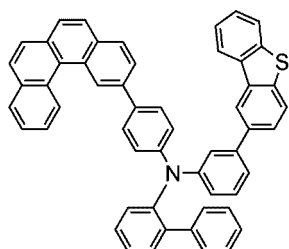
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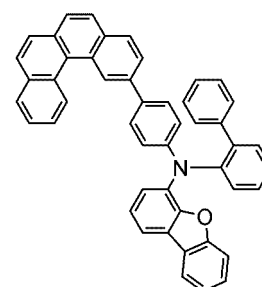
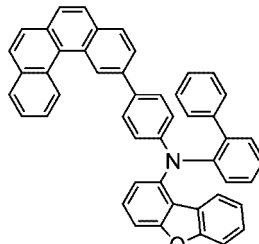
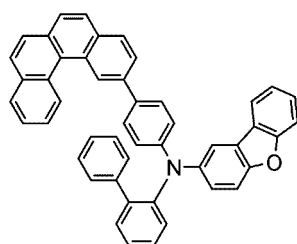
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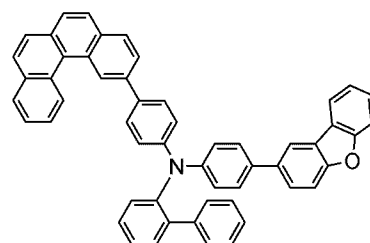
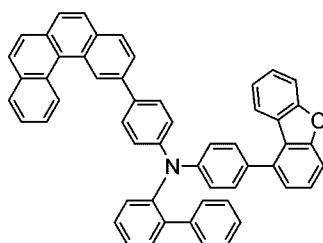
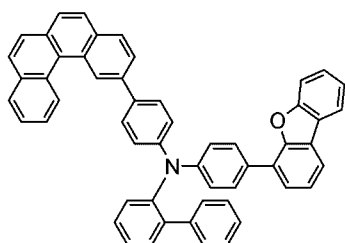
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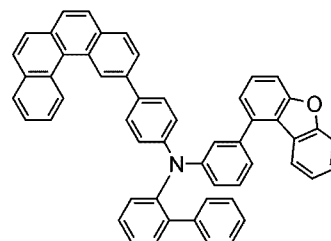
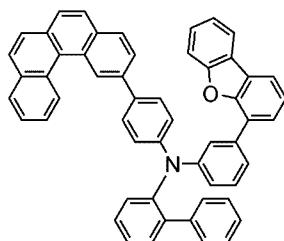
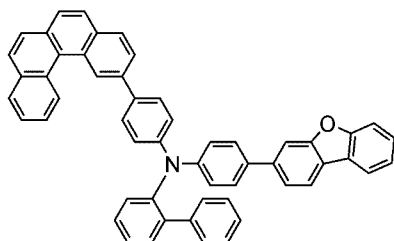
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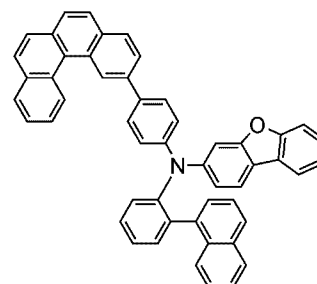
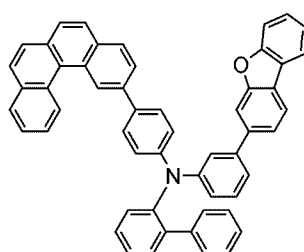
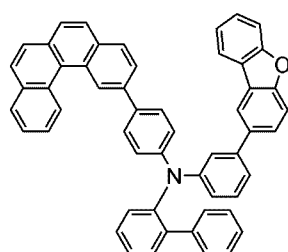
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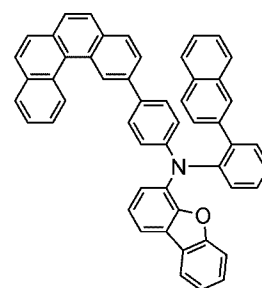
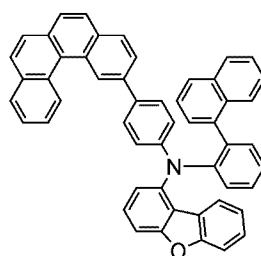
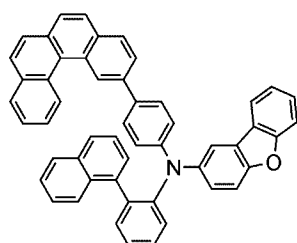
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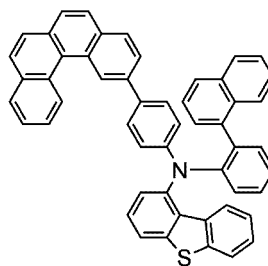
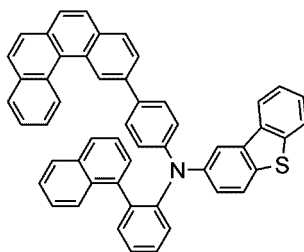
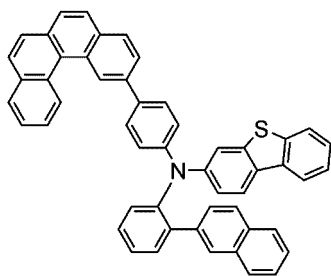
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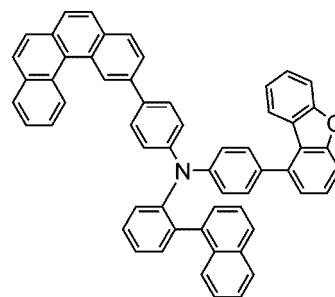
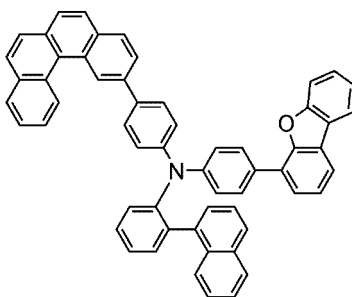
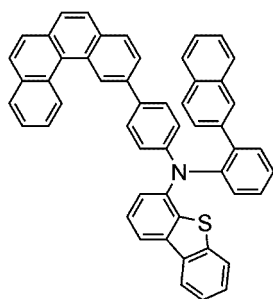
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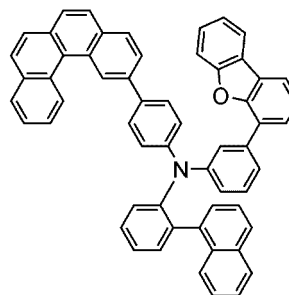
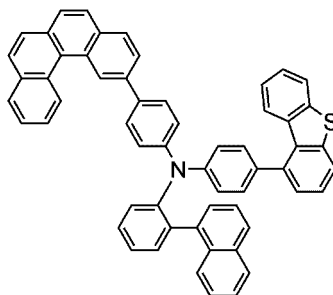
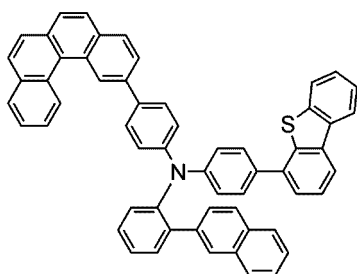
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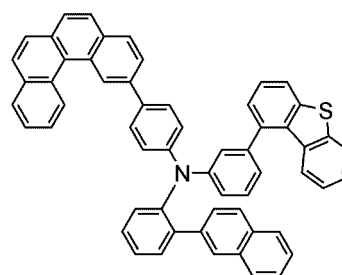
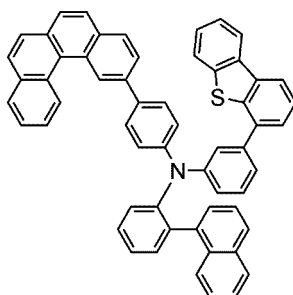
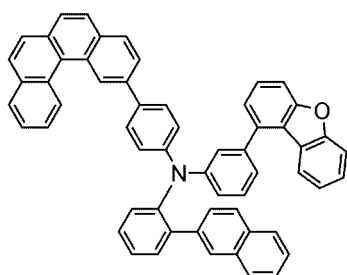
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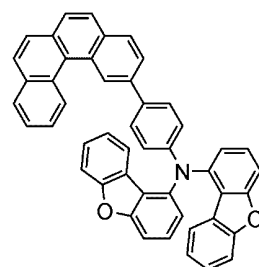
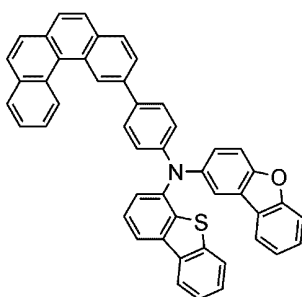
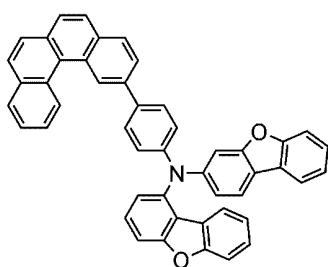
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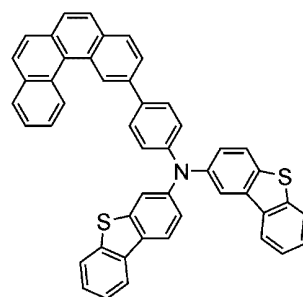
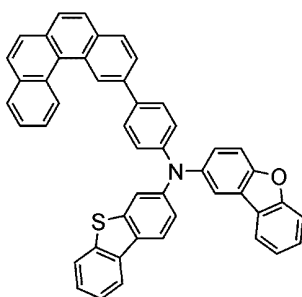
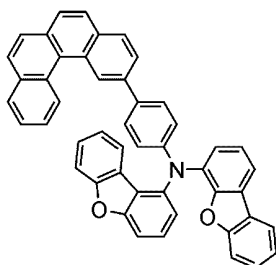
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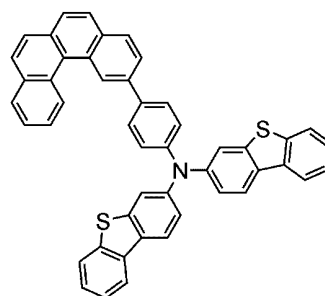
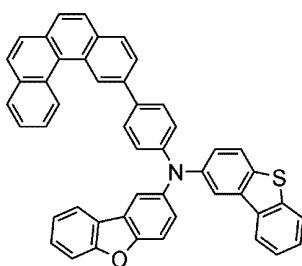
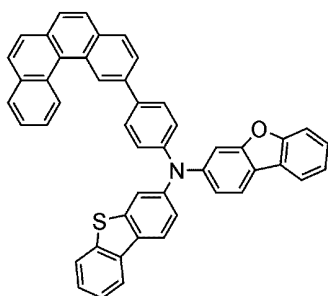
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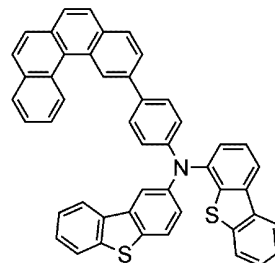
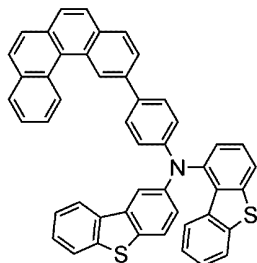
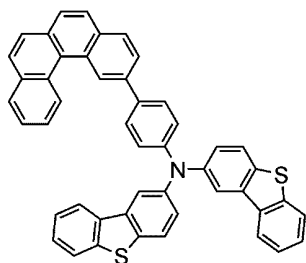
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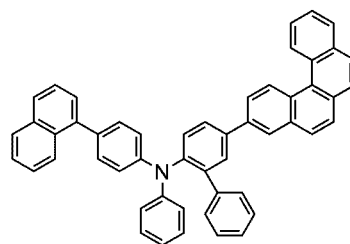
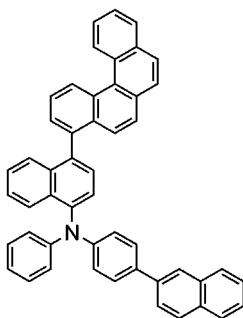
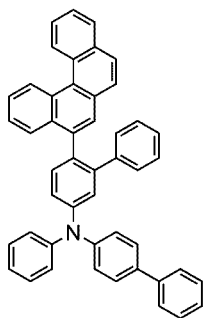
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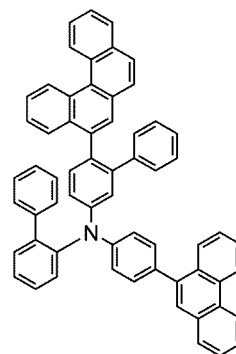
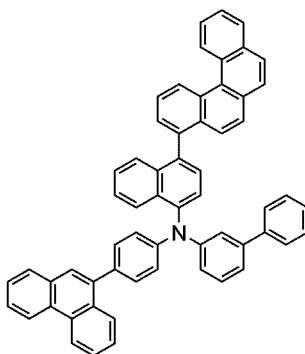
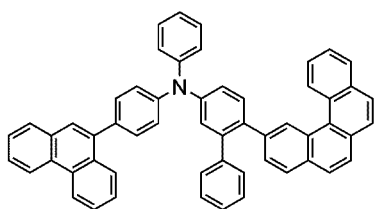
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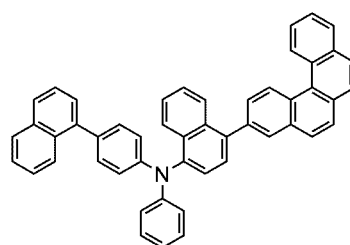
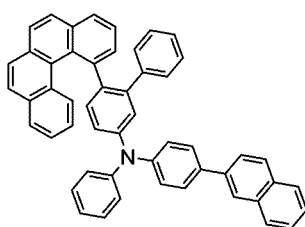
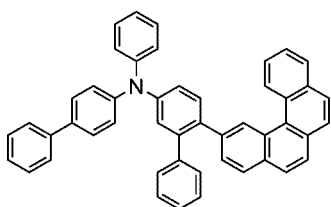
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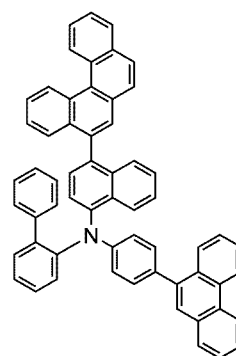
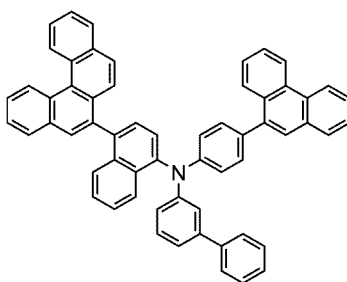
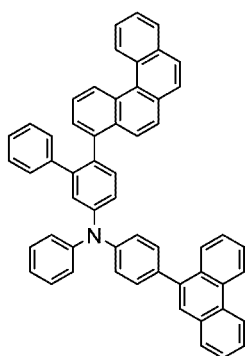
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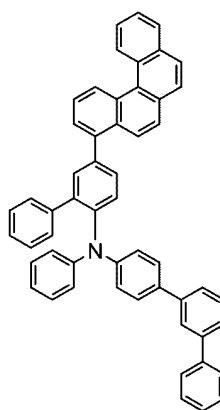
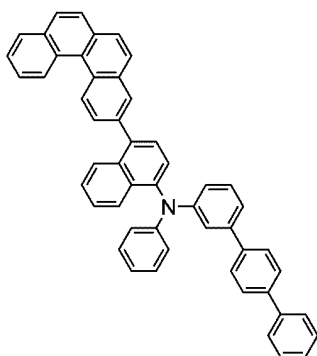
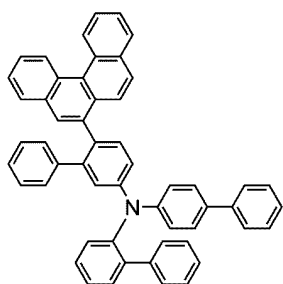
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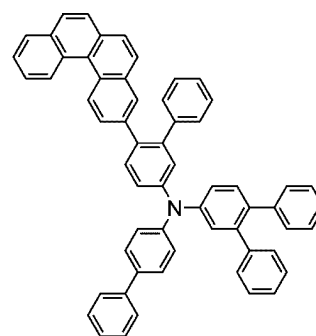
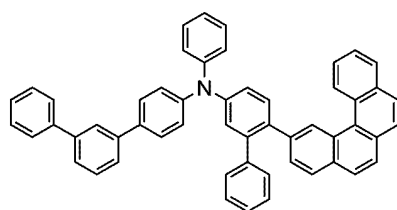
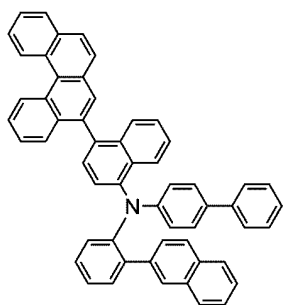
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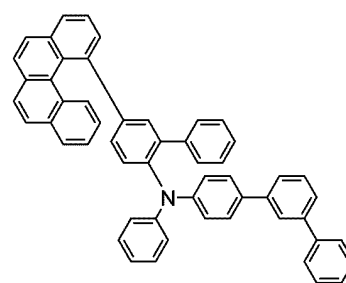
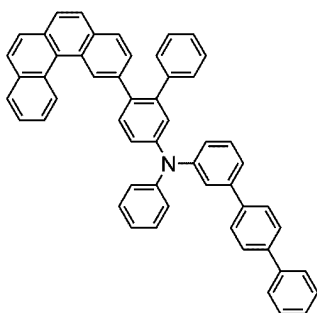
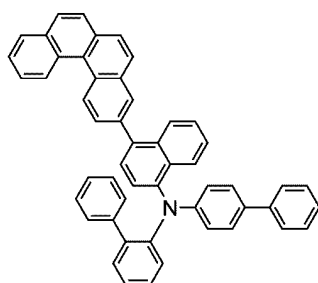
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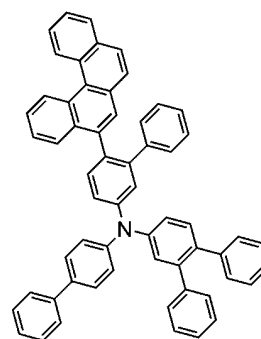
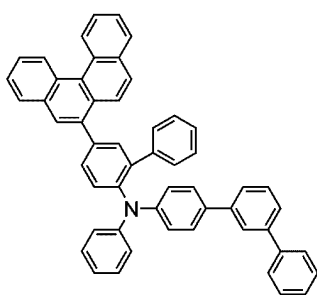
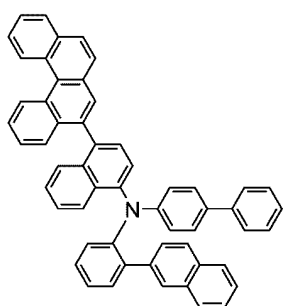
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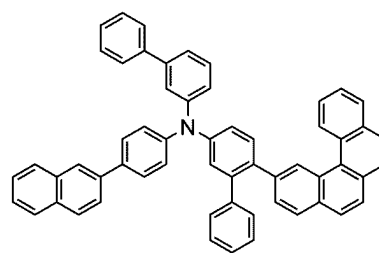
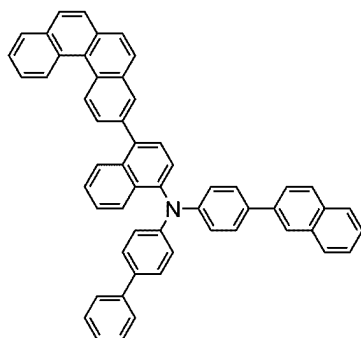
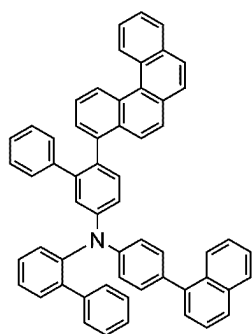
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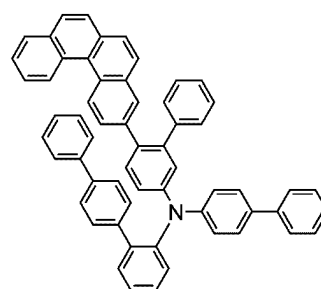
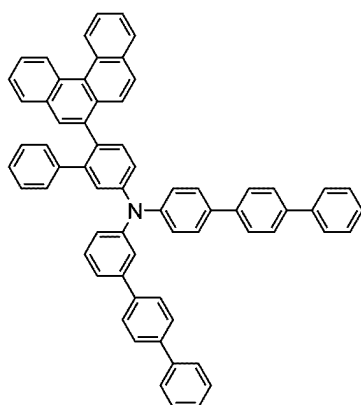
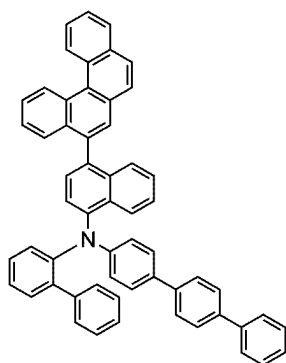
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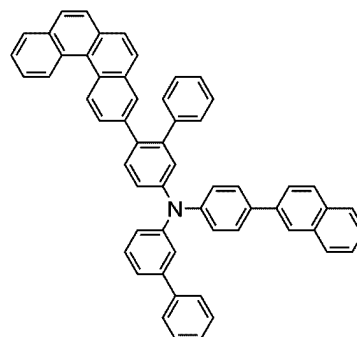
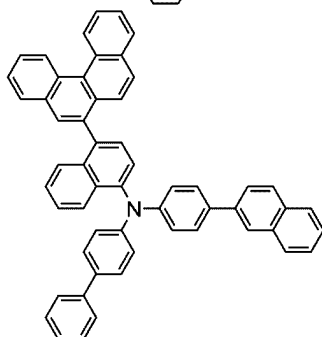
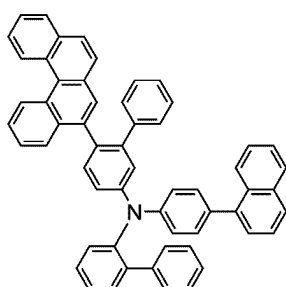
【化 3 5 8】



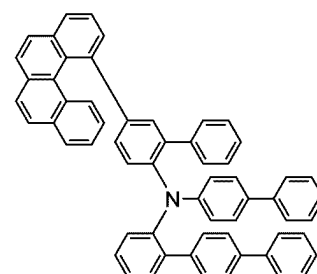
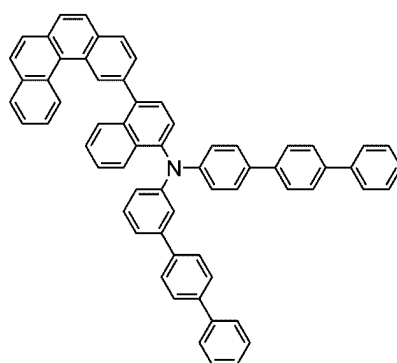
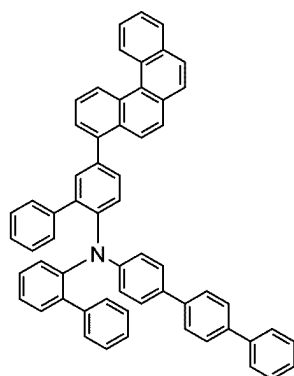
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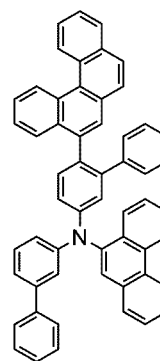
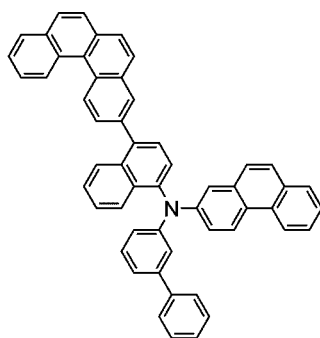
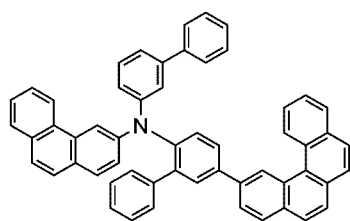
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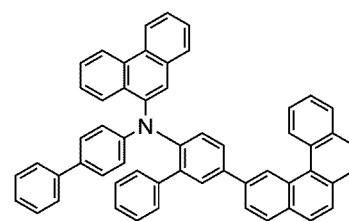
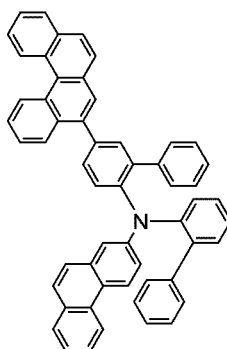
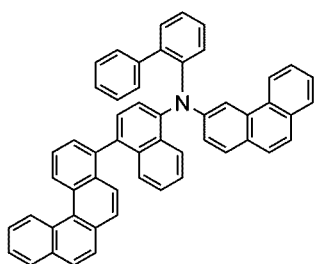
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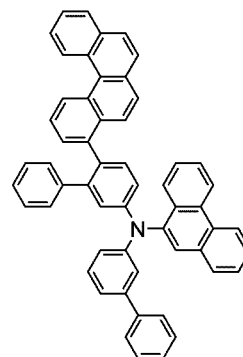
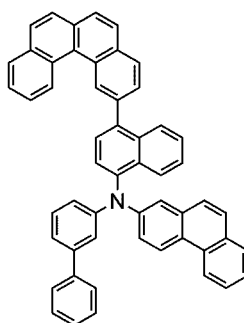
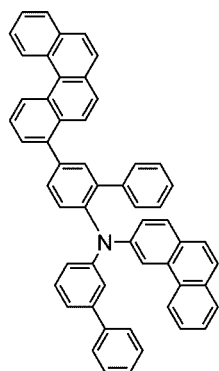
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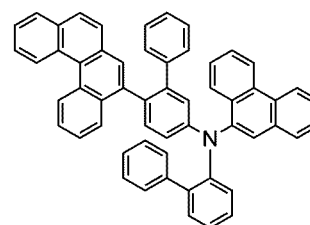
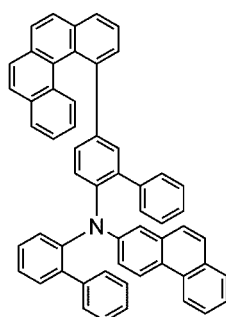
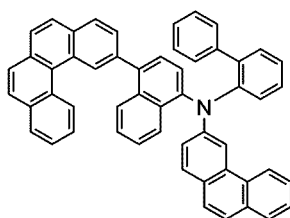
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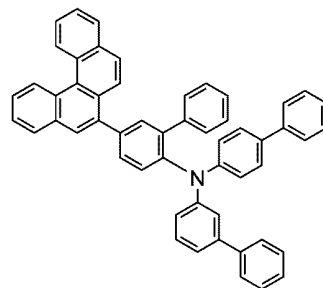
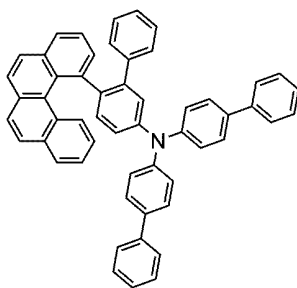
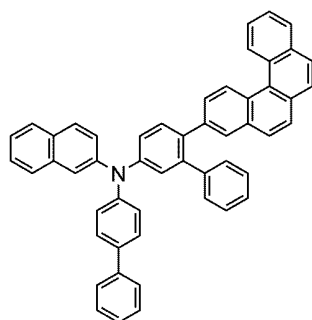
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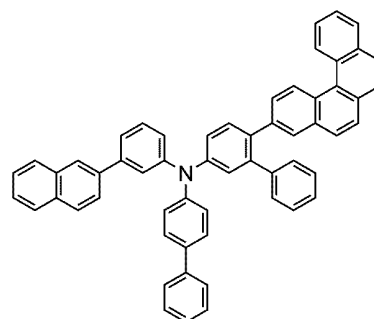
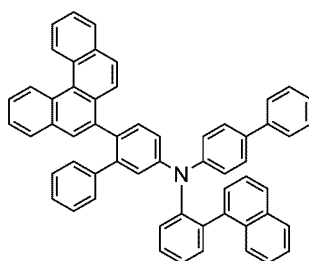
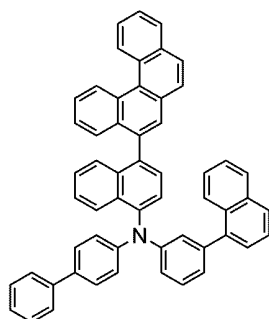
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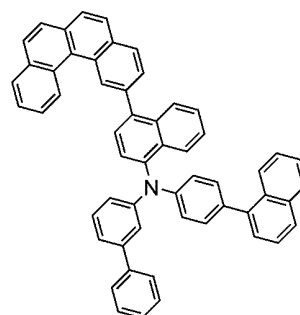
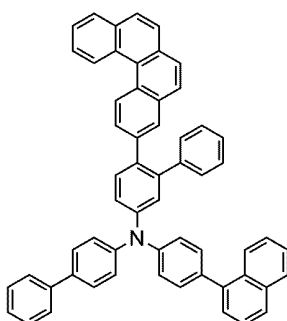
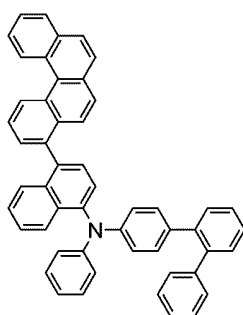
【化 3 6 0】



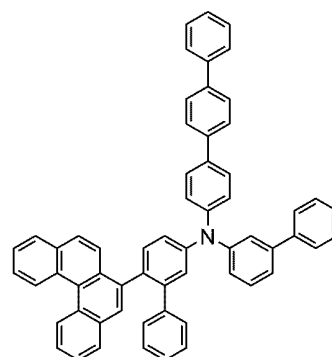
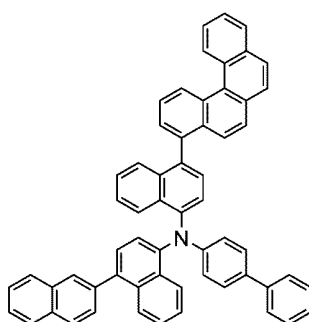
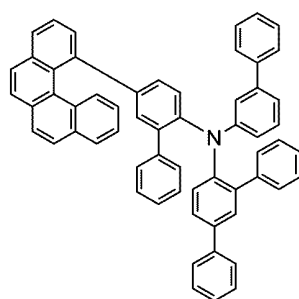
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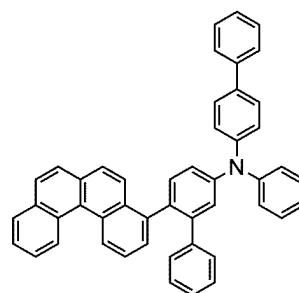
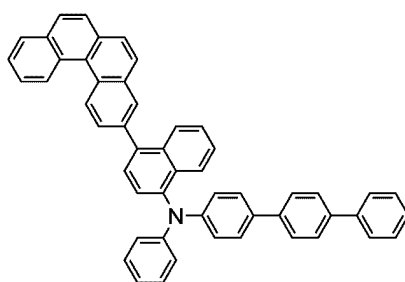
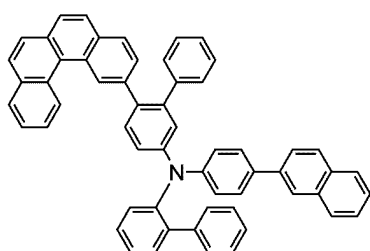
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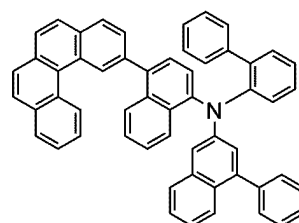
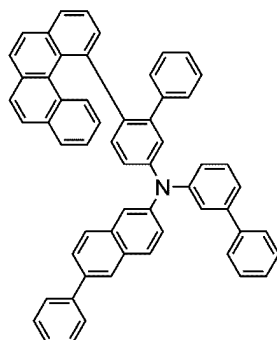
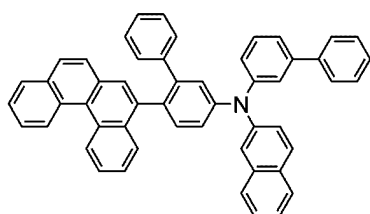
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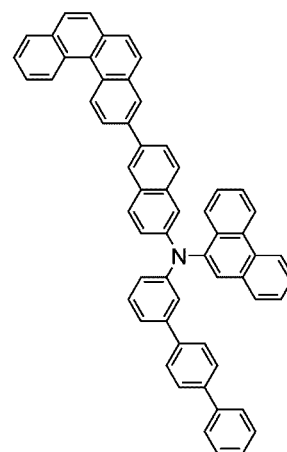
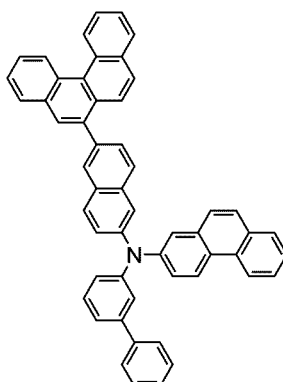
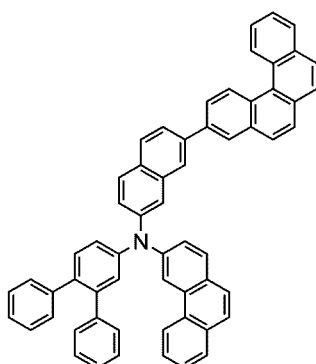


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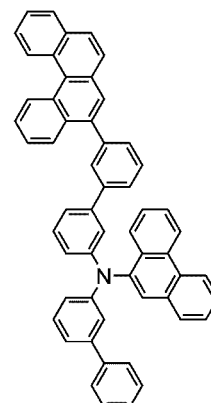
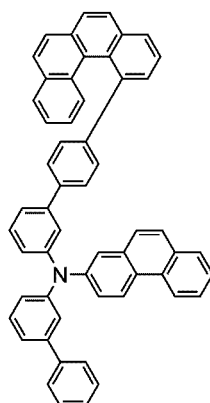
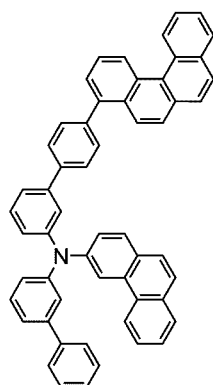


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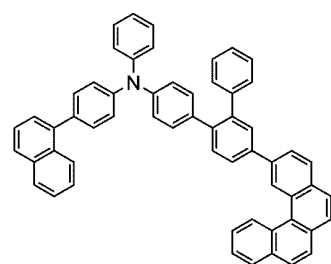
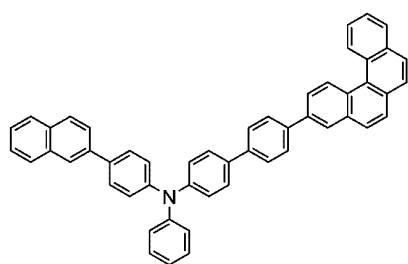
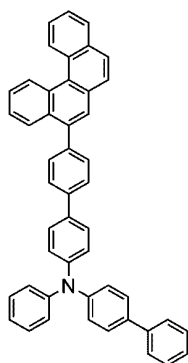
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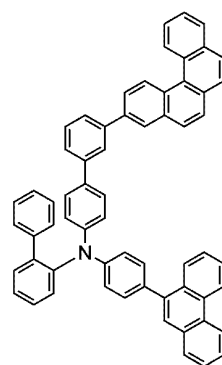
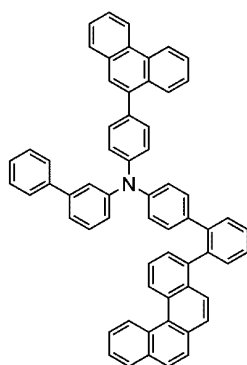
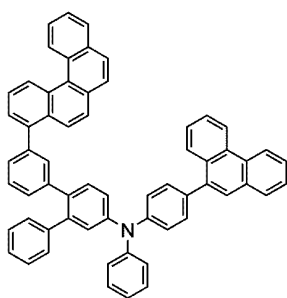
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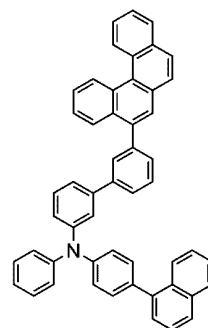
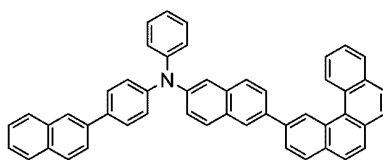
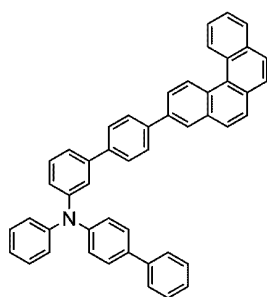
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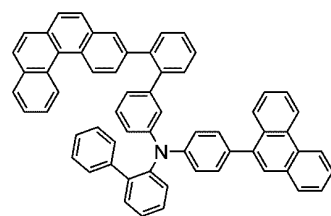
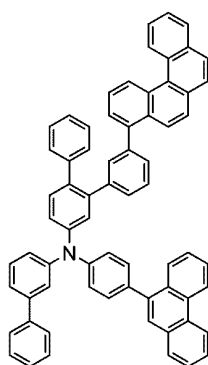
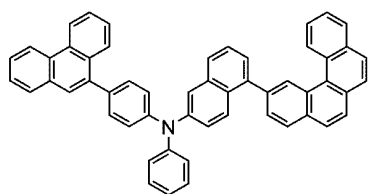
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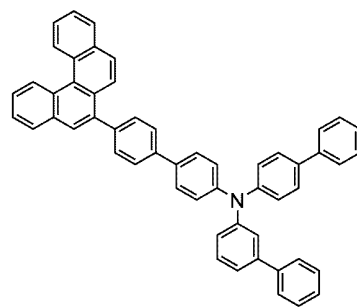
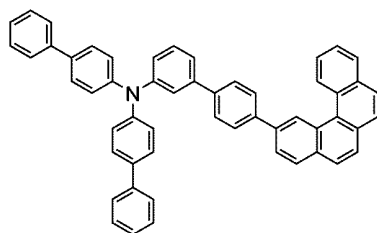
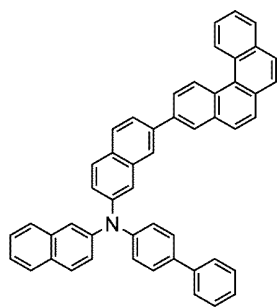
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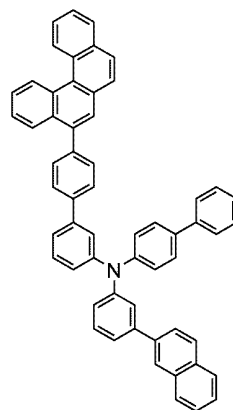
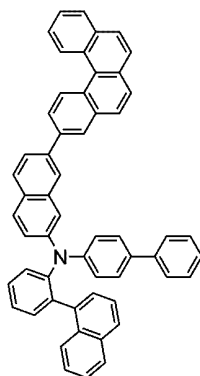
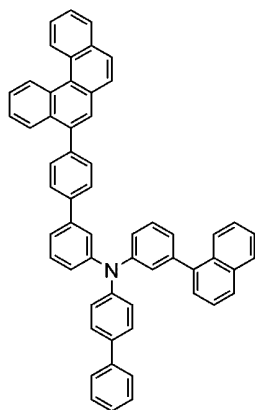
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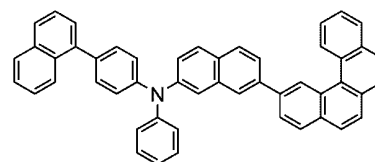
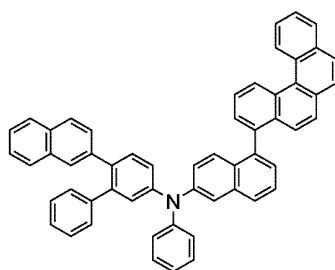
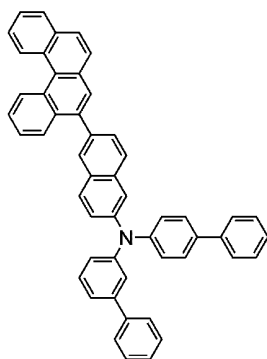
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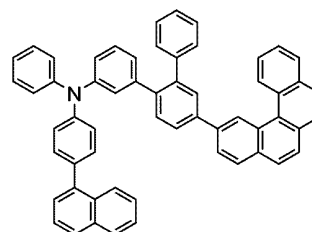
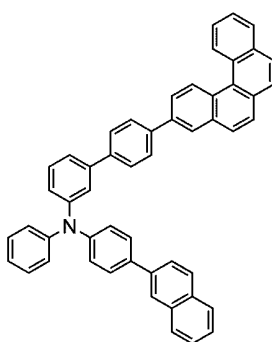
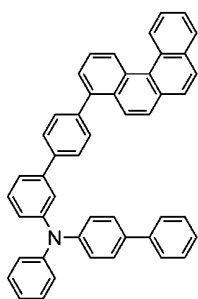
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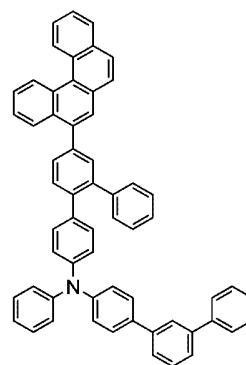
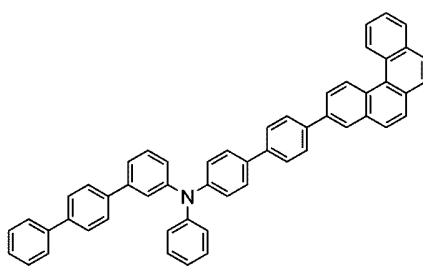
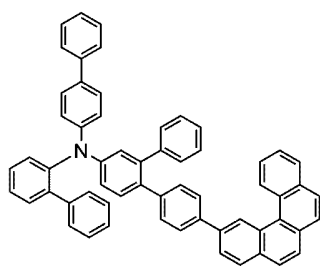
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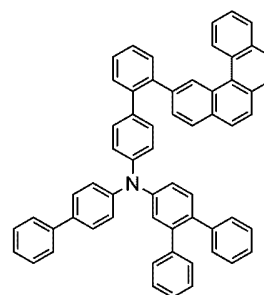
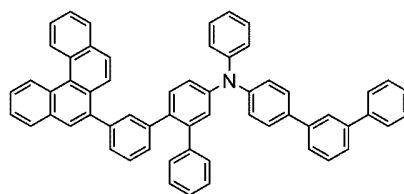
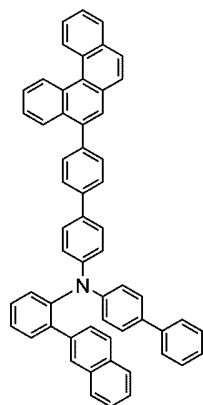
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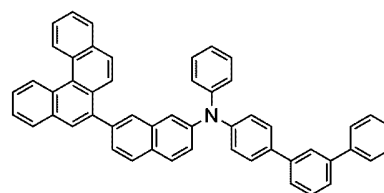
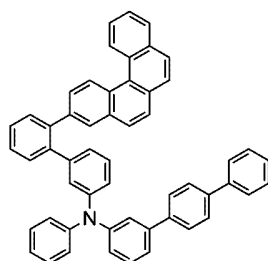
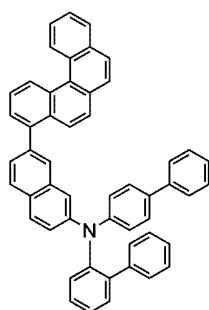
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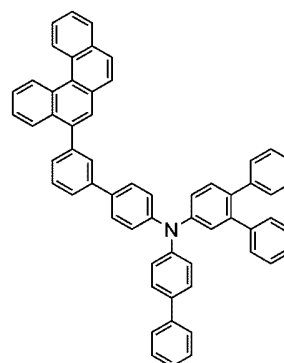
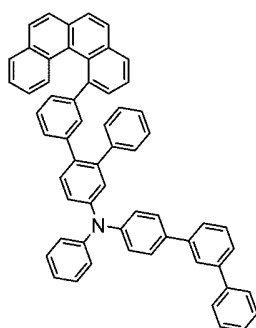
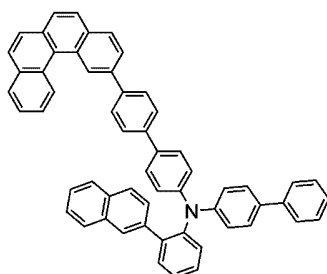
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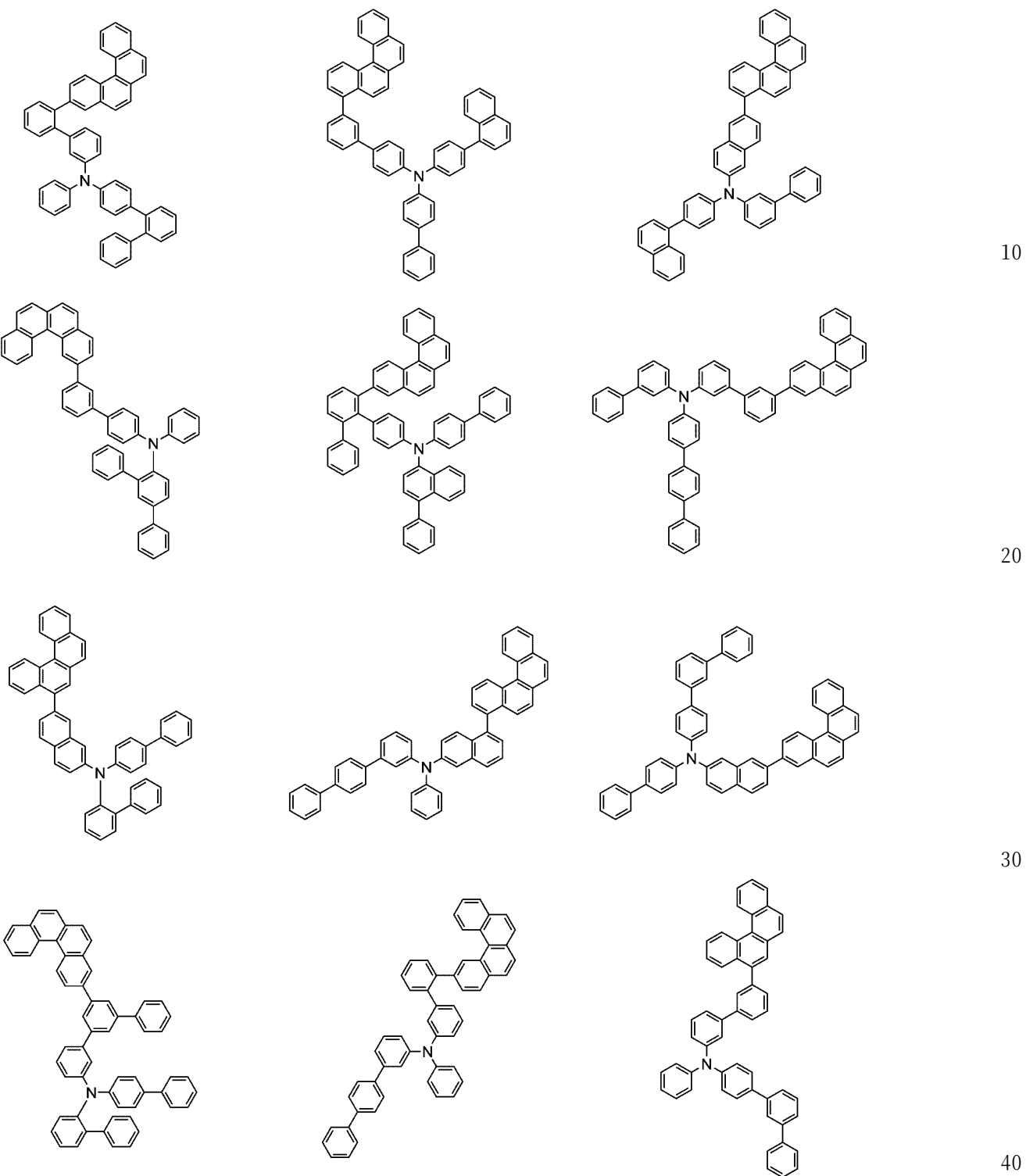
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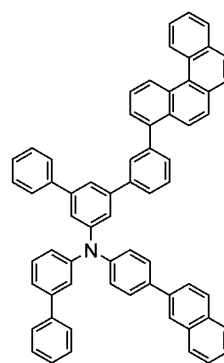
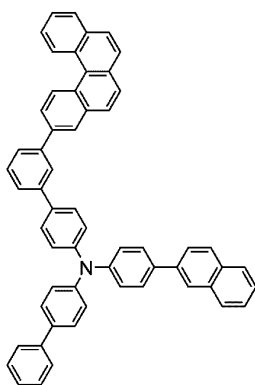
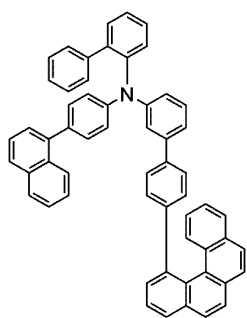
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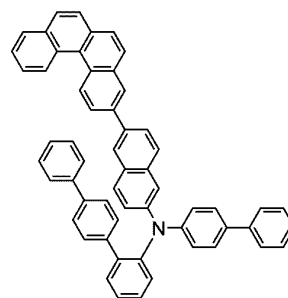
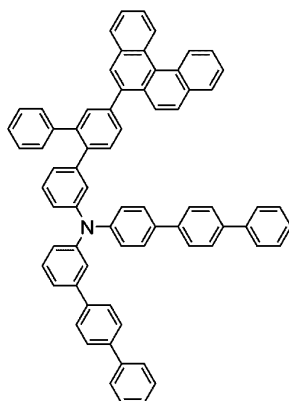
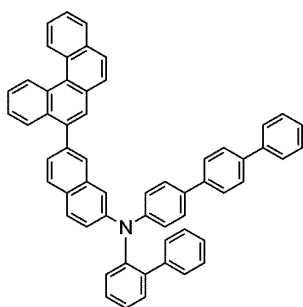
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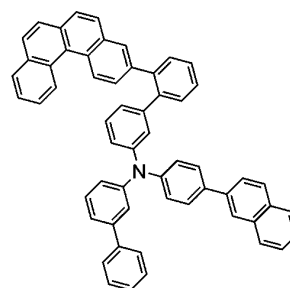
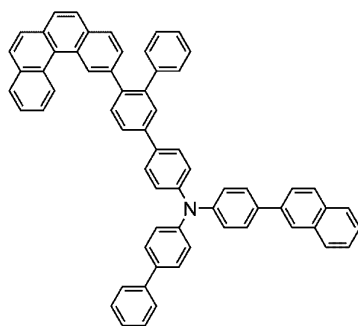
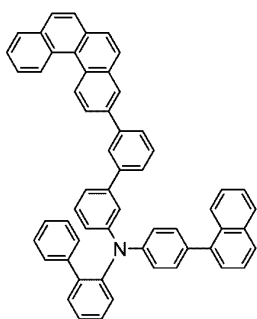
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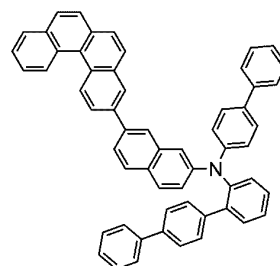
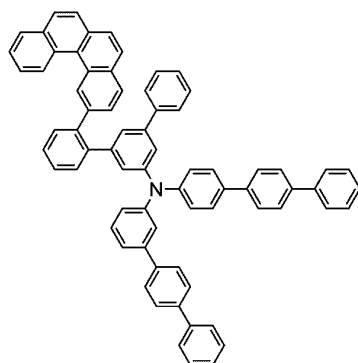
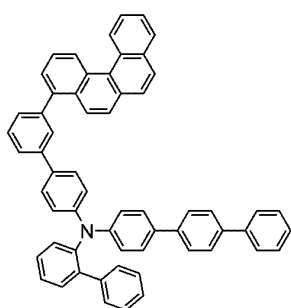
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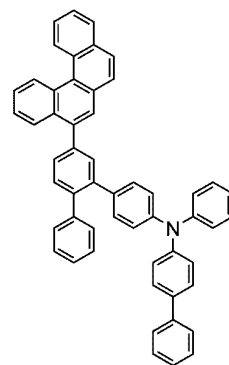
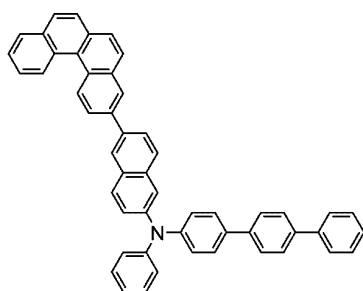
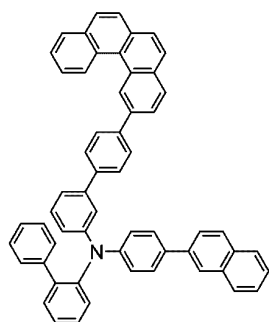
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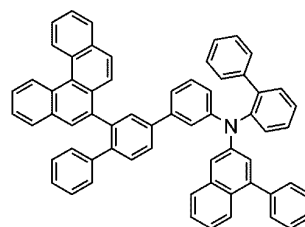
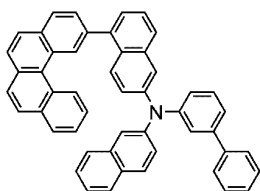
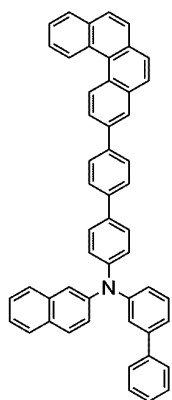
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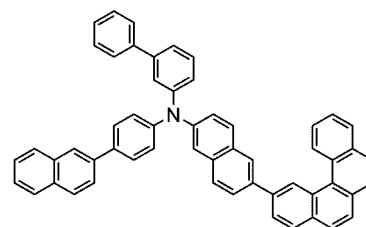
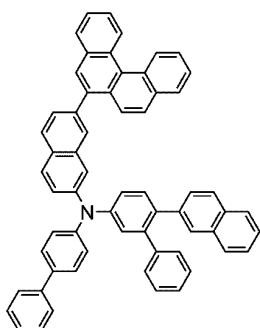
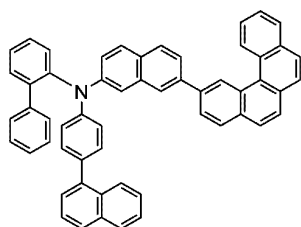
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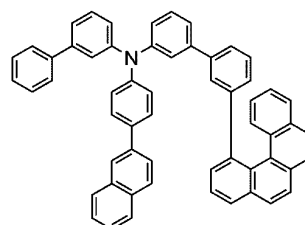
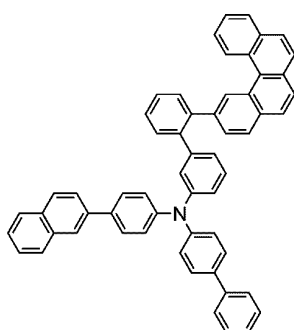
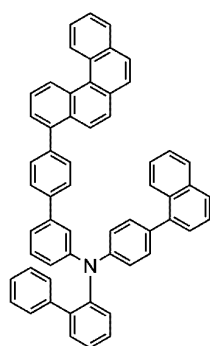
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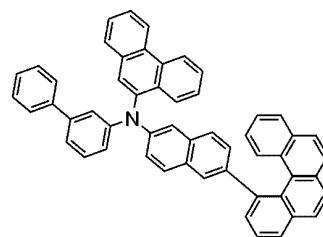
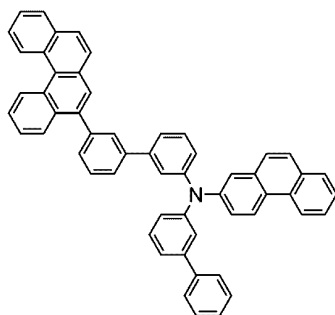
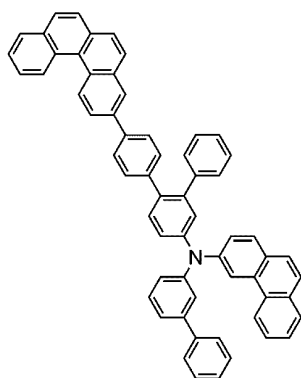
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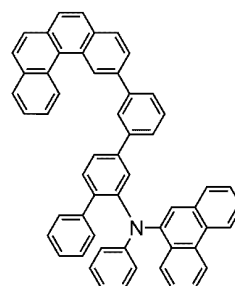
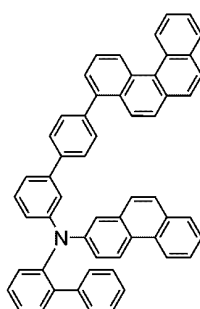
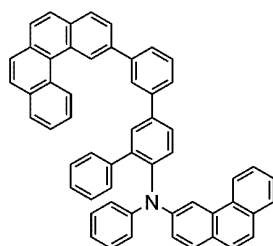
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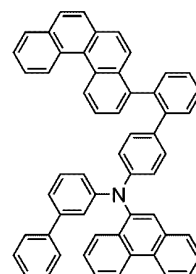
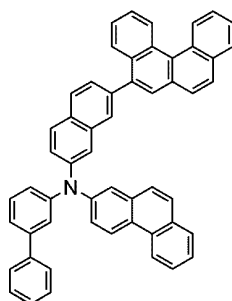
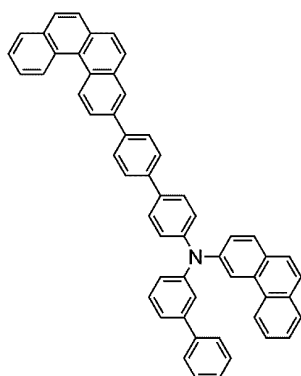
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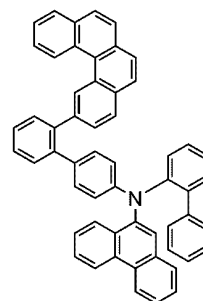
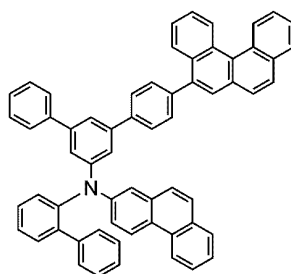
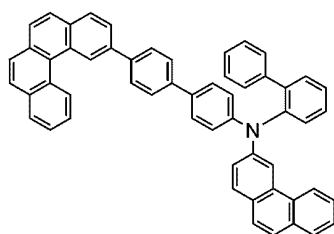
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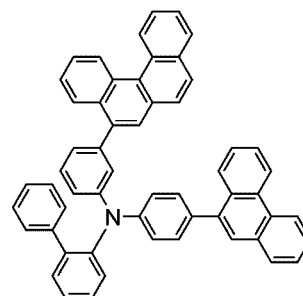
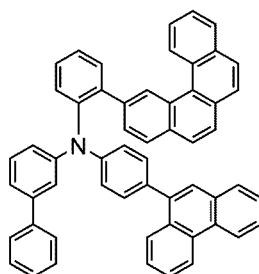
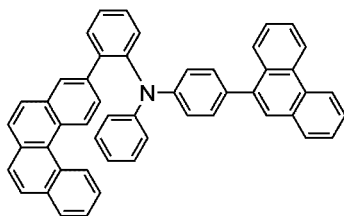
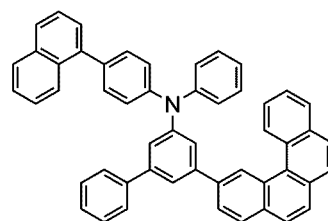
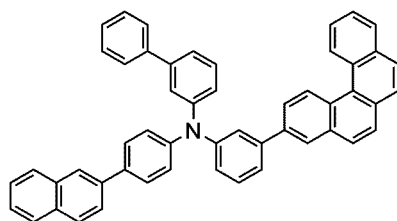
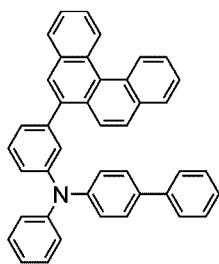
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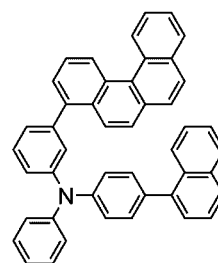
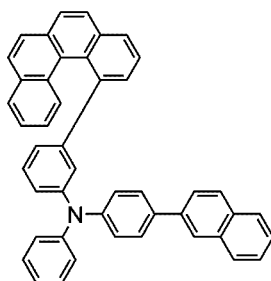
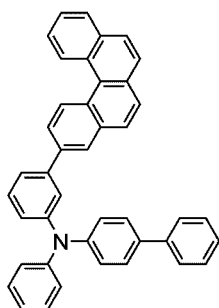
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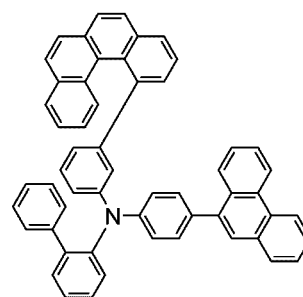
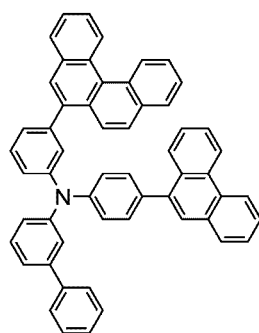
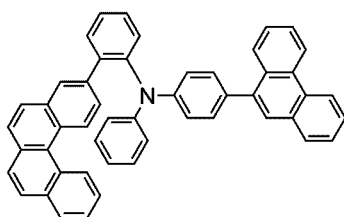
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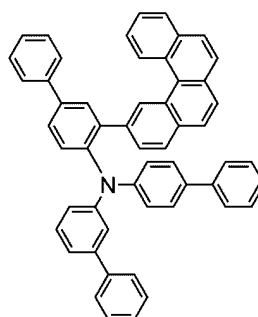
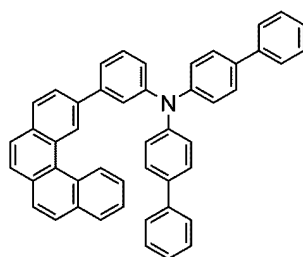
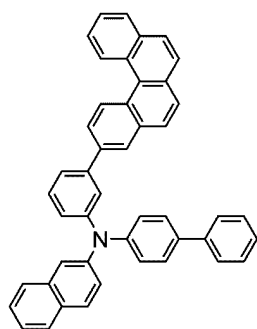


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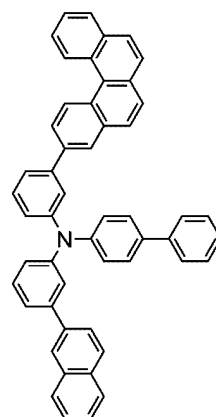
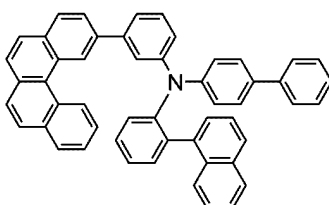
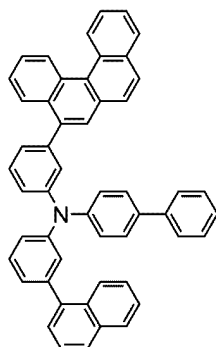
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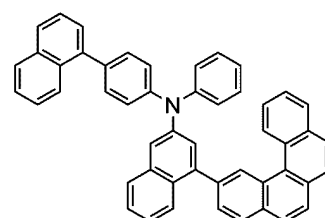
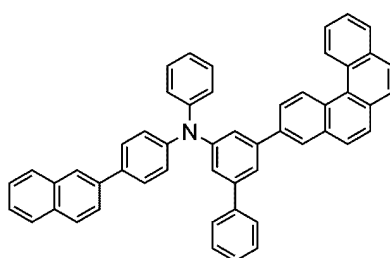
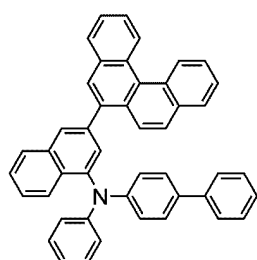
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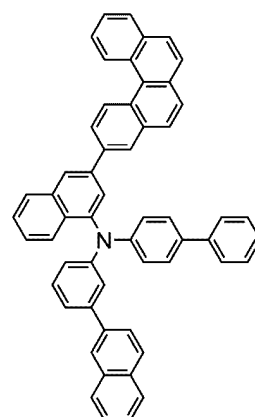
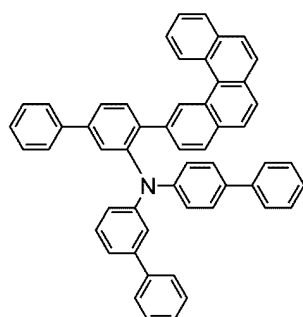
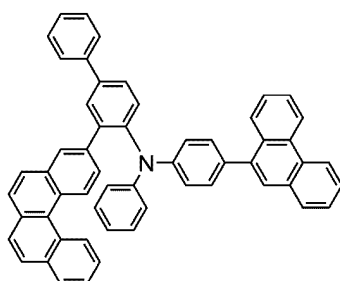
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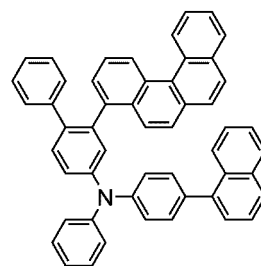
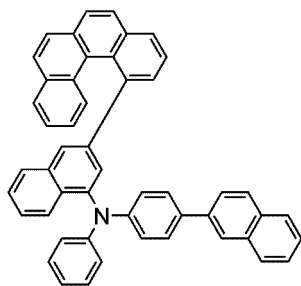
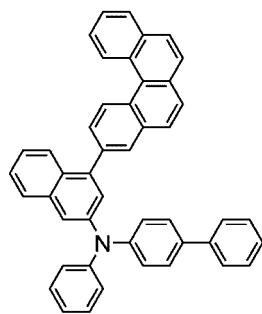
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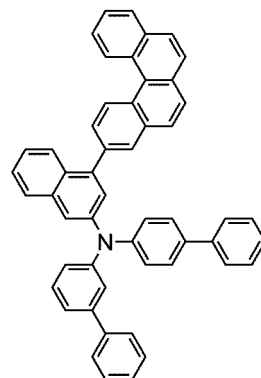
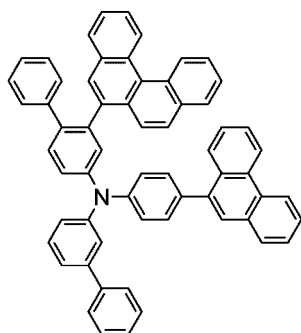
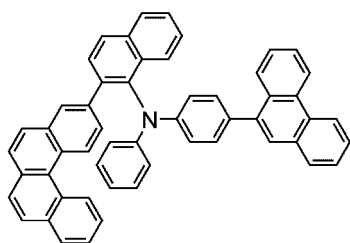
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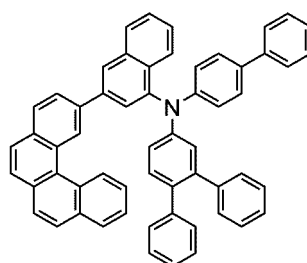
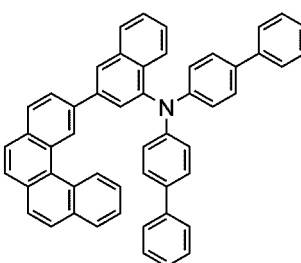
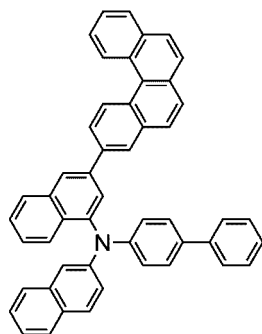
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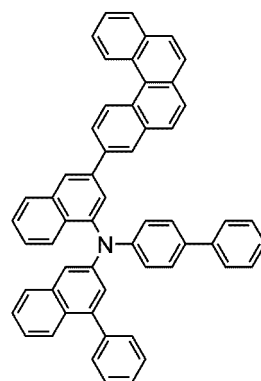
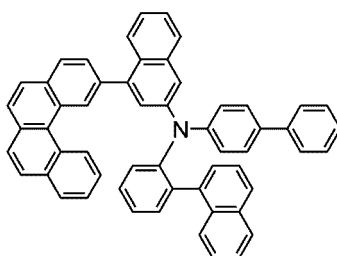
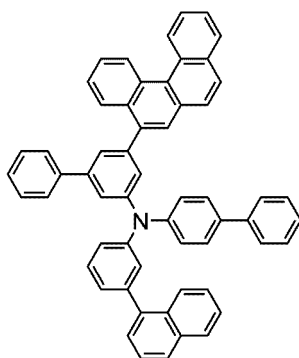
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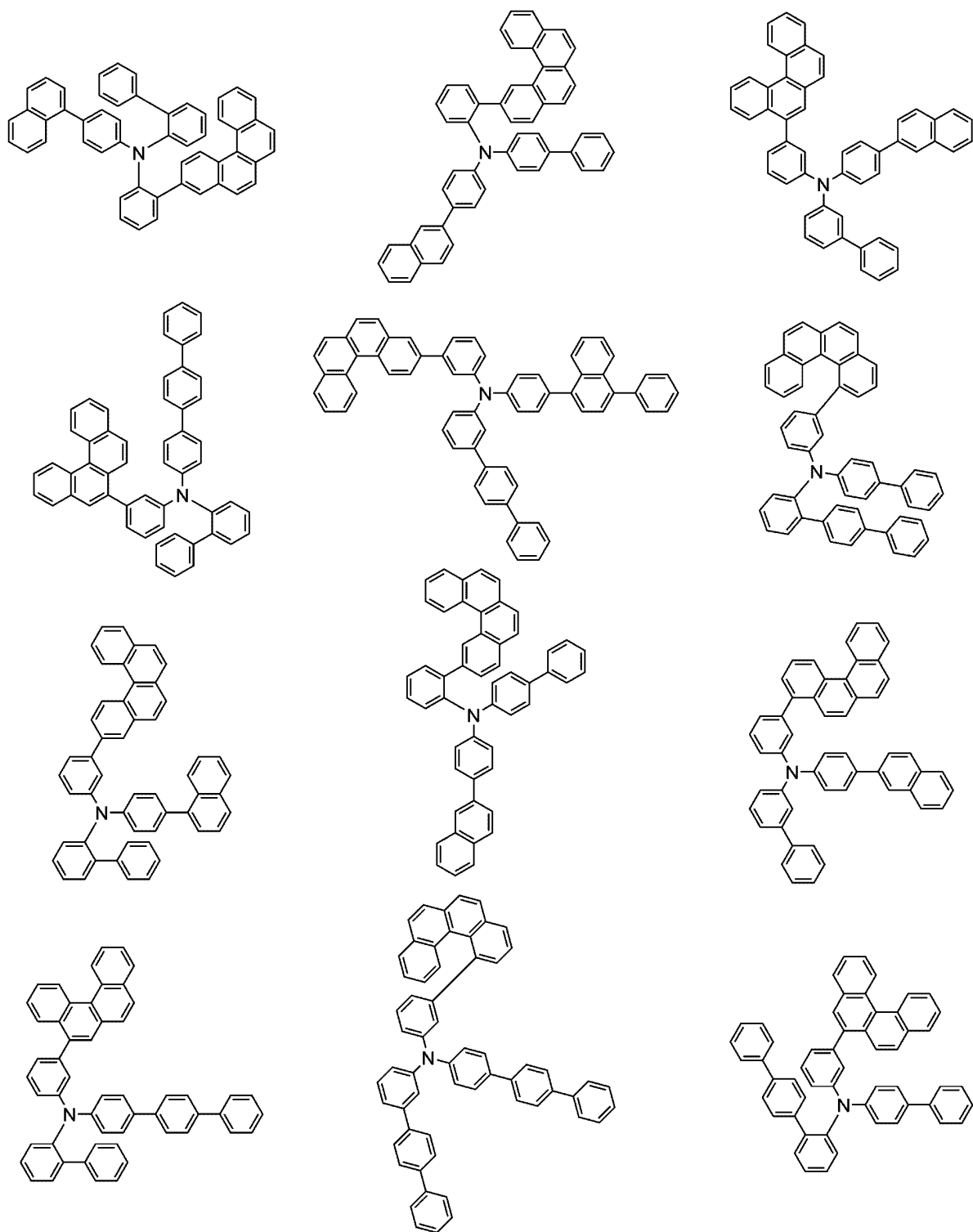
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【化 3 7 3】



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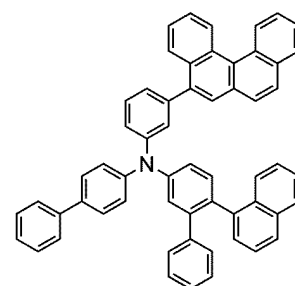
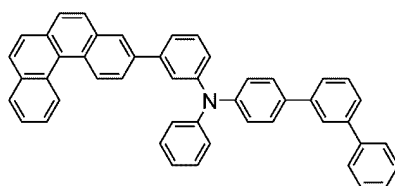
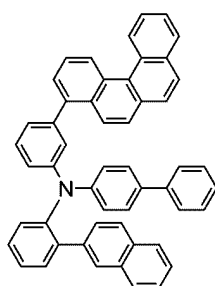
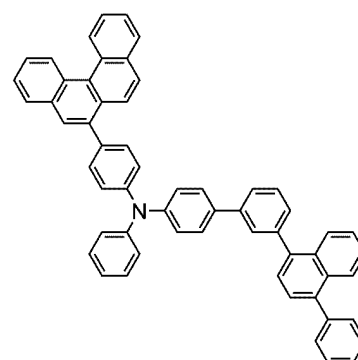
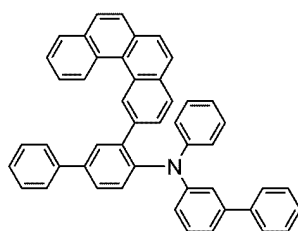
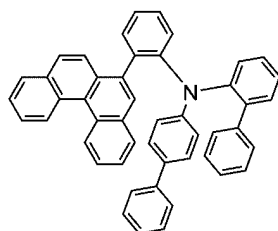
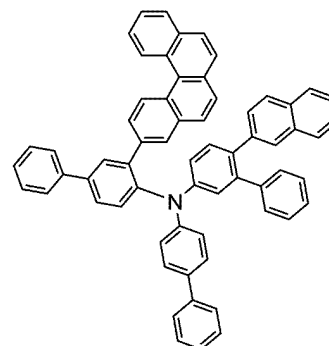
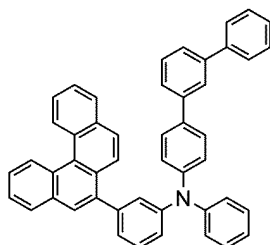
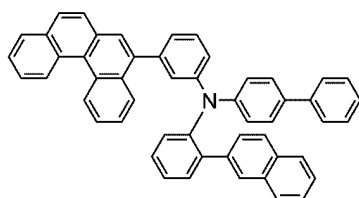
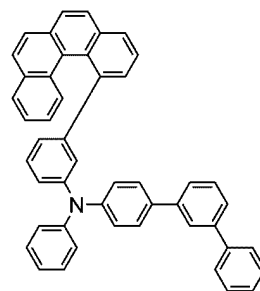
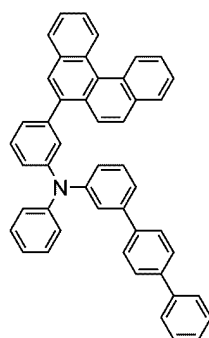
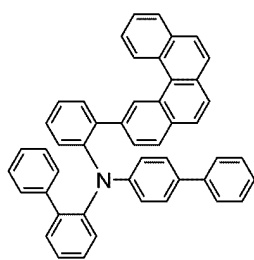
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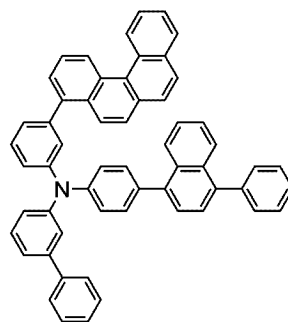
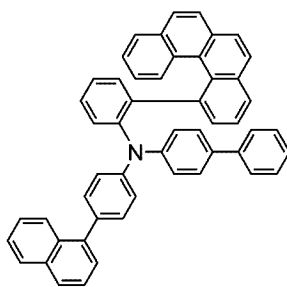
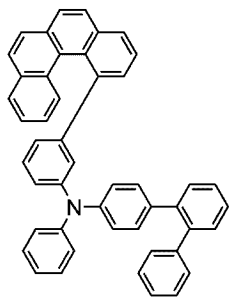
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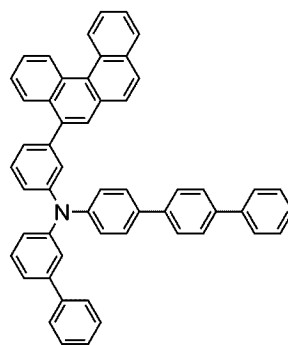
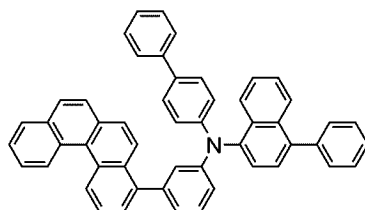
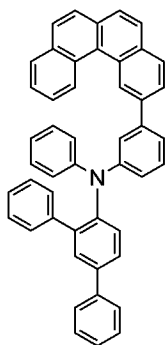
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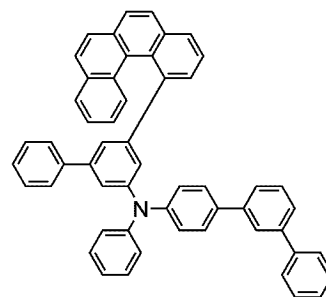
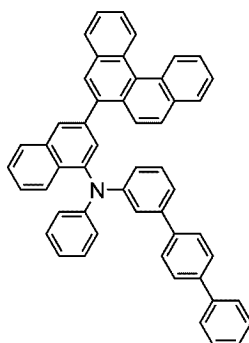
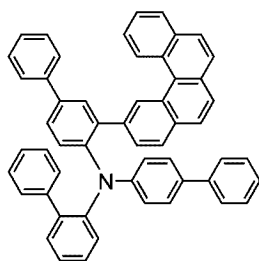
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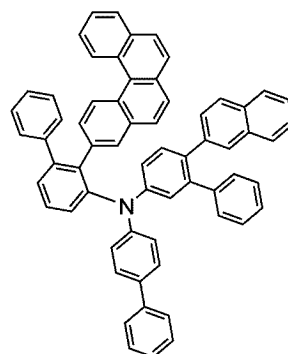
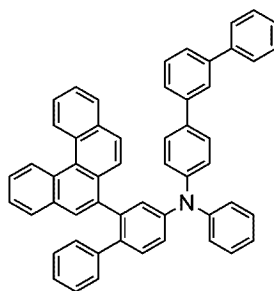
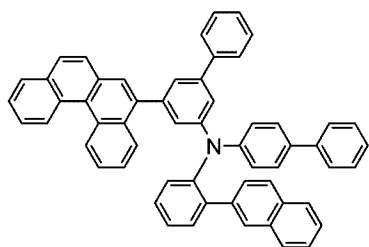
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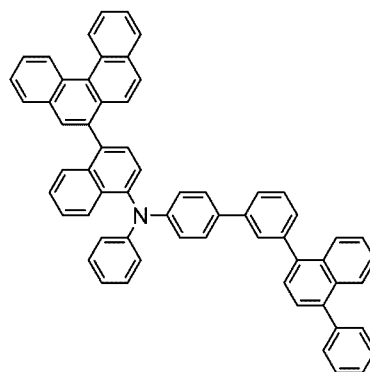
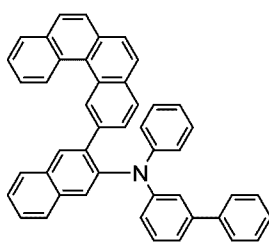
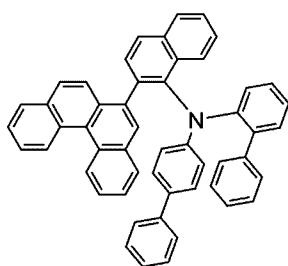
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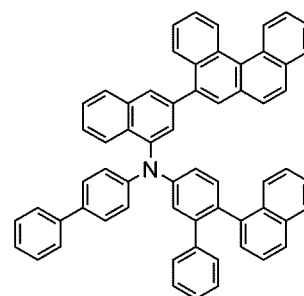
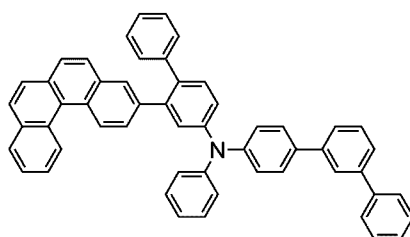
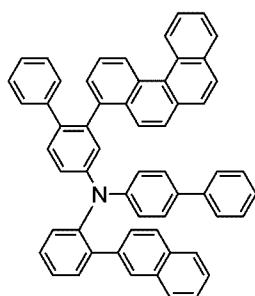
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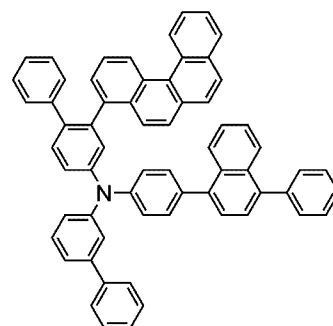
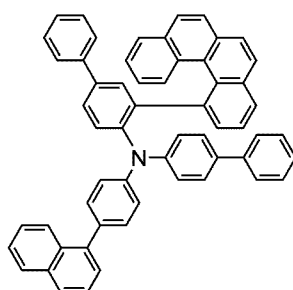
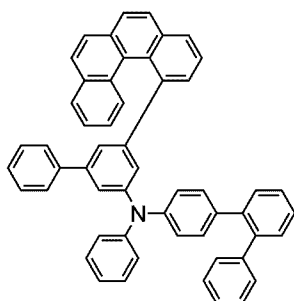
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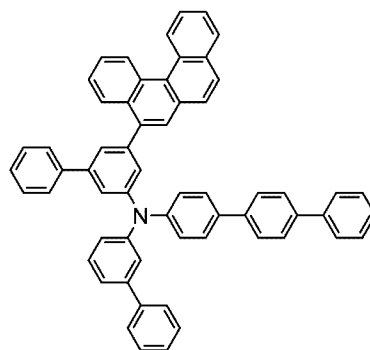
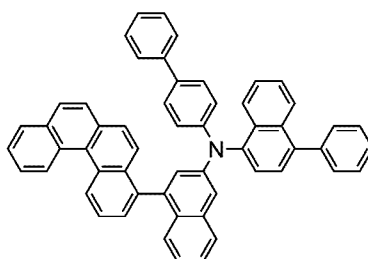
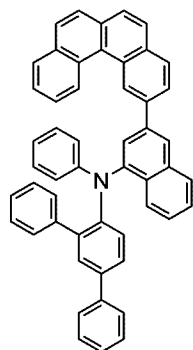
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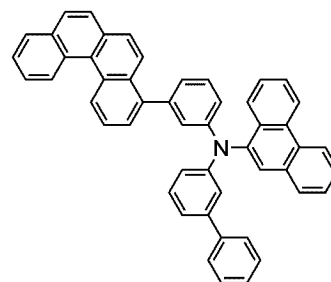
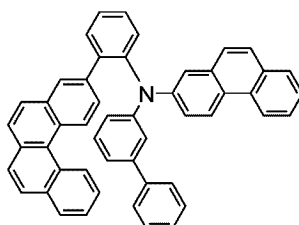
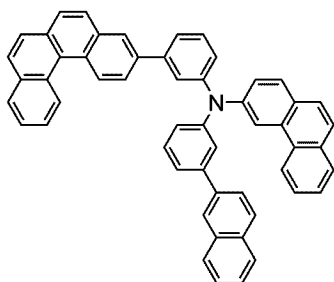
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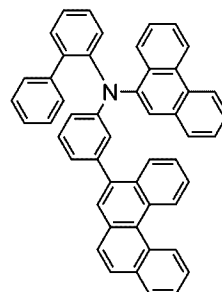
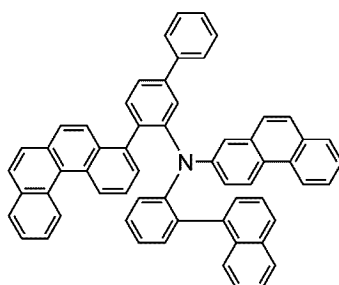
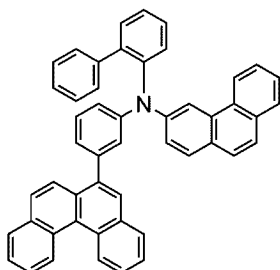
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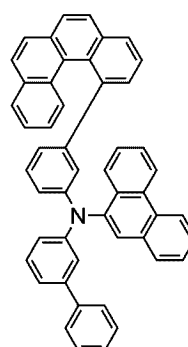
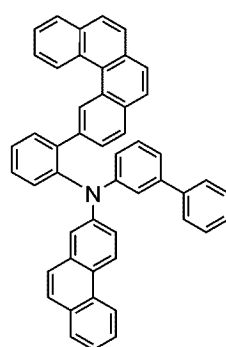
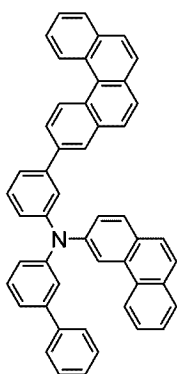
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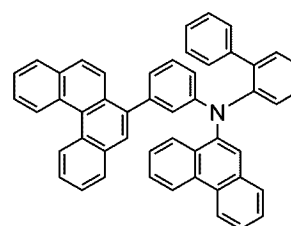
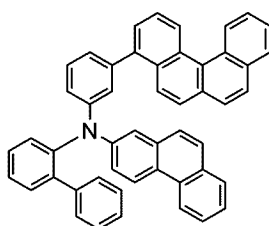
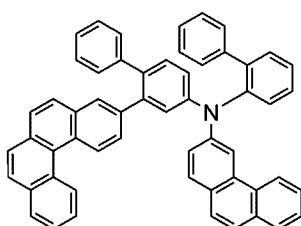
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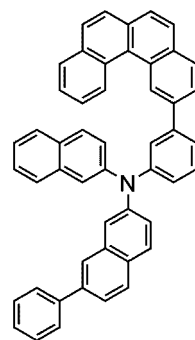
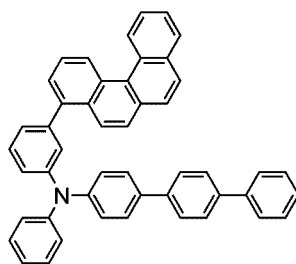
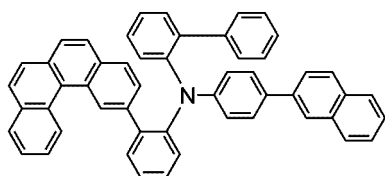
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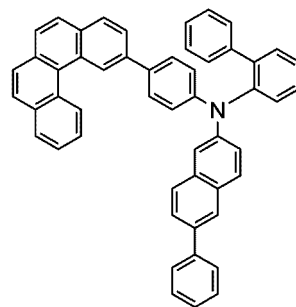
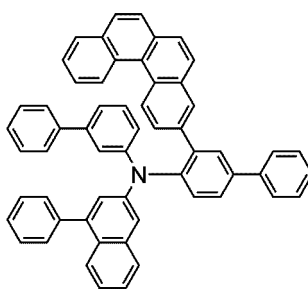
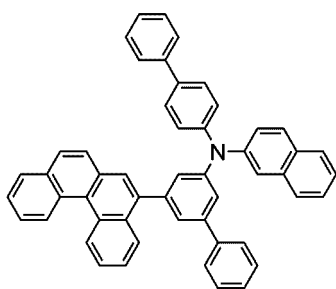
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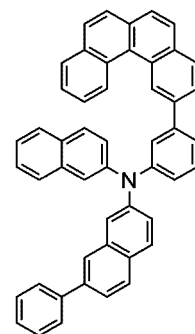
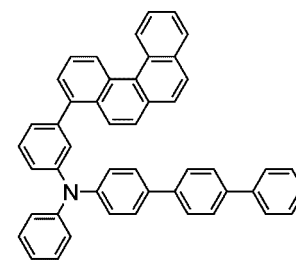
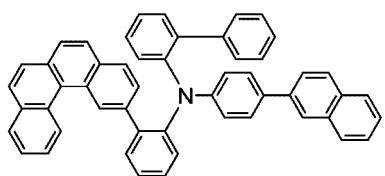


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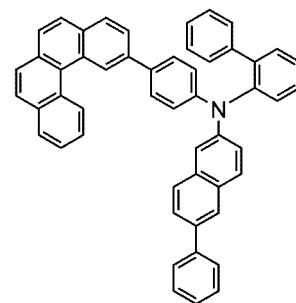
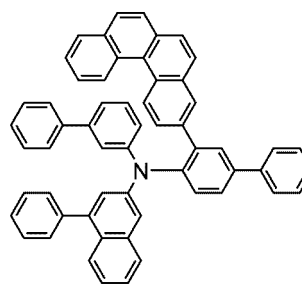
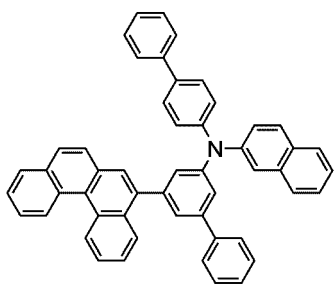


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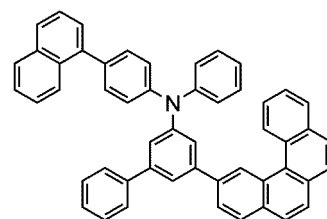
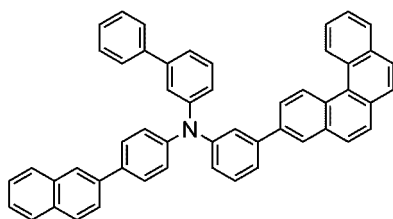
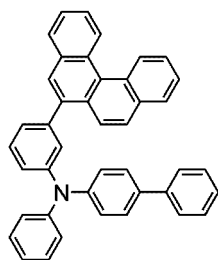


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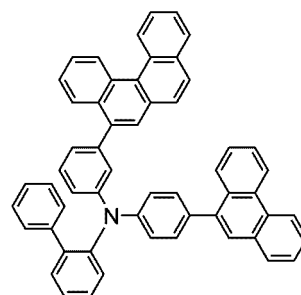
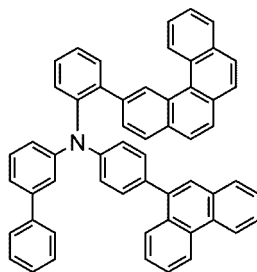
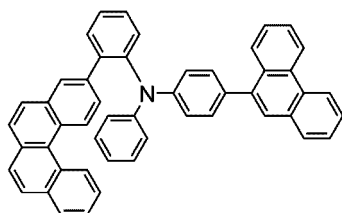


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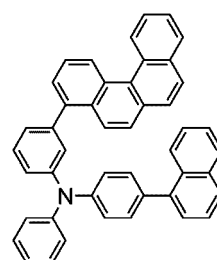
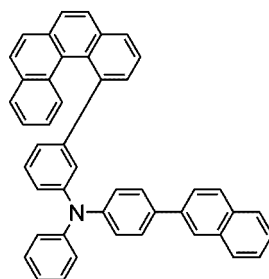
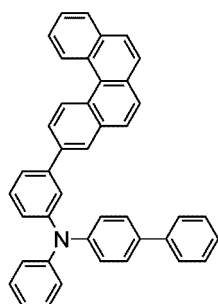
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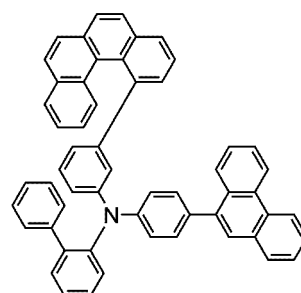
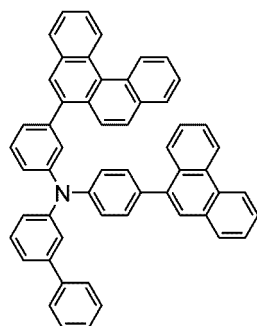
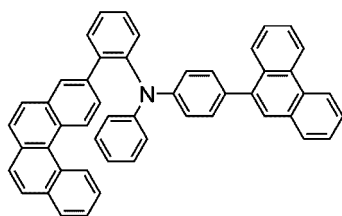
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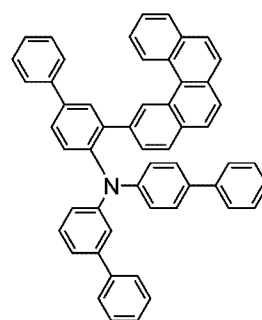
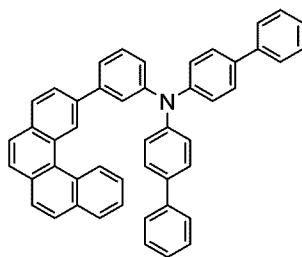
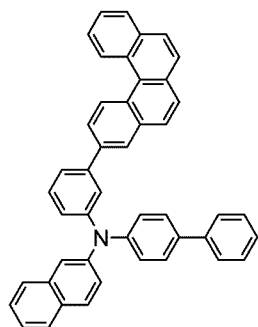
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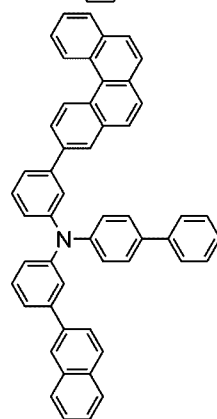
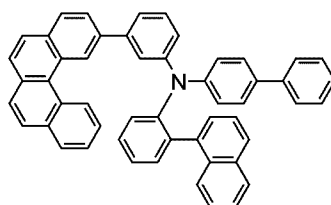
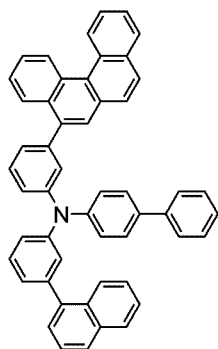
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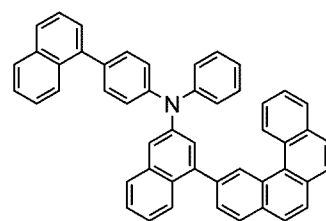
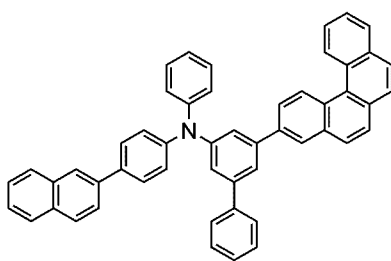
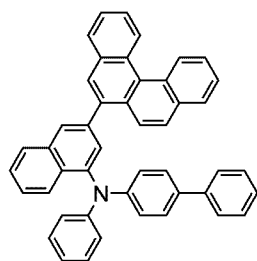
【化 3 8 1】



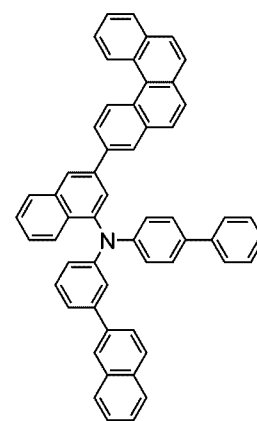
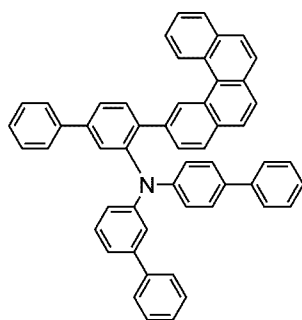
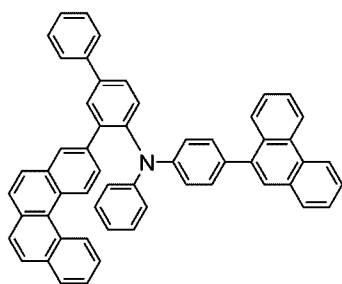
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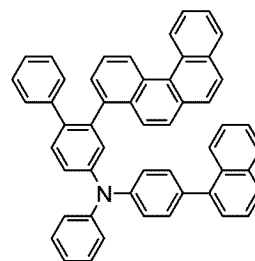
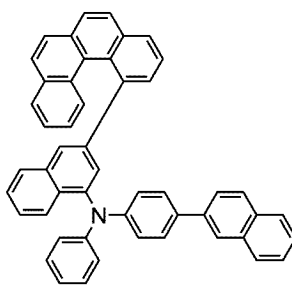
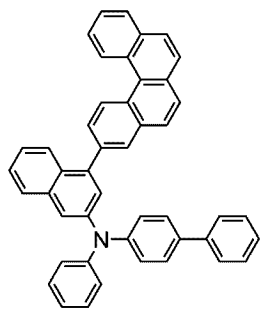
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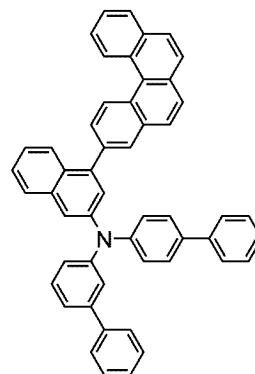
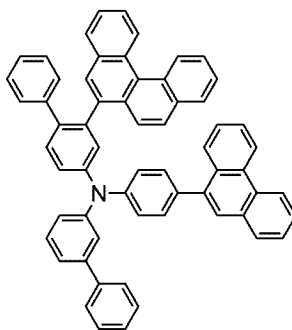
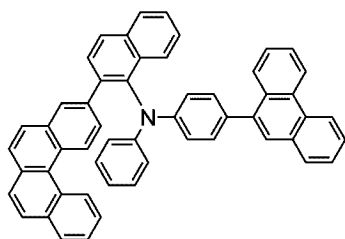
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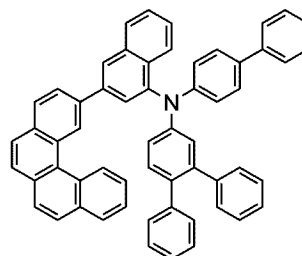
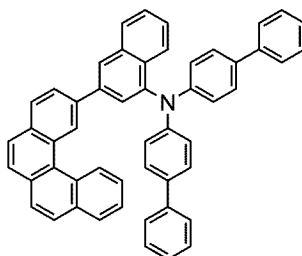
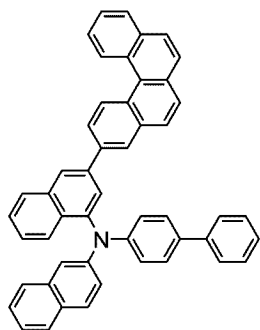
【化 3 8 2】



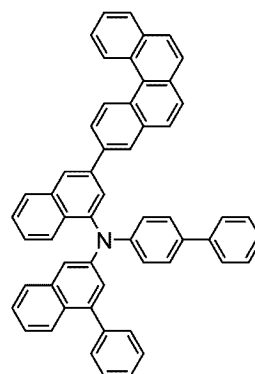
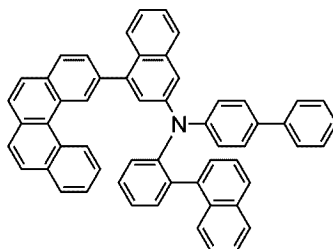
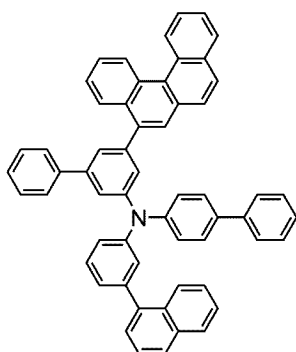
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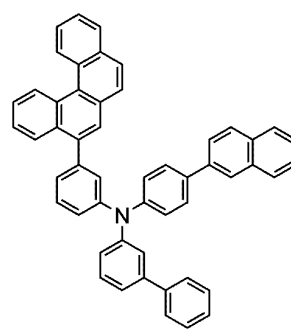
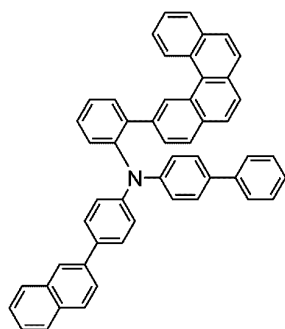
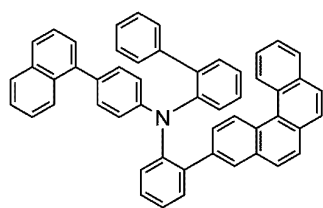
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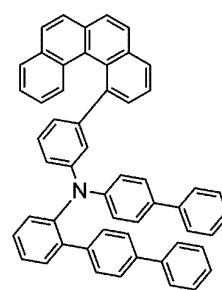
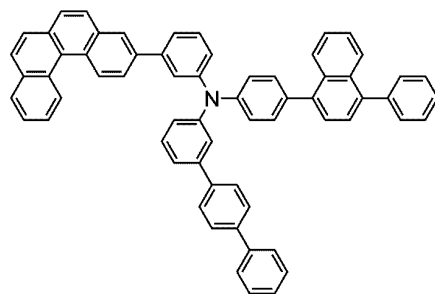
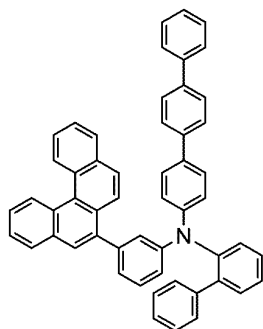
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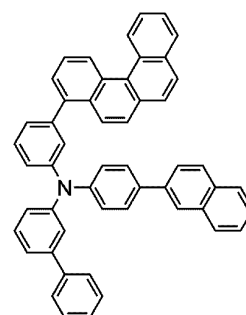
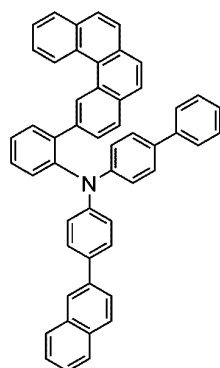
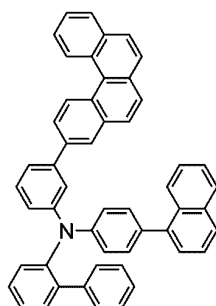
【化 3 8 3】



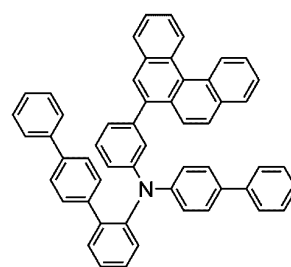
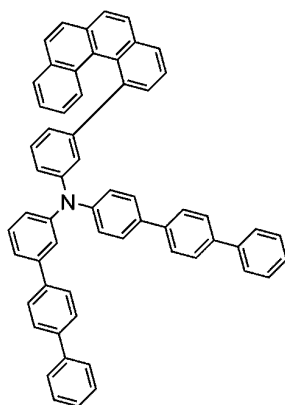
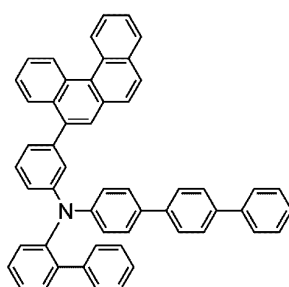
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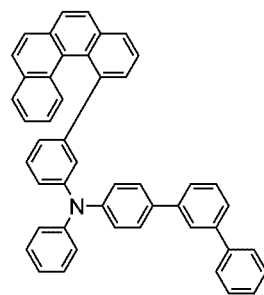
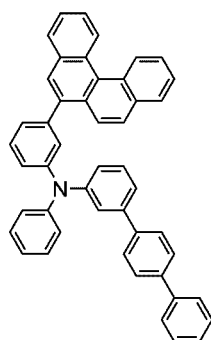
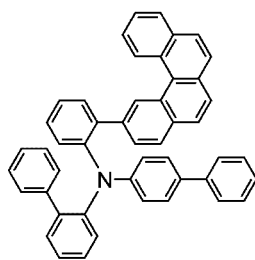
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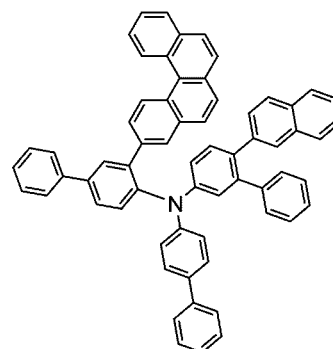
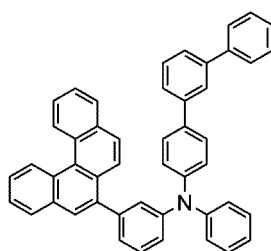
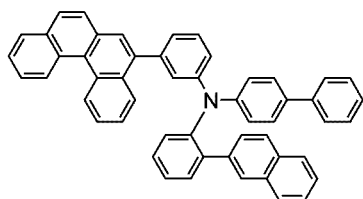
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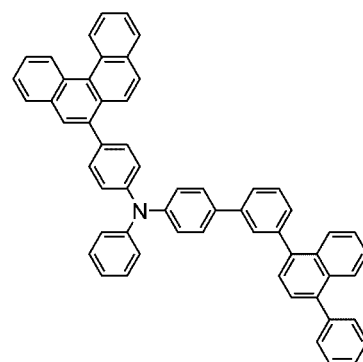
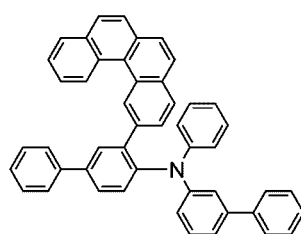
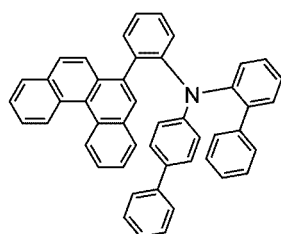
【化 3 8 4】



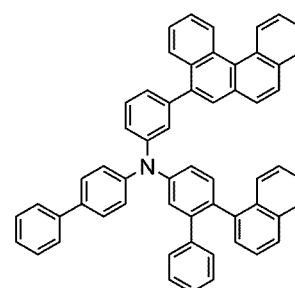
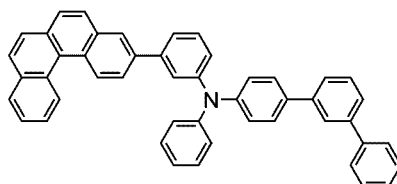
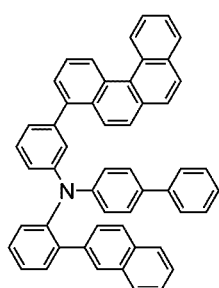
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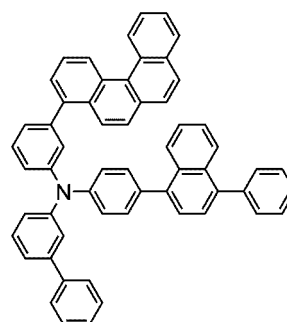
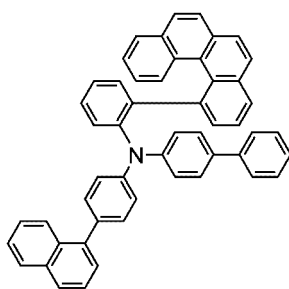
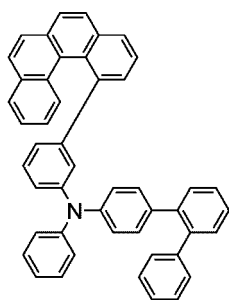
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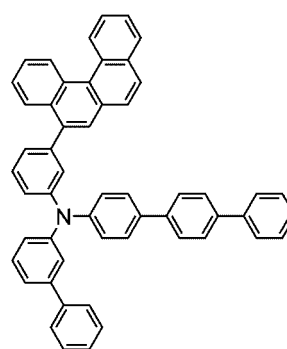
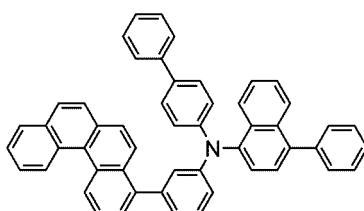
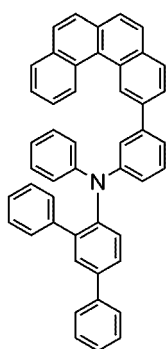
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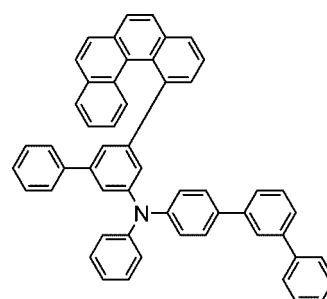
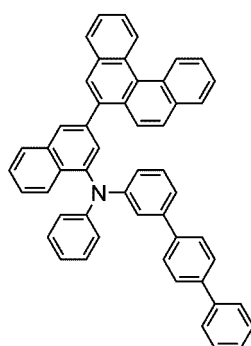
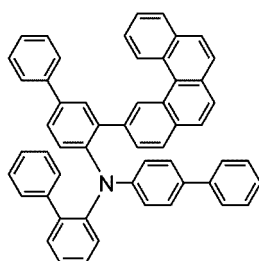
【化 3 8 5】



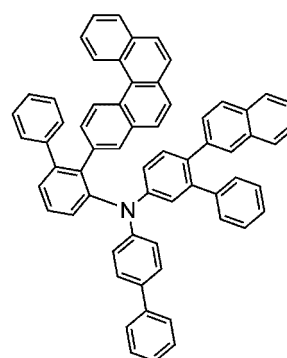
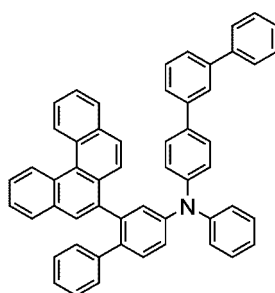
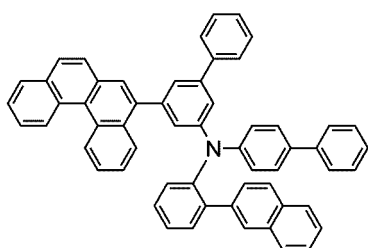
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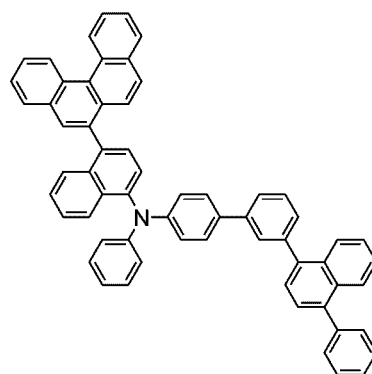
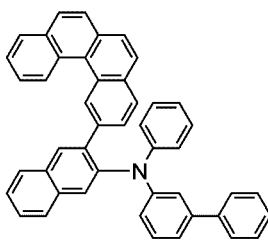
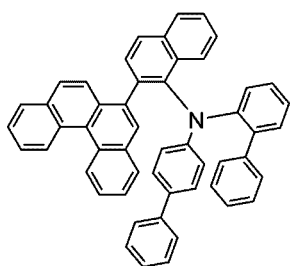
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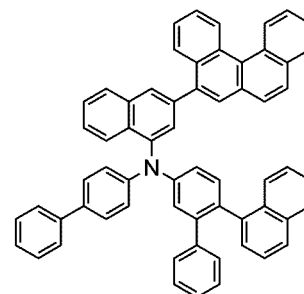
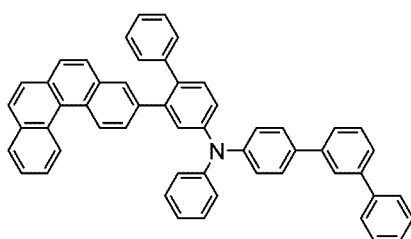
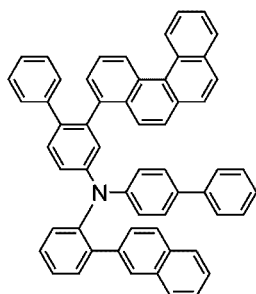
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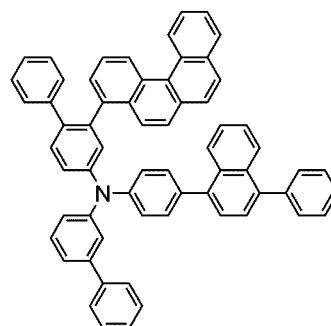
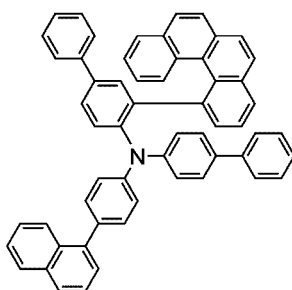
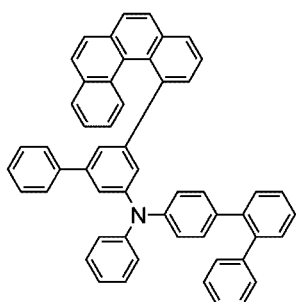
【化 3 8 6】



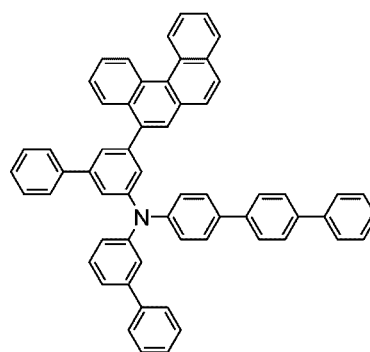
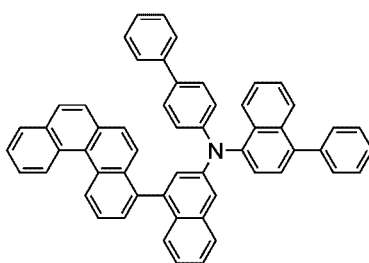
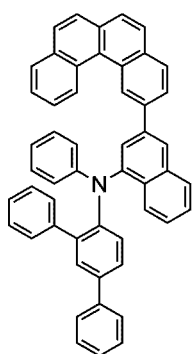
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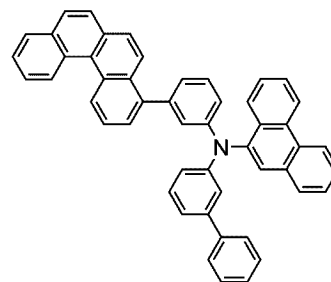
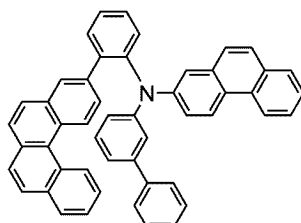
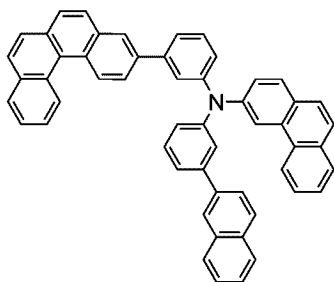


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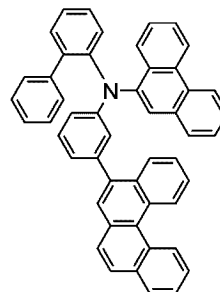
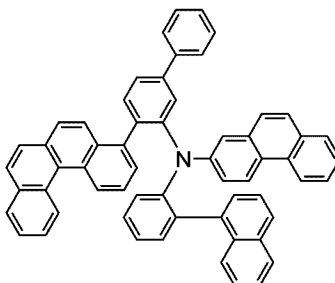
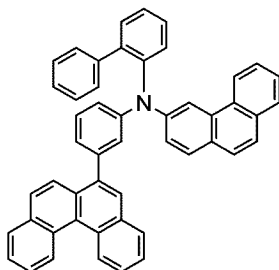


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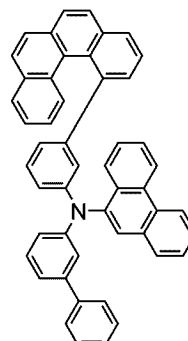
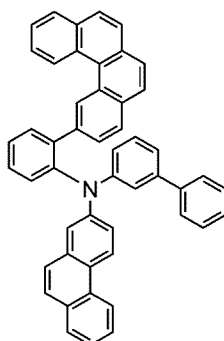
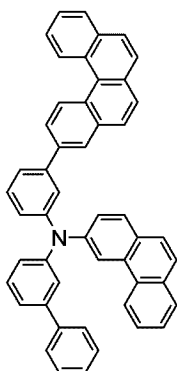
【化 3 8 7】



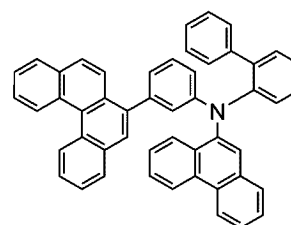
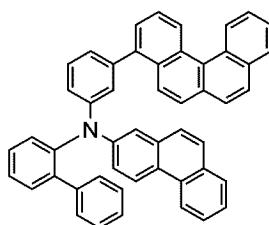
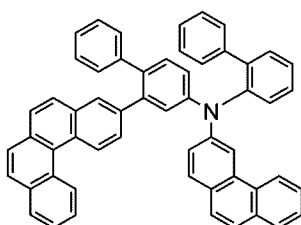
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【0 0 5 6】

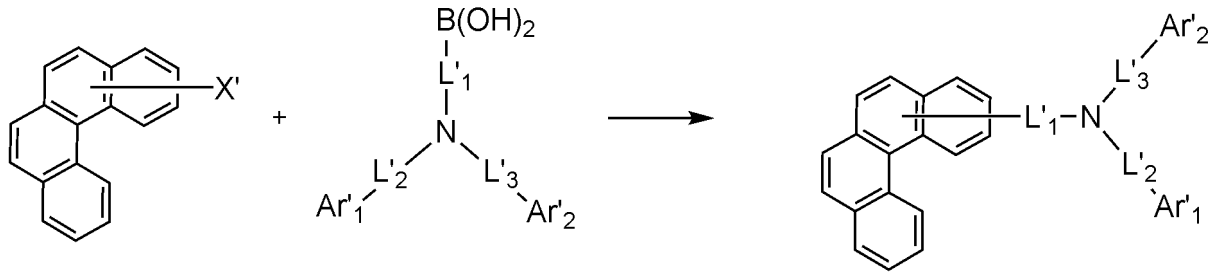
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前記化学式 2 で表される化合物中 $R'_{11} \sim R'_{12}$ のうちいずれか 1 つは、下記化学式 3 で表される置換基で、残りは水素である場合、例えば下記の反応式 2 のような製造方法で製造することができ、それ以外の残りの化合物も似たような方法で製造することができる。

〔反応式 2〕

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【化 3 8 8】



【0057】

前記反応式 2 中、 $L'1 \sim L'3$ 、 $Ar'1$ および $Ar'2$ は前記化学式 2 で定義した通りであり、 X' はハロゲンで、好ましくは X' はクロロまたはブromoである。

【0058】

前記反応式 2 は、鈴木カップリング反応であって、パラジウム触媒と塩基存在下で行うことが好ましく、鈴木カップリング反応のための反応基は当業界で公知のものに従って変更可能である。前記製造方法は、後述する製造例でより具体化される。

【0059】

好ましくは、前記発光層において、前記化学式 1 で表される化合物および前記化学式 2 で表される化合物の重量比は、 $10 : 90 \sim 90 : 10$ で、より好ましくは $20 : 80 \sim 80 : 20$ 、 $30 : 70 \sim 70 : 30$ または $40 : 60 \sim 60 : 40$ である。

【0060】

一方、前記発光層は、ホスト以外にドーパントをさらに含んでもよい。前記ドーパント材料としては、有機発光素子に用いられる物質なら特に制限されない。例えば、芳香族アミン誘導体、スチリルアミン化合物、ホウ素錯体、フルオランテン化合物、金属錯体などがある。具体的には、芳香族アミン誘導体としては、置換または非置換のアリールアミノ基を有する縮合芳香族環誘導体であって、アリールアミノ基を有するピレン、アントラセン、クリセン、ペリフランテンなどがあり、スチリルアミン化合物としては、置換または非置換のアリールアミンに少なくとも 1 個のアリールビニル基が置換されている化合物で、アリール基、シリル基、アルキル基、シクロアルキル基およびアリールアミノ基からなる群より 1 または 2 以上選択される置換基が置換または非置換される。具体的には、スチリルアミン、スチリルジアミン、スチリルトリアミン、スチリルテトラアミンなどがあるが、これらに限定されるものではない。また、金属錯体としては、イリジウム錯体、白金錯体などがあるが、これらに限定されるものではない。

【0061】

好ましくは、前記ドーパント材料は下記で構成される群より選択されるいずれか 1 つ以上であり得る：

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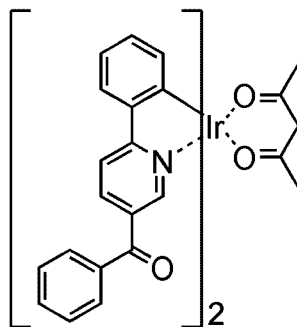
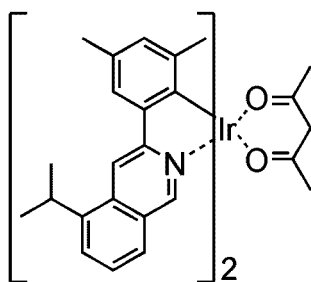
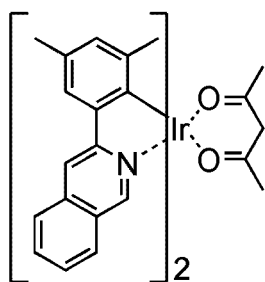
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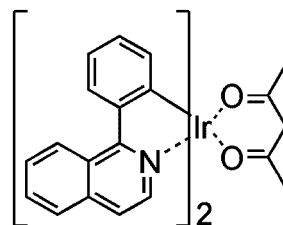
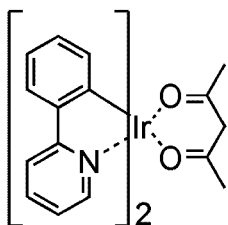
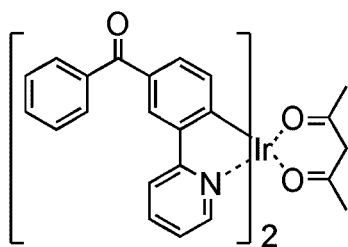
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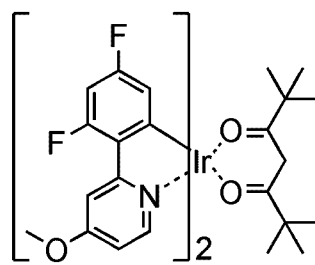
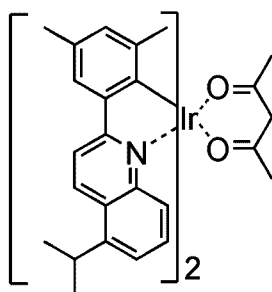
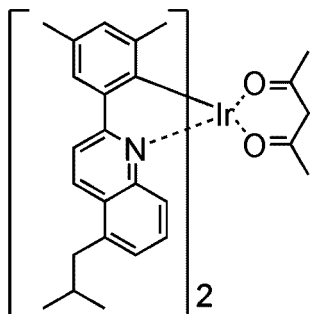
【化 3 8 9】



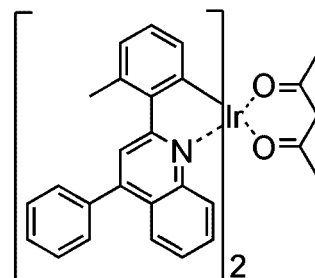
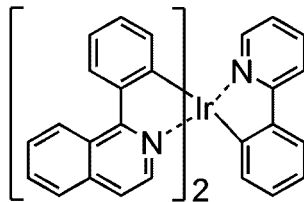
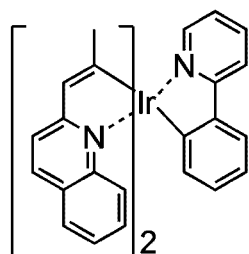
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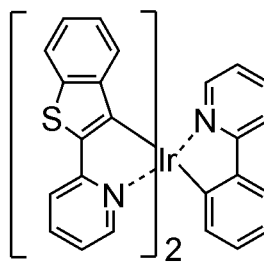
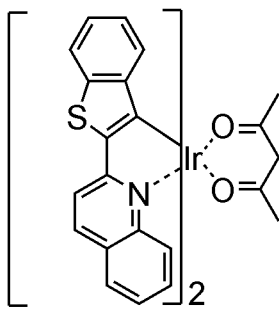
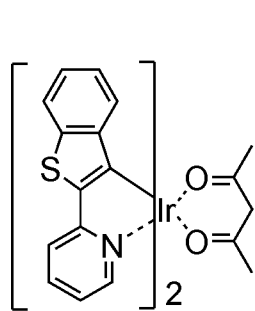
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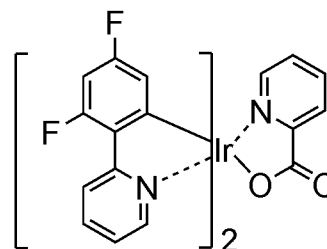
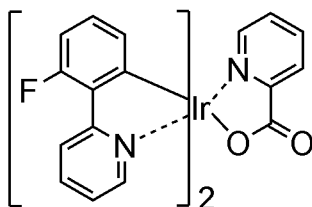
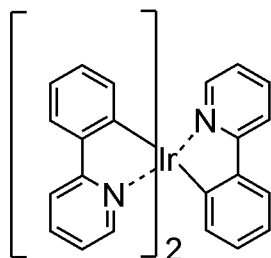
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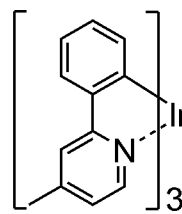
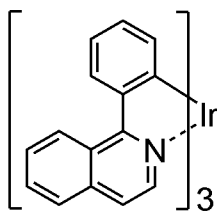
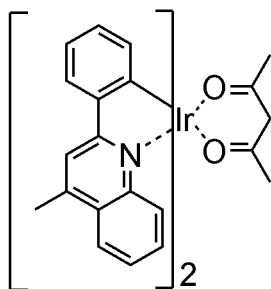
【化 3 9 0】



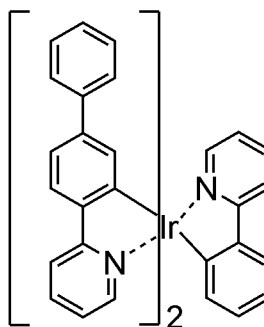
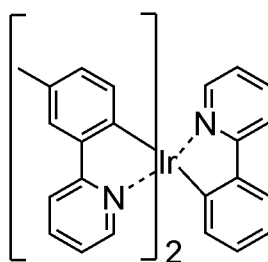
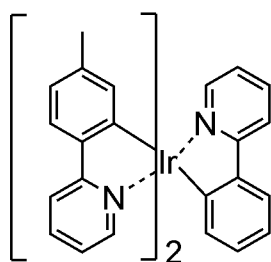
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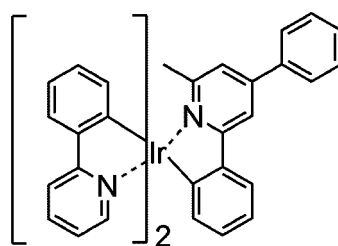
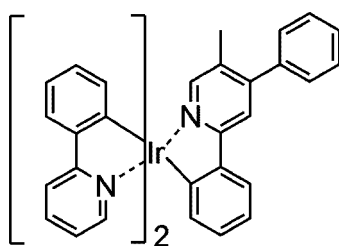
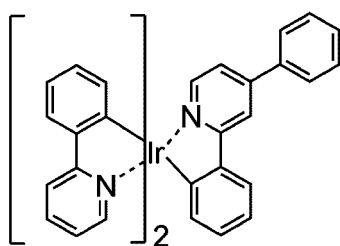
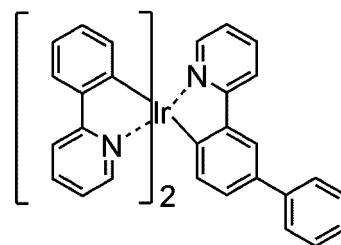
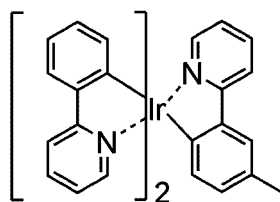
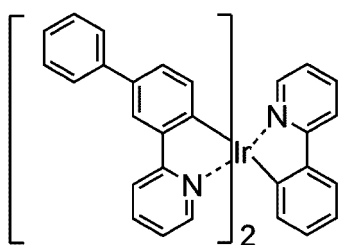
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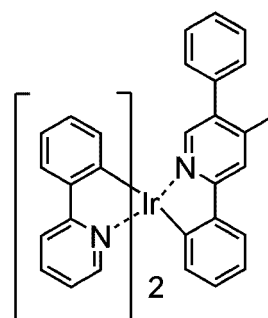
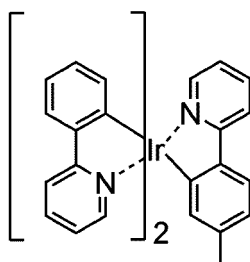
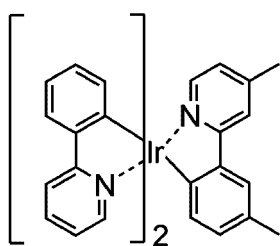
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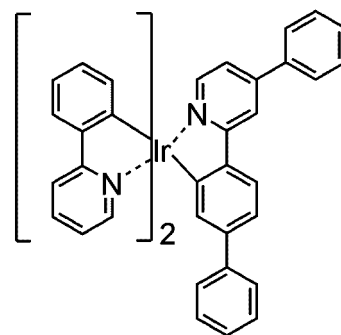
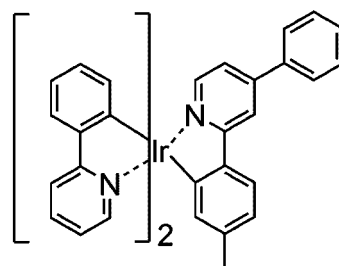
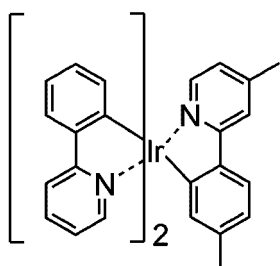
【化 3 9 1】



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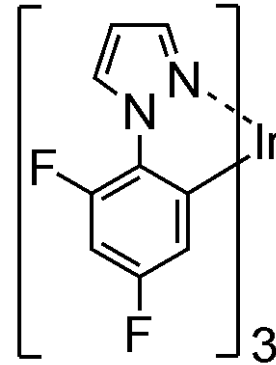
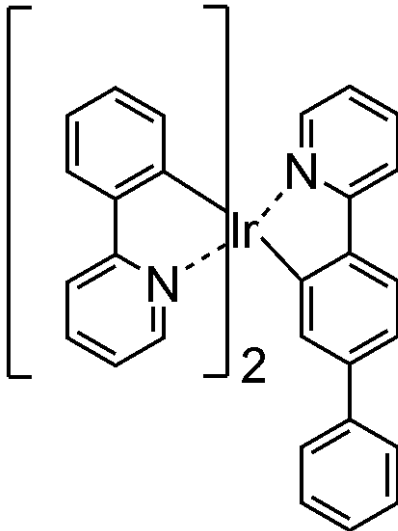


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【化 3 9 2】



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【0062】

正孔阻止層

本発明に係る有機発光素子は、必要に応じて前記発光層上に正孔阻止層を含むことができる。

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【0063】

前記正孔阻止層は、正極から注入された正孔が発光層で再結合されずに電子輸送層へ渡るのを防止するために、電子輸送層と発光層との間に置く層で、正孔抑制層とも呼ばれる。正孔阻止層にはイオン化エネルギーが大きい物質が好ましい。

【0064】

電子輸送層

本発明に係る有機発光素子は、必要に応じて前記発光層上に（または正孔阻止層が存在する場合、正孔阻止層上に）電子輸送層を含むことができる。

【0065】

前記電子輸送層は、負極または負極上に形成された電子注入層から電子を受け取って発光層まで電子を輸送し、また、発光層から正孔が伝達されるのを抑制する層であり、電子輸送物質としては、負極から電子の注入を良好に受けて発光層に移すことができる物質であって、電子に対する移動性が大きい物質が好適である。

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【0066】

前記電子輸送物質の具体的な例としては、8-ヒドロキシキノリンのAl錯体；Alq₃を含む錯体；有機ラジカル化合物；ヒドロキシフラボン-金属錯体などがあるが、これらにのみ限定されるものではない。電子輸送層は、従来技術に従って用いられた通り任意の所望のカソード物質と共に使用することができる。特に、適切なカソード物質の例としては、低い仕事関数を有し、アルミニウム層またはシルバー層がそれに続く通常の物質である。具体的には、セシウム、バリウム、カルシウム、イッテルビウムおよびサマリウムで、各々の場合、アルミニウム層またはシルバー層がそれに続く。

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【0067】

電子注入層

本発明に係る有機発光素子は、必要に応じて前記発光層上に（または電子輸送層が存在する場合、電子輸送層上に）電子注入層をさらに含んでもよい。

【0068】

前記電子注入層は、電極から電子を注入する層で、電子を輸送する能力を有し、負極からの電子注入効果、発光層または発光材料に対して優れた電子注入効果を有し、発光層で生成された励起子の正孔注入層への移動を防止し、また、薄膜形成能力の優れた化合物を使用することが好ましい。

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【0069】

前記電子注入層で用いられる物質の具体的な例としては、フルオレノン、アントラキノジメタン、ジフェノキノン、チオピランジオキシド、オキサゾール、オキサジアゾール、トリアゾール、イミダゾール、ペリレンテトラカルボン酸、プレオレニリデンメタン、アントロンなどとそれらの誘導体、金属錯体化合物および含窒素5員環誘導体などがあるが、これらに限定されるものではない。

【0070】

前記金属錯体化合物としては、8-ヒドロキシキノリナトリウム、ビス(8-ヒドロキシキノリナト)亜鉛、ビス(8-ヒドロキシキノリナト)銅、ビス(8-ヒドロキシキノリナト)マンガン、トリス(8-ヒドロキシキノリナト)アルミニウム、トリス(2-メチル-8-ヒドロキシキノリナト)アルミニウム、トリス(8-ヒドロキシキノリナト)ガリウム、ビス(10-ヒドロキシベンゾ[h]キノリナト)ベリリウム、ビス(10-ヒドロキシベンゾ[h]キノリナト)亜鉛、ビス(2-メチル-8-キノリナト)クロロガリウム、ビス(2-メチル-8-キノリナト)(o-クレゾラト)ガリウム、ビス(2-メチル-8-キノリナト)(1-ナフトラト)アルミニウム、ビス(2-メチル-8-キノリナト)(2-ナフトラト)ガリウムなどがあるが、これらに限定されるものではない。

【0071】

一方、本発明において、「電子注入および輸送層」は、前記電子注入層と前記電子輸送層の役割を全て行う層で、前記各層の役割をする物質を単独で、あるいは混合して使用することができるが、これに限定されない。

【0072】

有機発光素子

本発明に係る有機発光素子の構造を図1および図2に示した。図1は、基板1、正極2、発光層3、および負極4からなる有機発光素子の例を示した図である。図2は、基板1、正極2、正孔注入層5、正孔輸送層6、電子遮断層7、発光層3、正孔阻止層8、電子注入および輸送層9、および負極4からなる有機発光素子の例を示した図である。

【0073】

本発明に係る有機発光素子は、上述した構成を順次積層させて製造することができる。この時、スパッタリング法(sputtering)や電子ビーム蒸発法(e-beam evaporation)などのPVD(physical Vapor Deposition)方法を利用して、基板上に金属または導電性を有する金属酸化物、またはこれらの合金を蒸着させて正極を形成し、その上に上述した各層を形成した後、さらにその上に負極として用いられる物質を蒸着させて製造することができる。このような方法以外にも、基板上に負極物質から上述した構成の逆順で正極物質まで順に蒸着させて有機発光素子を作ることができる(WO2003/012890)。また、発光層はホストおよびドーパントを真空蒸着法だけでなく溶液塗布法によって形成されることができる。ここで、溶液塗布法とは、スピニング、ディップコーティング、ドクターブレードイング、インクジェットプリンティング、スクリーンプリンティング、スプレー法、ロールコーティングなどを意味するが、これらにのみ限定されるものではない。

【0074】

一方、本発明に係る有機発光素子は、背面発光(bottom emission)素子、全面発光(top emission)素子、または両面発光素子であってもよく、特に相対的に高い発光効率が求められる背面発光素子であってもよい。

【0075】

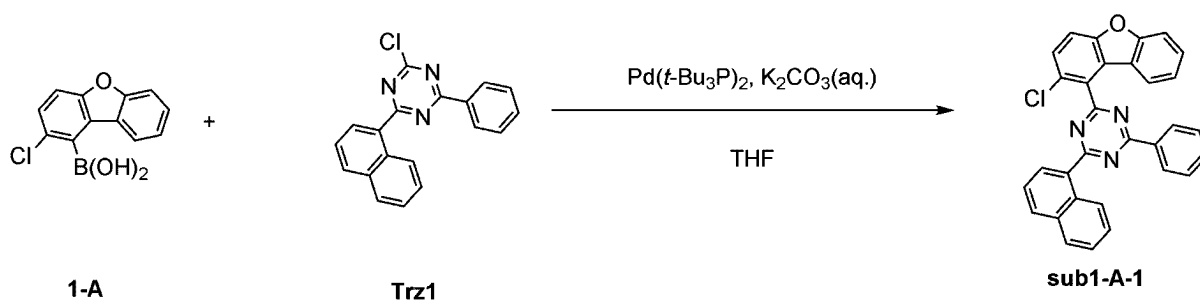
以下、本発明の理解を助けるために好ましい実施例を提示する。しかし、下記の実施例は、本発明をより理解し易くするために提供されるだけであり、これによって本発明の内容が限定されるのではない。

【0076】

[製造例]

製造例 1-1

【化 3 9 3】



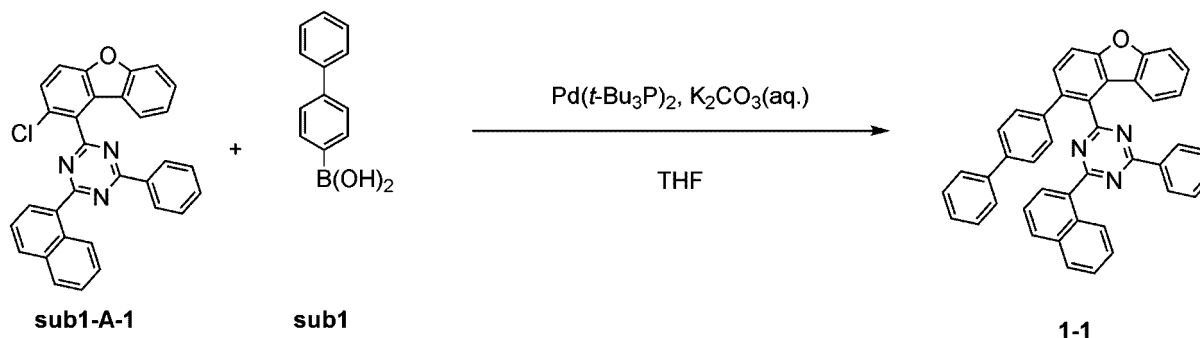
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【0077】

窒素雰囲気下で化合物 1-A (15 g、60.9 mmol) と化合物 Trz1 (19.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (16.8 g、121.7 mmol) を水 50 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-A-1 を 20.9 g 製造した。(収率 71%、MS: $[M+H]^+ = 484$)

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【化 3 9 4】



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【0078】

窒素雰囲気下で化合物 sub1-A-1 (15 g、31 mmol) と化合物 sub1 (6.1 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (8.6 g、62 mmol) を水 26 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-1 を 12.3 g 製造した。(収率 66%、MS: $[M+H]^+ = 602$)

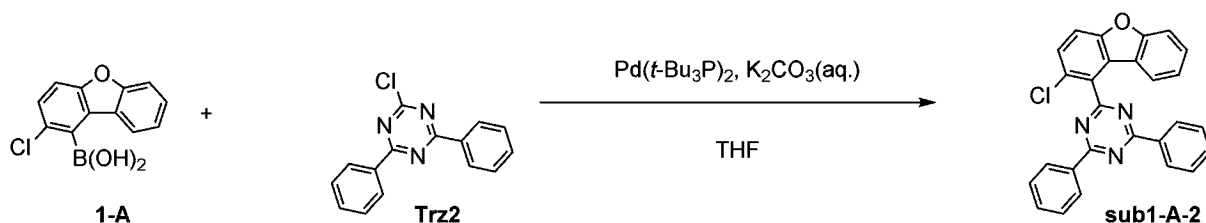
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【0079】

製造例 1-2

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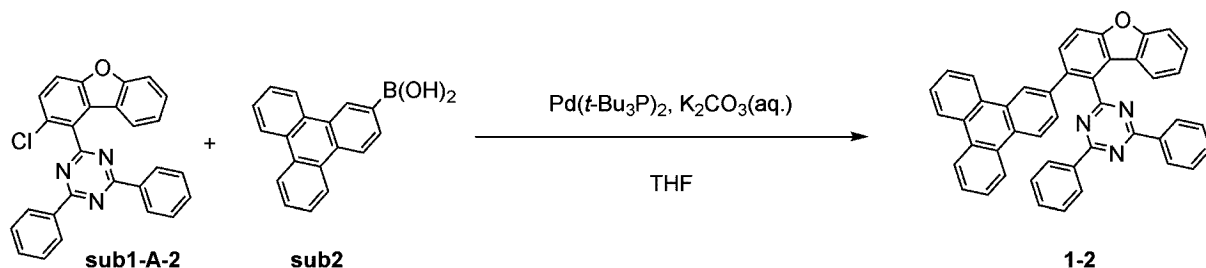
【化 3 9 5】



【0080】

窒素雰囲気下で化合物 **1-A** (15 g、60.9 mmol) と化合物 **Trz2** (16.3 g、60.9 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-A-2** を 19.5 g 製造した。(収率 74%、MS: $[\text{M} + \text{H}]^+ = 434$)

【化 3 9 6】



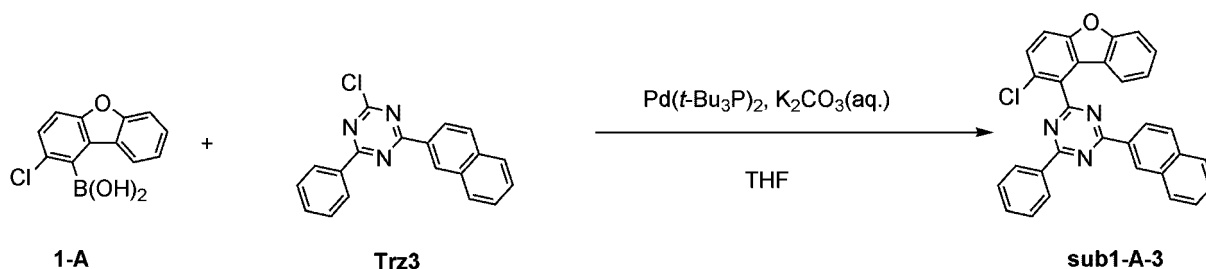
【0081】

窒素雰囲気下で化合物 **sub1-A-2** (15 g、34.6 mmol) と化合物 **sub2** (9.4 g、34.6 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.6 g、69.1 mmol) を水 29 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-2** を 14.3 g 製造した。(収率 66%、MS: $[\text{M} + \text{H}]^+ = 626$)

【0082】

製造例 1-3

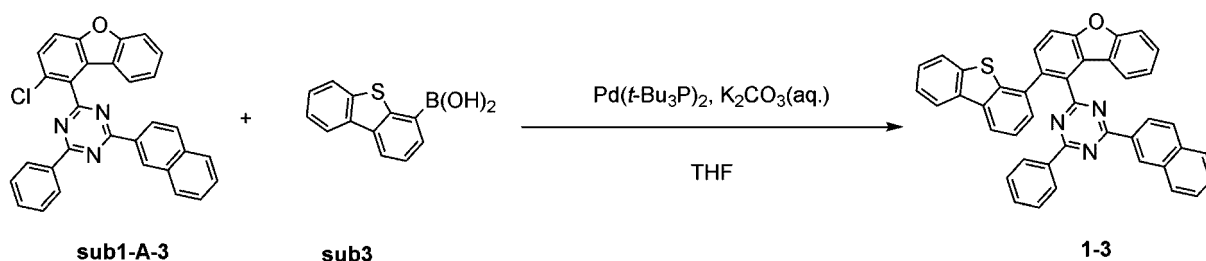
【化 3 9 7】



【0083】

窒素雰囲気下で化合物1-A (15 g、60.9 mmol) と化合物Trz3 (19.3 g、60.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水76 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。9時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-A-3を23.2 g製造した。(収率79%、MS: $[M+H]^+ = 484$)

【化398】



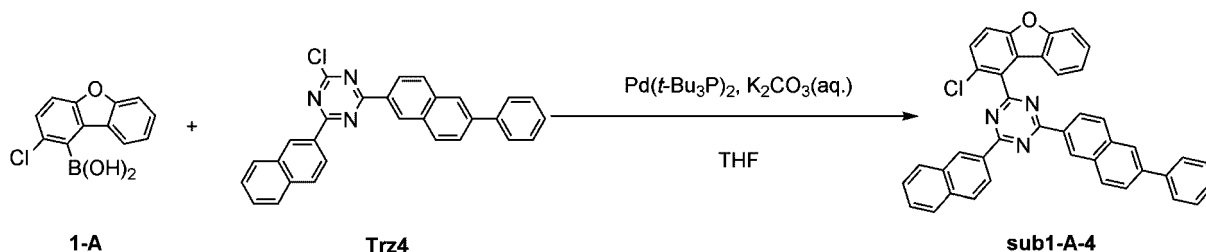
【0084】

窒素雰囲気下で化合物sub1-A-3 (15 g、31 mmol) と化合物sub3 (7.1 g、31 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (8.6 g、62 mmol) を水26 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.2 g、0.3 mmol) を投入した。12時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-3を12.9 g製造した。(収率66%、MS: $[M+H]^+ = 632$)

【0085】

製造例1-4

【化399】

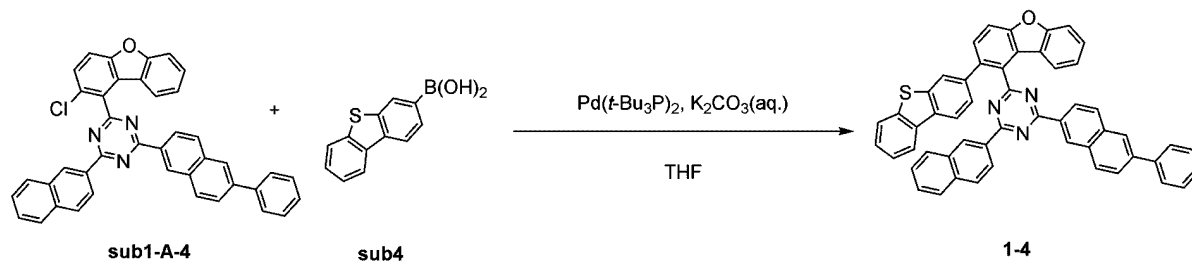


【0086】

窒素雰囲気下で化合物1-A (15 g、60.9 mmol) と化合物Trz4 (27 g、60.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水76 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。9時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを

入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-A-4 を 26 g 製造した。(収率 70%、MS: $[M+H]^+ = 610$)

【化 400】



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【0087】

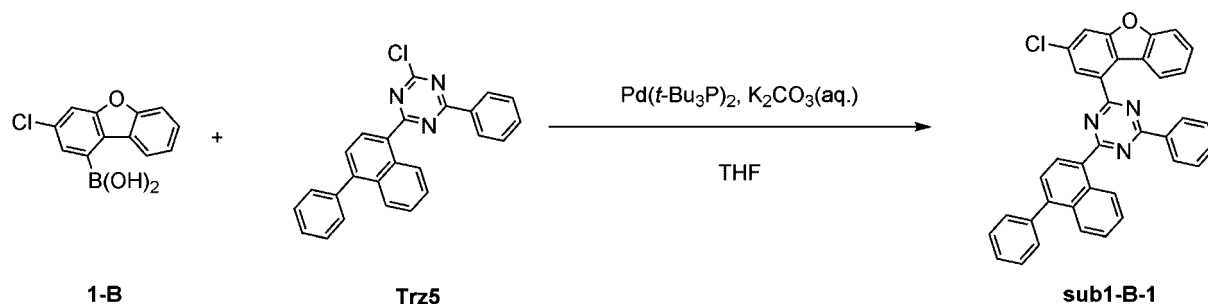
窒素雰囲気下で化合物 sub1-A-4 (15 g、24.6 mmol) と化合物 sub4 (5.6 g、24.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (6.8 g、49.2 mmol) を水 20 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butyl phosphine) palladium(0) (0.1 g、0.2 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-4 を 11.2 g 製造した。(収率 60%、MS: $[M+H]^+ = 758$)

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【0088】

製造例 1-5

【化 401】



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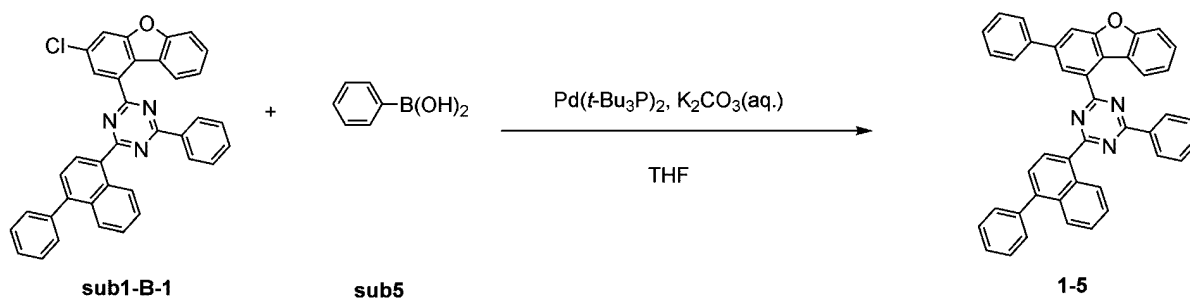
【0089】

窒素雰囲気下で化合物 1-B (15 g、60.9 mmol) と化合物 Trz5 (24 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butyl phosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-B-1 を 26.2 g 製造した。(収率 77%、MS: $[M+H]^+ = 560$)

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【化 4 0 2】



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【0 0 9 0】

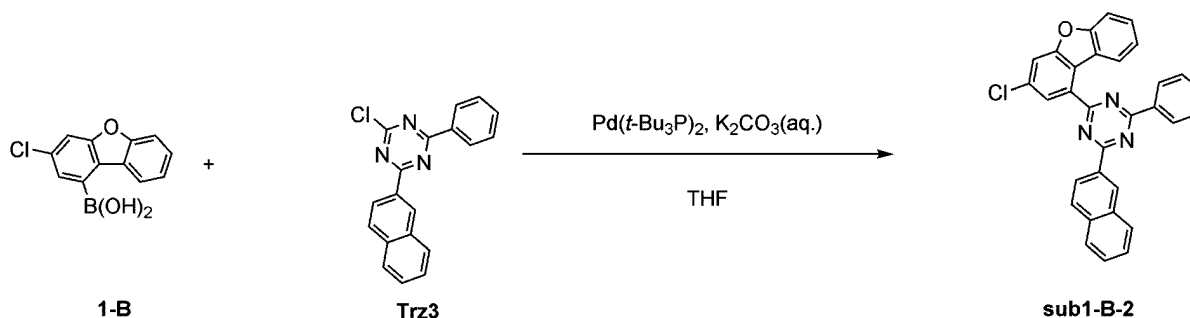
窒素雰囲気下で化合物 sub 1 - B - 1 (15 g、26.8 mmol) と化合物 sub 5 (3.3 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (7.4 g、53.6 mmol) を水 22 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 5 を 12.9 g 製造した。(収率 80 %、MS : $[M + H]^+ = 602$)

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【0 0 9 1】

製造例 1 - 6

【化 4 0 3】



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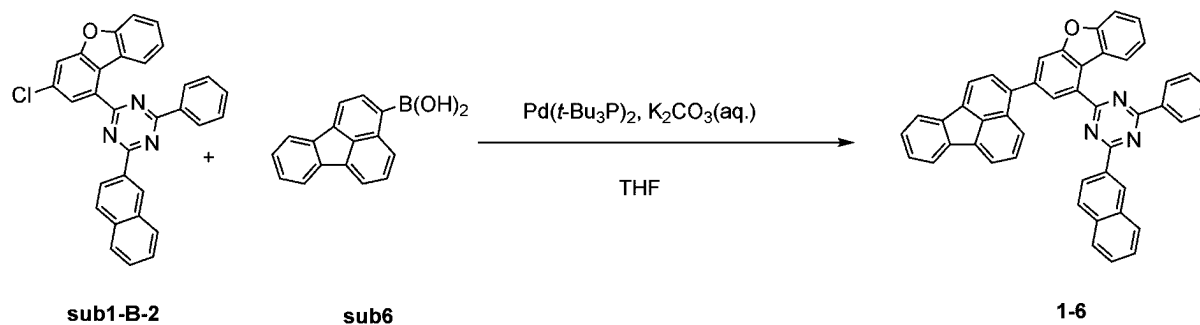
【0 0 9 2】

窒素雰囲気下で化合物 1 - B (15 g、60.9 mmol) と化合物 Trz 3 (19.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - B - 2 を 18.2 g 製造した。(収率 62 %、MS : $[M + H]^+ = 484$)

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【化 4 0 4】



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【0 0 9 3】

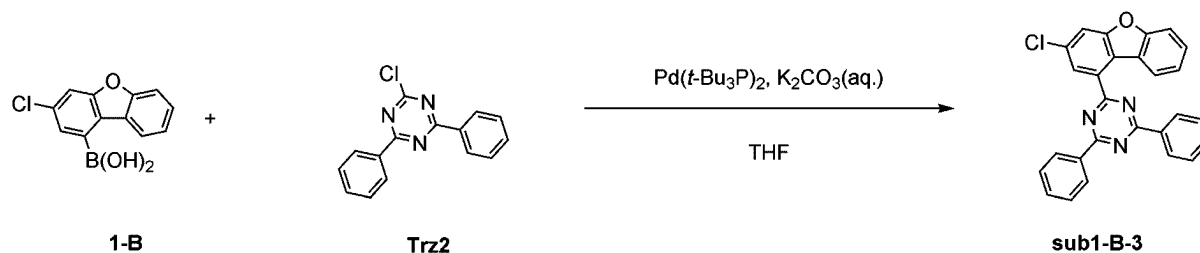
窒素雰囲気下で化合物 sub 1 - B - 2 (15 g、31 mmol) と化合物 sub 6 (7.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (8.6 g、62 mmol) を水 26 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 6 を 15.3 g 製造した。(収率 76%、MS: [M + H]⁺ = 650)

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【0 0 9 4】

製造例 1 - 7

【化 4 0 5】



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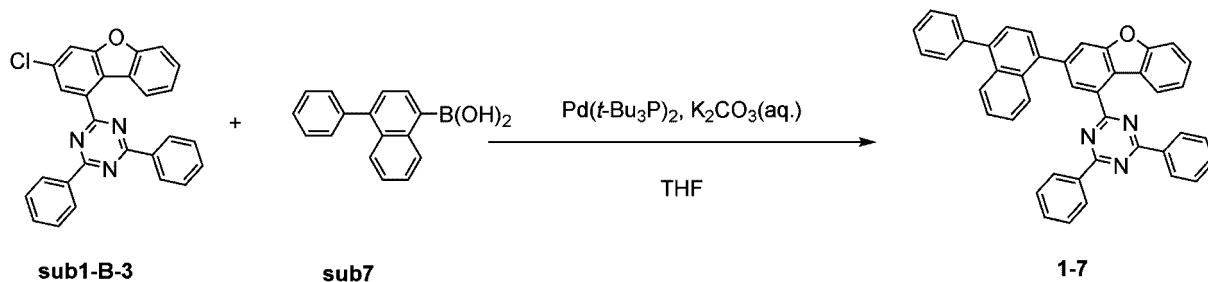
【0 0 9 5】

窒素雰囲気下で化合物 1 - B (15 g、60.9 mmol) と化合物 Trz 2 (16.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - B - 3 を 20.8 g 製造した。(収率 79%、MS: [M + H]⁺ = 434)

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【化 4 0 6】



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【0 0 9 6】

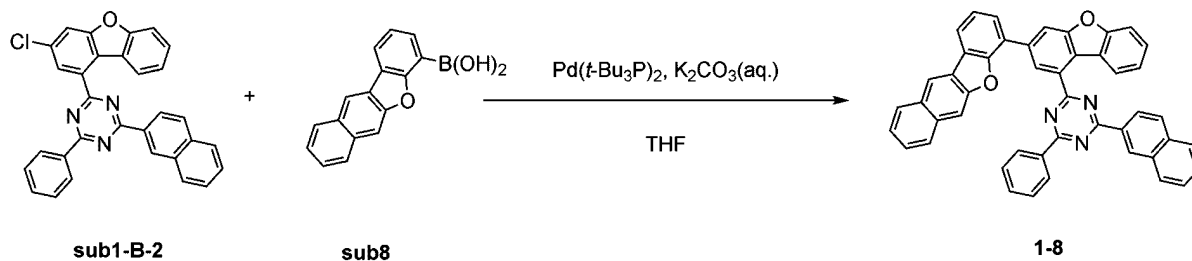
窒素雰囲気下で化合物 sub1-B-3 (15 g、34.6 mmol) と化合物 sub7 (8.6 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.6 g、69.1 mmol) を水 29 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-7 を 15.4 g 製造した。(収率 74 %、MS : $[M+H]^+ = 602$)

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【0 0 9 7】

製造例 1-8

【化 4 0 7】



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【0 0 9 8】

窒素雰囲気下で化合物 sub1-B-2 (15 g、31 mmol) と化合物 sub8 (8.1 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (8.6 g、62 mmol) を水 26 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-8 を 15.5 g 製造した。(収率 75 %、MS : $[M+H]^+ = 666$)

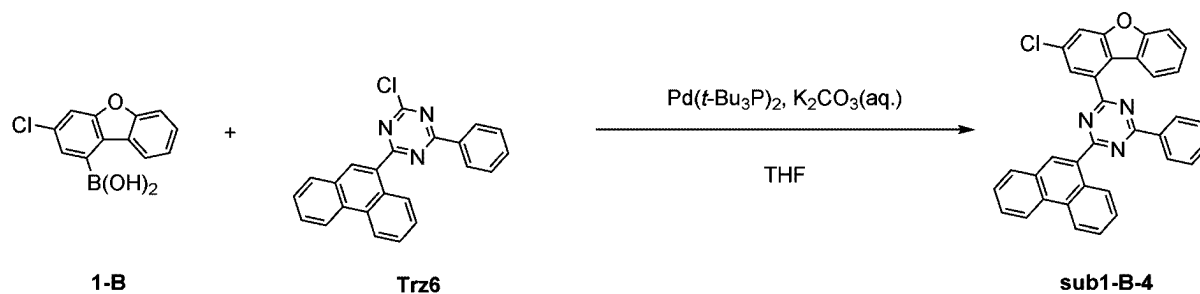
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【0 0 9 9】

製造例 1-9

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【化 4 0 8】



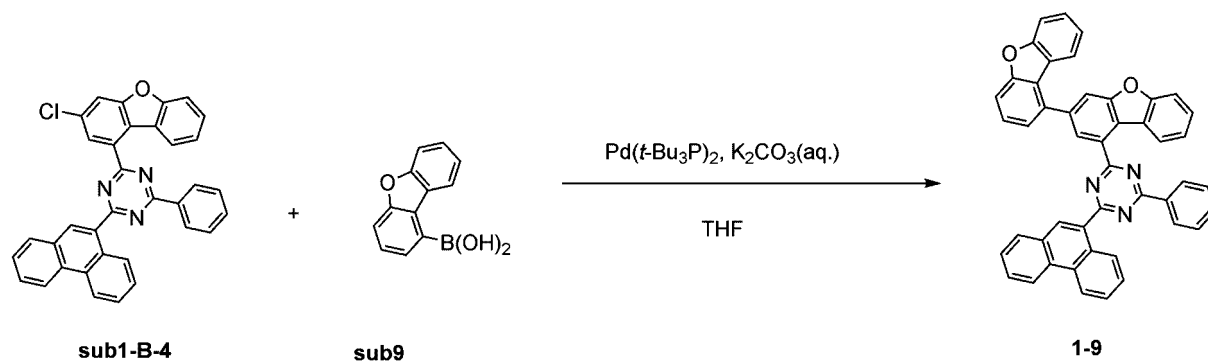
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【0 1 0 0】

窒素雰囲気下で化合物 1-B (15 g、60.9 mmol) と化合物 Trz6 (22.4 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-B-4 を 23.7 g 製造した。(収率 73%、MS: $[M+H]^+ = 534$)

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【化 4 0 9】



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【0 1 0 1】

窒素雰囲気下で化合物 sub1-B-4 (15 g、28.1 mmol) と化合物 sub9 (6 g、28.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (7.8 g、56.2 mmol) を水 23 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-9 を 11.6 g 製造した。(収率 62%、MS: $[M+H]^+ = 666$)

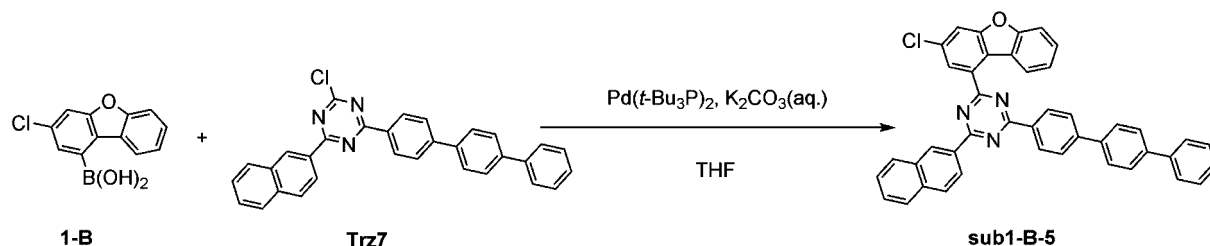
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【0 1 0 2】

製造例 1-10

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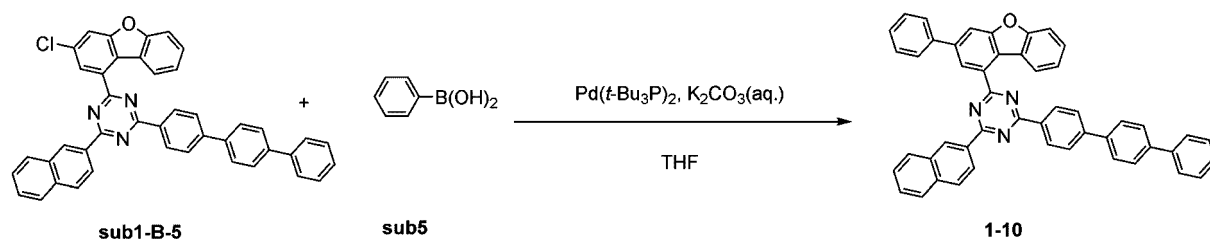
【化 4 1 0】



【0 1 0 3】

窒素雰囲気下で化合物 1-B (15 g、60.9 mmol) と化合物 Trz7 (28.6 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-B-5 を 28.6 g 製造した。(収率 74%、MS: $[M+H]^+ = 636$)

【化 4 1 1】



【0 1 0 4】

窒素雰囲気下で化合物 sub1-B-5 (15 g、23.6 mmol) と化合物 sub5 (2.9 g、23.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (6.5 g、47.2 mmol) を水 20 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.2 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-10 を 10.4 g 製造した。(収率 65%、MS: $[M+H]^+ = 678$)

【0 1 0 5】

製造例 1-11

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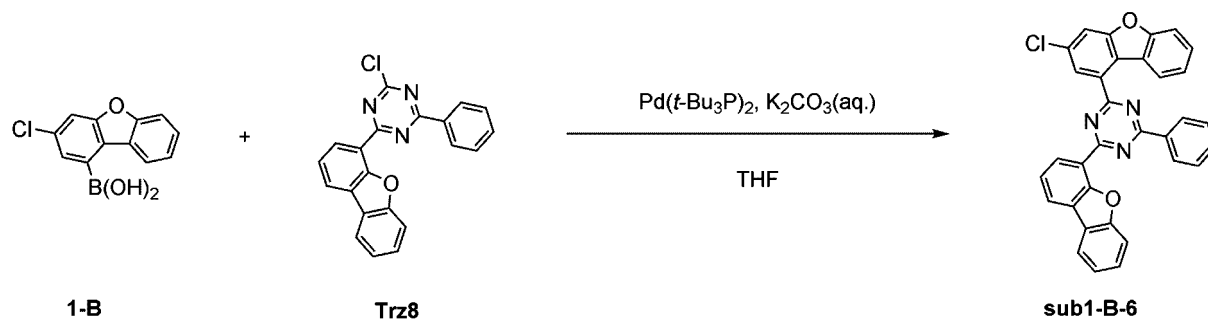
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【化 4 1 2】



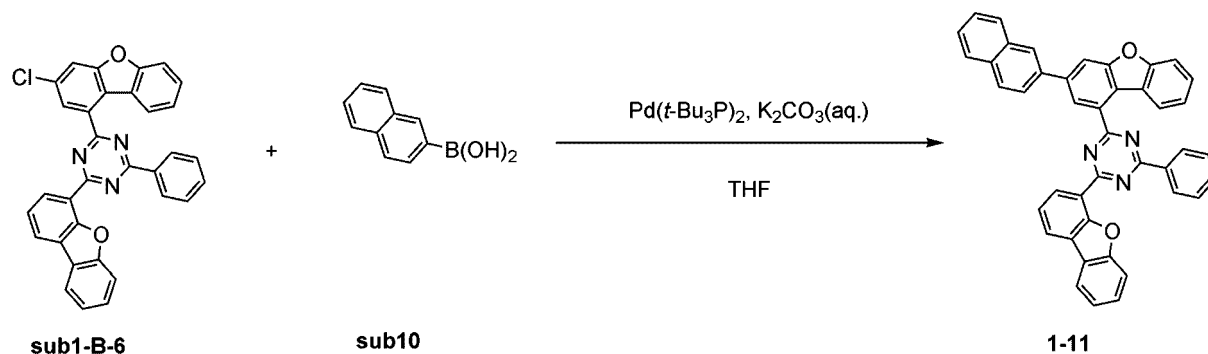
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【0 1 0 6】

窒素雰囲気下で化合物 1-B (15 g、60.9 mmol) と化合物 Trz8 (21.8 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-B-6 を 20.1 g 製造した。(収率 63%、MS: $[M+H]^+ = 524$)

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【化 4 1 3】



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【0 1 0 7】

窒素雰囲気下で化合物 sub1-B-6 (15 g、28.6 mmol) と化合物 sub10 (4.9 g、28.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (7.9 g、57.3 mmol) を水 24 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-11 を 11.4 g 製造した。(収率 65%、MS: $[M+H]^+ = 616$)

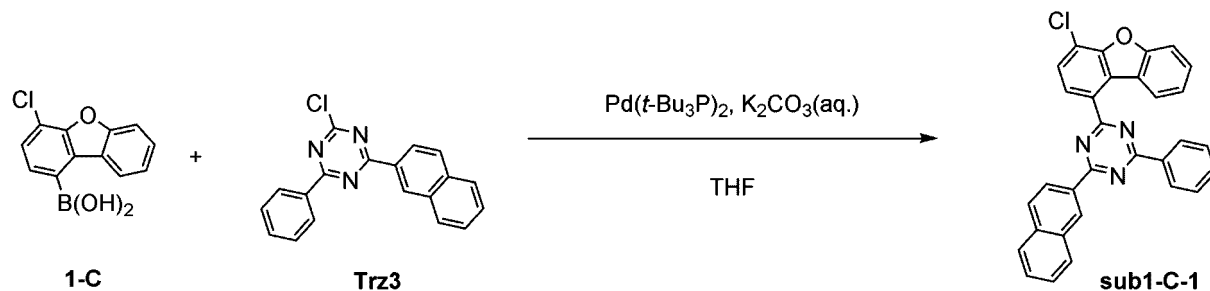
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【0 1 0 8】

製造例 1-12

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【化 4 1 4】



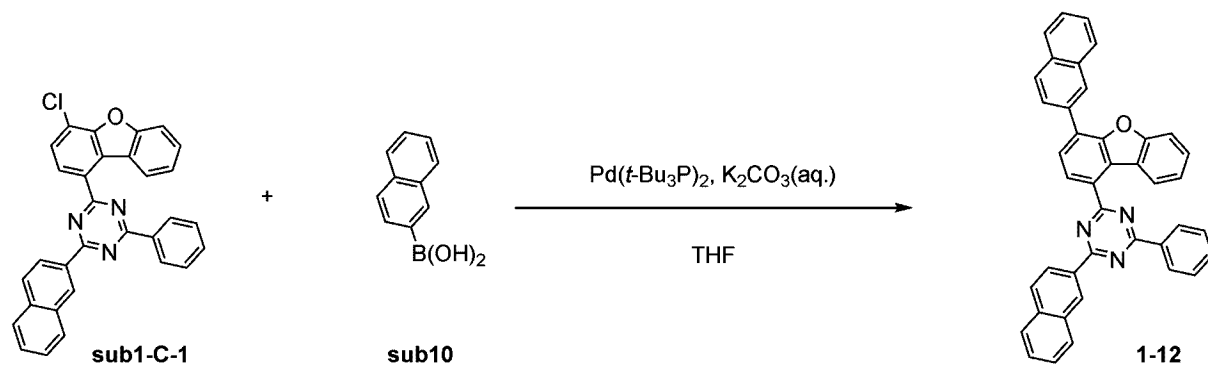
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【0 1 0 9】

窒素雰囲気下で化合物 1-C (15 g、60.9 mmol) と化合物 Trz3 (19.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-C-1 を 17.6 g 製造した。(収率 60%、MS: $[M+H]^+ = 484$)

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【化 4 1 5】



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【0 1 1 0】

窒素雰囲気下で化合物 sub1-C-1 (15 g、31 mmol) と化合物 sub10 (5.3 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (8.6 g、62 mmol) を水 26 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-12 を 12.8 g 製造した。(収率 72%、MS: $[M+H]^+ = 576$)

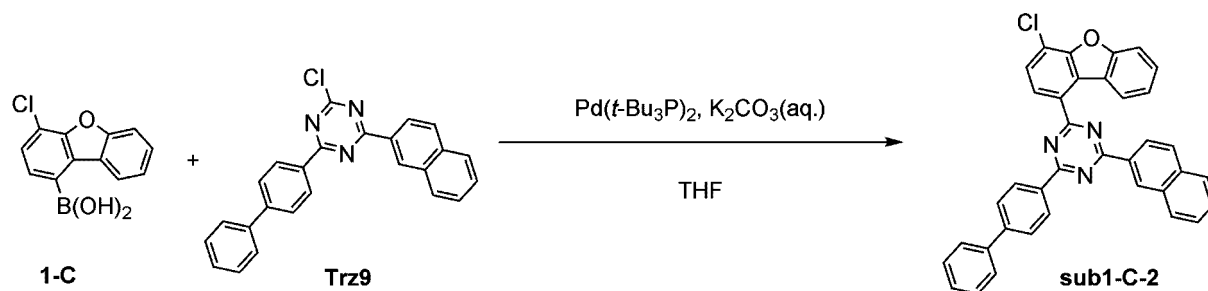
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【0 1 1 1】

製造例 1-13

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【化 4 1 6】



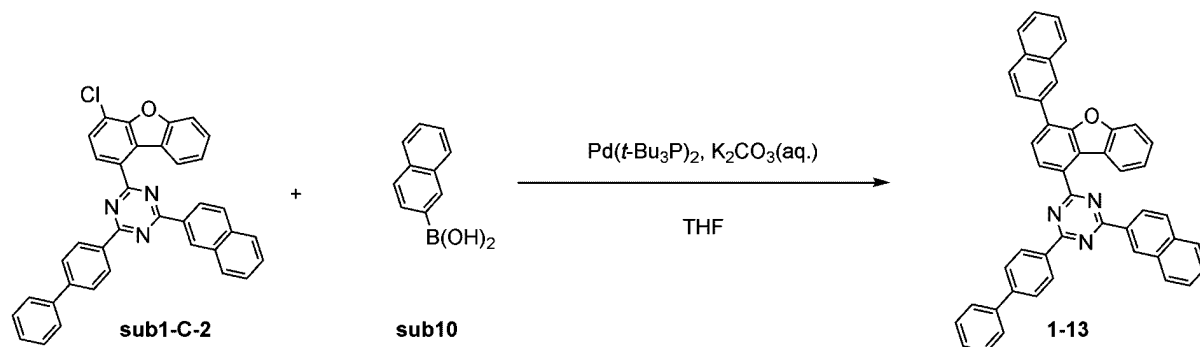
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【0 1 1 2】

窒素雰囲気下で化合物 1-C (15 g、60.9 mmol) と化合物 Trz9 (24 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-C-2 を 23.5 g 製造した。(収率 69%、MS: $[M+H]^+ = 560$)

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【化 4 1 7】



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【0 1 1 3】

窒素雰囲気下で化合物 sub1-C-2 (15 g、26.8 mmol) と化合物 sub10 (4.6 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (7.4 g、53.6 mmol) を水 22 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-13 を 14 g 製造した。(収率 80%、MS: $[M+H]^+ = 652$)

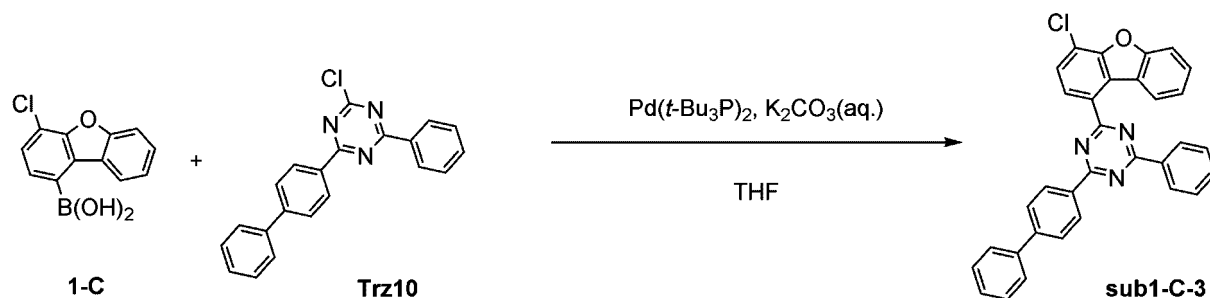
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【0 1 1 4】

製造例 1-14

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【化 4 1 8】



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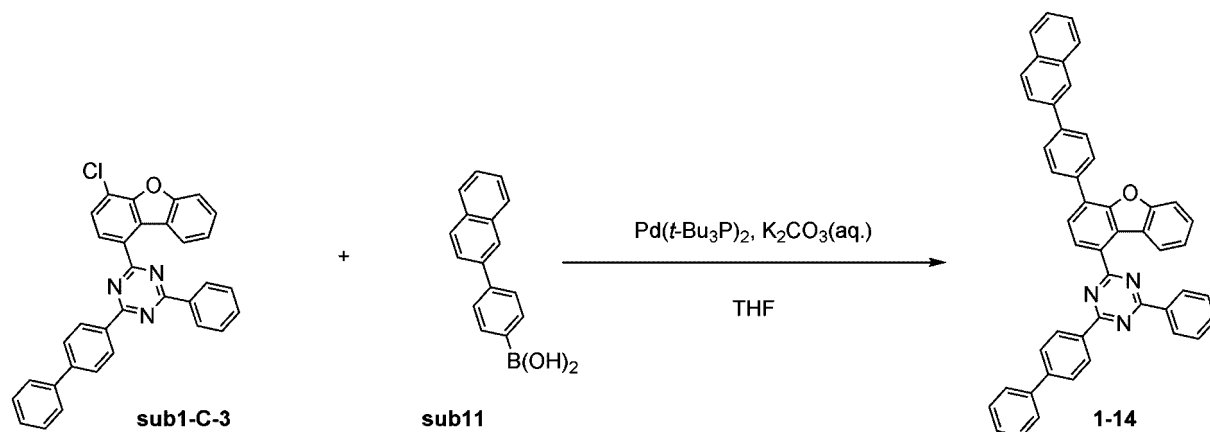
【0 1 1 5】

窒素雰囲気下で化合物 1-C (15 g、60.9 mmol) と化合物 Trz10 (20.9 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-C-3 を 20.5 g 製造した。(

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収率 66%、MS: $[M+H]^+ = 510$)

【化 4 1 9】



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【0 1 1 6】

窒素雰囲気下で化合物 sub1-C-3 (15 g、29.4 mmol) と化合物 sub11 (7.3 g、29.4 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (8.1 g、58.8 mmol) を水 24 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-14 を 15.3 g 製造した。(収率 77%、MS: $[M+H]^+ = 678$)

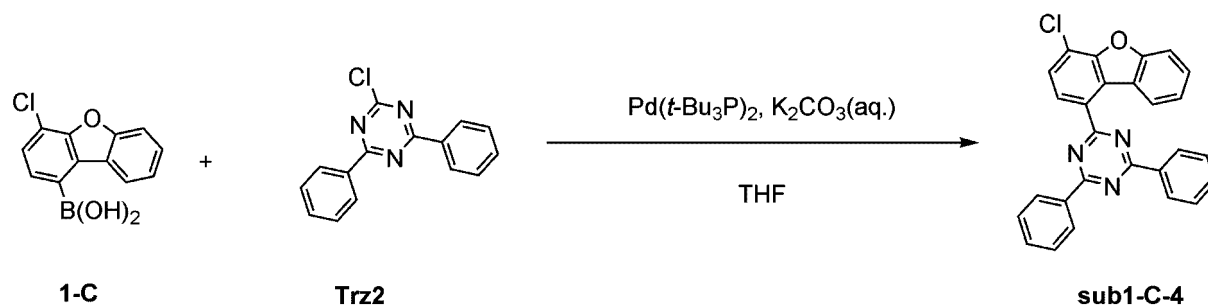
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【0 1 1 7】

製造例 1-15

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【化 4 2 0】



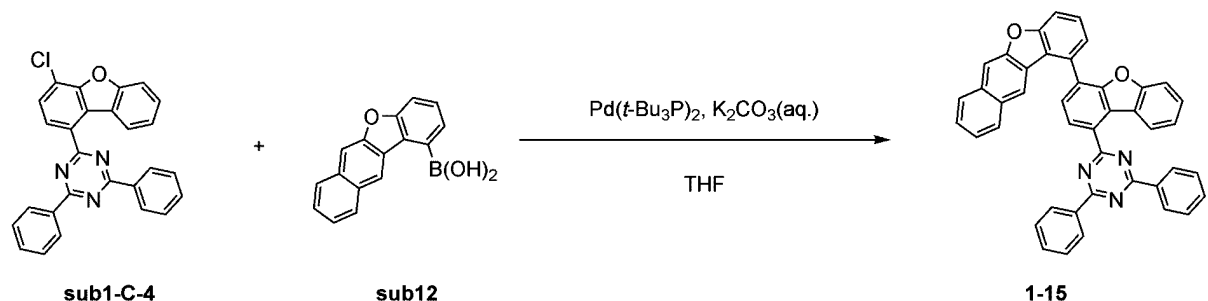
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【0 1 1 8】

窒素雰囲気下で化合物 **1-C** (15 g、60.9 mmol) と化合物 **Trz2** (16.3 g、60.9 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-C-4** を 18.7 g 製造した。(収率 71%、MS: $[\text{M} + \text{H}]^+ = 434$)

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【化 4 2 1】



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【0 1 1 9】

窒素雰囲気下で化合物 **sub1-C-4** (15 g、37.1 mmol) と化合物 **sub12** (9.7 g、37.1 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.3 g、74.3 mmol) を水 31 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-15** を 14.6 g 製造した。(収率 64%、MS: $[\text{M} + \text{H}]^+ = 616$)

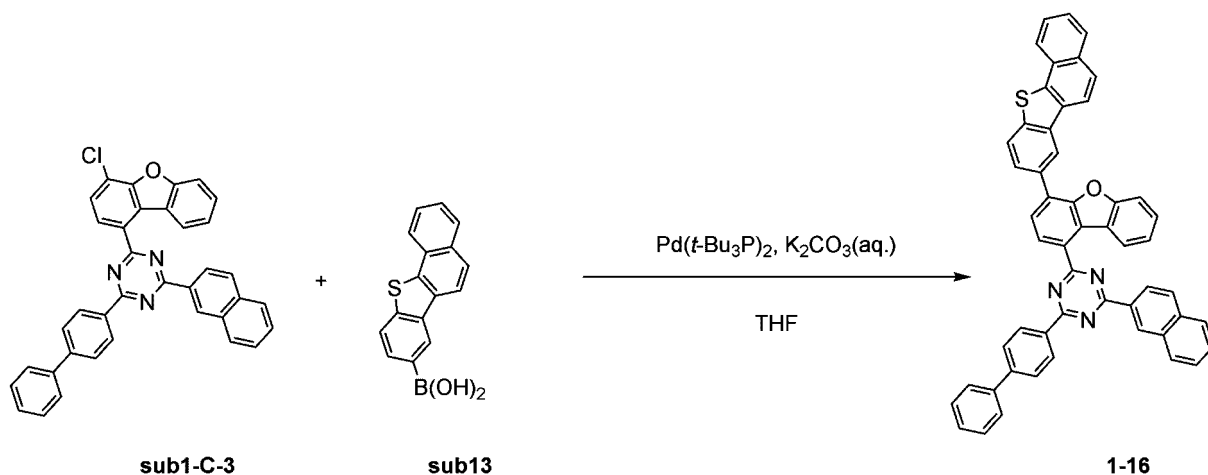
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【0 1 2 0】

製造例 1-16

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【化 4 2 2】



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【0 1 2 1】

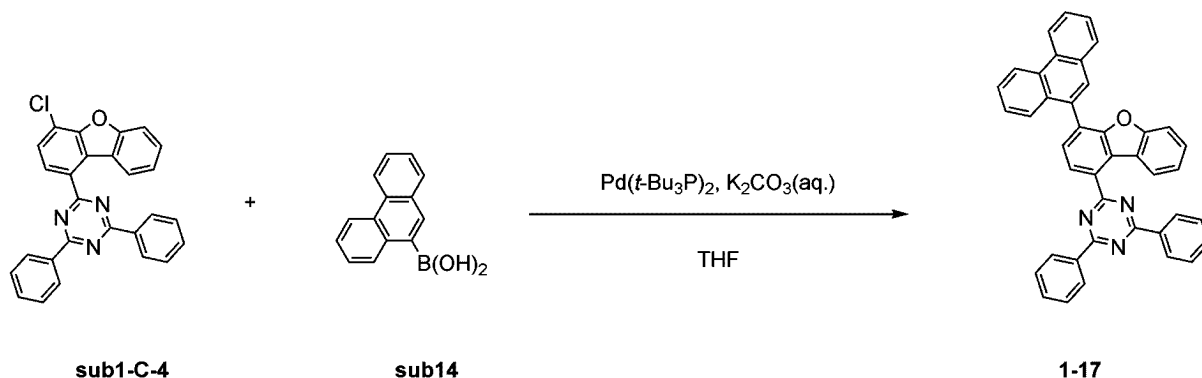
窒素雰囲気下で化合物 sub1-C-3 (15 g、26.8 mmol) と化合物 sub13 (7.4 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (7.4 g、53.6 mmol) を水 22 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-16 を 16.2 g 製造した。(収率 80%、MS: $[M+H]^+ = 758$)

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【0 1 2 2】

製造例 1-17

【化 4 2 3】



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【0 1 2 3】

窒素雰囲気下で化合物 sub1-C-4 (15 g、34.6 mmol) と化合物 sub14 (7.7 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.6 g、69.1 mmol) を水 29 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-17 を 12.3 g 製造した。(収率 62%、MS: $[M+H]^+ = 576$)

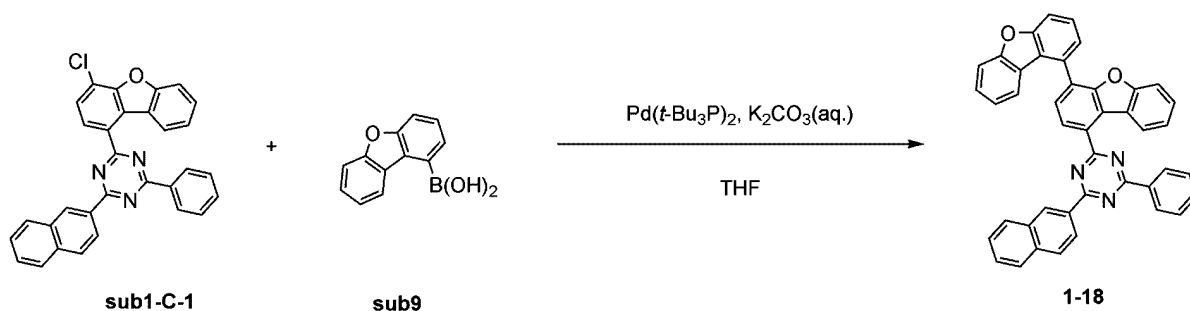
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【0124】

製造例1-18

【化424】



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【0125】

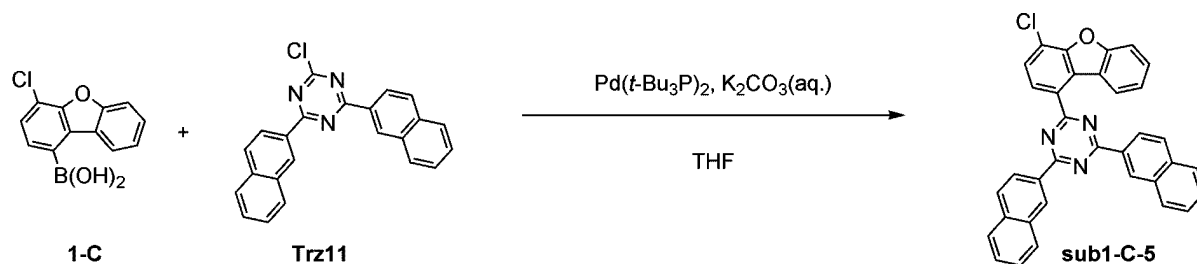
窒素雰囲気下で化合物 sub1-C-1 (15 g、31 mmol) と化合物 sub9 (6.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (8.6 g、62 mmol) を水 26 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-18 を 12 g 製造した。(収率 63%、MS: [M+H]⁺ = 616)

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【0126】

製造例1-19

【化425】



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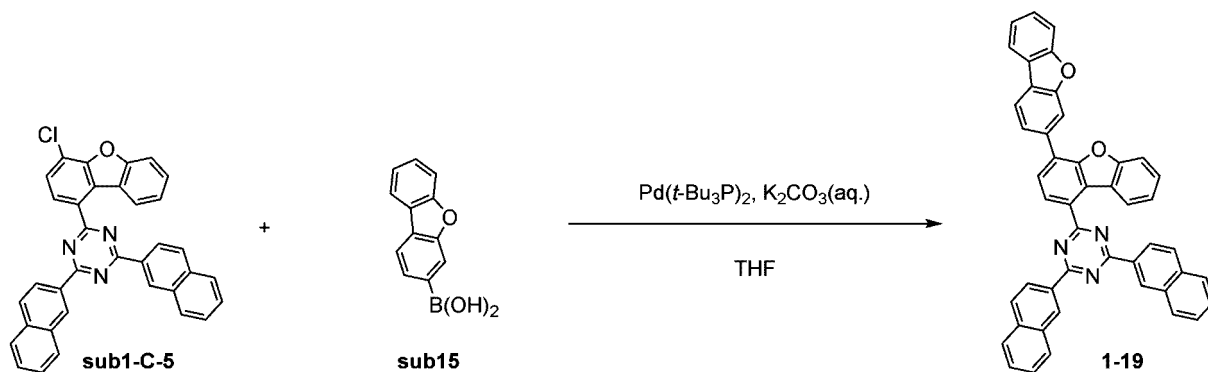
【0127】

窒素雰囲気下で化合物 1-C (15 g、60.9 mmol) と化合物 Trz11 (22.4 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-C-5 を 22.4 g 製造した。(収率 69%、MS: [M+H]⁺ = 534)

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【化 4 2 6】



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【0 1 2 8】

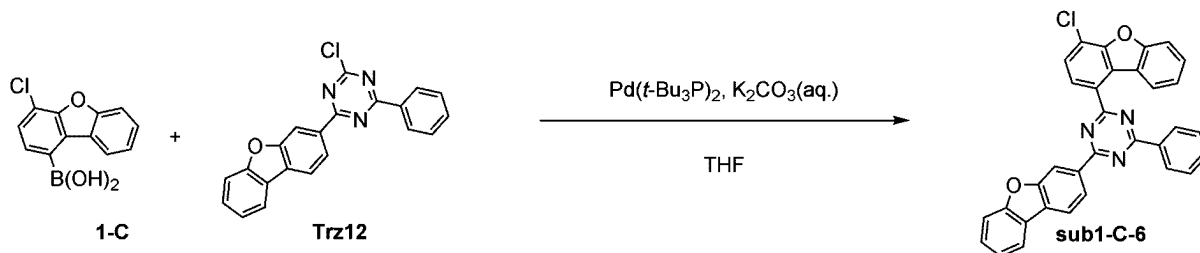
窒素雰囲気下で化合物 sub 1 - C - 5 (15 g、28.1 mmol) と化合物 sub 15 (6 g、28.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (7.8 g、56.2 mmol) を水 23 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 19 を 13.3 g 製造した。(収率 71 %、MS : $[M + H]^+ = 666$)

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【0 1 2 9】

製造例 1 - 20

【化 4 2 7】



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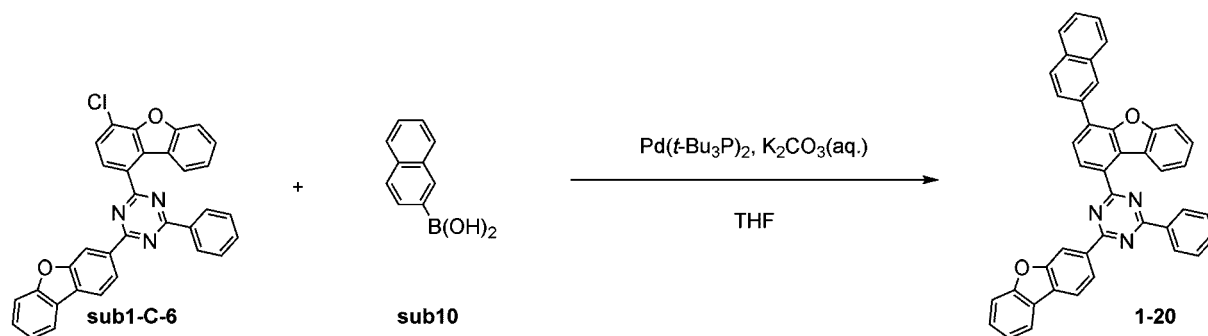
【0 1 3 0】

窒素雰囲気下で化合物 1 - C (15 g、60.9 mmol) と化合物 Trz12 (21.8 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - C - 6 を 21 g 製造した。(収率 66 %、MS : $[M + H]^+ = 524$)

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【化 4 2 8】



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【0 1 3 1】

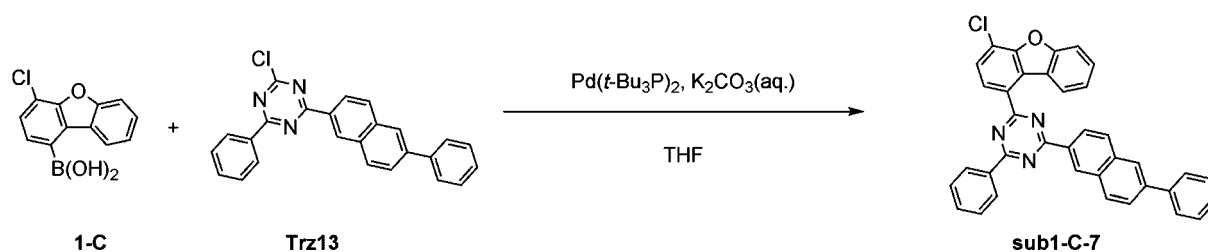
窒素雰囲気下で化合物 **sub1-C-6** (15 g、28.6 mmol) と化合物 **sub10** (4.9 g、28.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.9 g、85.9 mmol) を水 36 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-20** を 12.3 g 製造した。(収率 70%、MS: $[\text{M}+\text{H}]^+ = 616$)

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【0 1 3 2】

製造例 1-21

【化 4 2 9】



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【0 1 3 3】

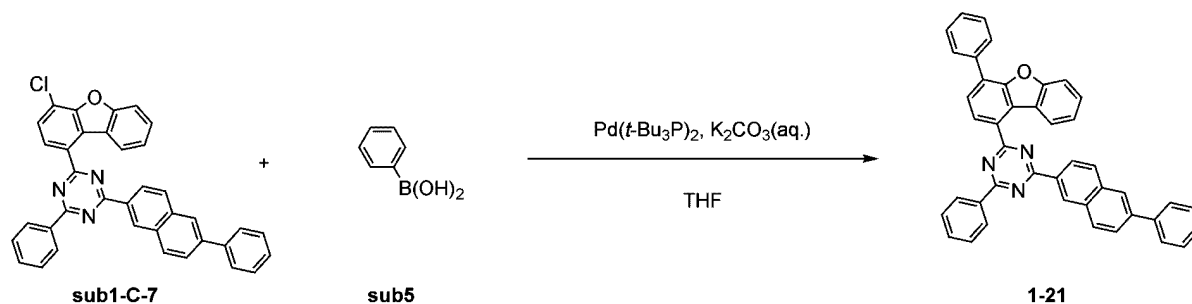
窒素雰囲気下で化合物 **1-C** (15 g、60.9 mmol) と化合物 **Trz13** (24 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-C-7** を 26.2 g 製造した。(収率 77%、MS: $[\text{M}+\text{H}]^+ = 560$)

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【0 1 3 4】

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【化 4 3 0】



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【 0 1 3 5】

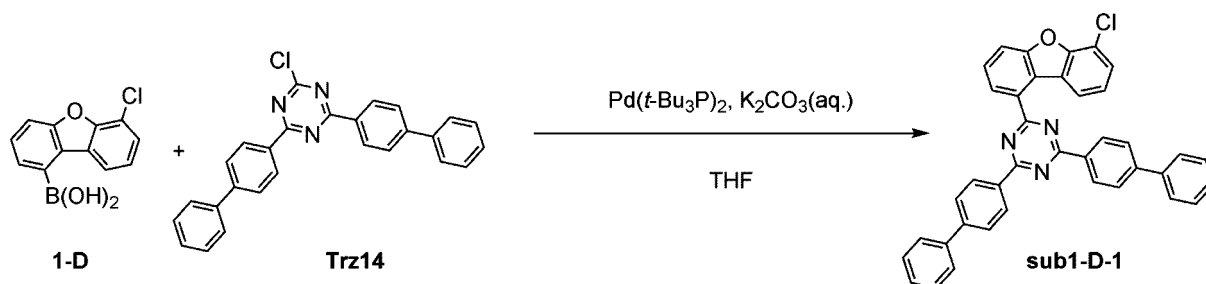
窒素雰囲気下で化合物 sub1-C-7 (15 g、26.8 mmol) と化合物 sub5 (3.3 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.1 g、80.3 mmol) を水 33 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-21 を 10.5 g 製造した。(収率 65%、MS: $[M+H]^+ = 602$)

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【 0 1 3 6】

製造例 1-22

【化 4 3 1】



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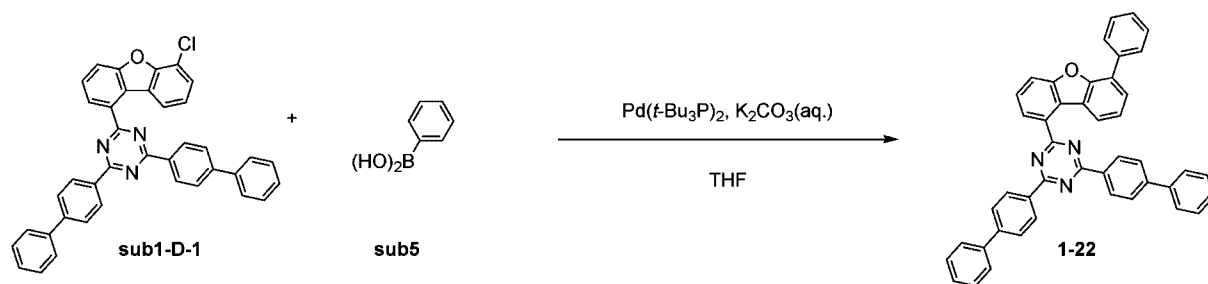
【 0 1 3 7】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz14 (19.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-D-1 を 23.9 g 製造した。(収率 67%、MS: $[M+H]^+ = 586$)

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【化 4 3 2】



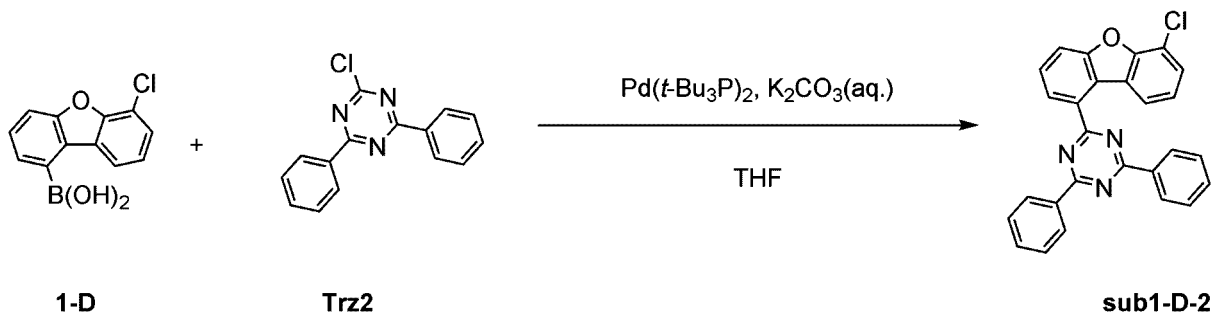
【0 1 3 8】

窒素雰囲気下で化合物 sub 1-D-1 (15 g、25.6 mmol) と化合物 sub 5 (3.1 g、25.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.6 g、76.8 mmol) を水 32 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-22 を 10.3 g 製造した。(収率 64%、MS: $[\text{M} + \text{H}]^+ = 628$)

【0 1 3 9】

製造例 1-23

【化 4 3 3】



【0 1 4 0】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz2 (16.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1-D-2 を 20 g 製造した。(収率 76%、MS: $[\text{M} + \text{H}]^+ = 434$)

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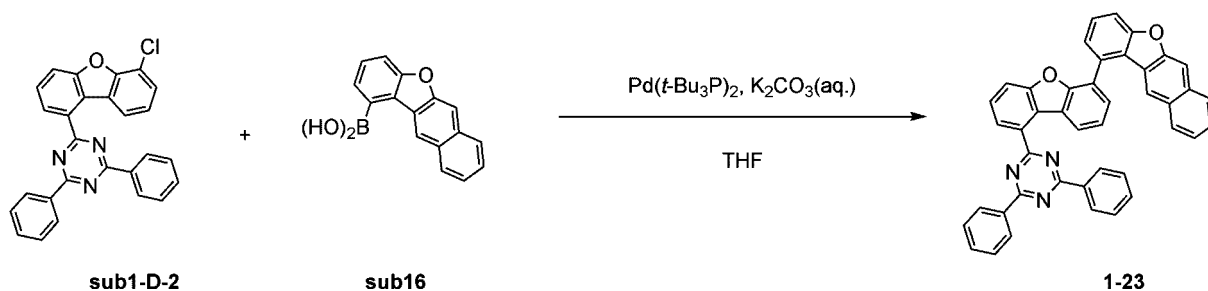
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【化 4 3 4】



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【0 1 4 1】

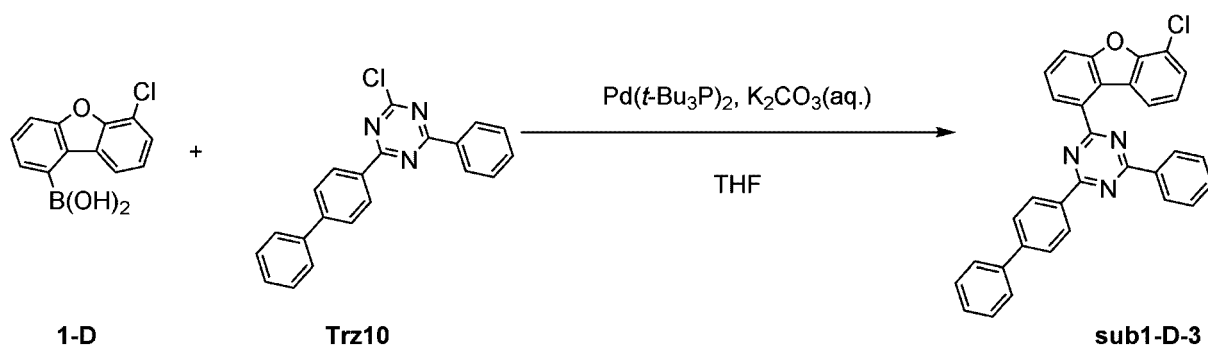
窒素雰囲気下で化合物 sub1-D-2 (15 g、34.6 mmol) と化合物 sub16 (9.1 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.3 g、103.7 mmol) を水 43 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-23 を 14 g 製造した。(収率 66%、MS: $[M+H]^+ = 616$)

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【0 1 4 2】

製造例 1-24

【化 4 3 5】



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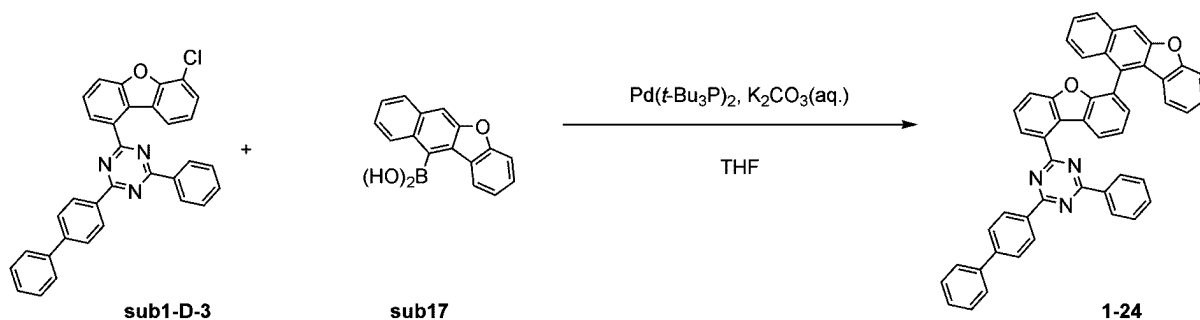
【0 1 4 3】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz10 (20.9 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-D-3 を 20.8 g 製造した。(収率 67%、MS: $[M+H]^+ = 510$)

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【化 4 3 6】



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【0 1 4 4】

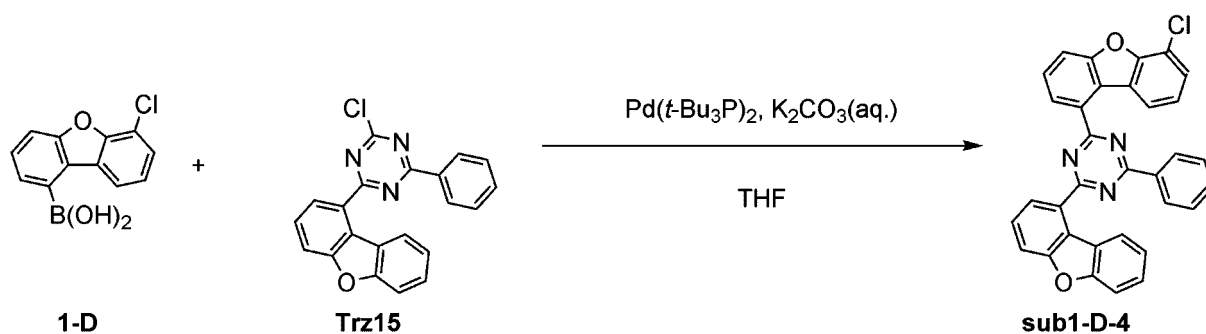
窒素雰囲気下で化合物 sub1-D-3 (15 g、29.4 mmol) と化合物 sub17 (7.7 g、29.4 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.2 g、88.2 mmol) を水 37 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-24 を 12.4 g 製造した。(収率 61%、MS: $[M+H]^+ = 692$)

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【0 1 4 5】

製造例 1-25

【化 4 3 7】



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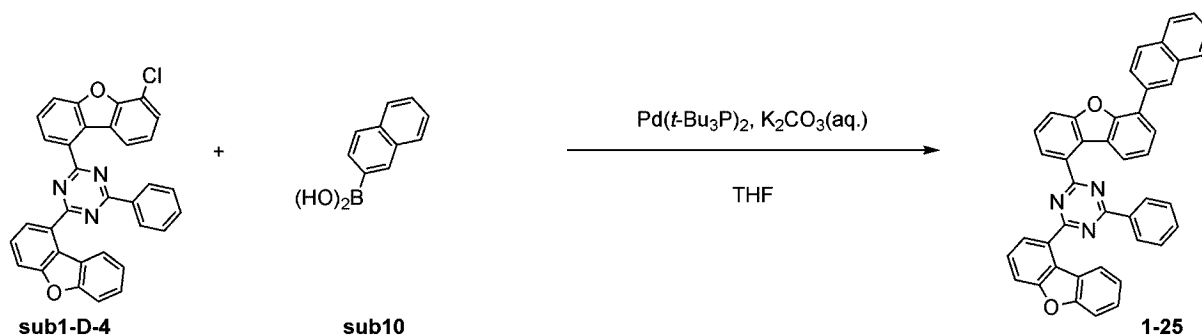
【0 1 4 6】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz15 (21.8 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-D-4 を 21.3 g 製造した。(収率 67%、MS: $[M+H]^+ = 524$)

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【化 4 3 8】



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【0 1 4 7】

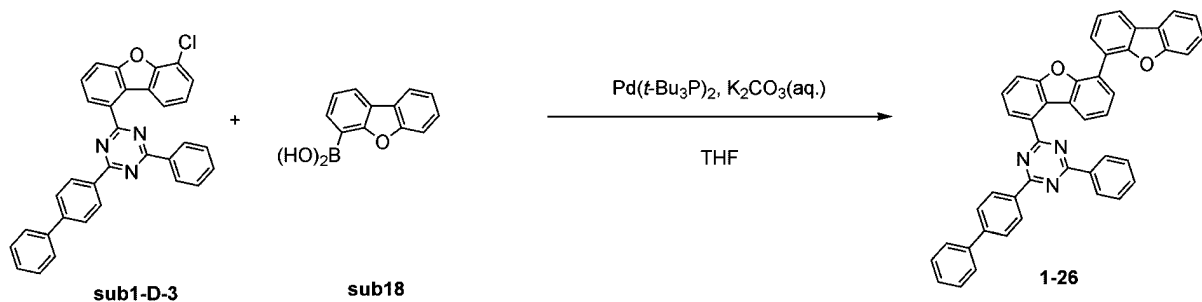
窒素雰囲気下で化合物 sub 1-D-4 (15 g、28.6 mmol) と化合物 sub 10 (4.9 g、28.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.9 g、85.9 mmol) を水 36 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-25 を 10.7 g 製造した。(収率 61%、MS: $[M+H]^+ = 616$)

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【0 1 4 8】

製造例 1-26

【化 4 3 9】



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【0 1 4 9】

窒素雰囲気下で化合物 sub 1-D-3 (15 g、29.4 mmol) と化合物 sub 18 (6.2 g、29.4 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.2 g、88.2 mmol) を水 37 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-26 を 14.3 g 製造した。(収率 76%、MS: $[M+H]^+ = 642$)

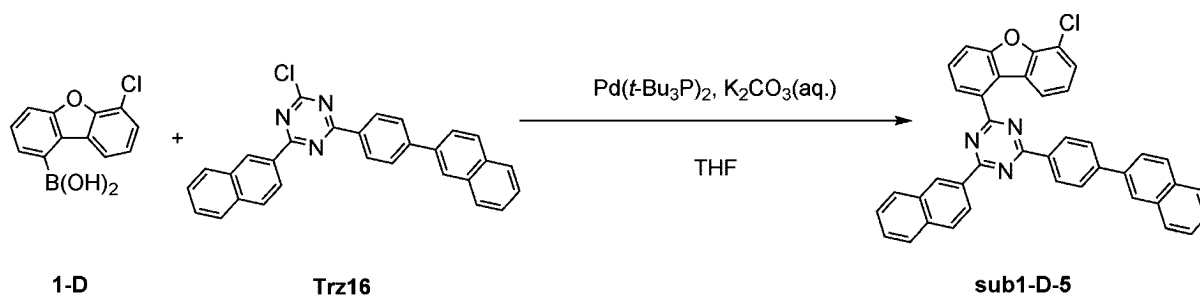
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【0 1 5 0】

製造例 1-27

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【化 4 4 0】



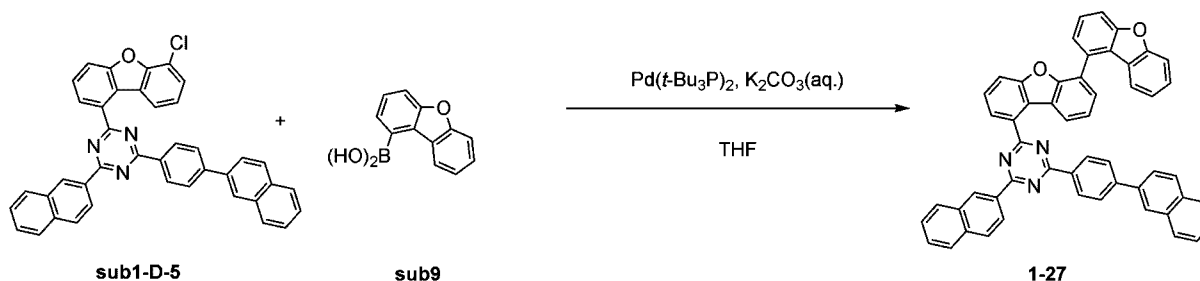
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【0 1 5 1】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz16 (27 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-D-5 を 27.1 g 製造した。(収率 73%、MS: $[M+H]^+ = 610$)

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【化 4 4 1】



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【0 1 5 2】

窒素雰囲気下で化合物 sub1-D-5 (15 g、24.6 mmol) と化合物 sub9 (5.2 g、24.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.2 g、73.8 mmol) を水 31 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.2 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-27 を 12.8 g 製造した。(収率 70%、MS: $[M+H]^+ = 742$)

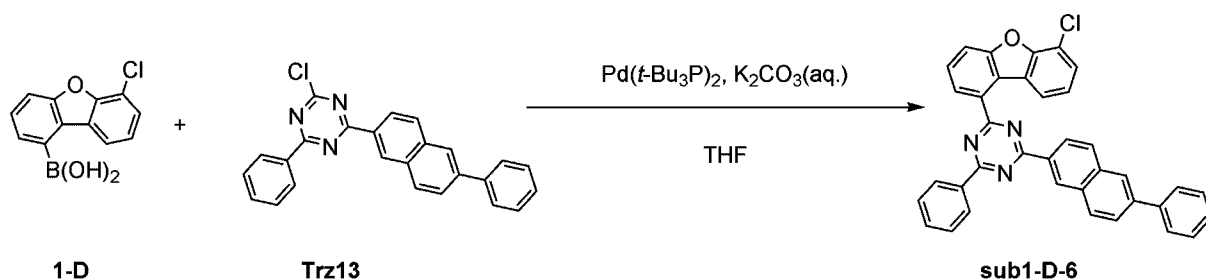
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【0 1 5 3】

製造例 1-28

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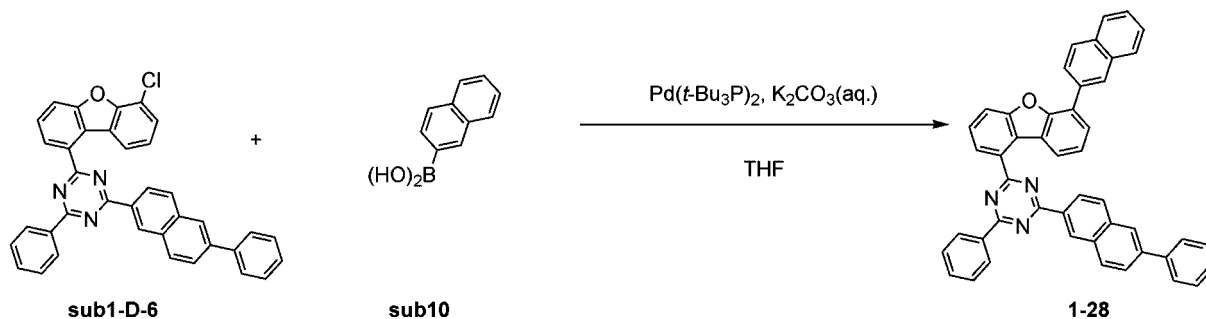
【化 4 4 2】



【0154】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz13 (24 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-D-6 を 20.8 g 製造した。(収率 61%、MS: $[M+H]^+ = 560$)

【化 4 4 3】



【0155】

窒素雰囲気下で化合物 sub1-D-6 (15 g、26.8 mmol) と化合物 sub10 (4.6 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.1 g、80.3 mmol) を水 33 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-28 を 12.2 g 製造した。(収率 70%、MS: $[M+H]^+ = 652$)

【0156】

製造例 1-29

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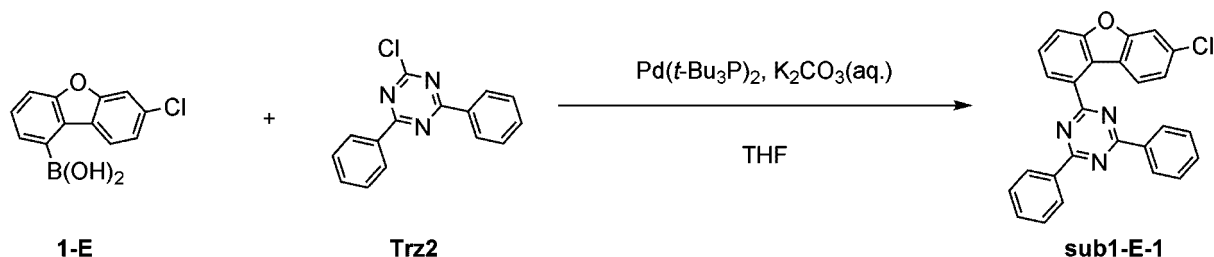
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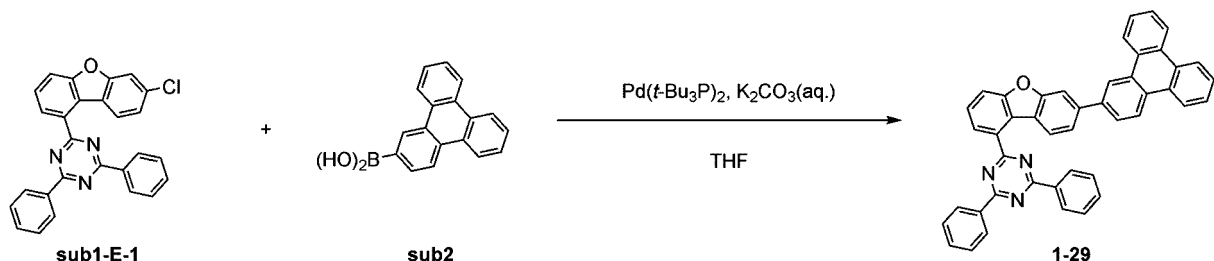
【化 4 4 4】



【0 1 5 7】

窒素雰囲気下で化合物 **1-E** (15 g、60.9 mmol) と化合物 **Trz2** (16.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-E-1** を 17.1 g 製造した。(収率 65%、MS: $[\text{M} + \text{H}]^+ = 434$)

【化 4 4 5】



【0 1 5 8】

窒素雰囲気下で化合物 **sub1-E-1** (15 g、34.6 mmol) と化合物 **sub2** (9.4 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.3 g、103.7 mmol) を水 43 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-29** を 14.5 g 製造した。(収率 67%、MS: $[\text{M} + \text{H}]^+ = 626$)

【0 1 5 9】

製造例 1-30

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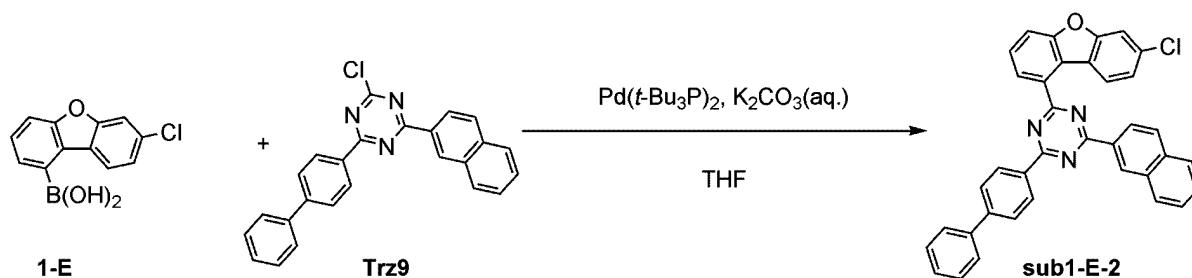
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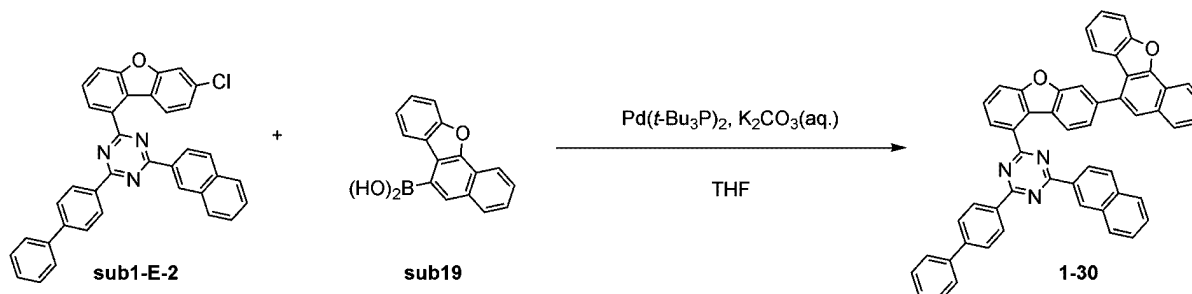
【化 4 4 6】



【0160】

窒素雰囲気下で化合物1-E (15 g、60.9 mmol) と化合物Trz9 (24 g、60.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水76 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-E-2を26.9 g製造した。(収率79%、MS: $[M+H]^+ = 560$)

【化 4 4 7】



【0161】

窒素雰囲気下で化合物sub1-E-2 (15 g、26.8 mmol) と化合物sub19 (7 g、26.8 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (11.1 g、80.3 mmol) を水33 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.3 mmol) を投入した。11時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-30を15.9 g製造した。(収率80%、MS: $[M+H]^+ = 742$)

【0162】

製造例1-31

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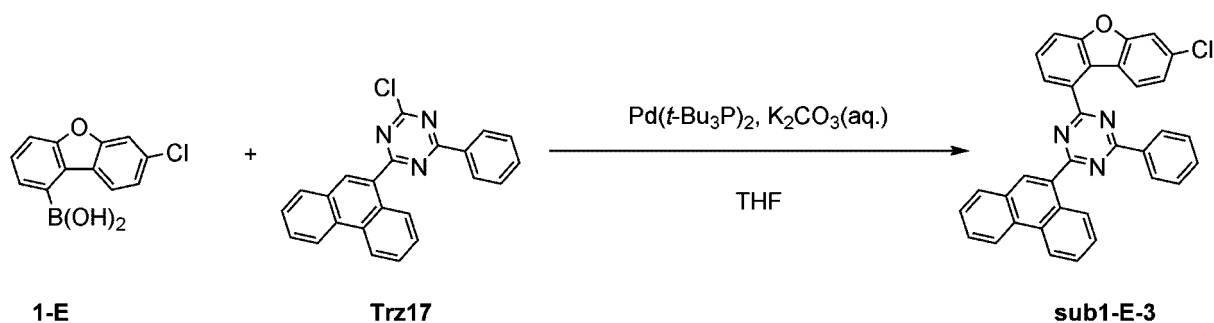
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【化 4 4 8】



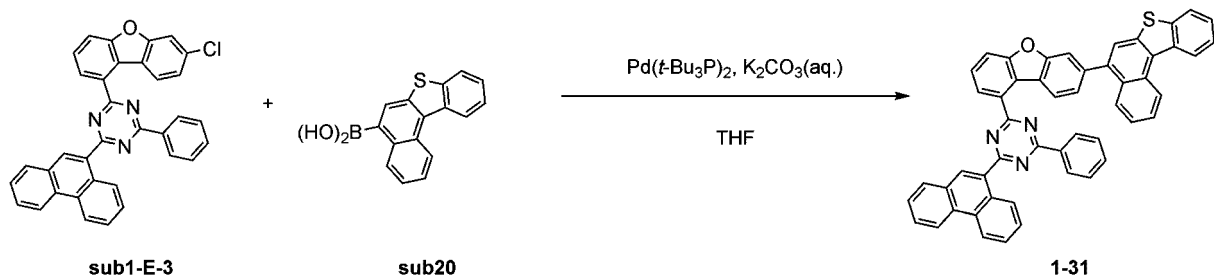
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【0 1 6 3】

窒素雰囲気下で化合物 1-E (15 g、60.9 mmol) と化合物 Trz17 (22.4 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-E-3 を 25.3 g 製造した。(収率 78%、MS: $[M+H]^+ = 534$)

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【化 4 4 9】



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【0 1 6 4】

窒素雰囲気下で化合物 sub1-E-3 (15 g、28.1 mmol) と化合物 sub20 (7.8 g、28.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.6 g、84.3 mmol) を水 35 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-31 を 14.8 g 製造した。(収率 72%、MS: $[M+H]^+ = 732$)

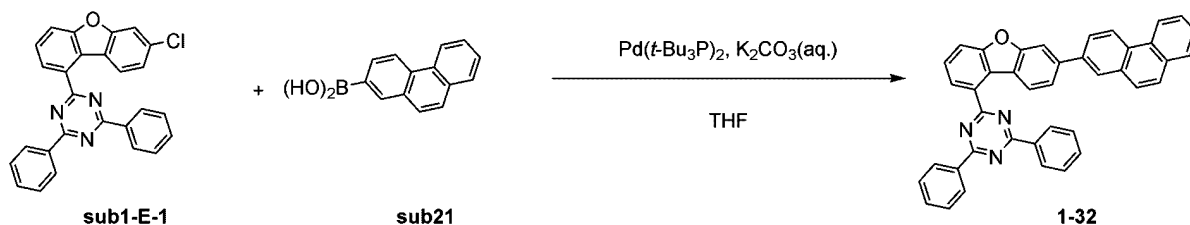
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【0 1 6 5】

製造例 1-32

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【化 4 5 0】



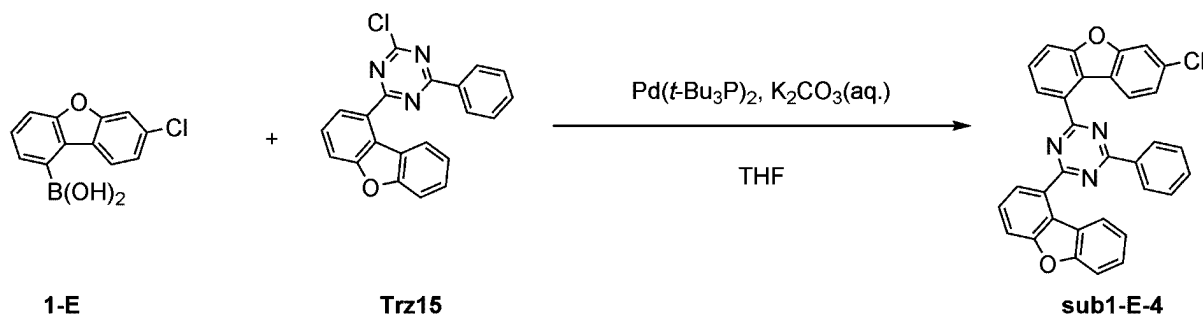
【0 1 6 6】

窒素雰囲気下で化合物 sub1-E-1 (15 g、34.6 mmol) と化合物 sub21 (7.7 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.3 g、103.7 mmol) を水 43 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-32 を 12.9 g 製造した。(収率 65%、MS: $[M+H]^+ = 576$)

【0 1 6 7】

製造例 1-33

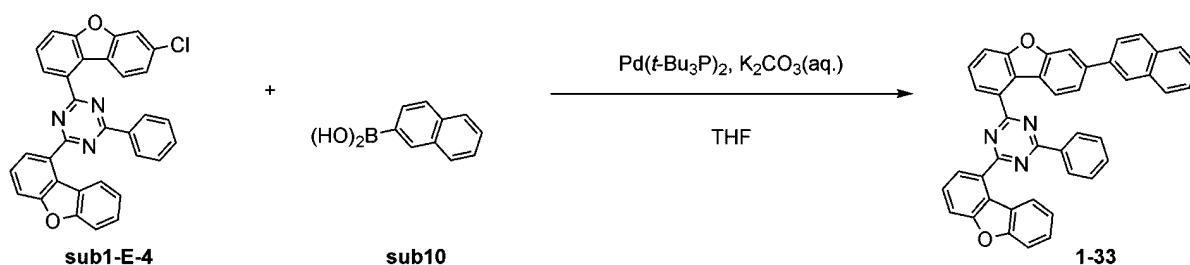
【化 4 5 1】



【0 1 6 8】

窒素雰囲気下で化合物 1-E (15 g、60.9 mmol) と化合物 Trz15 (21.8 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-E-4 を 25.5 g 製造した。(収率 80%、MS: $[M+H]^+ = 524$)

【化 4 5 2】



【0169】

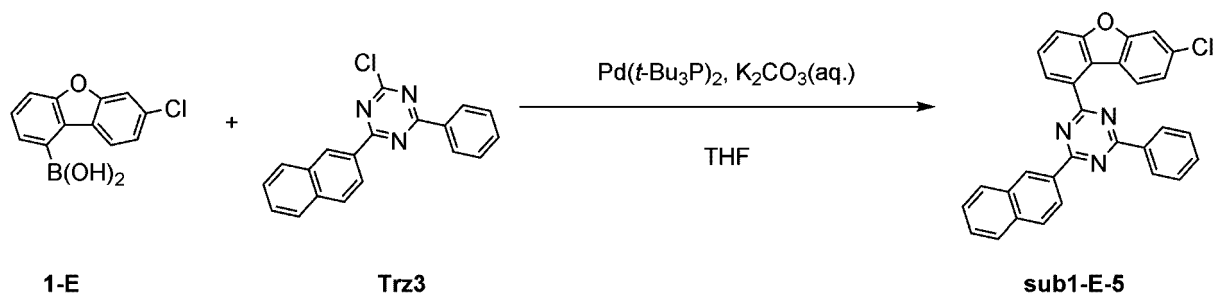
窒素雰囲気下で化合物 sub1-E-4 (15 g、28.6 mmol) と化合物 sub10 (4.9 g、28.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.9 g、85.9 mmol) を水 36 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-33 を 10.6 g 製造した。(収率 60%、MS: $[M+H]^+ = 616$)

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【0170】

製造例 1-34

【化 453】



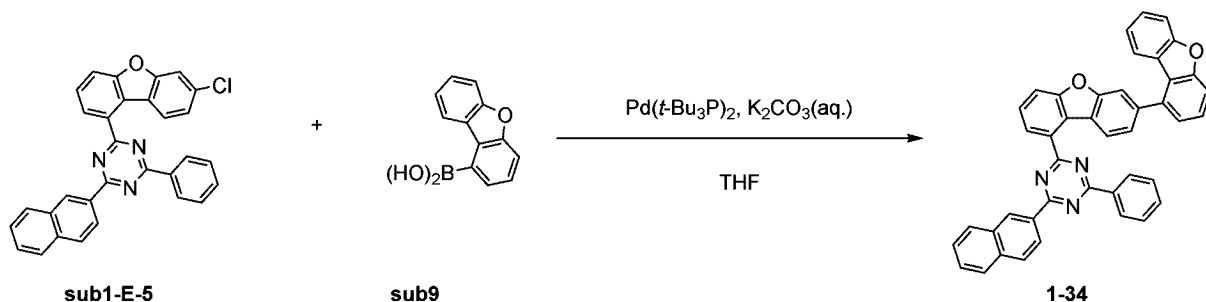
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【0171】

窒素雰囲気下で化合物 1-E (15 g、60.9 mmol) と化合物 Trz3 (19.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-E-5 を 17.6 g 製造した。(収率 60%、MS: $[M+H]^+ = 484$)

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【化 454】



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【0172】

窒素雰囲気下で化合物 sub1-E-5 (15 g、31 mmol) と化合物 sub9 (6.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。11 時

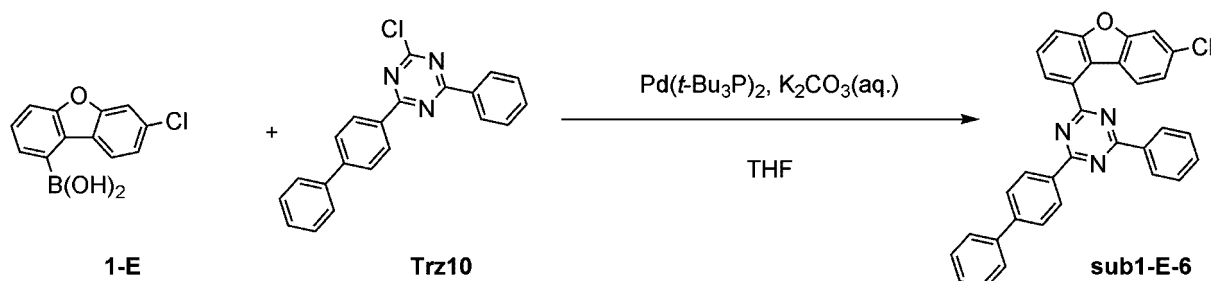
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間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-34を11.4 g製造した。(収率60%、MS: $[M+H]^+ = 616$)

【0173】

製造例1-35

【化455】



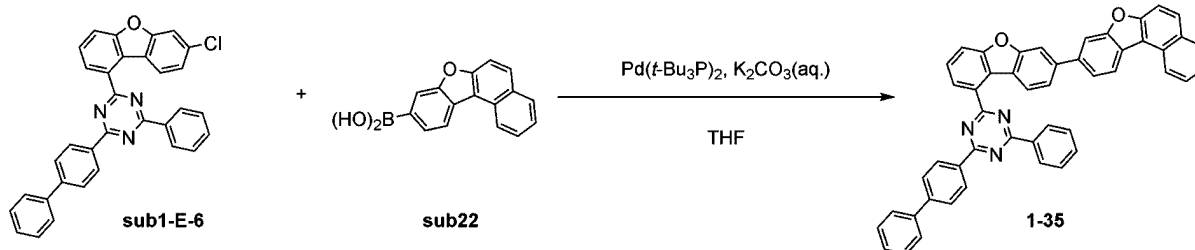
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【0174】

窒素雰囲気下で化合物1-E (15 g、60.9 mmol)と化合物Trz10 (20.9 g、60.9 mmol)をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol)を水76 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine)palladium(0) (0.3 g、0.6 mmol)を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-E-6を21.7 g製造した。(収率70%、MS: $[M+H]^+ = 510$)

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【化456】



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【0175】

窒素雰囲気下で化合物sub1-E-6 (15 g、29.4 mmol)と化合物sub22 (7.7 g、29.4 mmol)をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (12.2 g、88.2 mmol)を水37 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine)palladium(0) (0.2 g、0.3 mmol)を投入した。9時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-35を14.6 g製造した。(収率72%、MS: $[M+H]^+ = 692$)

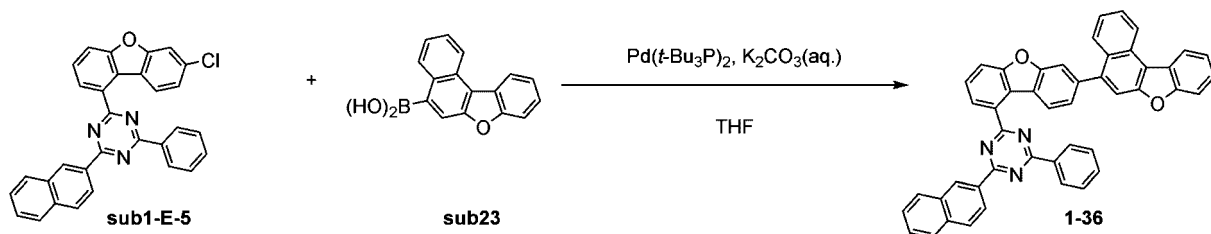
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【0176】

製造例1-36

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【化 4 5 7】



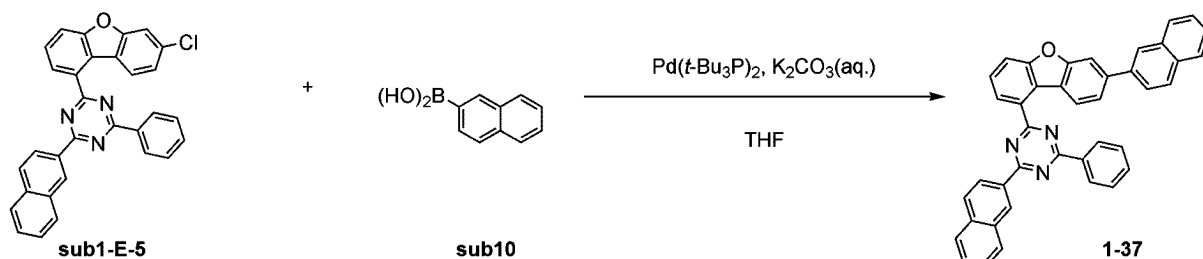
【0 1 7 7】

窒素雰囲気下で化合物 sub1-E-5 (15 g、31 mmol) と化合物 sub23 (8.1 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-36 を 12.4 g 製造した。(収率 60%、MS: $[\text{M}+\text{H}]^+ = 666$)

【0 1 7 8】

製造例 1-37

【化 4 5 8】



【0 1 7 9】

窒素雰囲気下で化合物 sub1-E-5 (15 g、31 mmol) と化合物 sub10 (5.3 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-37 を 14.1 g 製造した。(収率 79%、MS: $[\text{M}+\text{H}]^+ = 576$)

【0 1 8 0】

製造例 1-38

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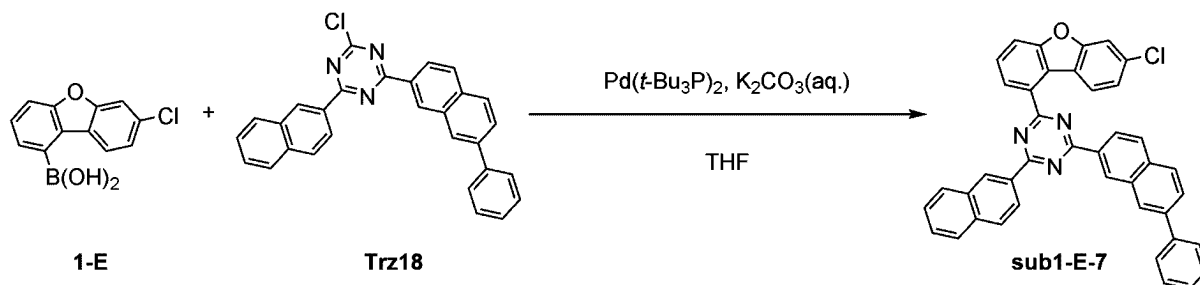
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【化 4 5 9】



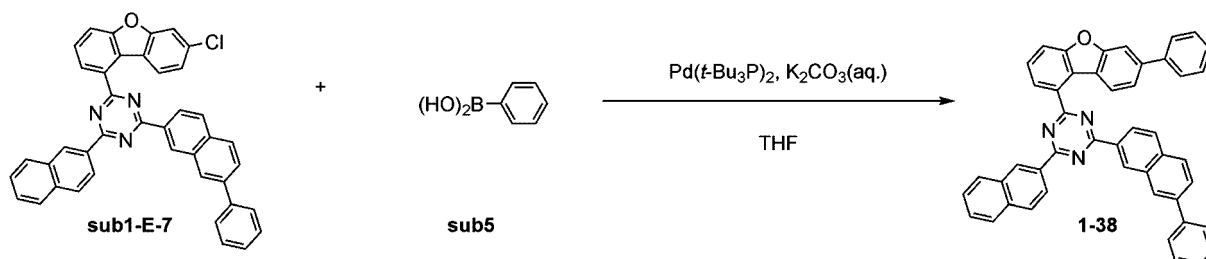
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【0181】

窒素雰囲気下で化合物 **1-E** (15 g、60.9 mmol) と化合物 **Trz18** (27 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-E-7** を 24.1 g 製造した。(収率 65%、MS: $[\text{M} + \text{H}]^+ = 610$)

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【化 4 6 0】



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【0182】

窒素雰囲気下で化合物 **sub1-E-7** (15 g、24.6 mmol) と化合物 **sub5** (3 g、24.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.2 g、73.8 mmol) を水 31 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.2 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-38** を 10.1 g 製造した。(収率 63%、MS: $[\text{M} + \text{H}]^+ = 652$)

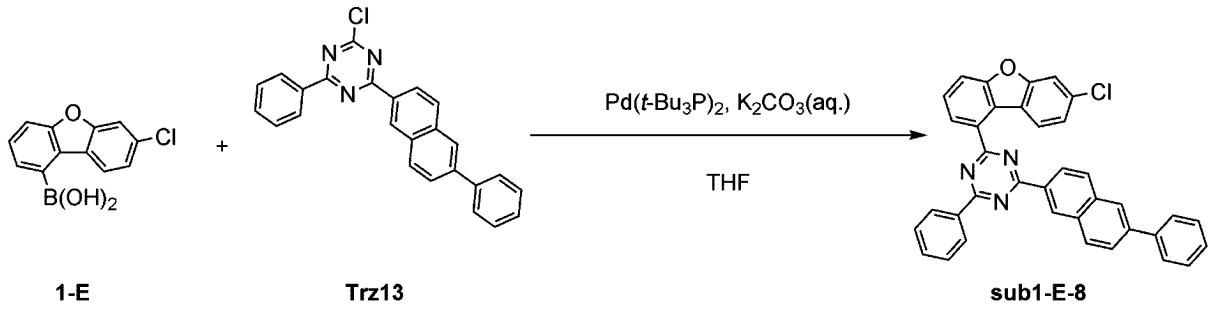
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【0183】

製造例 1-39

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【化 4 6 1】



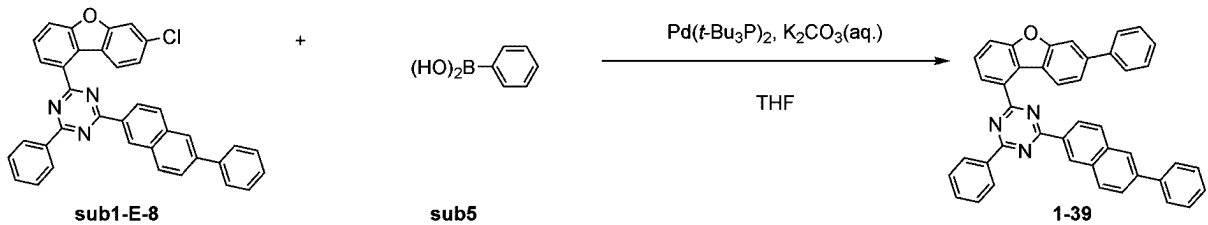
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【0184】

窒素雰囲気下で化合物 1-E (15 g、60.9 mmol) と化合物 Trz13 (24 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-E-8 を 26.2 g 製造した。(収率 77%、MS: $[M+H]^+ = 560$)

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【化 4 6 2】



【0185】

窒素雰囲気下で化合物 sub1-E-8 (15 g、26.8 mmol) と化合物 sub5 (3.3 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.1 g、80.3 mmol) を水 33 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-39 を 10.9 g 製造した。(収率 68%、MS: $[M+H]^+ = 602$)

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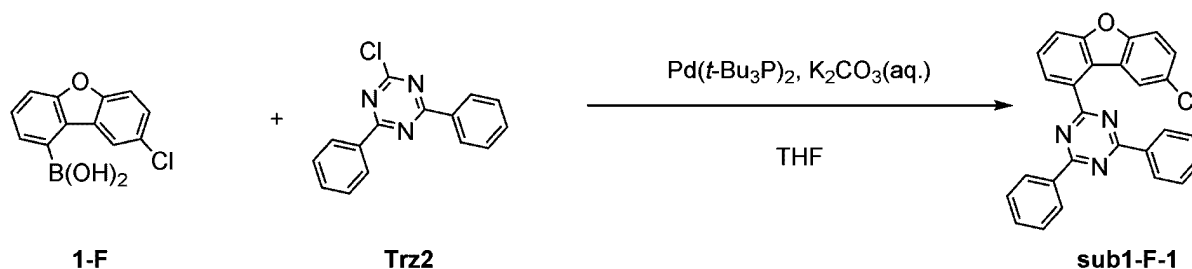
【0186】

製造例 1-40

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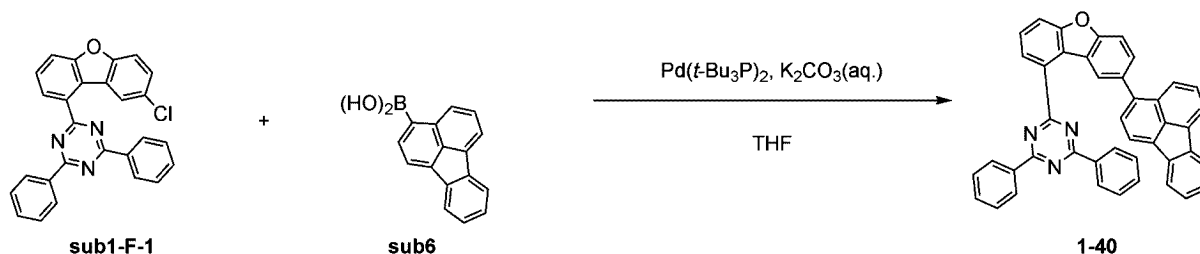
【化 4 6 3】



【0187】

窒素雰囲気下で化合物 1-F (15 g、60.9 mmol) と化合物 Trz2 (16.3 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-F-1 を 19.2 g 製造した。(収率 73%、MS: $[M+H]^+ = 434$)

【化 4 6 4】



【0188】

窒素雰囲気下で化合物 1-F-1 (15 g、34.6 mmol) と化合物 sub6 (8.5 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.3 g、103.7 mmol) を水 43 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-40 を 14.7 g 製造した。(収率 71%、MS: $[M+H]^+ = 600$)

【0189】

製造例 1-41

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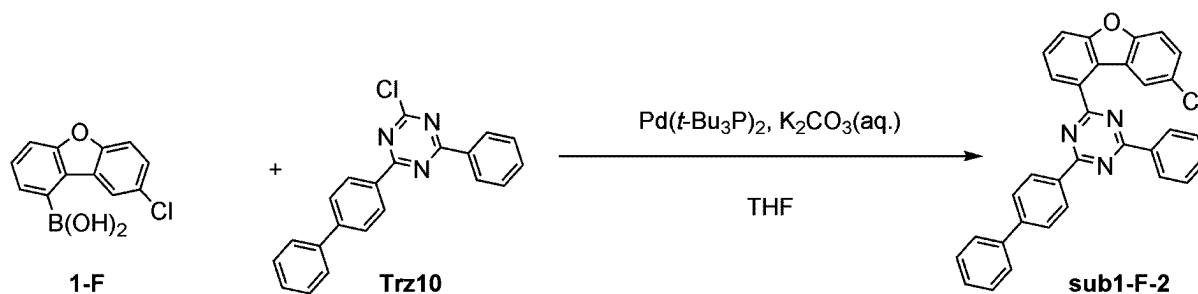
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【化 4 6 5】



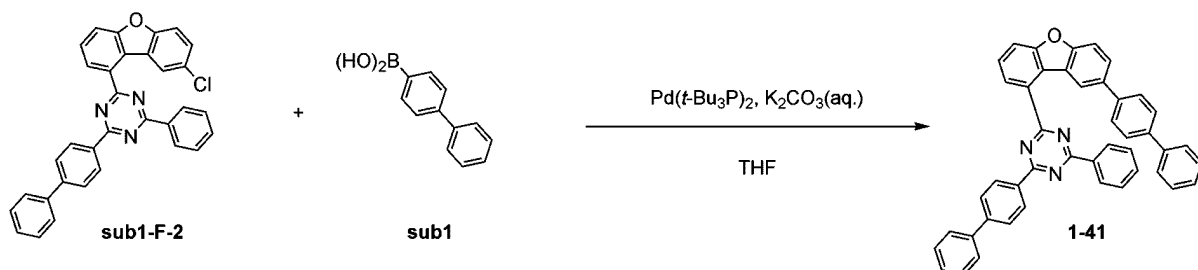
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【0190】

窒素雰囲気下で化合物 1-F (15 g、60.9 mmol) と化合物 Trz10 (20.9 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-F-2 を 21.1 g 製造した。(収率 68%、MS: $[M+H]^+ = 510$)

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【化 4 6 6】



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【0191】

窒素雰囲気下で化合物 sub1-F-2 (15 g、29.4 mmol) と化合物 sub1 (5.8 g、29.4 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.2 g、88.2 mmol) を水 37 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-41 を 14.2 g 製造した。(収率 77%、MS: $[M+H]^+ = 628$)

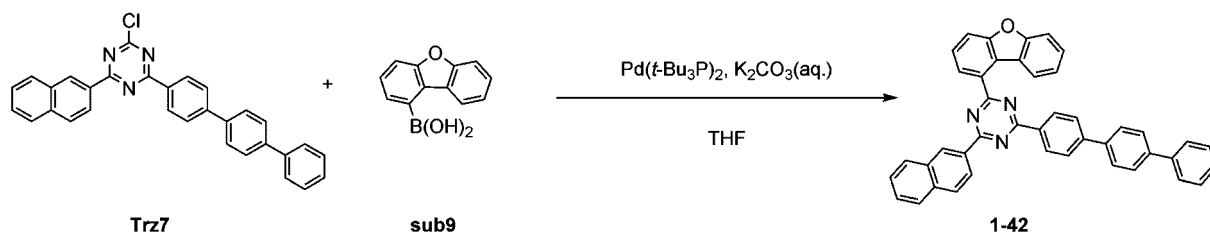
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【0192】

製造例 1-42

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【化 4 6 7】



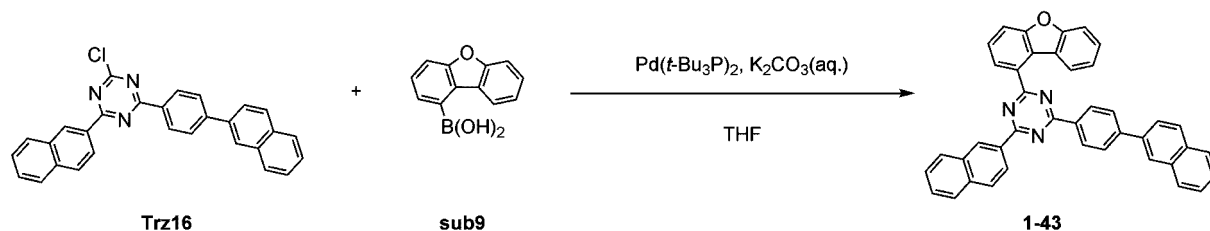
【0 1 9 3】

窒素雰囲気下で化合物 Trz7 (15 g、31.9 mmol) と化合物 sub9 (6.8 g、31.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (13.2 g、95.8 mmol) を水 40 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-42 を 15.2 g 製造した。(収率 79%、MS: $[\text{M} + \text{H}]^+ = 602$)

【0 1 9 4】

製造例 1-43

【化 4 6 8】



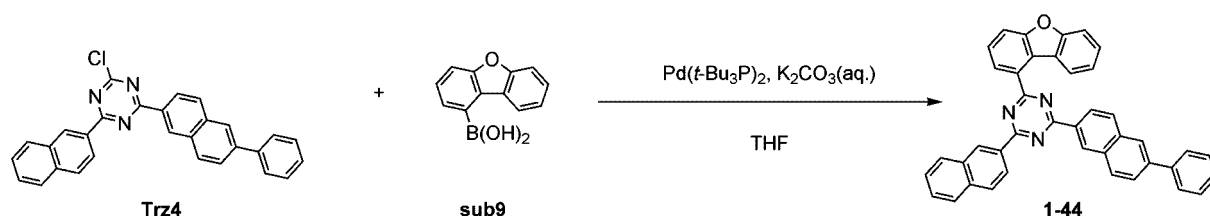
【0 1 9 5】

窒素雰囲気下で化合物 Trz16 (15 g、33.8 mmol) と化合物 sub9 (7.2 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-43 を 15 g 製造した。(収率 77%、MS: $[\text{M} + \text{H}]^+ = 576$)

【0 1 9 6】

製造例 1-44

【化 4 6 9】



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【0197】

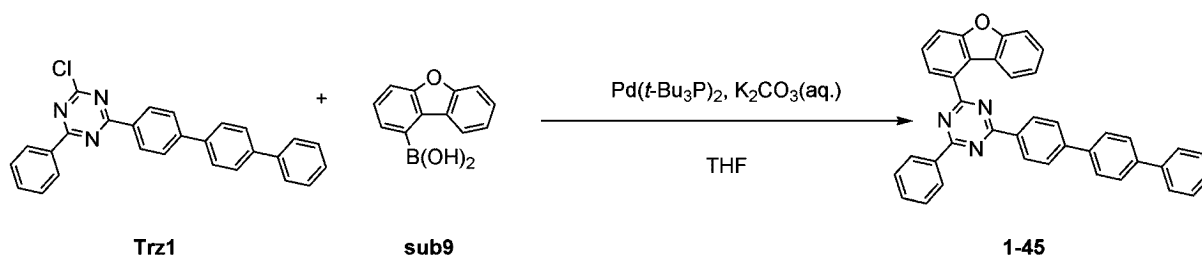
窒素雰囲気下で化合物 Trz4 (15 g、33.8 mmol) と化合物 sub9 (7.2 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.2 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-44 を 14.2 g 製造した。(収率 73%、MS: $[M+H]^+ = 576$)

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【0198】

製造例 1-45

【化470】



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【0199】

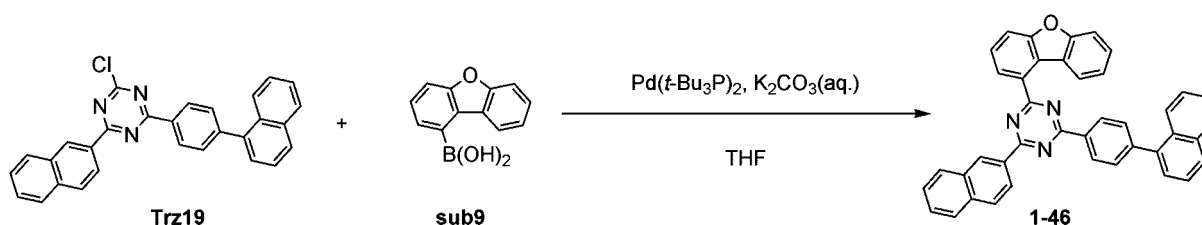
窒素雰囲気下で化合物 Trz1 (15 g、35.7 mmol) と化合物 sub9 (7.6 g、35.7 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.8 g、107.2 mmol) を水 44 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.2 g、0.4 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-45 を 12.2 g 製造した。(収率 62%、MS: $[M+H]^+ = 552$)

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【0200】

製造例 1-46

【化471】



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【0201】

窒素雰囲気下で化合物 Trz19 (15 g、33.8 mmol) と化合物 sub9 (7.2 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらに

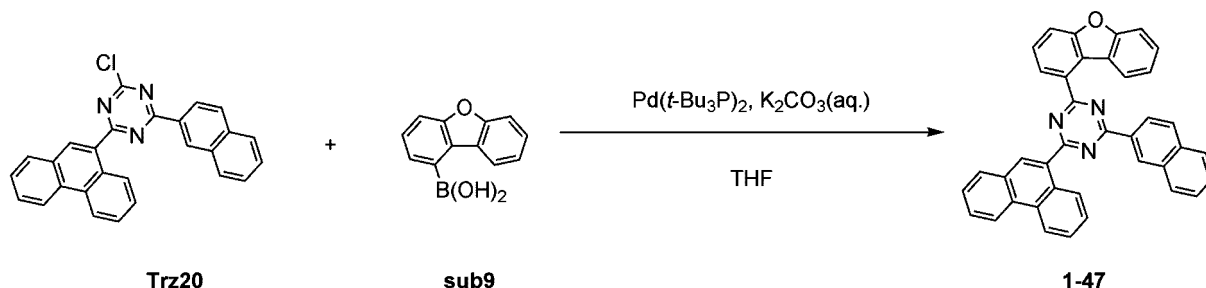
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クロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-46を13.6 g 製造した。(収率70%、MS: $[M+H]^+ = 576$)

【0202】

製造例1-47

【化472】



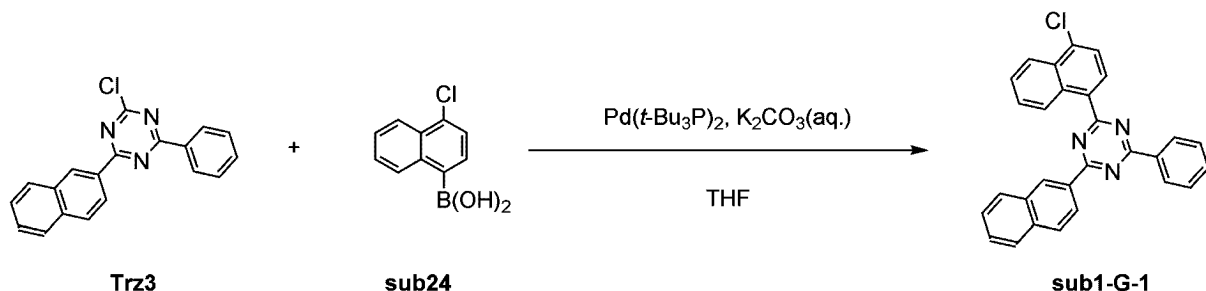
【0203】

窒素雰囲気下で化合物Trz20 (15 g、35.9 mmol) と化合物sub9 (7.6 g、35.9 mmol) をTHF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.9 g、107.7 mmol) を水45 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-47を15 g 製造した。(収率76%、MS: $[M+H]^+ = 550$)

【0204】

製造例1-48

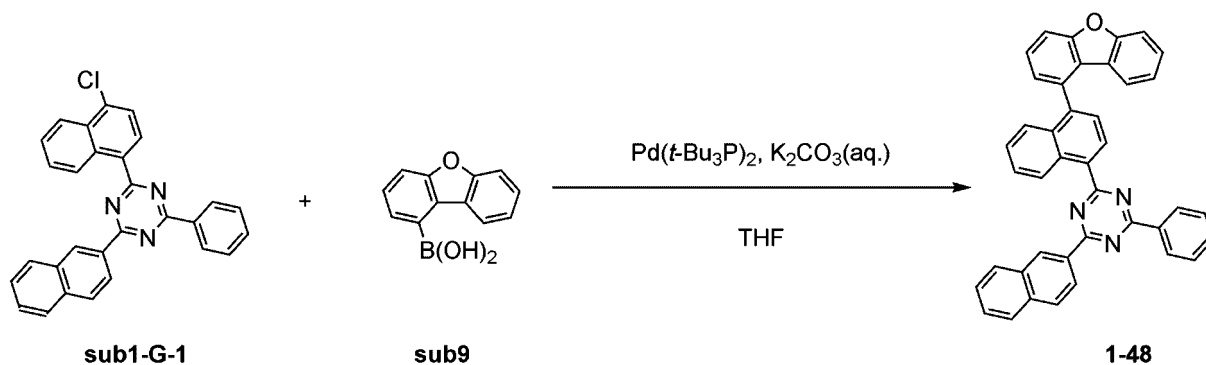
【化473】



【0205】

窒素雰囲気下で化合物Trz3 (15 g、47.2 mmol) と化合物sub24 (9.7 g、47.2 mmol) をTHF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (19.6 g、141.6 mmol) を水59 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.5 mmol) を投入した。11時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-G-1を13 g 製造した。(収率62%、MS: $[M+H]^+ = 444$)

【化 4 7 4】



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【0 2 0 6】

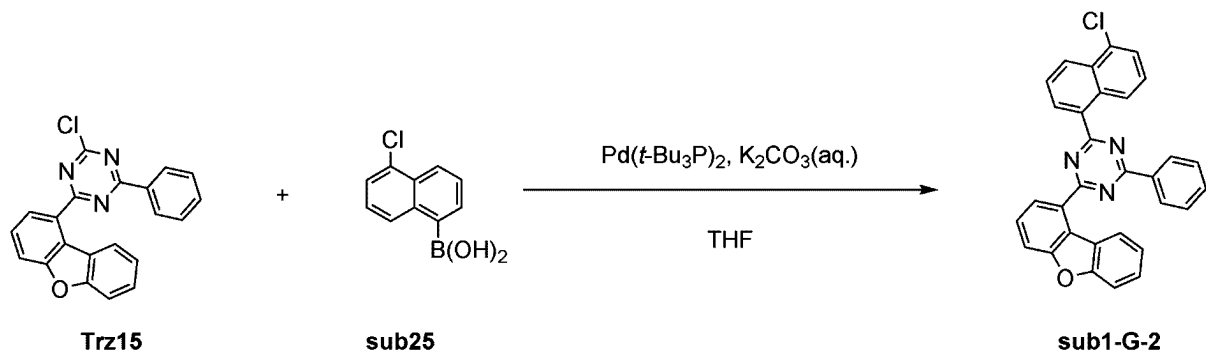
窒素雰囲気下で化合物 sub 1 - G - 1 (15 g、33.8 mmol) と化合物 sub 9 (7.2 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 48 を 15.2 g 製造した。(収率 78%、MS: $[M+H]^+ = 576$)

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【0 2 0 7】

製造例 1 - 4 9

【化 4 7 5】



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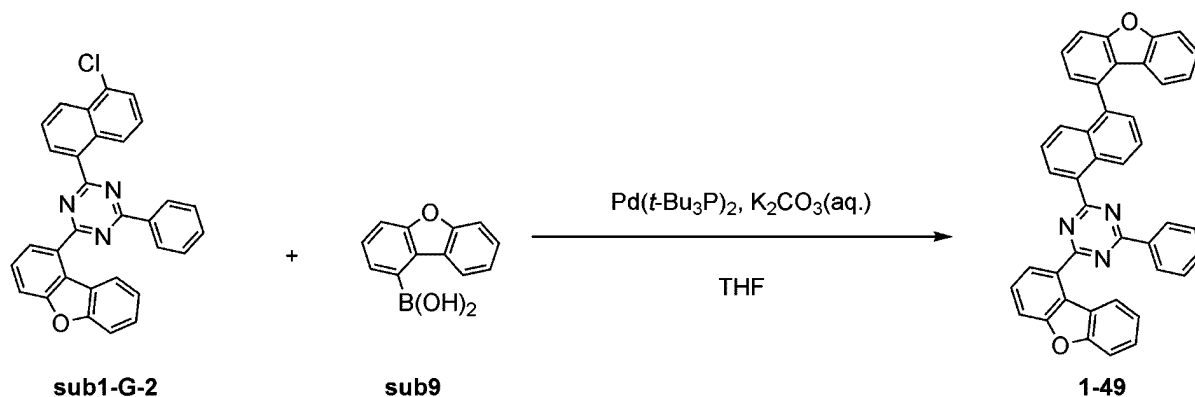
【0 2 0 8】

窒素雰囲気下で化合物 Trz15 (15 g、41.9 mmol) と化合物 sub 25 (8.7 g、41.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (17.4 g、125.8 mmol) を水 52 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - G - 2 を 12.6 g 製造した。(収率 62%、MS: $[M+H]^+ = 484$)

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【化 4 7 6】



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【0 2 0 9】

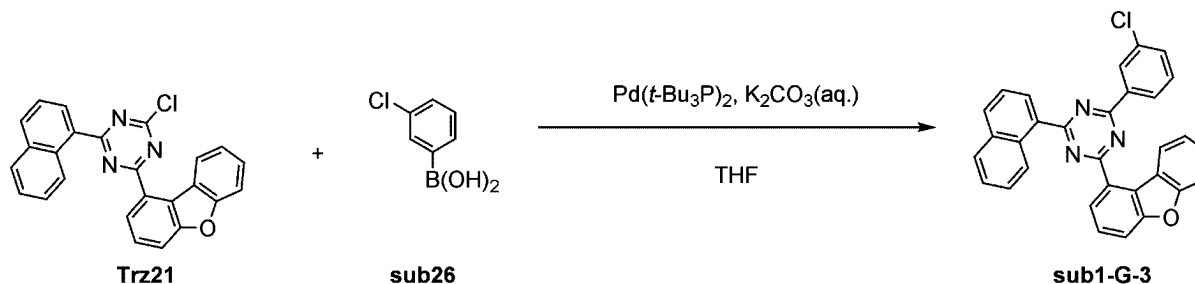
窒素雰囲気下で化合物 sub 1 - G - 2 (15 g、31 mmol) と化合物 sub 9 (6.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 49 を 13.7 g 製造した。(収率 72%、MS: $[M+H]^+ = 616$)

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【0 2 1 0】

製造例 1 - 5 0

【化 4 7 7】



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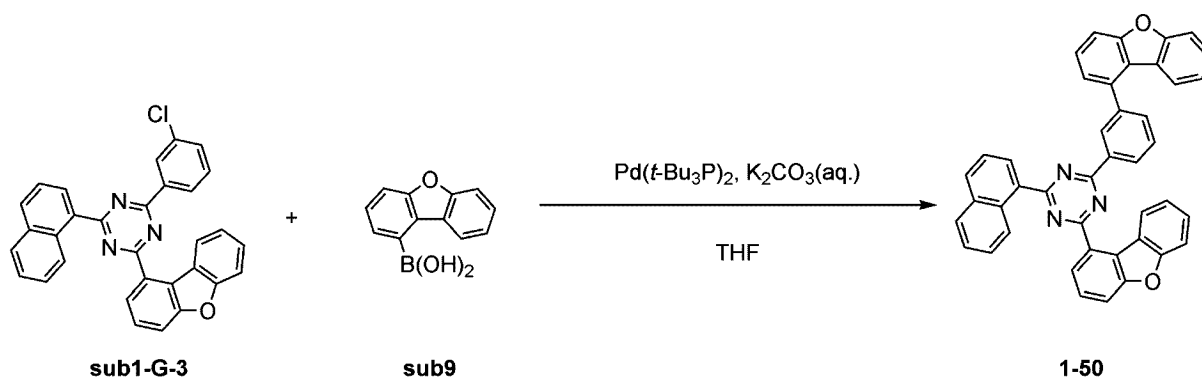
【0 2 1 1】

窒素雰囲気下で化合物 Trz 2 1 (15 g、36.8 mmol) と化合物 sub 2 6 (5.8 g、36.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (15.2 g、110.3 mmol) を水 46 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - G - 3 を 12.8 g 製造した。(収率 72%、MS: $[M+H]^+ = 484$)

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【化 4 7 8】



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【0 2 1 2】

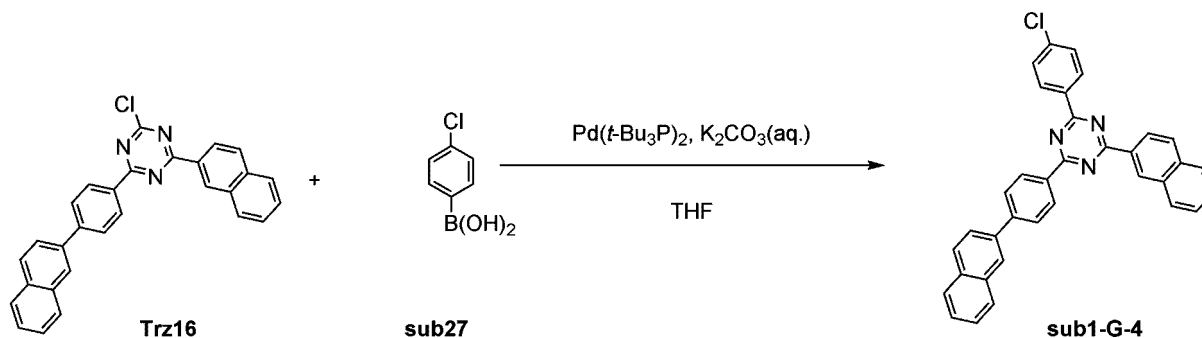
窒素雰囲気下で化合物 sub 1 - G - 3 (15 g、31 mmol) と化合物 sub 9 (6.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 50 を 13.2 g 製造した。(収率 69%、MS: [M+H]⁺ = 616)

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【0 2 1 3】

製造例 1 - 5 1

【化 4 7 9】



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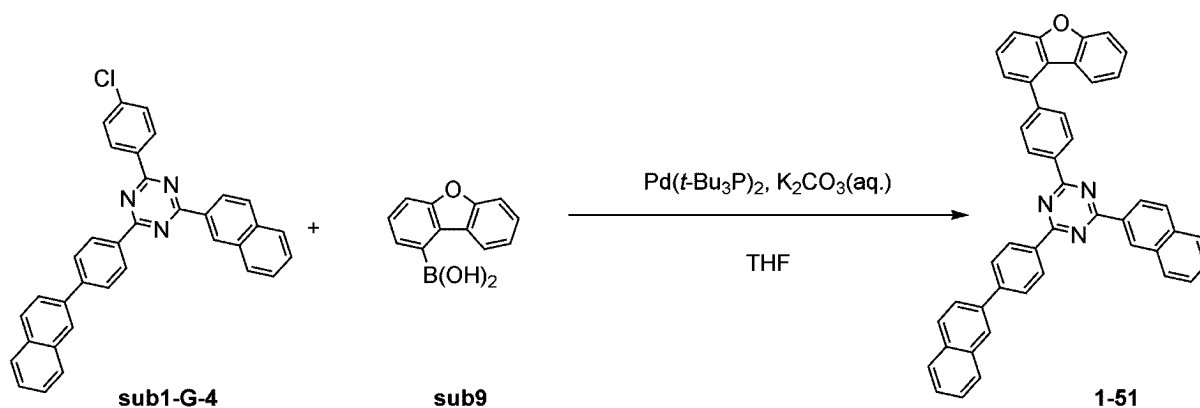
【0 2 1 4】

窒素雰囲気下で化合物 Trz16 (15 g、33.8 mmol) と化合物 sub 27 (5.3 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - G - 4 を 13.3 g 製造した。(収率 76%、MS: [M+H]⁺ = 520)

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【化 4 8 0】



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【0 2 1 5】

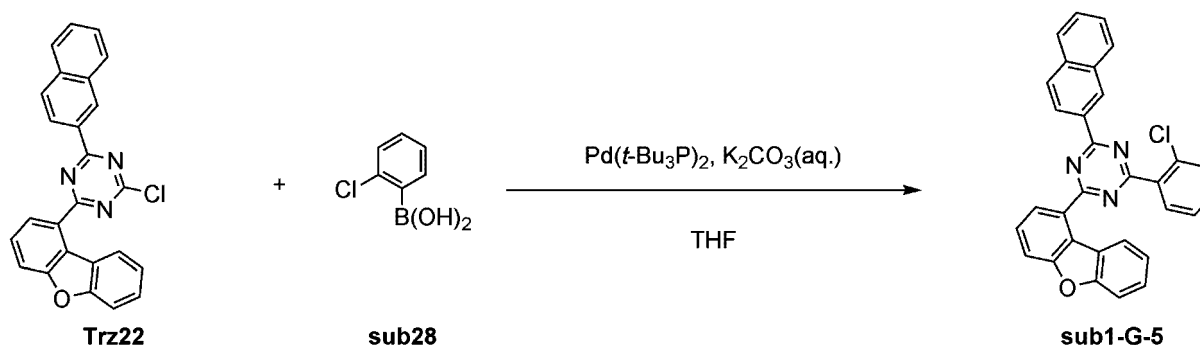
窒素雰囲気下で化合物 sub 1 - G - 4 (15 g、28.8 mmol) と化合物 sub 9 (6.1 g、28.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12 g、86.5 mmol) を水 36 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 5 1 を 13.3 g 製造した。(収率 71 %、MS : $[\text{M} + \text{H}]^+ = 652$)

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【0 2 1 6】

製造例 1 - 5 2

【化 4 8 1】



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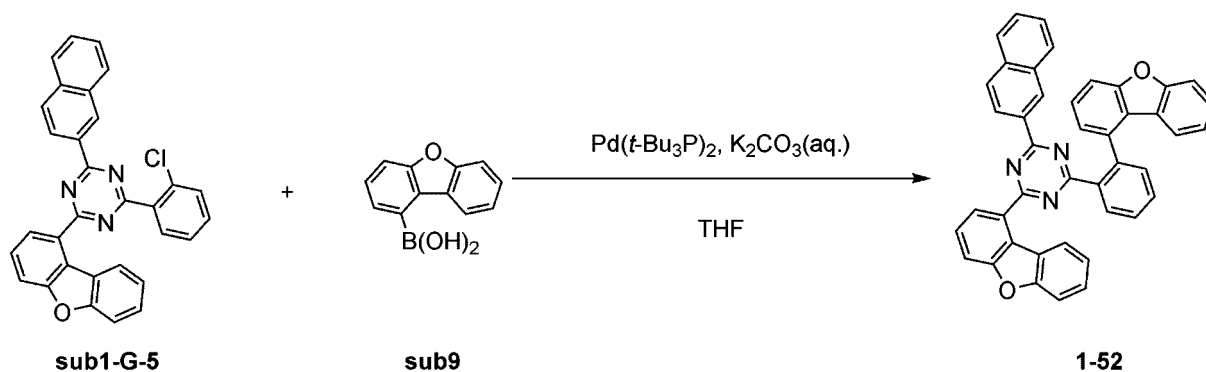
【0 2 1 7】

窒素雰囲気下で化合物 Trz 2 2 (15 g、36.8 mmol) と化合物 sub 2 8 (5.8 g、36.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (15.2 g、110.3 mmol) を水 46 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - G - 5 を 12.8 g 製造した。(収率 72 %、MS : $[\text{M} + \text{H}]^+ = 484$)

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【化 4 8 2】



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【0 2 1 8】

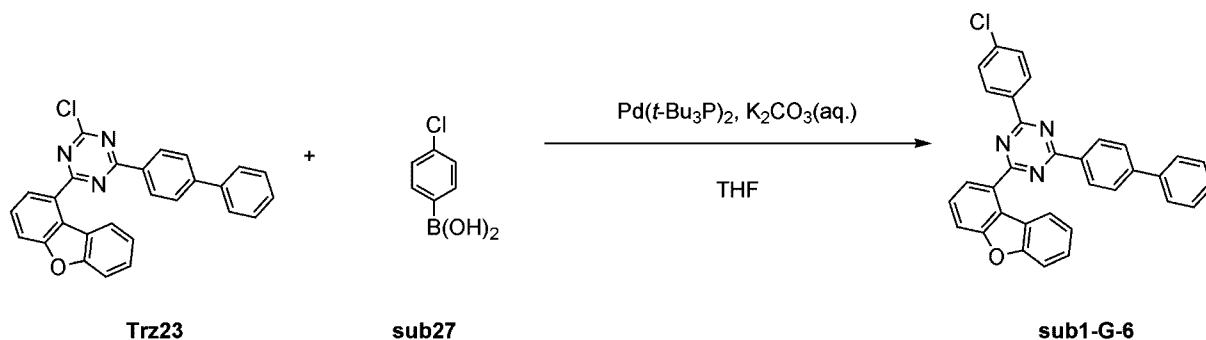
窒素雰囲気下で化合物 sub1-G-5 (15 g、31 mmol) と化合物 sub9 (6.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-52 を 13 g 製造した。(収率 68%、MS: $[\text{M} + \text{H}]^+ = 616$)

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【0 2 1 9】

製造例 1-53

【化 4 8 3】



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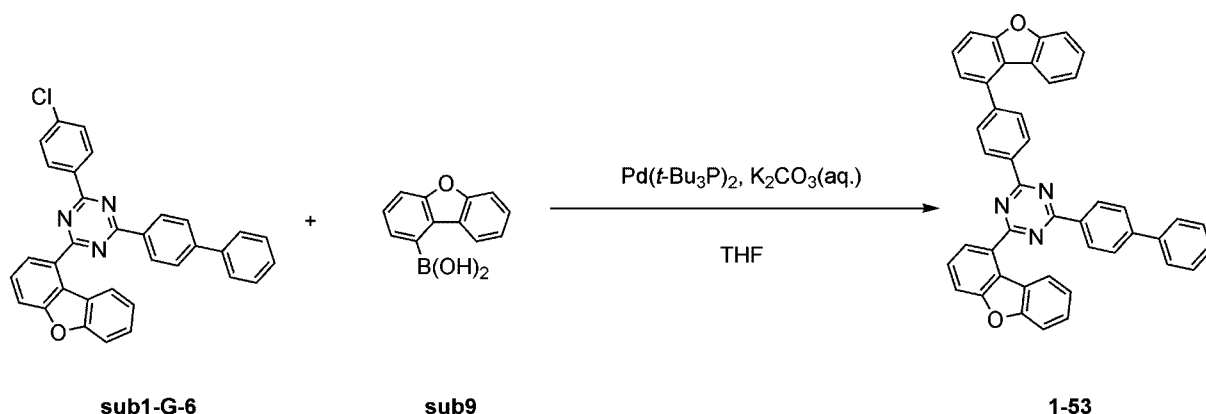
【0 2 2 0】

窒素雰囲気下で化合物 Trz23 (15 g、34.6 mmol) と化合物 sub27 (5.4 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.3 g、103.7 mmol) を水 43 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-G-6 を 11.3 g 製造した。(収率 64%、MS: $[\text{M} + \text{H}]^+ = 510$)

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【化 4 8 4】



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【0 2 2 1】

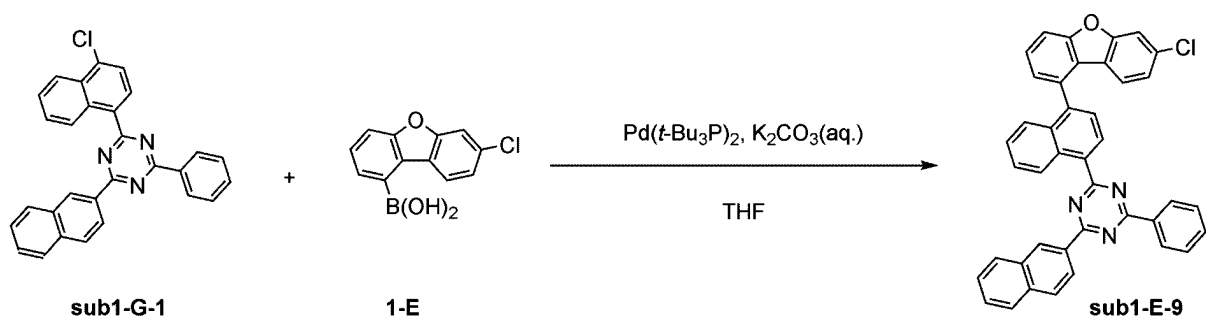
窒素雰囲気下で化合物 sub1-G-6 (15 g、31 mmol) と化合物 sub9 (6.6 g、31 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-53 を 13 g 製造した。(収率 68%、MS: [M+H]⁺ = 616)

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【0 2 2 2】

製造例 1-54

【化 4 8 5】



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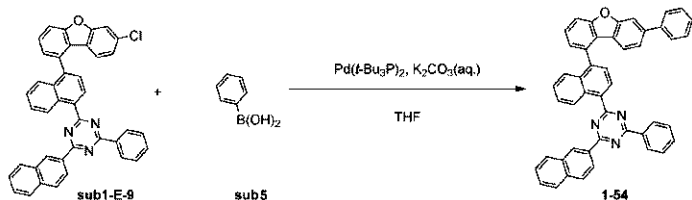
【0 2 2 3】

窒素雰囲気下で化合物 sub1-G-1 (15 g、33.8 mmol) と化合物 1-E (8.3 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-E-9 を 14.4 g 製造した。(収率 70%、MS: [M+H]⁺ = 610)

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【化 4 8 6】



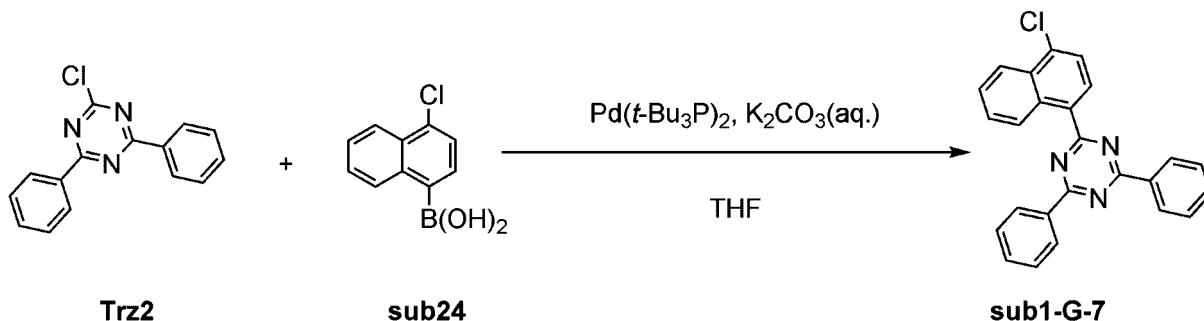
【0 2 2 4】

窒素雰囲気下で化合物 sub1-E-9 (15 g、24.6 mmol) と化合物 sub5 (3 g、24.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.2 g、73.8 mmol) を水 31 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.2 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-54 を 12.2 g 製造した。(収率 76%、MS: $[\text{M} + \text{H}]^+ = 652$)

【0 2 2 5】

製造例 1-55

【化 4 8 7】



【0 2 2 6】

窒素雰囲気下で化合物 Trz2 (15 g、56 mmol) と化合物 sub24 (11.6 g、56 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.2 g、168.1 mmol) を水 70 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-G-7 を 15.6 g 製造した。(収率 71%、MS: $[\text{M} + \text{H}]^+ = 394$)

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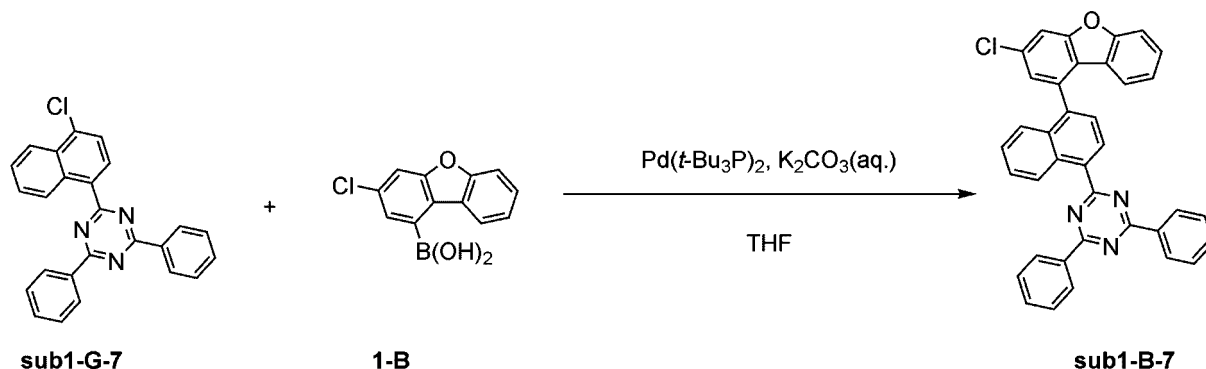
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【化 4 8 8】



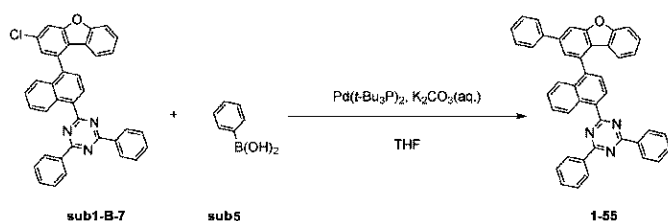
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【0 2 2 7】

窒素雰囲気下で化合物 sub1-G-7 (15 g、38.1 mmol) と化学式 1-B (9.4 g、38.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (15.8 g、114.3 mmol) を水 47 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.2 g、0.4 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-B-7 を 13.8 g 製造した。(収率 65%、MS: $[M+H]^+ = 560$)

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【化 4 8 9】



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【0 2 2 8】

窒素雰囲気下で化合物 sub1-B-7 (15 g、26.8 mmol) と化合物 sub5 (3.3 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.1 g、80.3 mmol) を水 33 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-55 を 12.9 g 製造した。(収率 80%、MS: $[M+H]^+ = 602$)

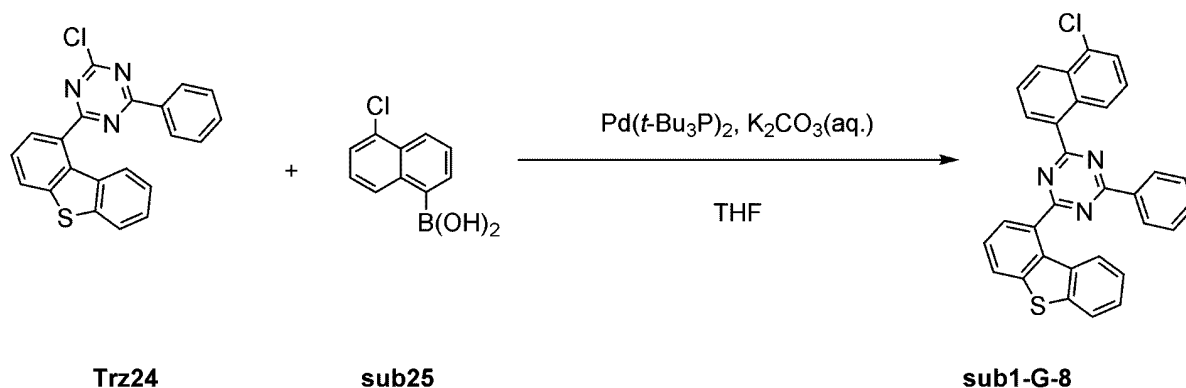
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【0 2 2 9】

製造例 1-56

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【化 4 9 0】



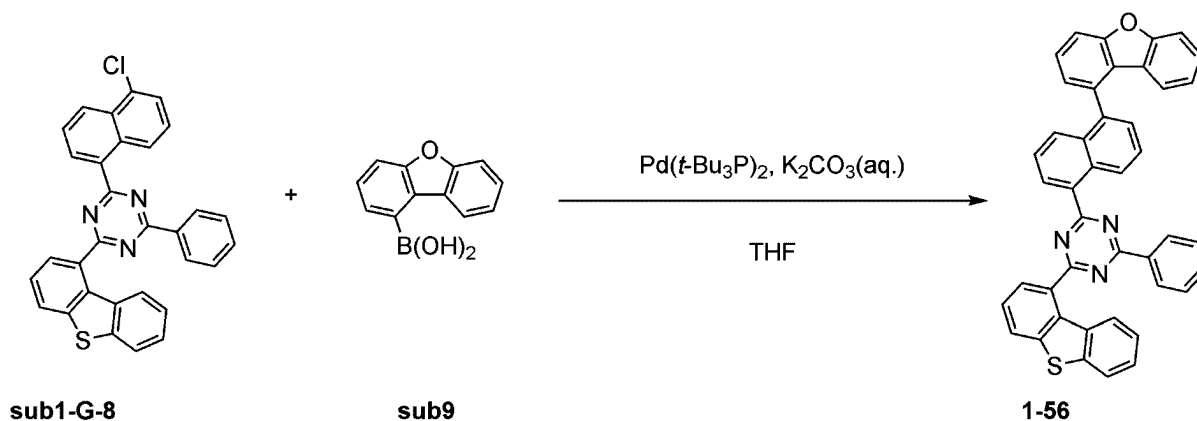
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【0 2 3 0】

窒素雰囲気下で化合物 Trz24 (15 g、38.1 mmol) と化合物 sub25 (9.4 g、38.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (15.8 g、114.3 mmol) を水 47 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-G-8 を 13.8 g 製造した。(収率 65%、MS: $[M+H]^+ = 560$)

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【化 4 9 1】



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【0 2 3 1】

窒素雰囲気下で化合物 sub1-G-8 (15 g、30 mmol) と化合物 sub9 (6.4 g、30 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.4 g、90 mmol) を水 37 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-56 を 13.4 g 製造した。(収率 71%、MS: $[M+H]^+ = 632$)

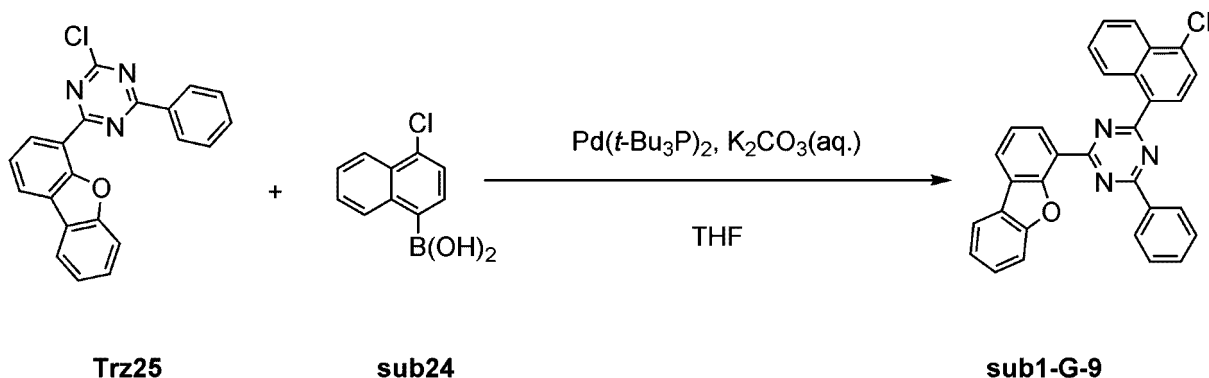
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【0 2 3 2】

製造例 1-57

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【化 4 9 2】



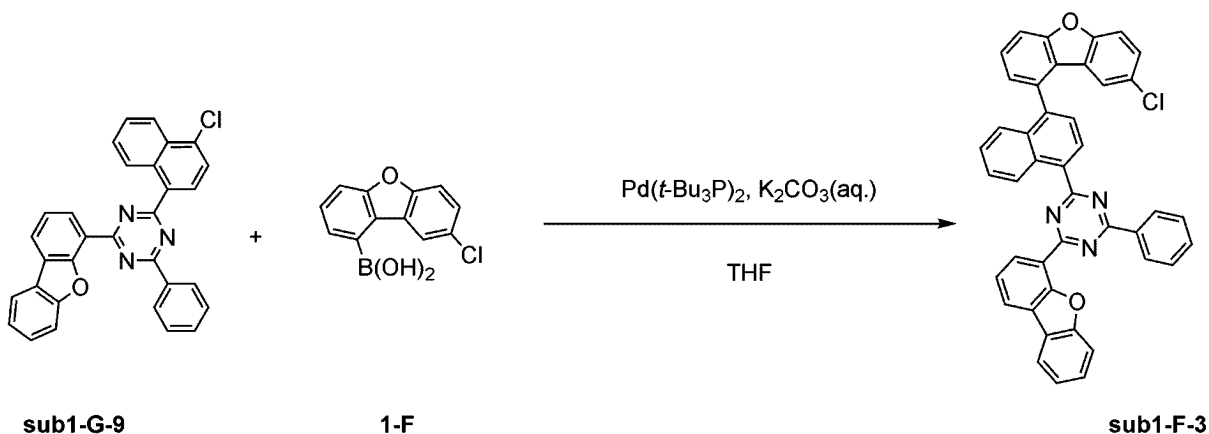
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【0 2 3 3】

窒素雰囲気下で化合物 **Trz25** (15 g、41.9 mmol) と化合物 **sub24** (8.7 g、41.9 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (17.4 g、125.8 mmol) を水 52 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-G-9** を 12.4 g 製造した。(収率 61%、MS: $[\text{M}+\text{H}]^+ = 484$)

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【化 4 9 3】



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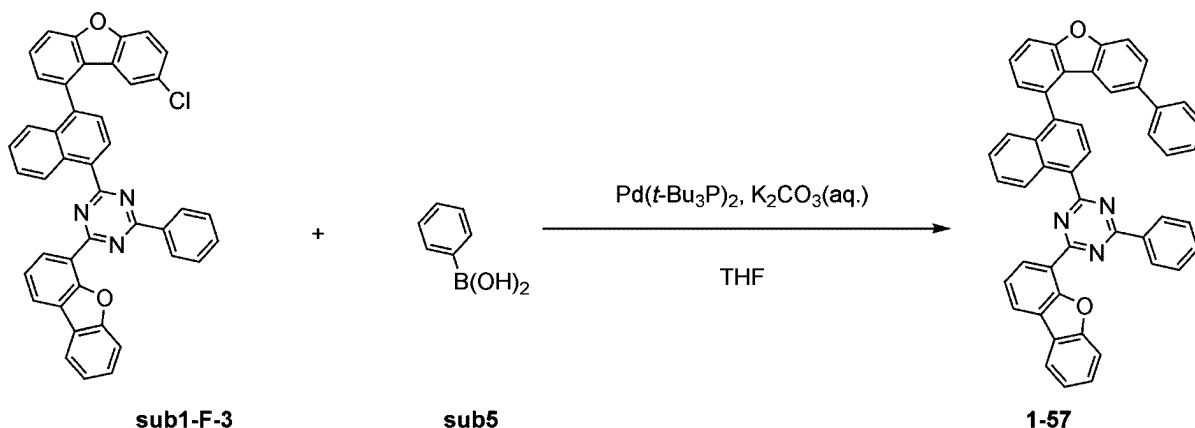
【0 2 3 4】

窒素雰囲気下で化合物 **sub1-G-9** (15 g、31 mmol) と化学式 **1-F** (7.6 g、31 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12.9 g、93 mmol) を水 39 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-F-3** を 12.5 g 製造した。(収率 62%、MS: $[\text{M}+\text{H}]^+ = 650$)

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【化 4 9 4】



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【0 2 3 5】

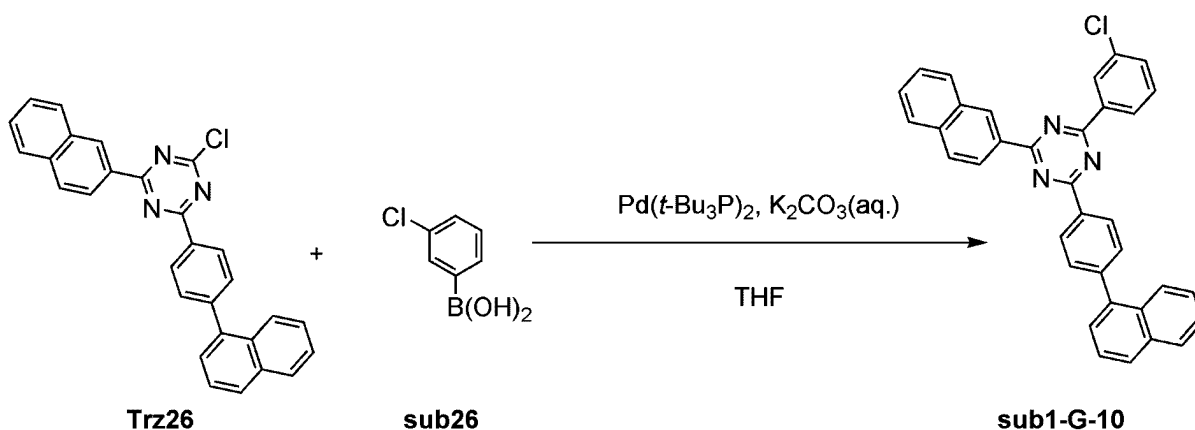
窒素雰囲気下で化合物 sub 1 - F - 3 (15 g、23.1 mmol) と化合物 sub 5 (2.8 g、23.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.6 g、69.2 mmol) を水 29 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.1 g、0.2 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 57 を 12.8 g 製造した。(収率 80%、MS: $[\text{M} + \text{H}]^+ = 692$)

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【0 2 3 6】

製造例 1 - 5 8

【化 4 9 5】



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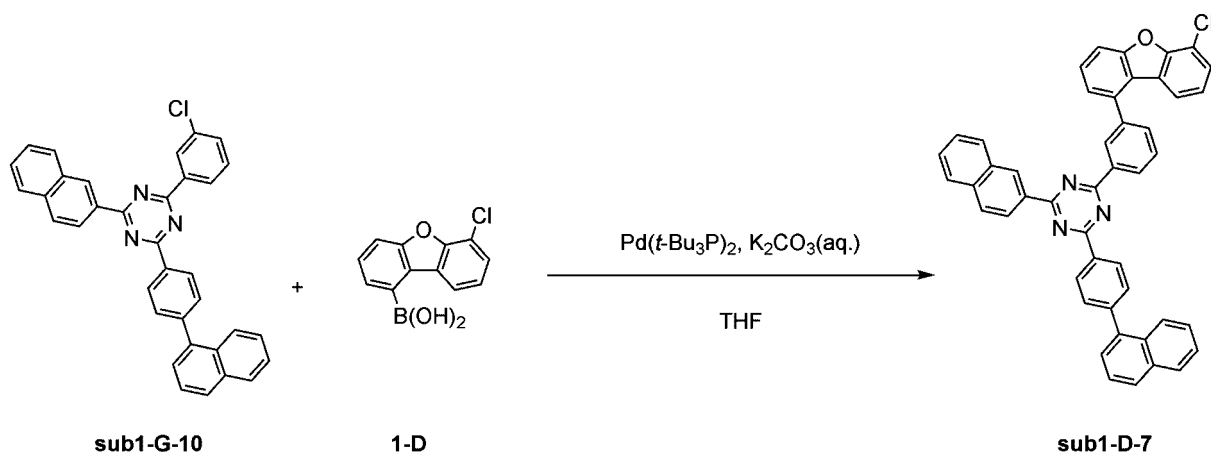
【0 2 3 7】

窒素雰囲気下で化合物 Trz 2 6 (15 g、33.8 mmol) と化合物 sub 2 6 (5.3 g、33.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水 42 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1 - G - 10 を 10.5 g 製造した。(収率 60%、MS: $[\text{M} + \text{H}]^+ = 520$)

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【化 4 9 6】



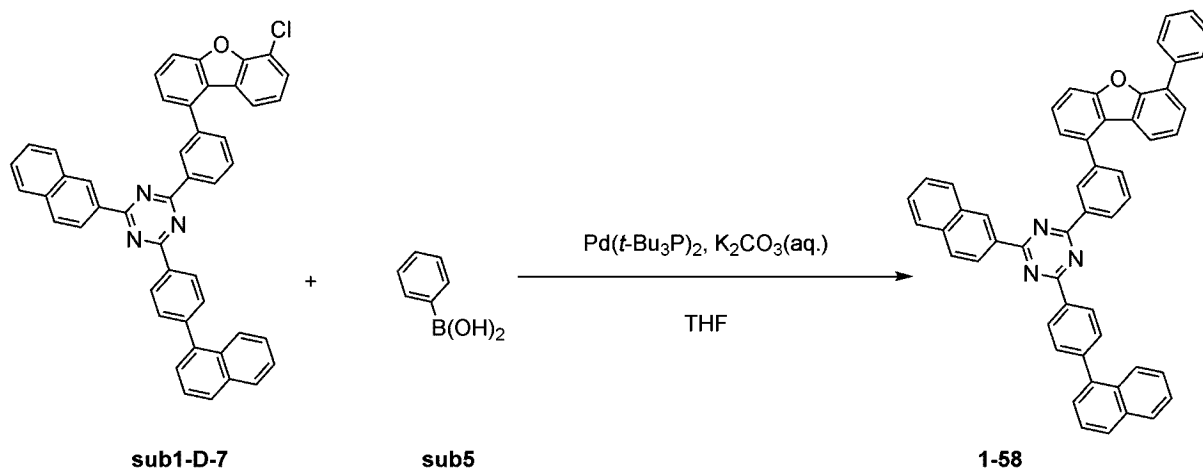
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【0 2 3 8】

窒素雰囲気下で化合物 **sub1-G-10** (15 g、28.8 mmol) と化合物 **1-D** (7.1 g、28.8 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (12 g、86.5 mmol) を水 36 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-D-7** を 15 g 製造した。(収率 76%、MS: $[\text{M} + \text{H}]^+ = 686$)

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【化 4 9 7】



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【0 2 3 9】

窒素雰囲気下で化合物 **sub1-D-7** (15 g、21.9 mmol) と化合物 **sub5** (2.7 g、21.9 mmol) を **THF** 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.1 g、65.6 mmol) を水 27 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.1 g、0.2 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-58** を 9.9 g 製造した。(収率 62%、MS: $[\text{M} + \text{H}]^+ = 728$)

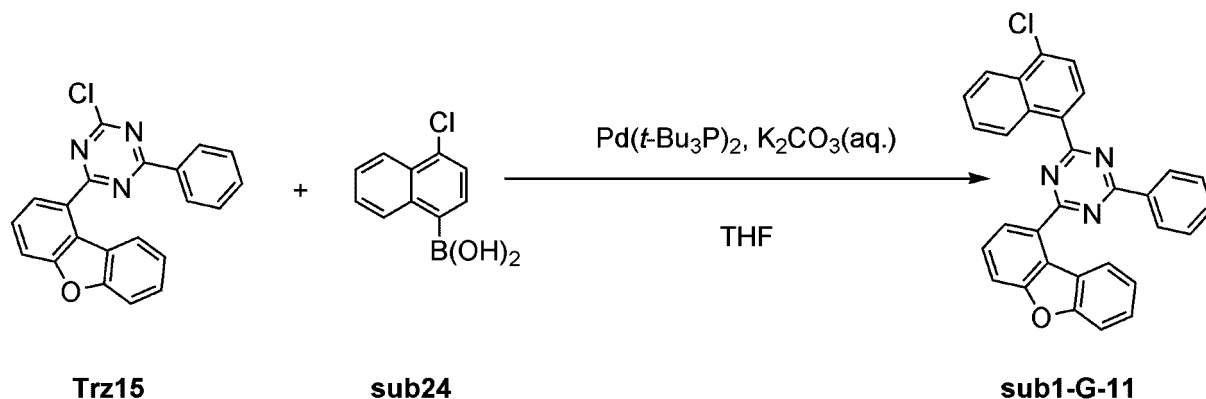
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【0240】

製造例1-59

【化498】



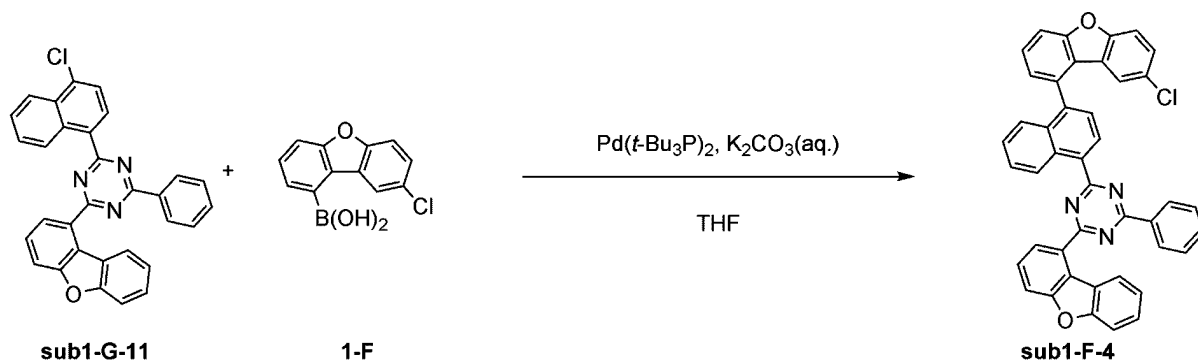
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【0241】

窒素雰囲気下で化合物Trz15 (15 g、41.9 mmol) と化合物sub24 (8.7 g、41.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (17.4 g、125.8 mmol) を水52 mlに溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.4 mmol) を投入した。11時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-G-11を12.4 g製造した。(収率61%、MS: $[M+H]^+ = 484$)

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【化499】



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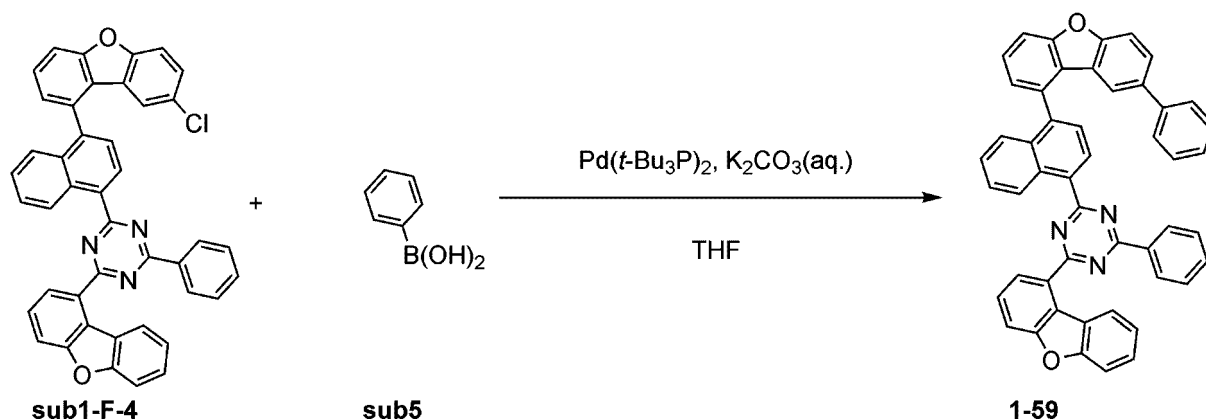
【0242】

窒素雰囲気下で化合物sub1-G-11 (15 g、28.8 mmol) と化合物1-F (7.1 g、28.8 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (12 g、86.5 mmol) を水36 mlに溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.3 mmol) を投入した。10時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-F-4を15 g製造した。(収率76%、MS: $[M+H]^+ = 686$)

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【化500】



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【0243】

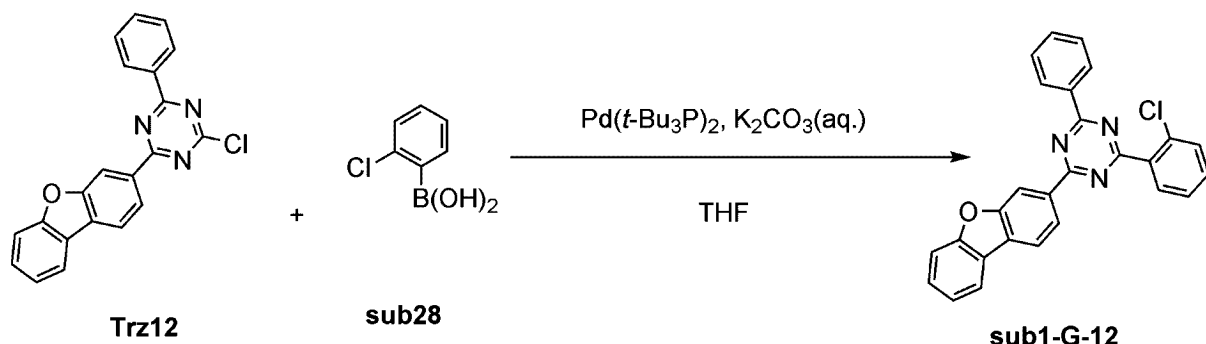
窒素雰囲気下で化合物 sub1-F-4 (15 g、23.1 mmol) と化合物 sub5 (2.8 g、23.1 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.6 g、69.2 mmol) を水 29 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.1 g、0.2 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-59 を 12.1 g 製造した。(収率 76%、MS: $[M+H]^+ = 692$)

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【0244】

製造例 1-60

【化501】



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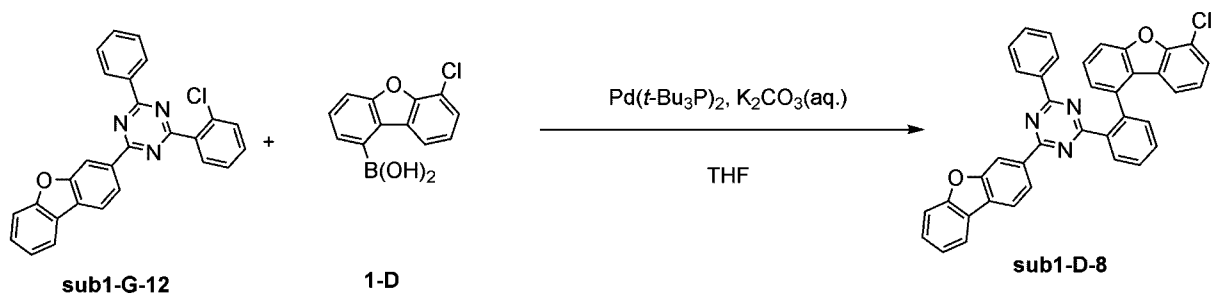
【0245】

窒素雰囲気下で化合物 Trz12 (15 g、41.9 mmol) と化合物 sub28 (6.6 g、41.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (17.4 g、125.8 mmol) を水 52 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.2 g、0.4 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-G-12 を 11.1 g 製造した。(収率 61%、MS: $[M+H]^+ = 434$)

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【化 5 0 2】



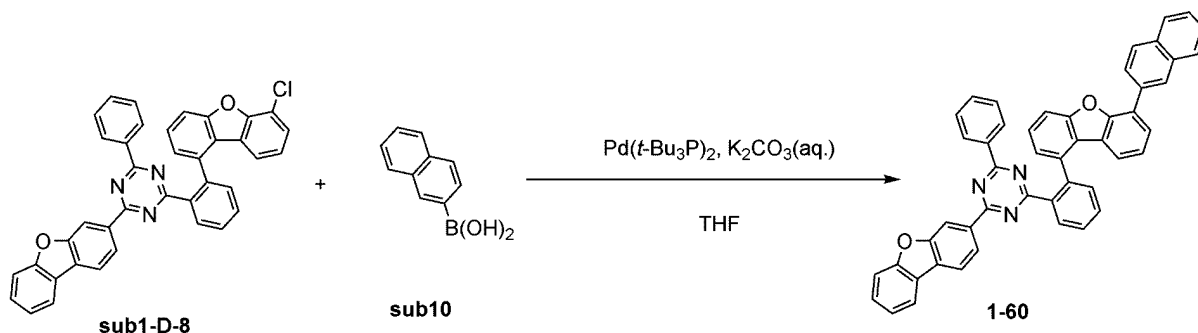
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【 0 2 4 6】

窒素雰囲気下で化合物 **sub1-G-12** (15 g、34.6 mmol) と化合物 **1-D** (8.5 g、34.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14.3 g、103.7 mmol) を水 43 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.2 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-D-8** を 13.6 g 製造した。(収率 79%、MS: $[\text{M}+\text{H}]^+ = 500$)

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【化 5 0 3】



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【 0 2 4 7】

窒素雰囲気下で化合物 **sub1-D-8** (15 g、25 mmol) と化合物 **sub10** (4.3 g、25 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.4 g、75 mmol) を水 31 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.1 g、0.2 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-60** を 13.3 g 製造した。(収率 77%、MS: $[\text{M}+\text{H}]^+ = 692$)

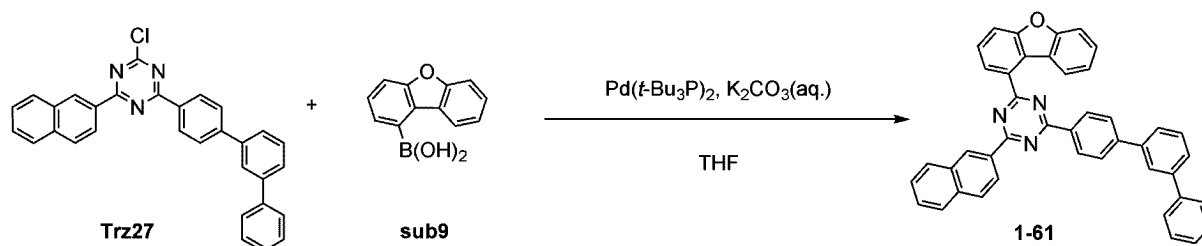
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【 0 2 4 8】

製造例 1-61

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【化504】



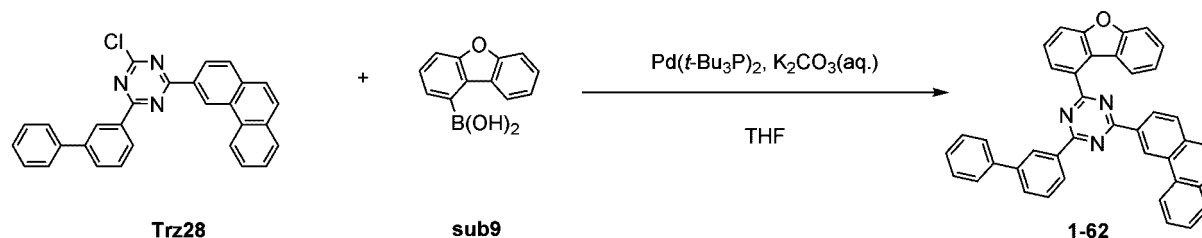
【0249】

窒素雰囲気下で化合物Trz27 (15 g、31.9 mmol) と化合物sub9 (6.8 g、31.9 mmol) をTHF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (13.2 g、95.8 mmol) を水40 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.4 g、0.3 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-61を10 g 製造した。(収率52%、MS: $[M+H]^+ = 602$)

【0250】

製造例1-62

【化505】



【0251】

窒素雰囲気下で化合物Trz28 (15 g、33.8 mmol) と化合物sub9 (7.2 g、33.8 mmol) をTHF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水42 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.4 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-62を12.2 g 製造した。(収率63%、MS: $[M+H]^+ = 576$)

【0252】

製造例1-63

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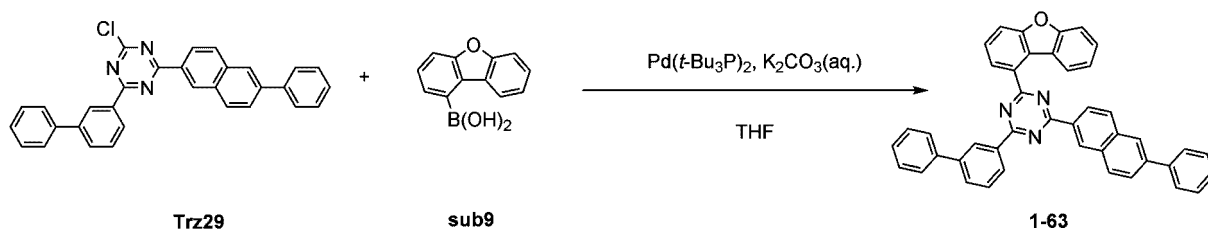
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【化506】



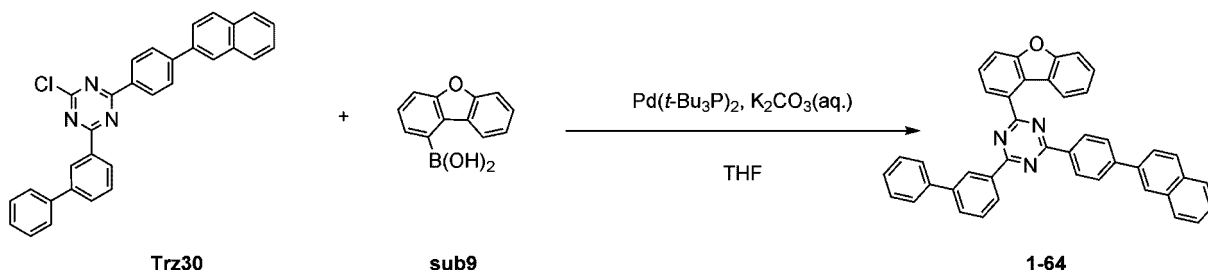
【0253】

窒素雰囲気下で化合物Trz29 (15 g、31.9 mmol) と化合物sub9 (6.8 g、31.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (13.2 g、95.8 mmol) を水40 mlに溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.4 g、0.3 mmol) を投入した。12時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-63を12.7 g製造した。(収率66%、MS: $[M+H]^+ = 602$)

【0254】

製造例1-64

【化507】



【0255】

窒素雰囲気下で化合物Trz30 (15 g、31.9 mmol) と化合物sub9 (6.8 g、31.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (13.2 g、95.8 mmol) を水40 mlに溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.4 g、0.3 mmol) を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-64を13.2 g製造した。(収率69%、MS: $[M+H]^+ = 602$)

【0256】

製造例1-65

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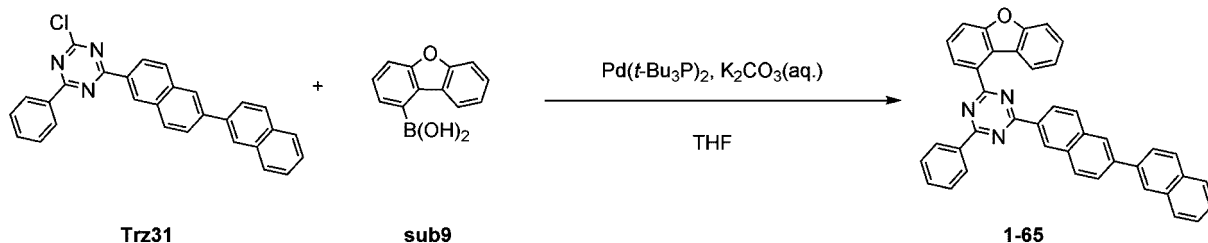
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【化508】



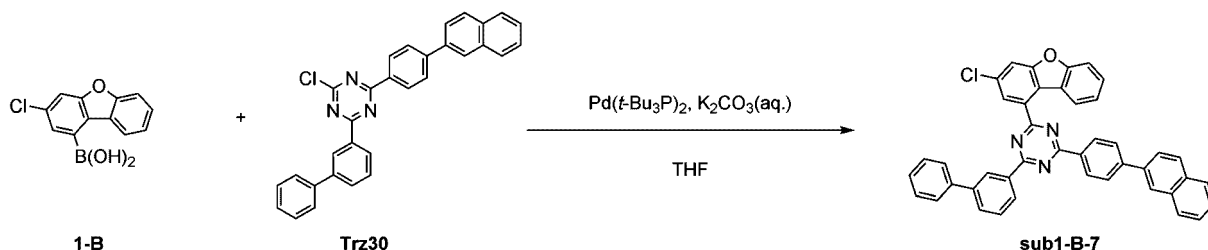
【0257】

窒素雰囲気下で化合物Trz31 (15 g、33.8 mmol) と化合物sub9 (7.2 g、33.8 mmol) をTHF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (14 g、101.4 mmol) を水42 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.4 g、0.3 mmol) を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物1-65を14.6 g 製造した。(収率75%、MS: $[M+H]^+ = 576$)

【0258】

製造例1-66

【化509】



【0259】

窒素雰囲気下で化合物1-B (15 g、60.9 mmol) と化合物Trz30 (28.6 g、60.9 mmol) をTHF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水76 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.7 g、0.6 mmol) を投入した。12時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物sub1-B-7を19.3 g 製造した。(収率50%、MS: $[M+H]^+ = 636$)

【0260】

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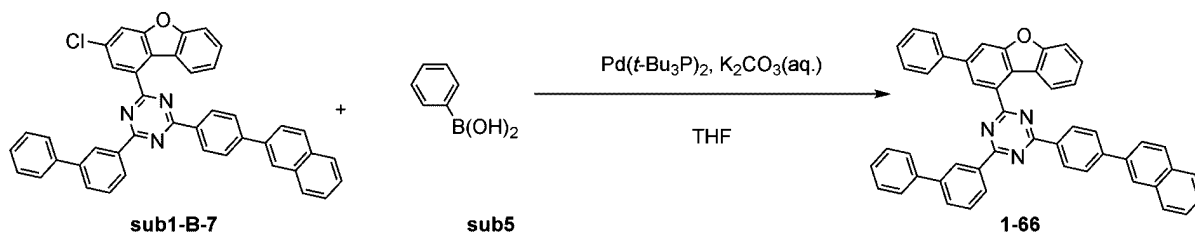
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【化 5 1 0】



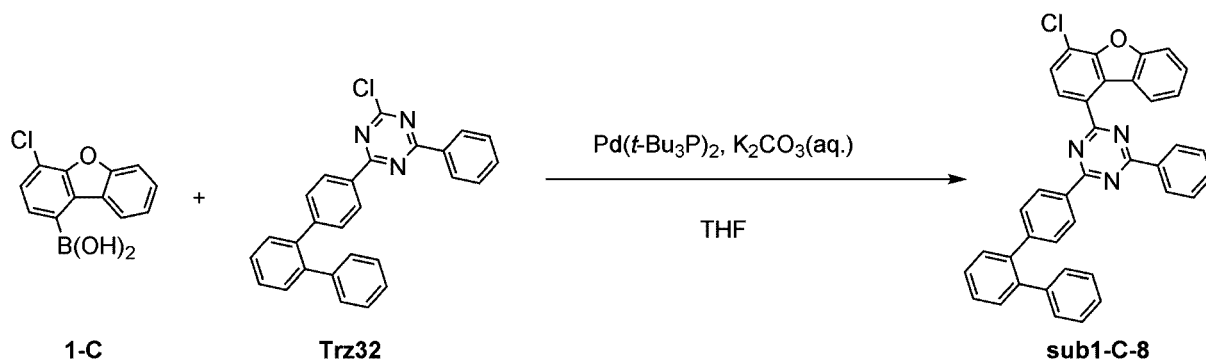
【 0 2 6 1】

窒素雰囲気下で化合物 **sub1-B-7** (15 g、23.6 mmol) と化合物 **sub5** (2.9 g、23.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (9.8 g、70.7 mmol) を水 29 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenyl phosphine) palladium (0) (0.3 g、0.2 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **1-66** を 8.5 g 製造した。(収率 53 %、MS : $[\text{M} + \text{H}]^+ = 678$)

【 0 2 6 2】

製造例 1-67

【化 5 1 1】



【 0 2 6 3】

窒素雰囲気下で化合物 **1-C** (15 g、60.9 mmol) と化合物 **Trz32** (25.6 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenyl phosphine) palladium (0) (0.7 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 **sub1-C-8** を 24.9 g 製造した。(収率 70 %、MS : $[\text{M} + \text{H}]^+ = 586$)

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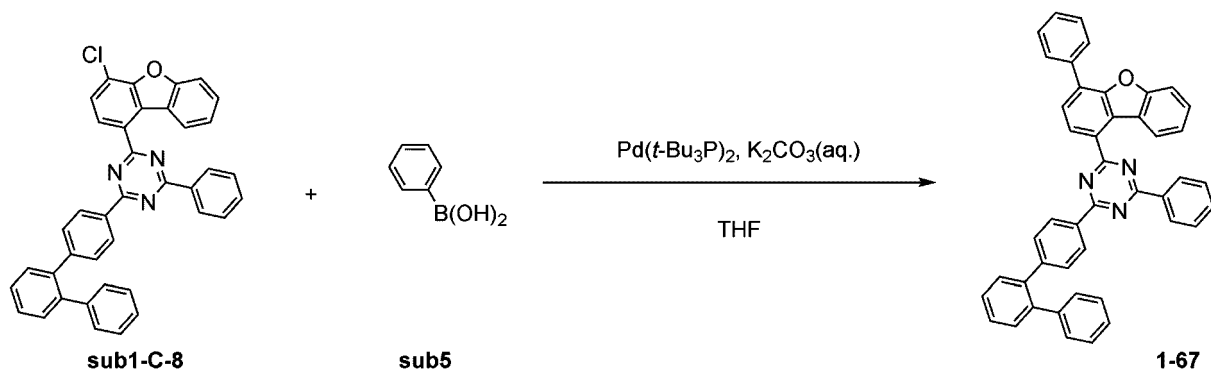
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【化 5 1 2】



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【0 2 6 4】

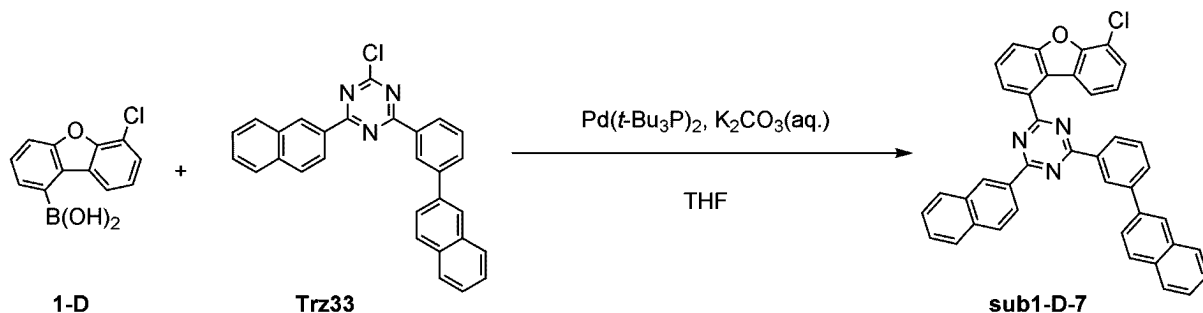
窒素雰囲気下で化合物 sub1-C-8 (15 g、25.6 mmol) と化合物 sub5 (3.1 g、25.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.6 g、76.8 mmol) を水 32 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.3 g、0.3 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-67 を 10.6 g 製造した。(収率 66%、MS: $[M+H]^+ = 628$)

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【0 2 6 5】

製造例 1-68

【化 5 1 3】



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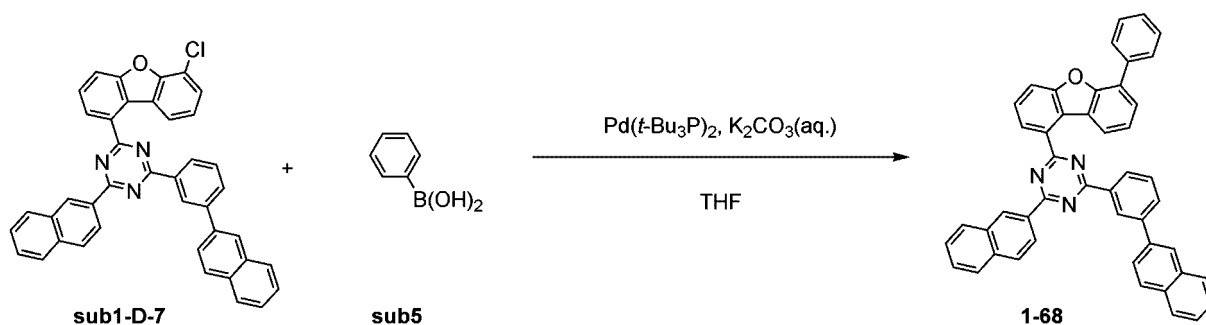
【0 2 6 6】

窒素雰囲気下で化合物 1-D (15 g、60.9 mmol) と化合物 Trz33 (27 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenylphosphine) palladium (0) (0.7 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub1-D-7 を 29.7 g 製造した。(収率 80%、MS: $[M+H]^+ = 610$)

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【化 5 1 4】



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【0 2 6 7】

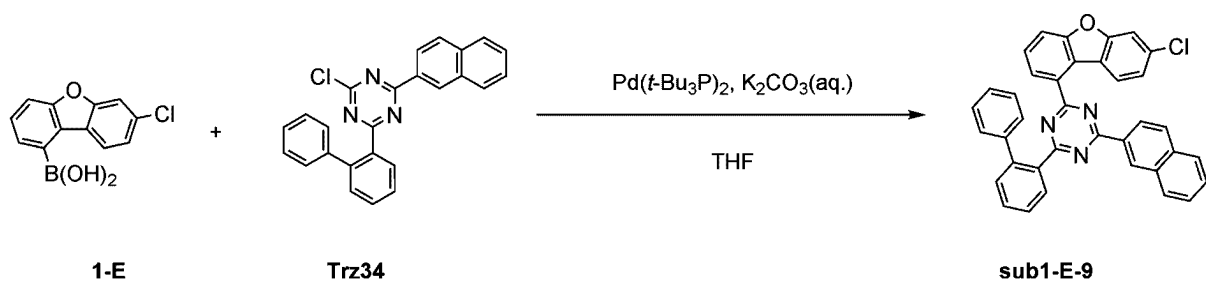
窒素雰囲気下で化合物 sub 1-D-7 (15 g、24.6 mmol) と化合物 sub 5 (3 g、24.6 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (10.2 g、73.8 mmol) を水 31 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenyl phosphine) palladium (0) (0.3 g、0.2 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1-68 を 11.2 g 製造した。(収率 70%、MS: $[M+H]^+ = 652$)

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【0 2 6 8】

製造例 1-69

【化 5 1 5】



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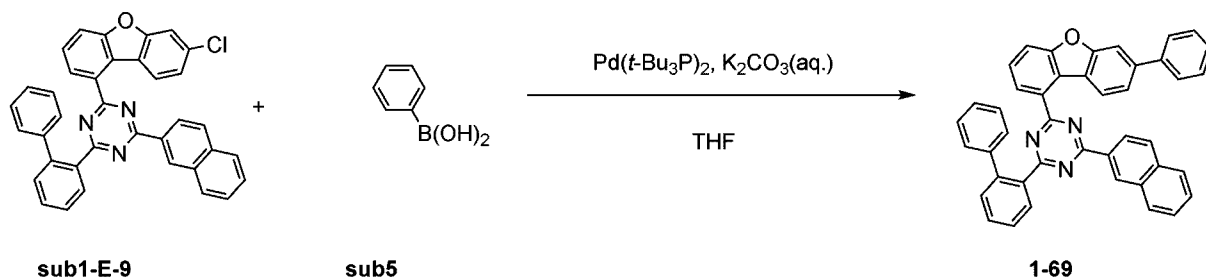
【0 2 6 9】

窒素雰囲気下で化合物 1-E (15 g、60.9 mmol) と化合物 Trz34 (24 g、60.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (25.2 g、182.6 mmol) を水 76 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenyl phosphine) palladium (0) (0.7 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 sub 1-E-9 を 21.8 g 製造した。(収率 64%、MS: $[M+H]^+ = 560$)

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【化 5 1 6】



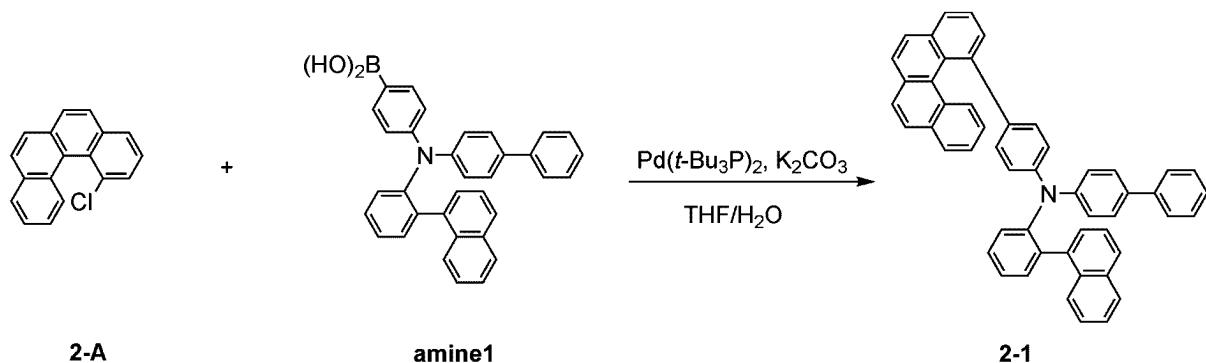
【0 2 7 0】

窒素雰囲気下で化合物 sub 1 - E - 9 (15 g、26.8 mmol) と化合物 sub 5 (3.3 g、26.8 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (11.1 g、80.3 mmol) を水 33 ml に溶かして投入して十分に攪拌した後、Tetrakis (triphenyl phosphine) palladium (0) (0.3 g、0.3 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 1 - 69 を 10 g 製造した。(収率 62 %、MS : $[M + H]^+ = 602$)

【0 2 7 1】

製造例 2 - 1

【化 5 1 7】



【0 2 7 2】

窒素雰囲気下で化合物 2 - A (15 g、57.1 mmol) と化合物 amine 1 (29.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2 - 1 を 11.9 g 製造した。(収率 31 %、MS : $[M + H]^+ = 674$)

【0 2 7 3】

製造例 2 - 2

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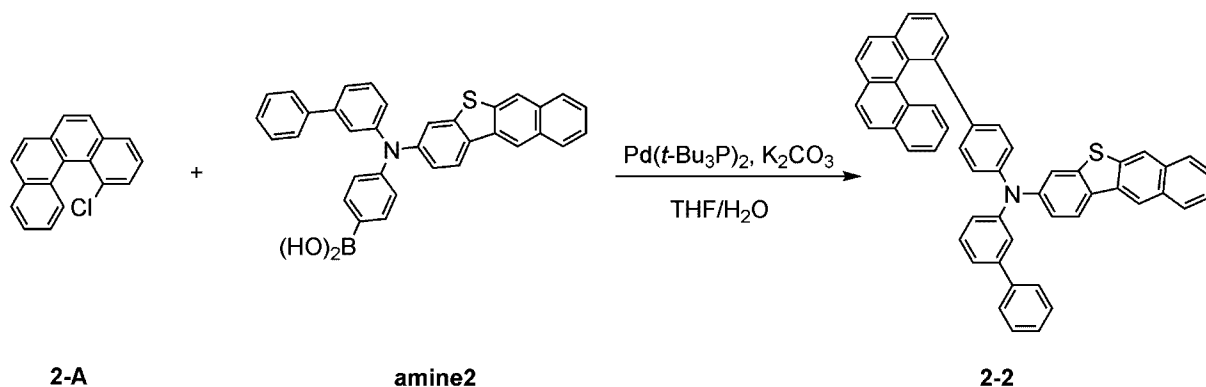
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【化 5 1 8】



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【0 2 7 4】

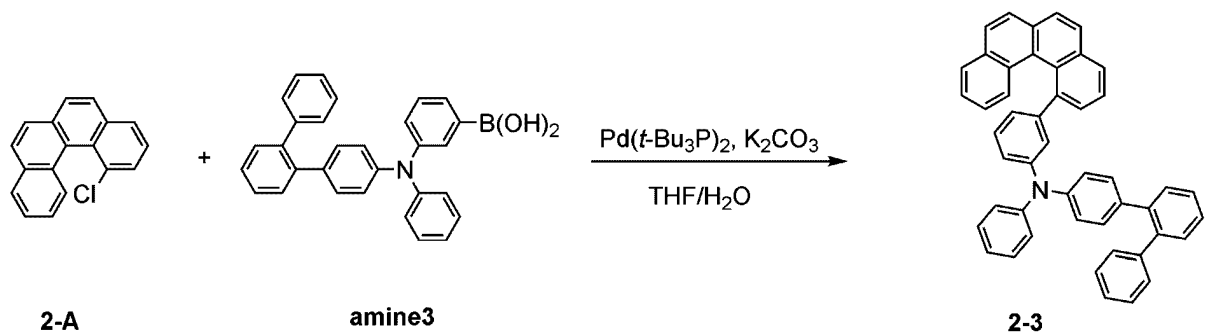
窒素雰囲気下で化合物 2-A (15 g、57.1 mmol) と化合物 amine2 (31.3 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-2 を 15.3 g 製造した。(収率 38 %、MS : [M + H]⁺ = 704)

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【0 2 7 5】

製造例 2-3

【化 5 1 9】



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【0 2 7 6】

窒素雰囲気下で化合物 2-A (15 g、57.1 mmol) と化合物 amine3 (26.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-3 を 11.4 g 製造した。(収率 32 %、MS : [M + H]⁺ = 624)

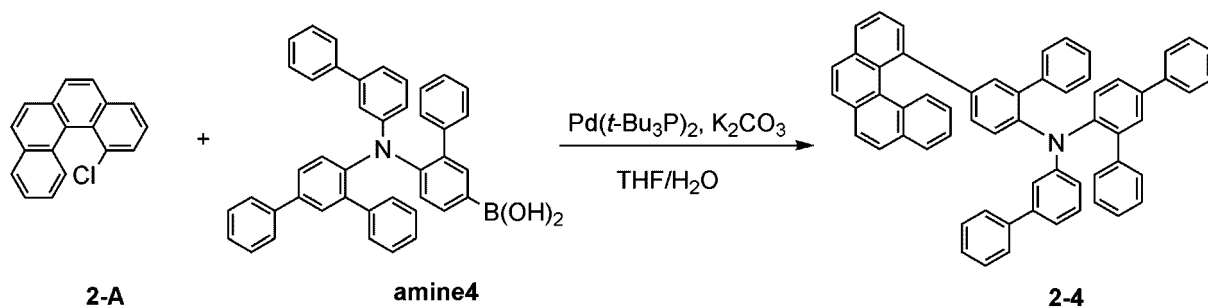
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【0 2 7 7】

製造例 2-4

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【化 5 2 0】



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【0 2 7 8】

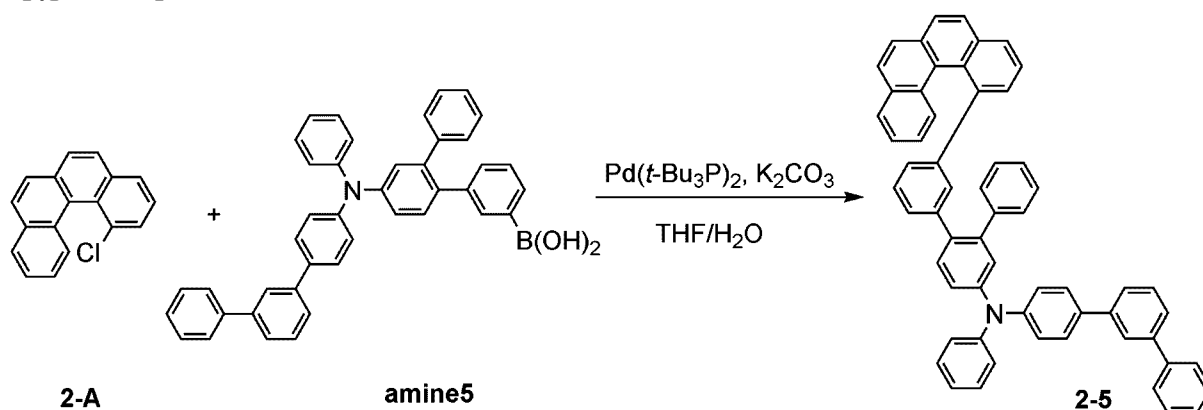
窒素雰囲気下で化合物 2-A (15 g、57.1 mmol) と化合物 amine 4 (35.6 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-4 を 14.6 g 製造した。(収率 33%、MS: $[M+H]^+ = 776$)

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【0 2 7 9】

製造例 2-5

【化 5 2 1】



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【0 2 8 0】

窒素雰囲気下で化合物 2-A (15 g、57.1 mmol) と化合物 amine 5 (35.6 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-5 を 15 g 製造した。(収率 34%、MS: $[M+H]^+ = 776$)

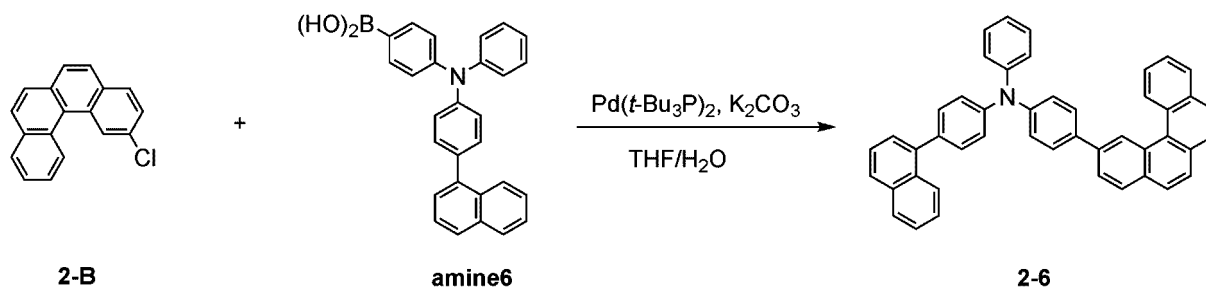
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【0 2 8 1】

製造例 2-6

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【化 5 2 2】



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【0 2 8 2】

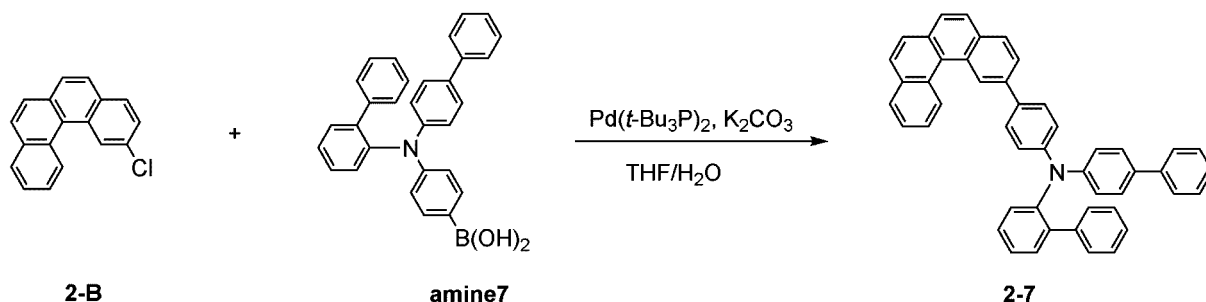
窒素雰囲気下で化合物 2-B (15 g、57.1 mmol) と化合物 amine 6 (24.9 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-6 を 24.6 g 製造した。(収率 72%、MS: $[M+H]^+ = 598$)

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【0 2 8 3】

製造例 2-7

【化 5 2 3】



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【0 2 8 4】

窒素雰囲気下で化合物 2-B (15 g、57.1 mmol) と化合物 amine 7 (26.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-7 を 26.7 g 製造した。(収率 75%、MS: $[M+H]^+ = 624$)

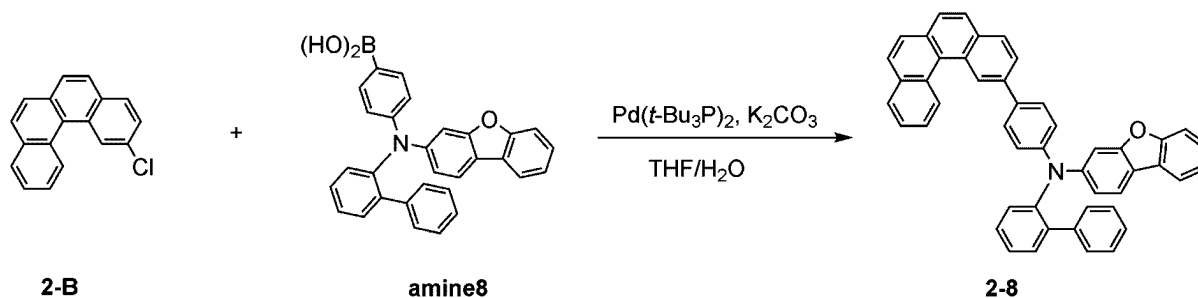
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【0 2 8 5】

製造例 2-8

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【化 5 2 4】



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【0 2 8 6】

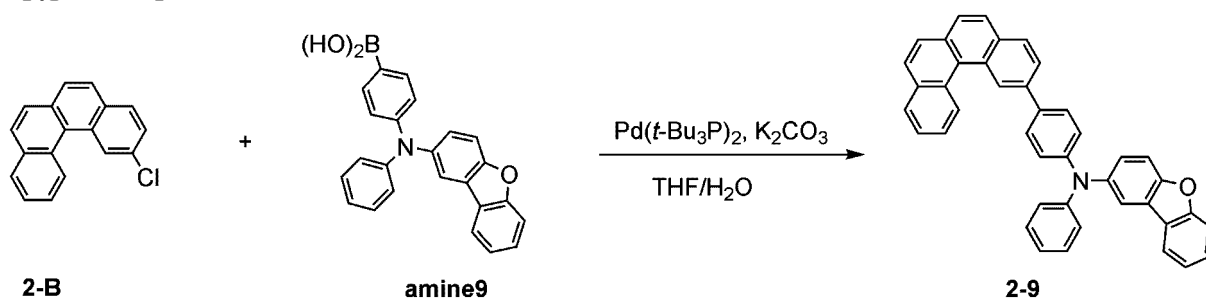
窒素雰囲気下で化合物 2-B (15 g、57.1 mmol) と化合物 amine 8 (27.3 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-8 を 23.6 g 製造した。(収率 65%、MS: $[M+H]^+ = 638$)

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【0 2 8 7】

製造例 2-9

【化 5 2 5】



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【0 2 8 8】

窒素雰囲気下で化合物 2-B (15 g、57.1 mmol) と化合物 amine 9 (22.7 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-9 を 21.8 g 製造した。(収率 68%、MS: $[M+H]^+ = 562$)

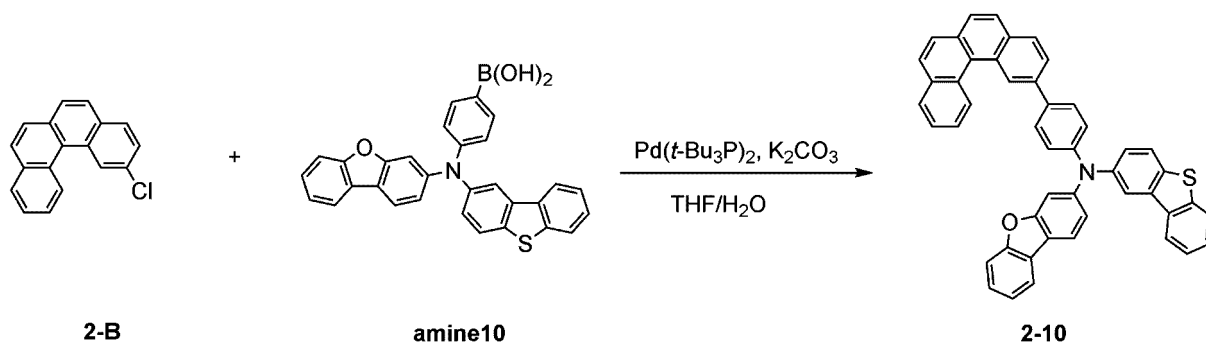
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【0 2 8 9】

製造例 2-10

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【化526】



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【0290】

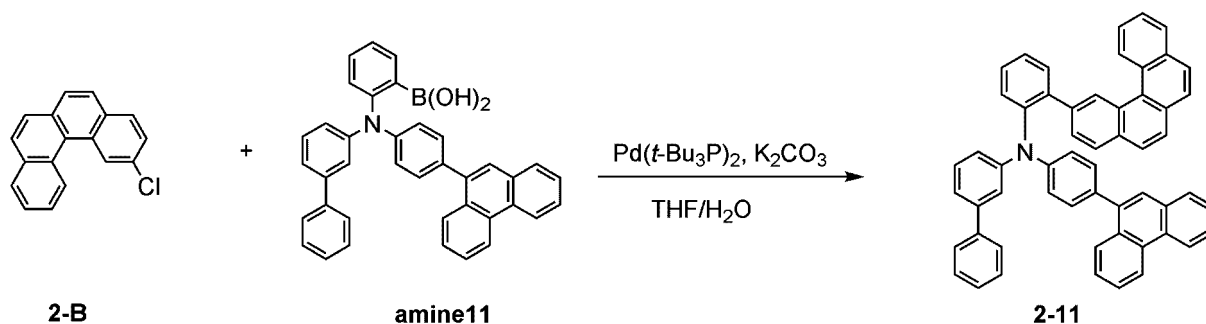
窒素雰囲気下で化合物2-B (15 g、57.1 mmol) と化合物amine10 (29.1 g、59.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水71 mlに溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物2-10を27 g製造した。(収率71%、MS: $[M+H]^+ = 668$)

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【0291】

製造例2-11

【化527】



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【0292】

窒素雰囲気下で化合物2-B (15 g、57.1 mmol) と化合物amine11 (32.5 g、59.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水71 mlに溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物2-11を33 g製造した。(収率80%、MS: $[M+H]^+ = 724$)

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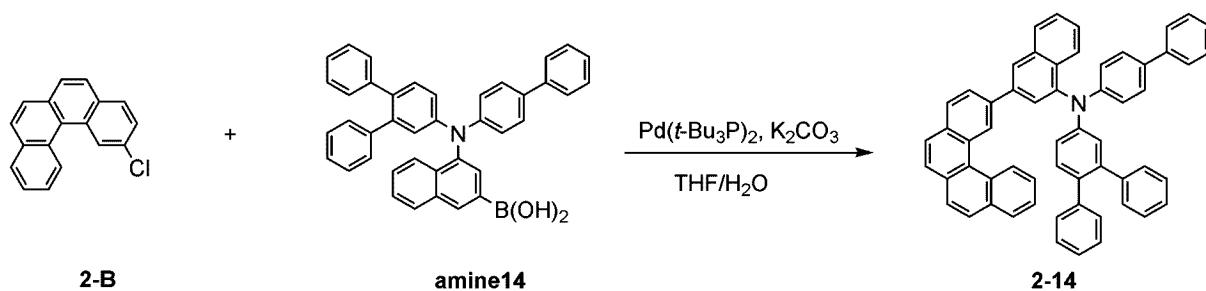
【0293】

製造例2-12

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製造例 2-14

【化530】



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【0298】

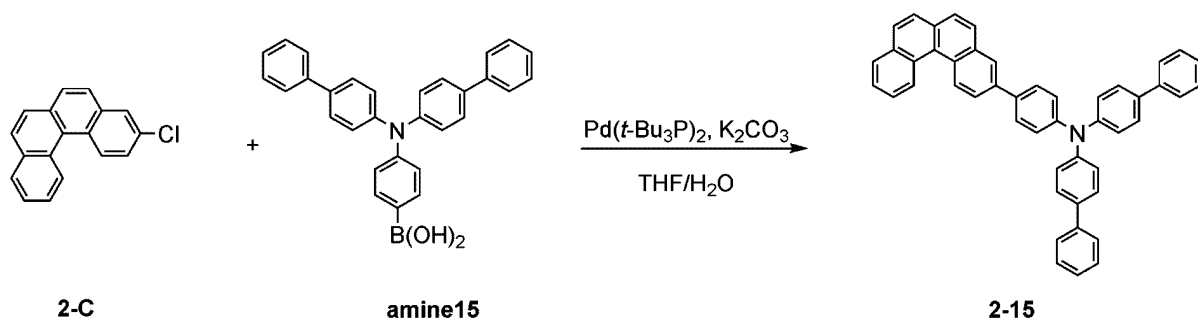
窒素雰囲気下で化合物2-B (15 g、57.1 mmol) と化合物amine14 (34 g、59.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水71 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。8時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物2-14を30.8 g製造した。(収率72%、MS: $[M+H]^+ = 750$)

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【0299】

製造例2-15

【化531】



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【0300】

窒素雰囲気下で化合物2-C (15 g、57.1 mmol) と化合物amine15 (26.5 g、59.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水71 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。11時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物2-15を28.5 g製造した。(収率80%、MS: $[M+H]^+ = 624$)

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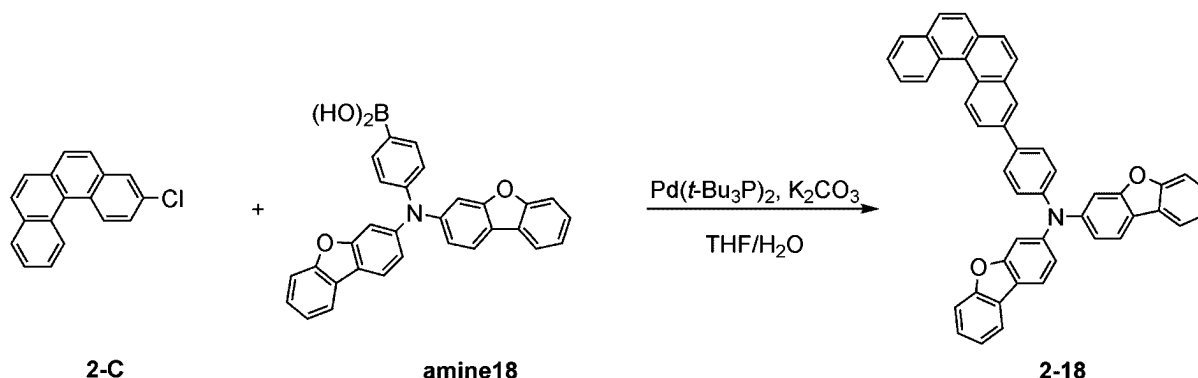
【0301】

製造例2-16

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製造例 2-18

【化 5 3 4】



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【0306】

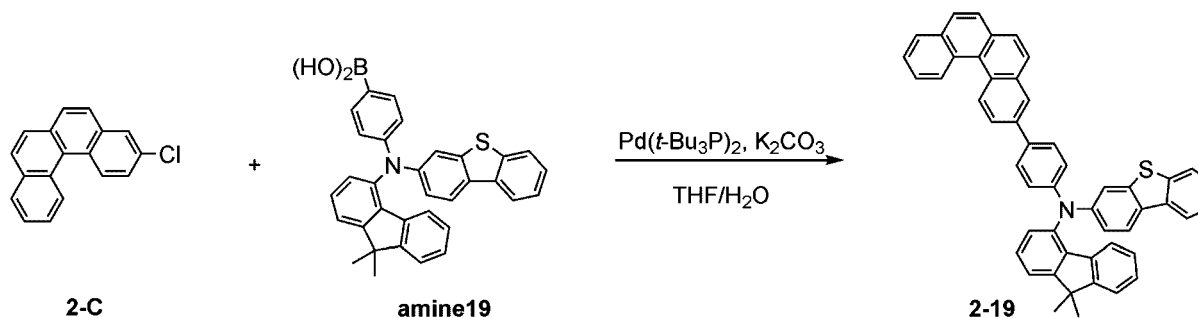
窒素雰囲気下で化合物 2-C (15 g、57.1 mmol) と化合物 amine18 (28.1 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-18 を 28.3 g 製造した。(収率 76%、MS: $[M+H]^+ = 652$)

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【0307】

製造例 2-19

【化 5 3 5】



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【0308】

窒素雰囲気下で化合物 2-C (15 g、57.1 mmol) と化合物 amine19 (30.7 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-19 を 30.5 g 製造した。(収率 77%、MS: $[M+H]^+ = 694$)

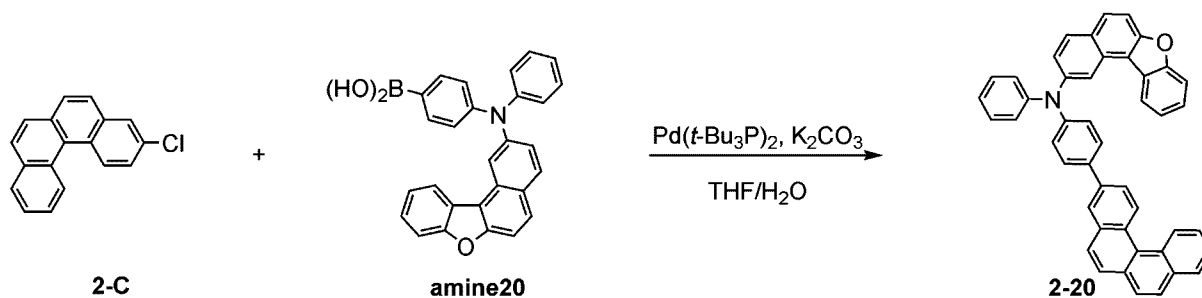
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【0309】

製造例 2-20

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【化536】



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【0310】

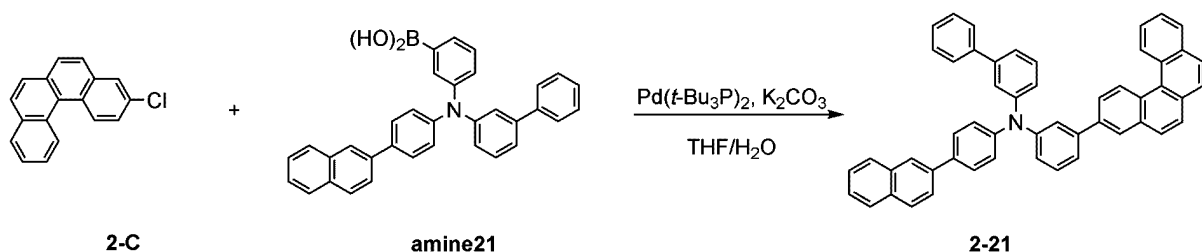
窒素雰囲気下で化合物2-C (15 g、57.1 mmol) と化合物amine20 (25.7 g、59.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水71 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。10時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物2-20を24.4 g製造した。(収率70%、MS: $[M+H]^+ = 612$)

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【0311】

製造例2-21

【化537】



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【0312】

窒素雰囲気下で化合物2-C (15 g、57.1 mmol) と化合物amine21 (29.5 g、59.9 mmol) をTHF 300 mlに入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水71 mlに溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。10時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で2回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物2-21を25.4 g製造した。(収率66%、MS: $[M+H]^+ = 674$)

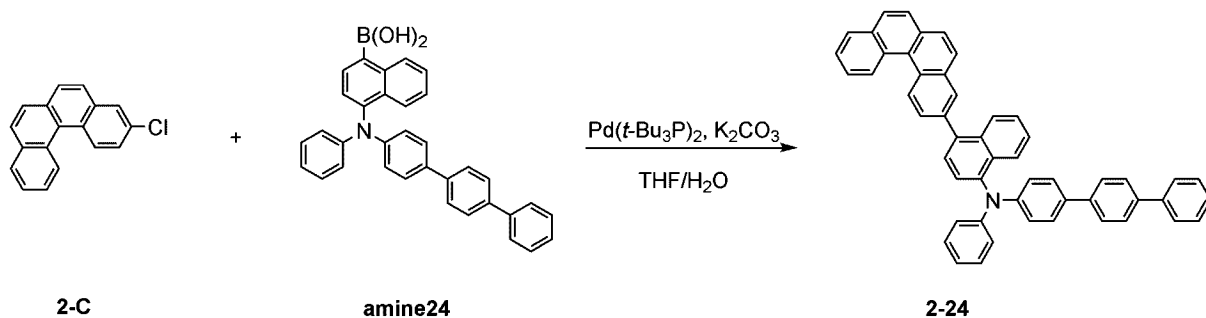
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【0313】

製造例2-22

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【化 5 4 0】



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【0 3 1 8】

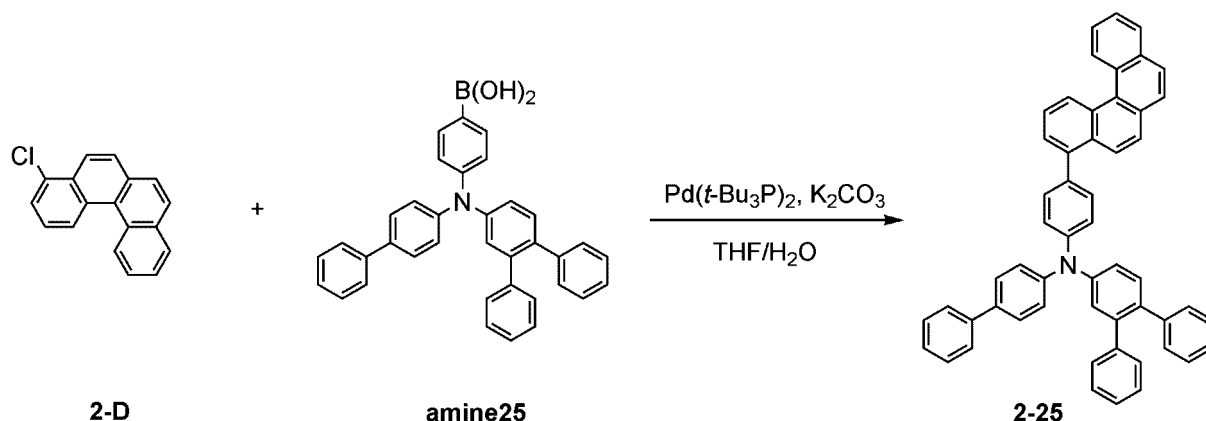
窒素雰囲気下で化合物 2-C (15 g、57.1 mmol) と化合物 amine24 (29.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-24 を 23.8 g 製造した。(収率 62%、MS: $[M+H]^+ = 674$)

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【0 3 1 9】

製造例 2-25

【化 5 4 1】



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【0 3 2 0】

窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine25 (31 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-25 を 29.5 g 製造した。(収率 74%、MS: $[M+H]^+ = 700$)

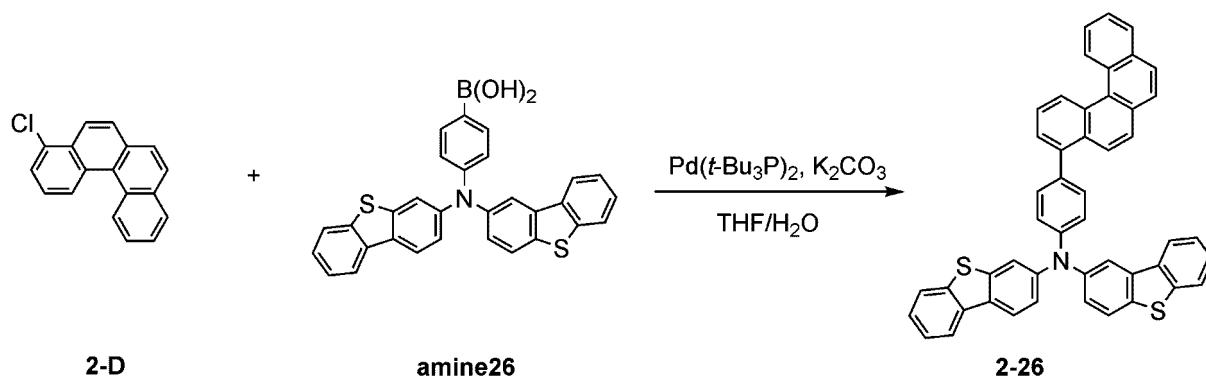
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【0 3 2 1】

製造例 2-26

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【化 5 4 2】



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【0 3 2 2】

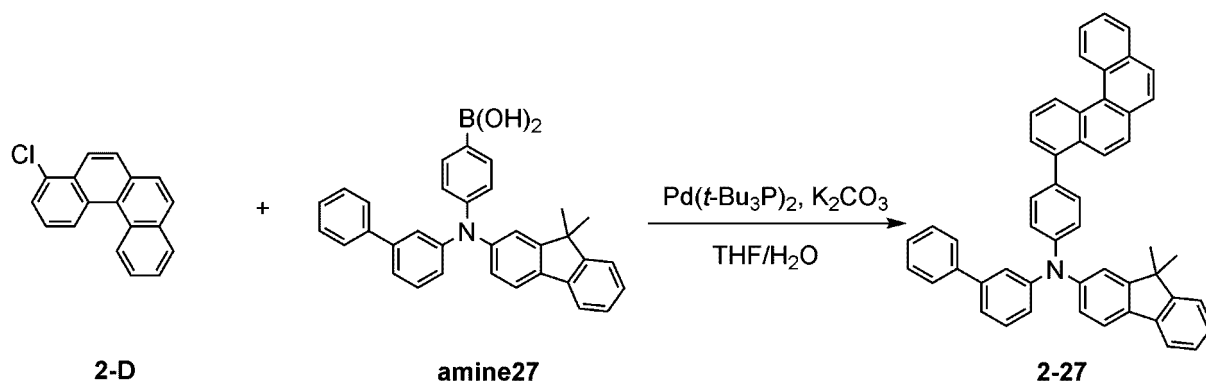
窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine 26 (30.1 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。9 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-26 を 25.4 g 製造した。(収率 65%、MS: $[M+H]^+ = 684$)

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【0 3 2 3】

製造例 2-27

【化 5 4 3】



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【0 3 2 4】

窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine 27 (28.9 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-27 を 29.2 g 製造した。(収率 77%、MS: $[M+H]^+ = 664$)

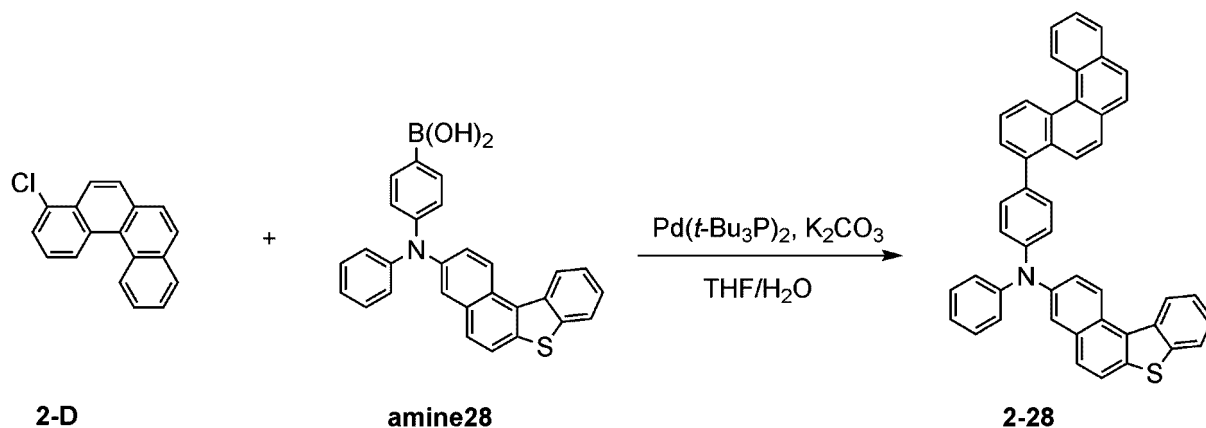
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【0 3 2 5】

製造例 2-28

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【化 5 4 4】



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【0 3 2 6】

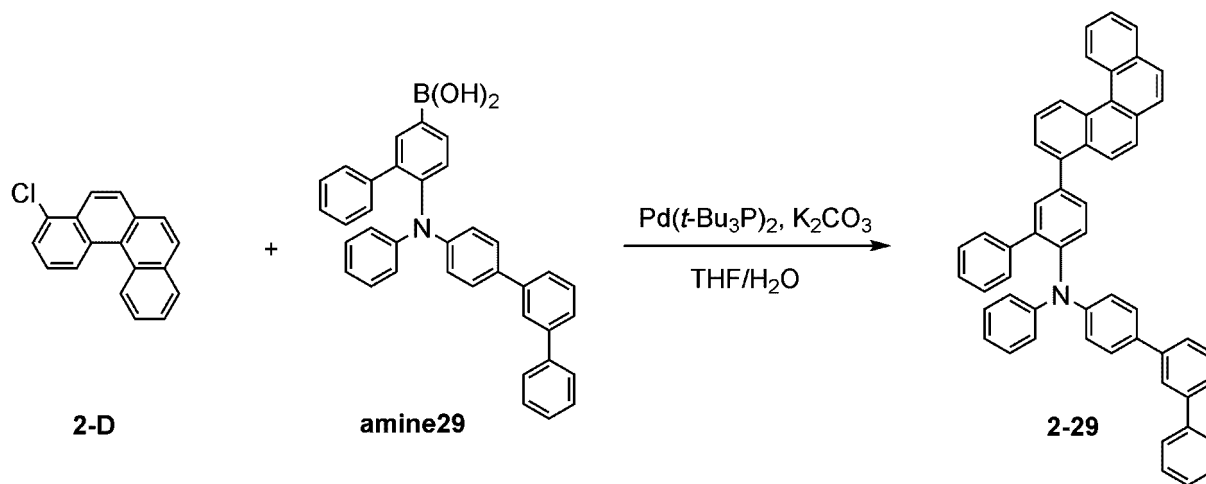
窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine28 (26.7 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-28 を 21.8 g 製造した。(収率 61%、MS: $[M+H]^+ = 628$)

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【0 3 2 7】

製造例 2-29

【化 5 4 5】



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【0 3 2 8】

窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine29 (31 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲル

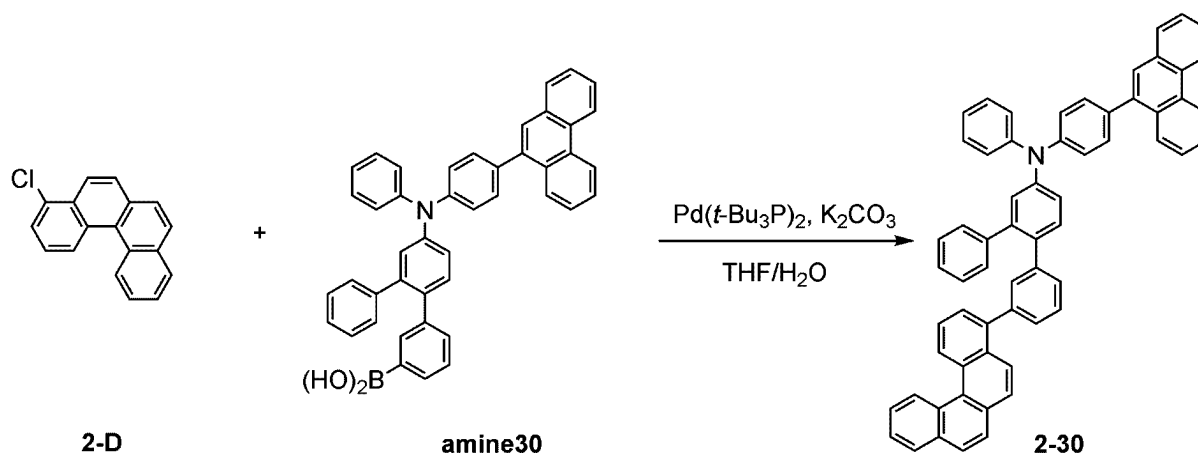
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カラムクロマトグラフィーで精製して化合物 2-29 を 31.9 g 製造した。(収率 80 %、MS: $[M+H]^+ = 700$)

【0329】

製造例 2-30

【化546】



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【0330】

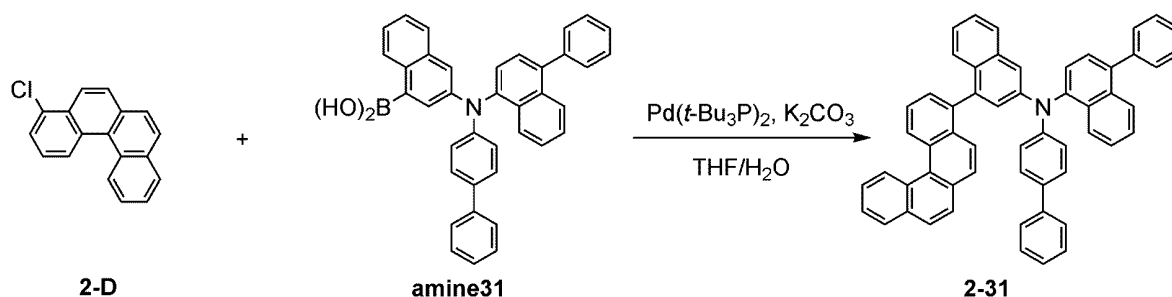
窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine 30 (37 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-30 を 32.4 g 製造した。(収率 71 %、MS: $[M+H]^+ = 800$)

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【0331】

製造例 2-31

【化547】



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【0332】

窒素雰囲気下で化合物 2-D (15 g、57.1 mmol) と化合物 amine 31 (32.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリ

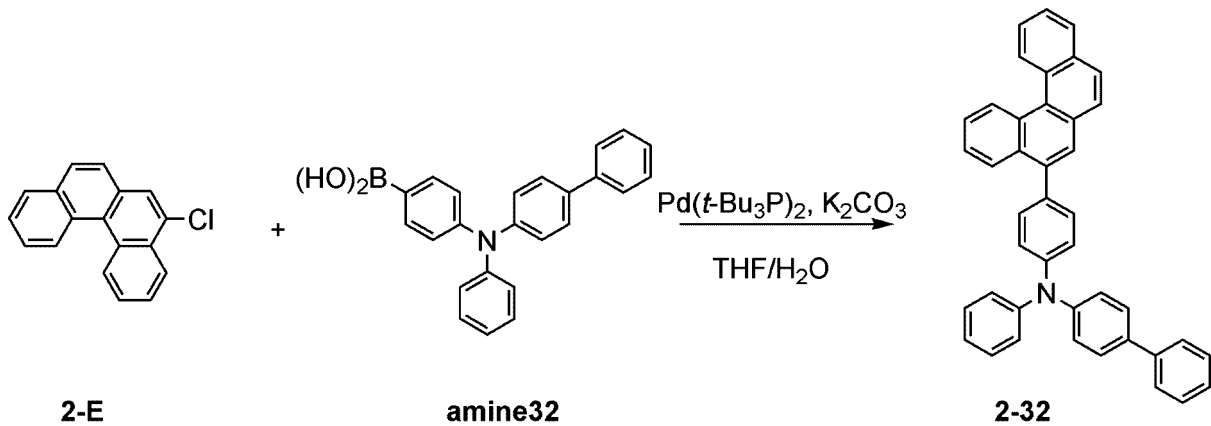
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カゲルカラムクロマトグラフィーで精製して化合物 2-31 を 29.3 g 製造した。(収率 71%、MS: $[M+H]^+ = 724$)

【0333】

製造例 2-32

【化548】



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【0334】

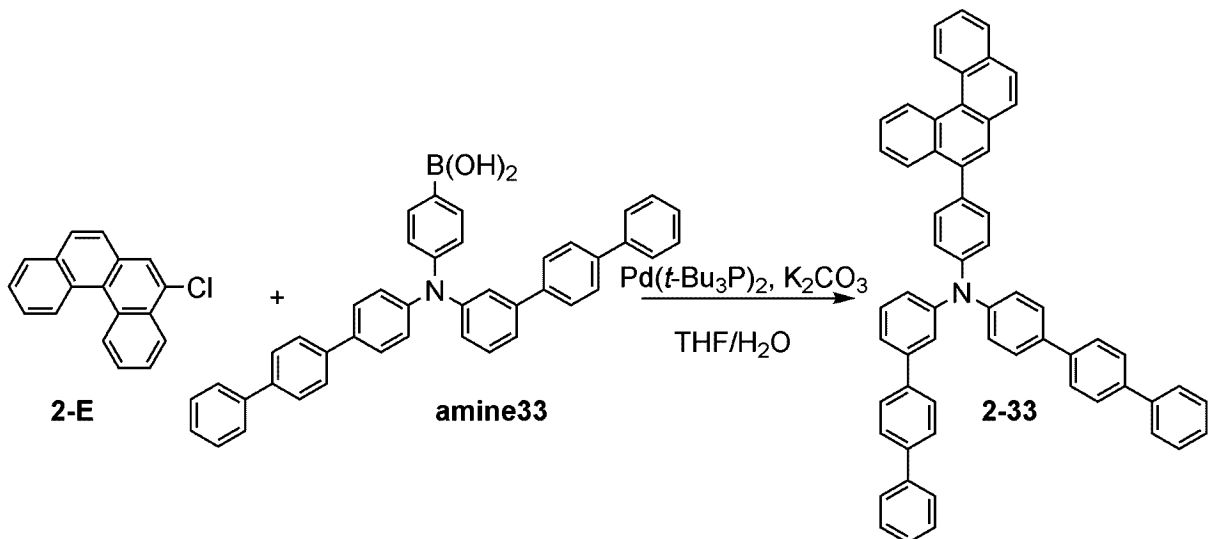
窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine32 (21.9 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium(0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-32 を 19.1 g 製造した。(収率 61%、MS: $[M+H]^+ = 548$)

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【0335】

製造例 2-33

【化549】



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【0336】

窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine33 (35.6 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を

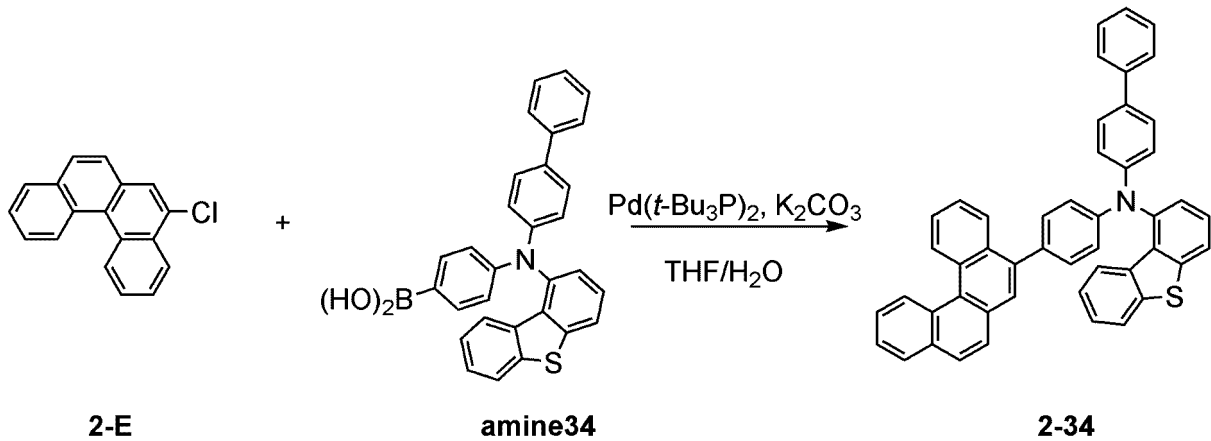
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水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-33 を 31.9 g 製造した。(収率 72%、MS: $[M+H]^+ = 776$)

【0337】

製造例 2-34

【化 550】



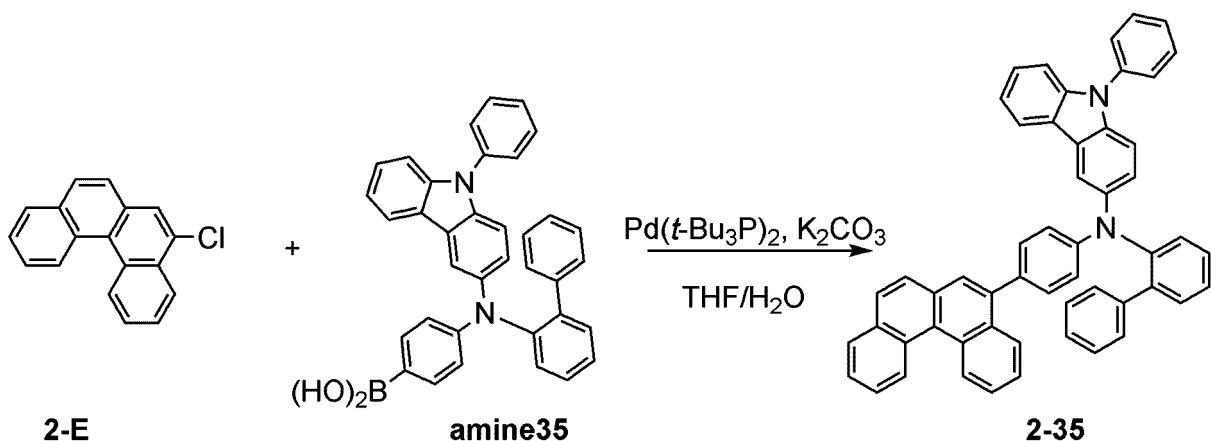
【0338】

窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine 34 (28.3 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-34 を 25 g 製造した。(収率 67%、MS: $[M+H]^+ = 654$)

【0339】

製造例 2-35

【化 551】



【0340】

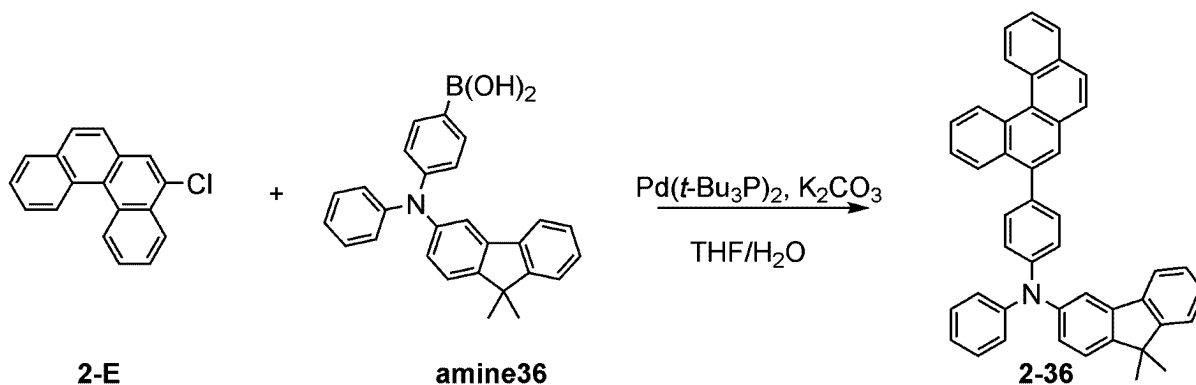
窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine 35 (31.8 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-35 を 26.4 g 製造した。(収率 65%、MS: $[M+H]^+ = 713$)

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【0341】

製造例 2-36

【化552】



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【0342】

窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine 36 (24.3 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-36 を 21.1 g 製造した。(収率 63%、MS: $[M+H]^+ = 588$)

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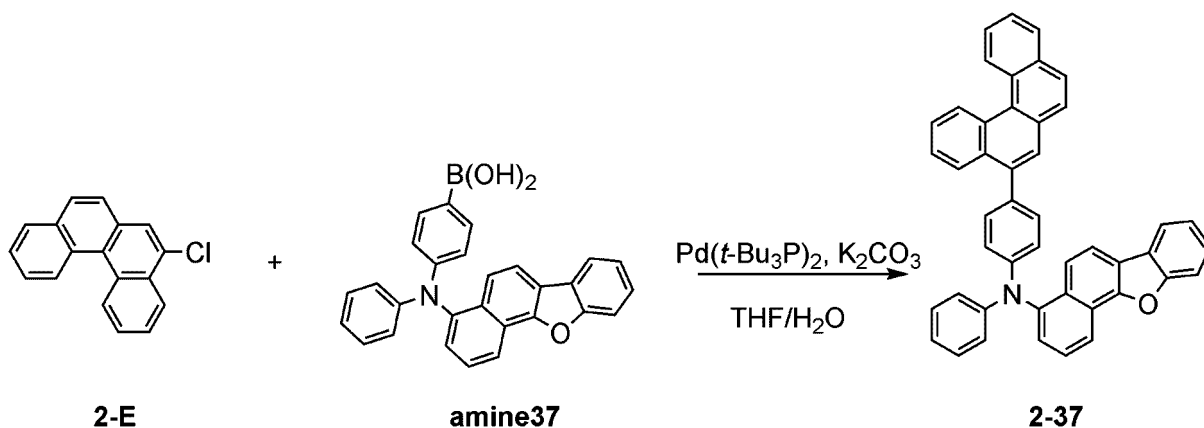
【0343】

製造例 2-37

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【化 5 5 3】



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【0 3 4 4】

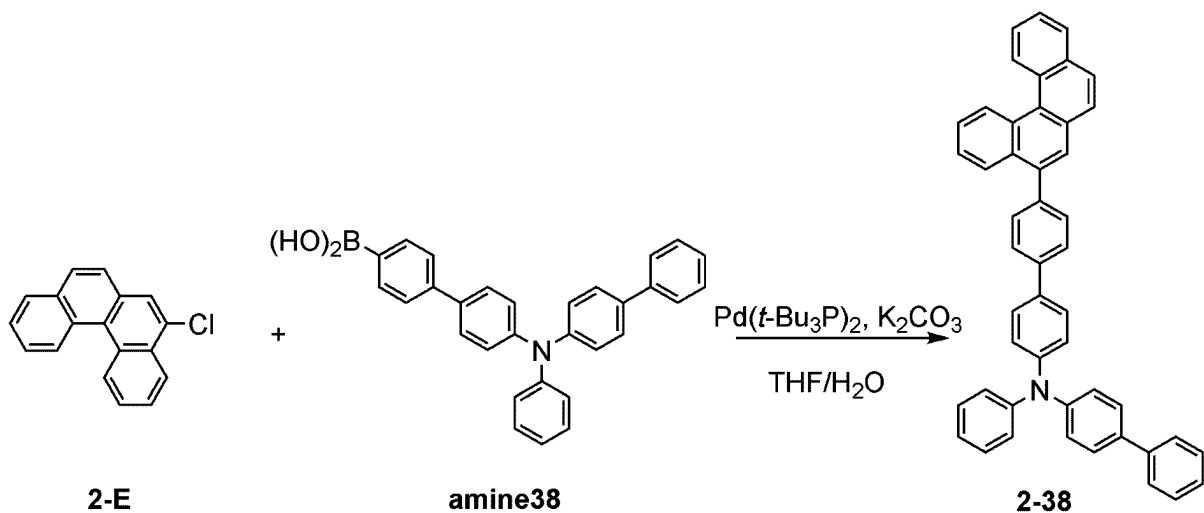
窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine37 (25.7 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-37 を 25.5 g 製造した。(収率 73%、MS: $[M+H]^+ = 612$)

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【0 3 4 5】

製造例 2-38

【化 5 5 4】



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【0 3 4 6】

窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine38 (26.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリ

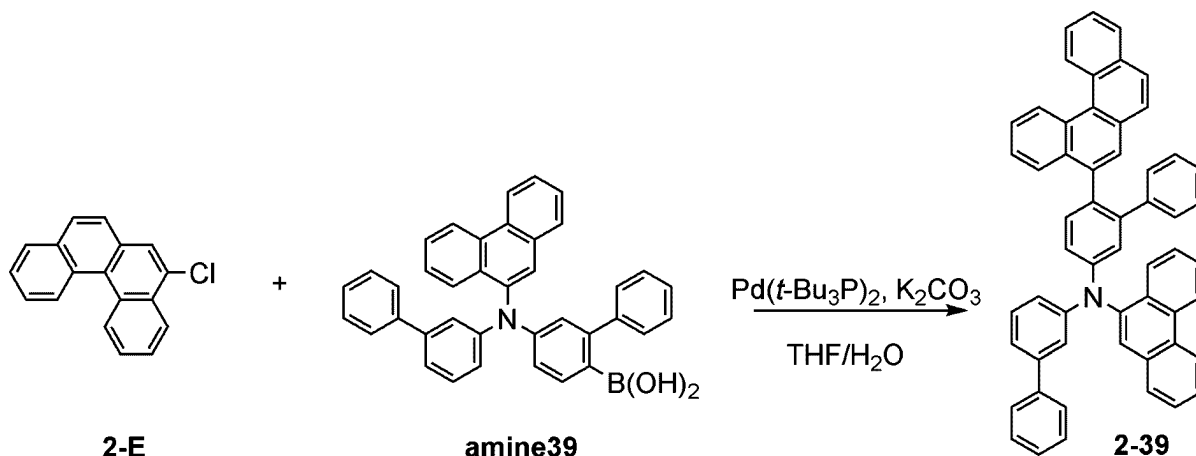
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カゲルカラムクロマトグラフィーで精製して化合物 2-38 を 23.1 g 製造した。(収率 65%、MS: $[M+H]^+ = 624$)

【0347】

製造例 2-39

【化555】



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【0348】

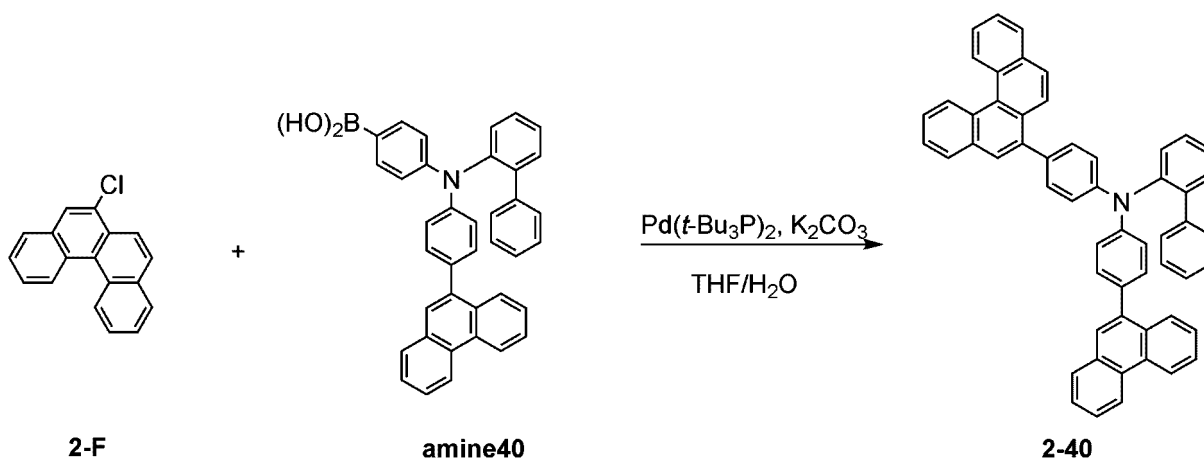
窒素雰囲気下で化合物 2-E (15 g、57.1 mmol) と化合物 amine39 (32.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-39 を 25.2 g 製造した。(収率 61%、MS: $[M+H]^+ = 724$)

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【0349】

製造例 2-40

【化556】



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【0350】

窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine40 (32.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butyl

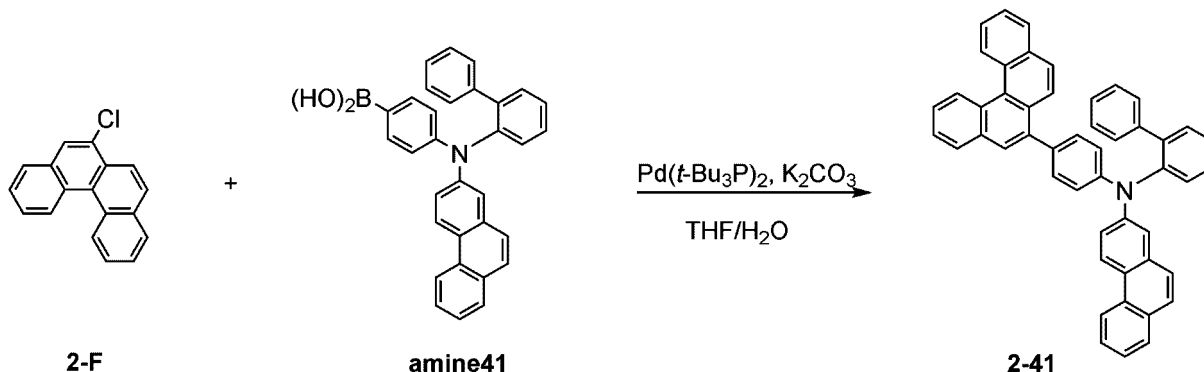
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l phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-40 を 26 g 製造した。(収率 63 %、MS: $[M+H]^+ = 724$)

【0351】

製造例 2-41

【化557】



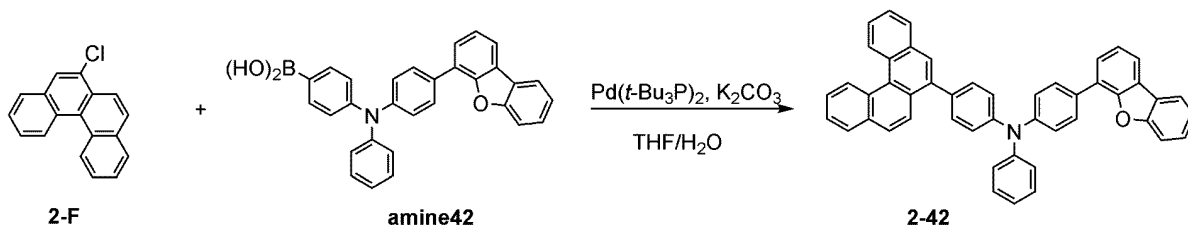
【0352】

窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine 41 (27.9 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。11 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-41 を 26.6 g 製造した。(収率 72 %、MS: $[M+H]^+ = 648$)

【0353】

製造例 2-42

【化558】



【0354】

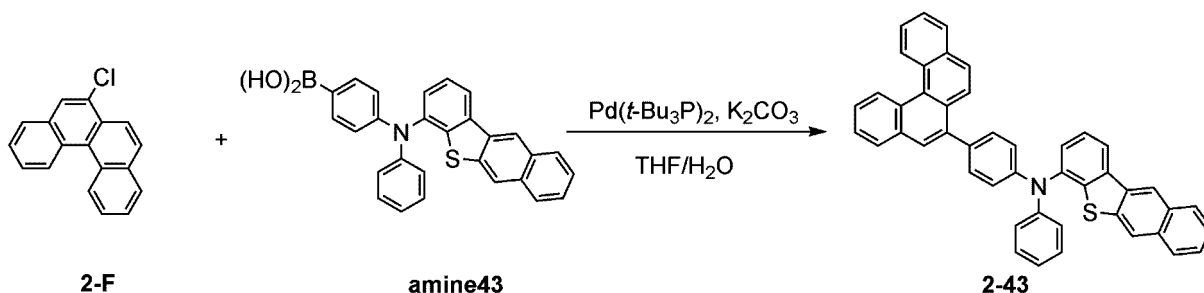
窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine 42 (27.3 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butyl phosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリ

カゲルカラムクロマトグラフィーで精製して化合物 2-42 を 29.1 g 製造した。(収率 80%、MS: $[M+H]^+ = 638$)

【0355】

製造例 2-43

【化559】



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【0356】

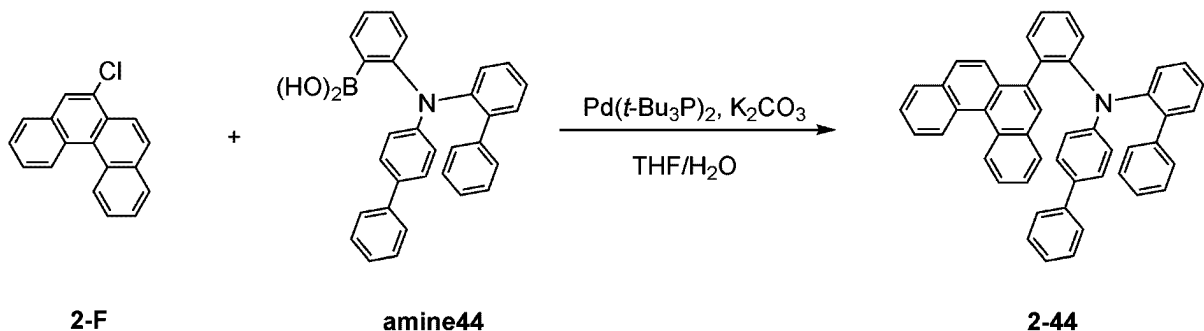
窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine43 (26.7 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-43 を 23.3 g 製造した。(収率 65%、MS: $[M+H]^+ = 628$)

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【0357】

製造例 2-44

【化560】



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【0358】

窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine44 (26.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis(tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。10 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-44 を 26 g 製造した。(収率 73%、MS: $[M+H]^+ = 624$)

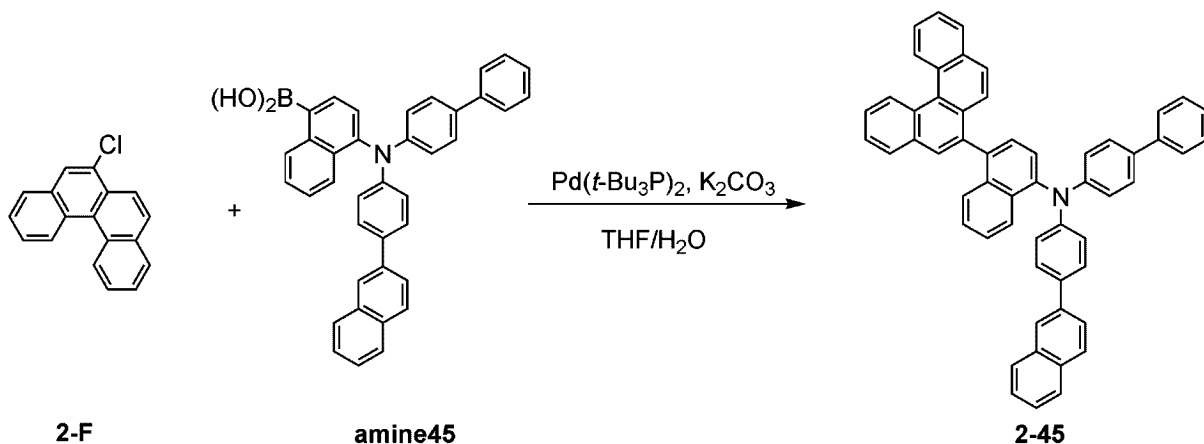
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【0359】

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製造例 2-45

【化 5 6 1】



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【0360】

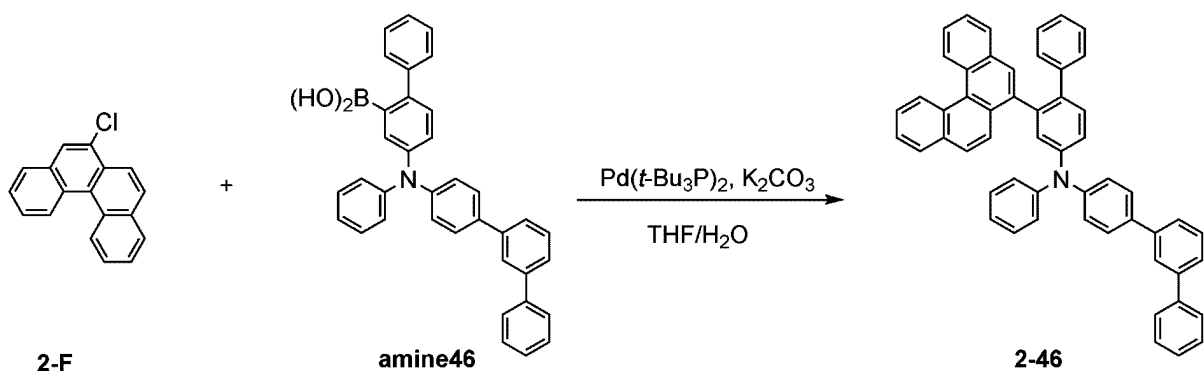
窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine 45 (32.5 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。12 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-45 を 30.6 g 製造した。(収率 74%、MS: $[\text{M}+\text{H}]^+ = 724$)

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【0361】

製造例 2-46

【化 5 6 2】



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【0362】

窒素雰囲気下で化合物 2-F (15 g、57.1 mmol) と化合物 amine 46 (31 g、59.9 mmol) を THF 300 ml に入れて攪拌および還流した。その後、potassium carbonate (23.7 g、171.3 mmol) を水 71 ml に溶かして投入して十分に攪拌した後、bis (tri-tert-butylphosphine) palladium (0) (0.3 g、0.6 mmol) を投入した。8 時間反応後、常温で冷やして有機層と水層を分離した後、有機層を蒸留した。これをさらにクロロホルムに溶かし、水で 2 回洗浄した後、有機層を分離して、無水硫酸マグネシウムを入れて攪拌した後、ろ過して濾液を減圧蒸留した。濃縮した化合物をシリカゲルカラムクロマトグラフィーで精製して化合物 2-46 を 25.6 g 製造した。(収率 64

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%、MS : [M + H]⁺ = 700)

【0363】

〔実施例〕

実施例 1

ITO (indium tin oxide) が 1000 Å の厚さで薄膜コーティングされたガラス基板を洗剤を溶かした蒸留水に入れて超音波で洗浄した。この時、洗剤としてはフィッシャー社 (Fischer Co.) 製品を使用し、蒸留水としてはミリポア社 (Millipore Co.) 製品のフィルター (Filter) で2次ろ過した蒸留水を使用した。ITOを30分間洗浄した後、蒸留水で2回繰り返し超音波洗浄を10分間進行した。蒸留水洗浄が終わった後、イソプロピルアルコール、アセトン、メタノールの溶剤で超音波洗浄を行い、乾燥させた後、プラズマ洗浄装置に輸送させた。また、酸素プラズマを利用して前記基板を5分間洗浄した後、真空蒸着装置に基板を輸送させた。

【0364】

このように用意されたITO透明電極上に正孔注入層で下記化合物HI-1を1150 Åの厚さで形成し、下記化合物A-1を1.5重量%濃度でp-dopingした。前記正孔注入層上に下記化合物HT-1を真空蒸着して膜厚さ800 Åの正孔輸送層を形成した。続いて、前記正孔輸送層上に膜厚さ150 Åで下記化合物EB-1を真空蒸着して電子遮断層を形成した。続いて、前記EB-1蒸着膜上に前記製造した化合物1-2、化合物2-1、Dp-7化合物を49:49:2の重量比で真空蒸着して、400 Åの厚さの赤色発光層を形成した。前記発光層上に膜厚さ30 Åで下記化合物HB-1を真空蒸着して正孔阻止層を形成した。続いて、前記正孔阻止層上に下記化合物ET-1と下記化合物LiQを2:1の重量比で真空蒸着して、300 Åの厚さで電子注入および輸送層を形成した。前記電子注入および輸送層上に順次12 Åの厚さでフッ化リチウム (LiF) と1000 Åの厚さでアルミニウムを蒸着して負極を形成した。

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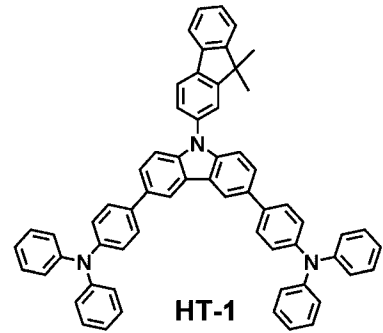
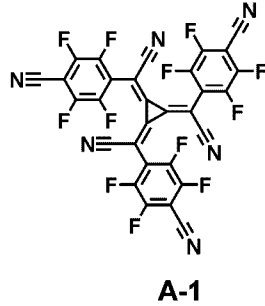
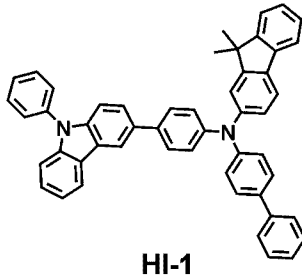
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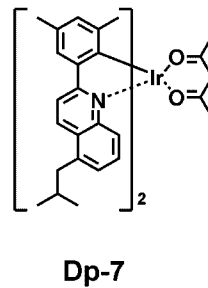
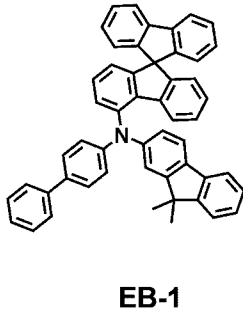
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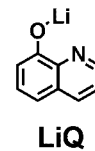
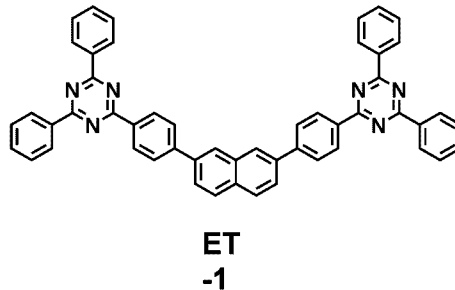
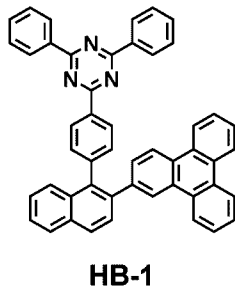
【化 5 6 3】



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【0 3 6 5】

前記の過程で、有機物の蒸着速度は $0.4 \sim 0.7 \text{ \AA} / \text{sec}$ を維持し、負極のフッ化リチウムは $0.3 \text{ \AA} / \text{sec}$ 、アルミニウムは $2 \text{ \AA} / \text{sec}$ の蒸着速度を維持し、蒸着時真空度は $2 \times 10^{-7} \sim 5 \times 10^{-6} \text{ torr}$ を維持して、有機発光素子を製造した。

【0 3 6 6】

実施例 2 ～ 実施例 200

実施例 1 の有機発光素子で化合物 1-2 および／または化合物 2-1 の代わりに表 1 ～ 表 5 に記載された第 1 ホスト化合物と第 2 ホスト化合物を 1 : 1 で共蒸着して使用することを除いては、前記実施例 1 と同様の方法で有機発光素子を製造した。

【0 3 6 7】

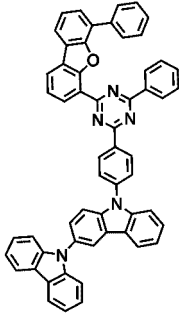
比較例 1 ～ 比較例 60

実施例 1 の有機発光素子で化合物 1-2 および／または化合物 2-1 の代わりに下記表 6 および表 7 に記載された第 1 ホスト化合物と第 2 ホスト化合物を 1 : 1 で共蒸着して使用することを除いては、前記実施例 1 と同様の方法で有機発光素子を製造した。この時、表 6 および表 7 の化合物 B-1 ～ 化合物 B-12 の構造は、下記の通りである。

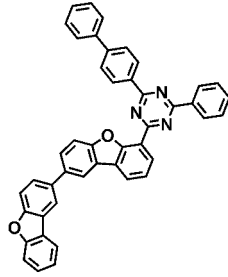
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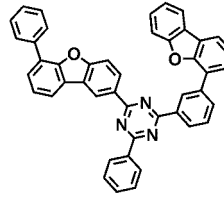
【化 5 6 4】



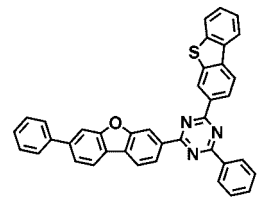
B-1



B-2

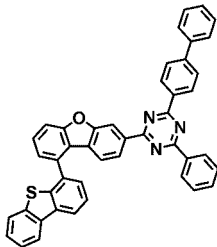


B-3

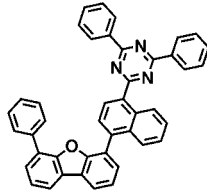


B-4

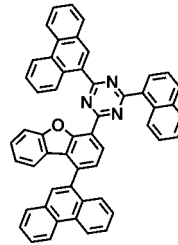
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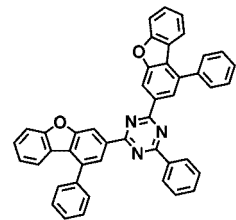
B-5



B-6

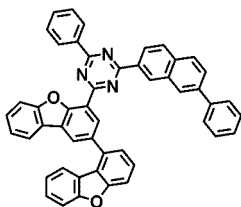


B-7

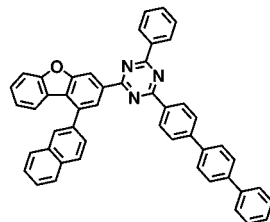


B-8

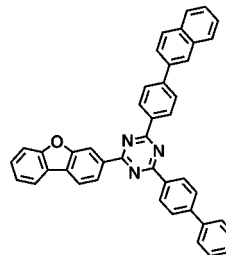
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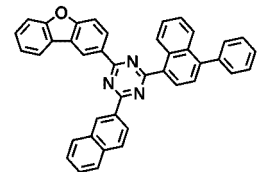
B-9



B-10



B-11



B-12

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【 0 3 6 8】

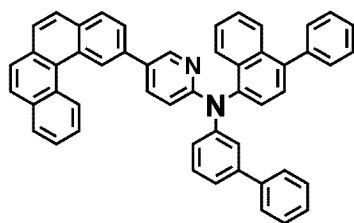
比較例 6 1～比較例 1 3 2

実施例 1 の有機発光素子で化合物 1-2 および／または化合物 2-1 の代わりに下記表 8 および表 9 に記載された第 1 ホスト化合物と第 2 ホスト化合物を 1：1 で共蒸着して使用することを除いては、前記実施例 1 と同様の方法で有機発光素子を製造した。この時、表 8 および表 9 の化合物 C-1～化合物 C-9 の構造は下記の通りである。

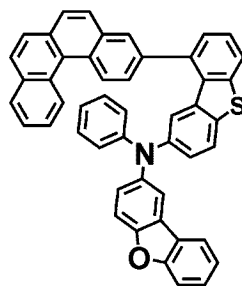
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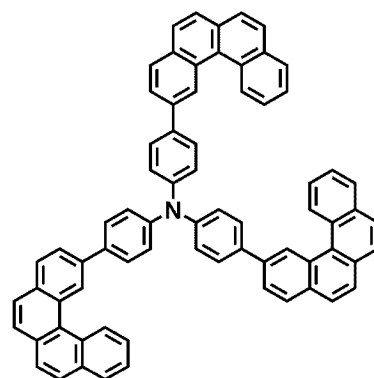
【化 5 6 5】



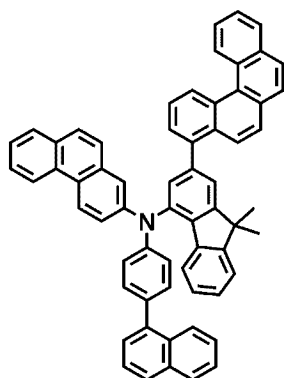
C-1



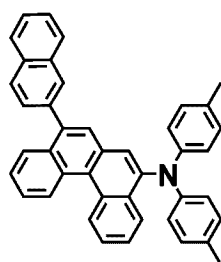
C-2



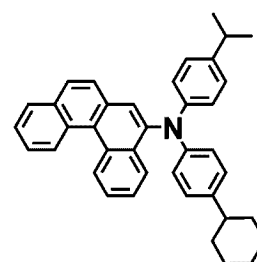
C-3



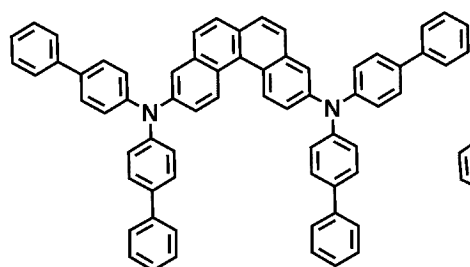
C-4



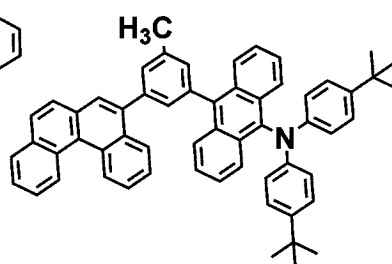
C-5



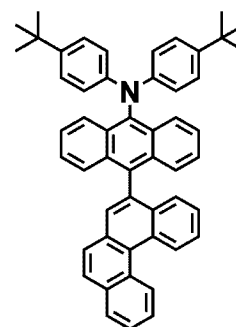
C-6



C-7



C-8



C-9

【 0 3 6 9】

〔実験例〕

前記実施例 1 ～ 実施例 200 および比較例 1 ～ 比較例 132 で製造した有機発光素子に電流を印加した時、電圧、効率を測定（ $15\text{mA}/\text{cm}^2$ 基準）して、その結果を下記の表 1 ～ 表 9 に示した。寿命 T_{95} は 7000nit 基準に測定され、 T_{95} は初期寿命から 95% に減少するのに要する時間を意味する。

【 0 3 7 0】

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【表 1】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
実施例1	化合物1-2	化合物2-1	3.58	23.01	221	赤色
実施例2	化合物1-2	化合物2-7	3.70	23.21	210	赤色
実施例3	化合物1-2	化合物2-15	3.66	23.34	213	赤色
実施例4	化合物1-2	化合物2-25	3.59	22.88	221	赤色
実施例5	化合物1-2	化合物2-32	3.63	22.72	215	赤色
実施例6	化合物1-3	化合物2-2	3.59	22.79	217	赤色
実施例7	化合物1-3	化合物2-8	3.60	22.40	209	赤色
実施例8	化合物1-3	化合物2-16	3.63	22.50	209	赤色
実施例9	化合物1-3	化合物2-26	3.65	23.28	211	赤色
実施例10	化合物1-3	化合物2-41	3.65	23.36	225	赤色
実施例11	化合物1-8	化合物2-3	3.42	23.96	252	赤色
実施例12	化合物1-8	化合物2-9	3.43	23.25	246	赤色
実施例13	化合物1-8	化合物2-17	3.46	23.52	264	赤色
実施例14	化合物1-8	化合物2-27	3.48	23.02	247	赤色
実施例15	化合物1-8	化合物2-34	3.43	23.46	252	赤色
実施例16	化合物1-9	化合物2-4	3.74	23.96	232	赤色
実施例17	化合物1-9	化合物2-10	3.81	23.25	230	赤色
実施例18	化合物1-9	化合物2-18	3.73	23.52	239	赤色
実施例19	化合物1-9	化合物2-28	3.72	23.02	233	赤色
実施例20	化合物1-9	化合物2-43	3.81	23.46	238	赤色
実施例21	化合物1-10	化合物2-5	3.40	21.48	245	赤色
実施例22	化合物1-10	化合物2-11	3.51	21.87	263	赤色
実施例23	化合物1-10	化合物2-19	3.37	21.82	255	赤色
実施例24	化合物1-10	化合物2-29	3.51	21.75	261	赤色
実施例25	化合物1-10	化合物2-36	3.51	21.69	261	赤色
実施例26	化合物1-12	化合物2-6	3.65	22.88	222	赤色
実施例27	化合物1-12	化合物2-12	3.63	22.47	208	赤色
実施例28	化合物1-12	化合物2-20	3.62	23.19	207	赤色
実施例29	化合物1-12	化合物2-30	3.60	22.99	220	赤色
実施例30	化合物1-12	化合物2-45	3.72	23.19	208	赤色

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【表 2】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
実施例31	化合物1-15	化合物2-1	3.67	23.08	207	赤色
実施例32	化合物1-15	化合物2-7	3.71	22.84	220	赤色
実施例33	化合物1-15	化合物2-15	3.57	22.63	206	赤色
実施例34	化合物1-15	化合物2-25	3.60	22.66	218	赤色
実施例35	化合物1-15	化合物2-40	3.68	23.28	214	赤色
実施例36	化合物1-16	化合物2-2	3.62	21.23	237	赤色
実施例37	化合物1-16	化合物2-8	3.56	21.01	228	赤色
実施例38	化合物1-16	化合物2-16	3.47	20.87	239	赤色
実施例39	化合物1-16	化合物2-26	3.61	21.04	248	赤色
実施例40	化合物1-16	化合物2-33	3.60	20.38	233	赤色
実施例41	化合物1-17	化合物2-3	3.61	20.48	229	赤色
実施例42	化合物1-17	化合物2-9	3.48	21.04	229	赤色
実施例43	化合物1-17	化合物2-17	3.53	20.75	230	赤色
実施例44	化合物1-17	化合物2-27	3.47	20.62	227	赤色
実施例45	化合物1-17	化合物2-42	3.61	20.29	240	赤色
実施例46	化合物1-20	化合物2-4	3.67	23.39	225	赤色
実施例47	化合物1-20	化合物2-10	3.67	23.43	237	赤色
実施例48	化合物1-20	化合物2-18	3.74	23.12	237	赤色
実施例49	化合物1-20	化合物2-28	3.69	23.23	220	赤色
実施例50	化合物1-20	化合物2-35	3.80	23.62	231	赤色
実施例51	化合物1-21	化合物2-5	3.46	23.39	245	赤色
実施例52	化合物1-21	化合物2-11	3.51	23.29	254	赤色
実施例53	化合物1-21	化合物2-19	3.48	23.93	247	赤色
実施例54	化合物1-21	化合物2-29	3.48	23.35	257	赤色
実施例55	化合物1-21	化合物2-44	3.49	23.94	265	赤色
実施例56	化合物1-24	化合物2-6	3.71	23.51	233	赤色
実施例57	化合物1-24	化合物2-12	3.67	23.38	238	赤色
実施例58	化合物1-24	化合物2-20	3.68	24.00	231	赤色
実施例59	化合物1-24	化合物2-30	3.68	23.45	235	赤色
実施例60	化合物1-24	化合物2-37	3.82	23.02	228	赤色
実施例61	化合物1-27	化合物2-1	3.80	24.09	227	赤色
実施例62	化合物1-27	化合物2-7	3.73	23.33	228	赤色
実施例63	化合物1-27	化合物2-13	3.75	23.67	233	赤色
実施例64	化合物1-27	化合物2-25	3.80	23.09	228	赤色
実施例65	化合物1-27	化合物2-32	3.68	23.74	229	赤色
実施例66	化合物1-28	化合物2-2	3.46	22.23	250	赤色
実施例67	化合物1-28	化合物2-8	3.50	21.45	260	赤色
実施例68	化合物1-28	化合物2-21	3.42	22.28	255	赤色
実施例69	化合物1-28	化合物2-26	3.49	21.57	253	赤色
実施例70	化合物1-28	化合物2-41	3.40	21.88	250	赤色

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【表 3】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
実施例71	化合物1-31	化合物2-3	3.71	22.91	215	赤色
実施例72	化合物1-31	化合物2-9	3.70	22.50	208	赤色
実施例73	化合物1-31	化合物2-31	3.69	22.60	226	赤色
実施例74	化合物1-31	化合物2-27	3.62	22.44	215	赤色
実施例75	化合物1-31	化合物2-34	3.68	22.70	215	赤色
実施例76	化合物1-33	化合物2-4	3.50	21.32	248	赤色
実施例77	化合物1-33	化合物2-10	3.41	21.10	252	赤色
実施例78	化合物1-33	化合物2-38	3.52	21.55	264	赤色
実施例79	化合物1-33	化合物2-28	3.37	21.83	247	赤色
実施例80	化合物1-33	化合物2-43	3.37	22.13	260	赤色
実施例81	化合物1-37	化合物2-5	3.47	23.81	265	赤色
実施例82	化合物1-37	化合物2-11	3.39	23.42	246	赤色
実施例83	化合物1-37	化合物2-39	3.46	23.85	258	赤色
実施例84	化合物1-37	化合物2-29	3.40	23.88	256	赤色
実施例85	化合物1-37	化合物2-36	3.45	23.83	253	赤色
実施例86	化合物1-39	化合物2-6	3.49	23.78	247	赤色
実施例87	化合物1-39	化合物2-12	3.51	23.46	266	赤色
実施例88	化合物1-39	化合物2-46	3.41	23.36	256	赤色
実施例89	化合物1-39	化合物2-30	3.41	23.57	263	赤色
実施例90	化合物1-39	化合物2-45	3.47	23.02	263	赤色
実施例91	化合物1-40	化合物2-1	3.82	23.41	225	赤色
実施例92	化合物1-40	化合物2-7	3.75	23.49	235	赤色
実施例93	化合物1-40	化合物2-13	3.67	23.06	227	赤色
実施例94	化合物1-40	化合物2-25	3.79	23.42	231	赤色
実施例95	化合物1-40	化合物2-40	3.82	23.39	231	赤色
実施例96	化合物1-41	化合物2-2	3.72	23.89	236	赤色
実施例97	化合物1-41	化合物2-8	3.70	23.76	237	赤色
実施例98	化合物1-41	化合物2-21	3.78	23.67	229	赤色
実施例99	化合物1-41	化合物2-26	3.72	23.34	237	赤色
実施例100	化合物1-41	化合物2-33	3.68	23.68	232	赤色
実施例101	化合物1-42	化合物2-3	3.39	21.53	259	赤色
実施例102	化合物1-42	化合物2-9	3.49	21.50	259	赤色
実施例103	化合物1-42	化合物2-31	3.46	21.99	251	赤色
実施例104	化合物1-42	化合物2-27	3.51	21.52	262	赤色
実施例105	化合物1-42	化合物2-42	3.41	22.01	255	赤色
実施例106	化合物1-43	化合物2-4	3.51	21.72	261	赤色
実施例107	化合物1-43	化合物2-10	3.40	21.57	245	赤色
実施例108	化合物1-43	化合物2-38	3.38	21.35	258	赤色
実施例109	化合物1-43	化合物2-28	3.50	21.79	252	赤色
実施例110	化合物1-43	化合物2-35	3.48	21.83	265	赤色

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【表 4】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
実施例111	化合物1-44	化合物2-5	3.39	23.97	259	赤色
実施例112	化合物1-44	化合物2-11	3.49	23.74	259	赤色
実施例113	化合物1-44	化合物2-39	3.46	23.72	251	赤色
実施例114	化合物1-44	化合物2-29	3.51	23.57	262	赤色
実施例115	化合物1-44	化合物2-44	3.41	23.89	255	赤色
実施例116	化合物1-48	化合物2-6	3.51	23.61	261	赤色
実施例117	化合物1-48	化合物2-12	3.40	23.61	245	赤色
実施例118	化合物1-48	化合物2-46	3.38	23.21	258	赤色
実施例119	化合物1-48	化合物2-30	3.50	23.83	252	赤色
実施例120	化合物1-48	化合物2-37	3.48	23.24	265	赤色
実施例121	化合物1-52	化合物2-1	3.67	23.36	224	赤色
実施例122	化合物1-52	化合物2-7	3.70	23.33	205	赤色
実施例123	化合物1-52	化合物2-14	3.60	22.77	226	赤色
実施例124	化合物1-52	化合物2-25	3.67	22.38	211	赤色
実施例125	化合物1-52	化合物2-32	3.70	22.75	224	赤色
実施例126	化合物1-53	化合物2-2	3.66	22.39	211	赤色
実施例127	化合物1-53	化合物2-8	3.61	22.57	206	赤色
実施例128	化合物1-53	化合物2-22	3.65	22.38	226	赤色
実施例129	化合物1-53	化合物2-26	3.63	22.44	213	赤色
実施例130	化合物1-53	化合物2-41	3.61	23.11	227	赤色
実施例131	化合物1-55	化合物2-3	3.38	23.83	245	赤色
実施例132	化合物1-55	化合物2-9	3.37	23.48	259	赤色
実施例133	化合物1-55	化合物2-31	3.52	23.59	248	赤色
実施例134	化合物1-55	化合物2-27	3.45	23.07	257	赤色
実施例135	化合物1-55	化合物2-34	3.46	23.73	247	赤色
実施例136	化合物1-56	化合物2-4	3.65	23.23	224	赤色
実施例137	化合物1-56	化合物2-10	3.61	22.65	186	赤色
実施例138	化合物1-56	化合物2-38	3.58	22.48	193	赤色
実施例139	化合物1-56	化合物2-28	3.70	22.56	189	赤色
実施例140	化合物1-56	化合物2-43	3.60	22.97	192	赤色
実施例141	化合物1-57	化合物2-5	3.68	22.11	199	赤色
実施例142	化合物1-57	化合物2-11	3.59	22.51	219	赤色
実施例143	化合物1-57	化合物2-39	3.65	22.71	197	赤色
実施例144	化合物1-57	化合物2-29	3.59	22.10	207	赤色
実施例145	化合物1-57	化合物2-36	3.70	22.39	194	赤色
実施例146	化合物1-58	化合物2-6	3.62	22.97	205	赤色
実施例147	化合物1-58	化合物2-12	3.69	22.75	191	赤色
実施例148	化合物1-58	化合物2-46	3.67	22.77	219	赤色
実施例149	化合物1-58	化合物2-30	3.65	22.91	227	赤色
実施例150	化合物1-58	化合物2-45	3.64	22.13	223	赤色
実施例151	化合物1-60	化合物2-1	3.70	23.05	211	赤色
実施例152	化合物1-60	化合物2-7	3.68	22.75	183	赤色
実施例153	化合物1-60	化合物2-14	3.63	22.80	204	赤色
実施例154	化合物1-60	化合物2-25	3.67	23.00	192	赤色
実施例155	化合物1-60	化合物2-40	3.60	22.15	206	赤色
実施例156	化合物1-61	化合物2-2	3.48	23.85	247	赤色
実施例157	化合物1-61	化合物2-8	3.50	23.80	249	赤色
実施例158	化合物1-61	化合物2-22	3.50	23.31	248	赤色
実施例159	化合物1-61	化合物2-26	3.39	23.61	260	赤色
実施例160	化合物1-61	化合物2-33	3.37	23.38	246	赤色

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【表 5】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
実施例161	化合物1-62	化合物2-3	3.81	23.85	225	赤色
実施例162	化合物1-62	化合物2-9	3.81	23.80	218	赤色
実施例163	化合物1-62	化合物2-31	3.68	23.31	230	赤色
実施例164	化合物1-62	化合物2-27	3.71	23.61	222	赤色
実施例165	化合物1-62	化合物2-42	3.69	23.38	224	赤色
実施例166	化合物1-63	化合物2-4	3.50	22.40	258	赤色
実施例167	化合物1-63	化合物2-10	3.49	22.31	244	赤色
実施例168	化合物1-63	化合物2-38	3.42	21.27	254	赤色
実施例169	化合物1-63	化合物2-28	3.37	21.78	250	赤色
実施例170	化合物1-63	化合物2-35	3.37	21.75	256	赤色
実施例171	化合物1-64	化合物2-5	3.47	21.94	257	赤色
実施例172	化合物1-64	化合物2-11	3.49	21.33	266	赤色
実施例173	化合物1-64	化合物2-39	3.42	21.30	254	赤色
実施例174	化合物1-64	化合物2-29	3.38	21.45	255	赤色
実施例175	化合物1-64	化合物2-44	3.50	22.02	264	赤色
実施例176	化合物1-65	化合物2-6	3.50	23.27	258	赤色
実施例177	化合物1-65	化合物2-12	3.49	23.61	244	赤色
実施例178	化合物1-65	化合物2-46	3.42	23.12	254	赤色
実施例179	化合物1-65	化合物2-30	3.37	23.36	250	赤色
実施例180	化合物1-65	化合物2-37	3.37	23.34	256	赤色
実施例181	化合物1-66	化合物2-1	3.69	22.13	204	赤色
実施例182	化合物1-66	化合物2-7	3.57	23.25	213	赤色
実施例183	化合物1-66	化合物2-13	3.68	22.99	221	赤色
実施例184	化合物1-66	化合物2-25	3.63	22.33	180	赤色
実施例185	化合物1-66	化合物2-32	3.60	22.90	209	赤色
実施例186	化合物1-67	化合物2-2	3.71	22.84	190	赤色
実施例187	化合物1-67	化合物2-8	3.59	22.47	182	赤色
実施例188	化合物1-67	化合物2-23	3.61	22.45	185	赤色
実施例189	化合物1-67	化合物2-26	3.62	22.24	217	赤色
実施例190	化合物1-67	化合物2-41	3.70	23.04	216	赤色
実施例191	化合物1-68	化合物2-3	3.59	22.28	210	赤色
実施例192	化合物1-68	化合物2-9	3.72	23.37	203	赤色
実施例193	化合物1-68	化合物2-31	3.68	22.83	205	赤色
実施例194	化合物1-68	化合物2-27	3.64	23.33	207	赤色
実施例195	化合物1-68	化合物2-34	3.63	22.62	205	赤色
実施例196	化合物1-69	化合物2-4	3.59	23.39	225	赤色
実施例197	化合物1-69	化合物2-10	3.59	22.97	195	赤色
実施例198	化合物1-69	化合物2-38	3.71	22.77	221	赤色
実施例199	化合物1-69	化合物2-28	3.68	22.37	212	赤色
実施例200	化合物1-69	化合物2-43	3.57	22.16	227	赤色

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【表 6】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
比較例1	化合物B-1	化合物2-1	4.20	15.07	120	赤色
比較例2	化合物B-1	化合物2-7	4.34	14.53	142	赤色
比較例3	化合物B-1	化合物2-15	4.30	14.76	127	赤色
比較例4	化合物B-1	化合物2-25	4.24	14.72	145	赤色
比較例5	化合物B-1	化合物2-32	4.15	15.00	122	赤色
比較例6	化合物B-2	化合物2-2	4.17	14.96	128	赤色
比較例7	化合物B-2	化合物2-8	4.24	15.03	135	赤色
比較例8	化合物B-2	化合物2-16	4.26	14.21	141	赤色
比較例9	化合物B-2	化合物2-26	4.31	14.94	140	赤色
比較例10	化合物B-2	化合物2-41	4.13	14.50	123	赤色
比較例11	化合物B-3	化合物2-3	4.28	16.31	107	赤色
比較例12	化合物B-3	化合物2-9	4.30	15.71	102	赤色
比較例13	化合物B-3	化合物2-17	4.26	15.73	107	赤色
比較例14	化合物B-3	化合物2-27	4.30	15.77	123	赤色
比較例15	化合物B-3	化合物2-34	4.17	16.22	105	赤色
比較例16	化合物B-4	化合物2-4	4.19	16.05	121	赤色
比較例17	化合物B-4	化合物2-10	4.25	15.53	104	赤色
比較例18	化合物B-4	化合物2-18	4.17	16.47	104	赤色
比較例19	化合物B-4	化合物2-28	4.20	15.81	113	赤色
比較例20	化合物B-4	化合物2-43	4.20	16.02	119	赤色
比較例21	化合物B-5	化合物2-5	4.12	14.68	125	赤色
比較例22	化合物B-5	化合物2-11	4.26	15.01	137	赤色
比較例23	化合物B-5	化合物2-19	4.18	14.52	138	赤色
比較例24	化合物B-5	化合物2-29	4.29	14.71	140	赤色
比較例25	化合物B-5	化合物2-36	4.16	14.83	123	赤色
比較例26	化合物B-6	化合物2-6	4.18	14.75	141	赤色
比較例27	化合物B-6	化合物2-12	4.33	14.74	141	赤色
比較例28	化合物B-6	化合物2-20	4.15	14.35	123	赤色
比較例29	化合物B-6	化合物2-30	4.19	15.03	136	赤色
比較例30	化合物B-6	化合物2-45	4.12	14.56	139	赤色
比較例31	化合物B-7	化合物2-1	4.29	16.43	120	赤色
比較例32	化合物B-7	化合物2-7	4.25	15.96	114	赤色
比較例33	化合物B-7	化合物2-15	4.22	15.38	115	赤色
比較例34	化合物B-7	化合物2-25	4.23	16.65	114	赤色
比較例35	化合物B-7	化合物2-32	4.36	16.15	112	赤色
比較例36	化合物B-8	化合物2-2	4.30	15.74	105	赤色
比較例37	化合物B-8	化合物2-8	4.18	16.54	116	赤色
比較例38	化合物B-8	化合物2-16	4.27	16.69	113	赤色
比較例39	化合物B-8	化合物2-26	4.17	15.75	105	赤色
比較例40	化合物B-8	化合物2-41	4.21	16.41	120	赤色

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【表 7】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
比較例41	化合物B-9	化合物2-3	4.28	14.50	145	赤色
比較例42	化合物B-9	化合物2-9	4.26	14.69	123	赤色
比較例43	化合物B-9	化合物2-17	4.32	15.08	131	赤色
比較例44	化合物B-9	化合物2-27	4.25	14.98	123	赤色
比較例45	化合物B-9	化合物2-34	4.28	14.45	126	赤色
比較例46	化合物B-10	化合物2-4	4.15	14.69	140	赤色
比較例47	化合物B-10	化合物2-10	4.28	14.33	148	赤色
比較例48	化合物B-10	化合物2-18	4.25	14.53	135	赤色
比較例49	化合物B-10	化合物2-28	4.11	14.66	125	赤色
比較例50	化合物B-10	化合物2-43	4.31	14.69	124	赤色
比較例51	化合物B-11	化合物2-5	4.32	15.34	113	赤色
比較例52	化合物B-11	化合物2-11	4.36	15.56	111	赤色
比較例53	化合物B-11	化合物2-19	4.23	15.76	110	赤色
比較例54	化合物B-11	化合物2-29	4.27	16.62	105	赤色
比較例55	化合物B-11	化合物2-36	4.32	16.13	104	赤色
比較例56	化合物B-12	化合物2-6	4.25	15.48	112	赤色
比較例57	化合物B-12	化合物2-12	4.23	16.34	120	赤色
比較例58	化合物B-12	化合物2-20	4.18	16.60	110	赤色
比較例59	化合物B-12	化合物2-30	4.30	16.45	119	赤色
比較例60	化合物B-12	化合物2-45	4.21	15.23	122	赤色

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【表 8】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
比較例61	化合物1-2	化合物C-1	4.09	18.97	133	赤色
比較例62	化合物1-11	化合物C-1	4.03	19.05	140	赤色
比較例63	化合物1-15	化合物C-1	4.08	18.52	136	赤色
比較例64	化合物1-28	化合物C-1	4.03	18.78	133	赤色
比較例65	化合物1-33	化合物C-1	4.02	18.77	143	赤色
比較例66	化合物1-40	化合物C-1	4.07	18.71	132	赤色
比較例67	化合物1-43	化合物C-1	4.11	18.75	136	赤色
比較例68	化合物1-55	化合物C-1	4.02	19.08	130	赤色
比較例69	化合物1-3	化合物C-2	3.98	19.14	147	赤色
比較例70	化合物1-7	化合物C-2	3.99	19.43	149	赤色
比較例71	化合物1-17	化合物C-2	3.98	19.25	144	赤色
比較例72	化合物1-24	化合物C-2	3.98	19.33	149	赤色
比較例73	化合物1-37	化合物C-2	3.99	19.45	148	赤色
比較例74	化合物1-47	化合物C-2	4.00	19.60	143	赤色
比較例75	化合物1-48	化合物C-2	3.98	19.26	145	赤色
比較例76	化合物1-58	化合物C-2	3.96	19.55	153	赤色
比較例77	化合物1-9	化合物C-3	4.01	18.96	135	赤色
比較例78	化合物1-16	化合物C-3	4.03	18.93	137	赤色
比較例79	化合物1-22	化合物C-3	4.14	18.60	141	赤色
比較例80	化合物1-38	化合物C-3	4.12	18.50	137	赤色
比較例81	化合物1-41	化合物C-3	4.05	18.69	133	赤色
比較例82	化合物1-45	化合物C-3	4.06	18.91	134	赤色
比較例83	化合物1-53	化合物C-3	4.09	18.78	135	赤色
比較例84	化合物1-62	化合物C-3	4.03	18.97	140	赤色
比較例85	化合物1-2	化合物C-4	3.97	19.58	156	赤色
比較例86	化合物1-14	化合物C-4	3.96	19.91	155	赤色
比較例87	化合物1-20	化合物C-4	3.92	19.95	155	赤色
比較例88	化合物1-27	化合物C-4	3.89	19.54	166	赤色
比較例89	化合物1-31	化合物C-4	3.93	19.71	157	赤色
比較例90	化合物1-52	化合物C-4	3.95	19.90	169	赤色
比較例91	化合物1-56	化合物C-4	3.95	19.73	156	赤色
比較例92	化合物1-60	化合物C-4	3.89	19.95	165	赤色
比較例93	化合物1-2	化合物C-5	4.23	18.39	132	赤色
比較例94	化合物1-11	化合物C-5	4.14	18.01	133	赤色
比較例95	化合物1-15	化合物C-5	4.23	18.38	133	赤色
比較例96	化合物1-28	化合物C-5	4.23	18.02	133	赤色
比較例97	化合物1-33	化合物C-5	4.19	18.46	130	赤色
比較例98	化合物1-40	化合物C-5	4.16	18.16	133	赤色
比較例99	化合物1-55	化合物C-5	4.22	18.13	130	赤色
比較例100	化合物1-64	化合物C-5	4.15	18.58	132	赤色

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【表 9】

区分	第 1 ホスト	第 2 ホスト	駆動電圧 (V)	効率 (cd/A)	寿命T95 (hr)	発光色
比較例101	化合物1-3	化合物C-6	4.19	18.51	130	赤色
比較例102	化合物1-7	化合物C-6	4.18	18.24	133	赤色
比較例103	化合物1-17	化合物C-6	4.15	18.36	133	赤色
比較例104	化合物1-24	化合物C-6	4.20	18.55	133	赤色
比較例105	化合物1-37	化合物C-6	4.17	18.06	131	赤色
比較例106	化合物1-47	化合物C-6	4.20	18.17	133	赤色
比較例107	化合物1-48	化合物C-6	4.11	18.32	132	赤色
比較例108	化合物1-58	化合物C-6	4.22	18.05	130	赤色
比較例109	化合物1-9	化合物C-7	3.97	19.11	148	赤色
比較例110	化合物1-16	化合物C-7	3.97	19.16	152	赤色
比較例111	化合物1-22	化合物C-7	4.00	19.55	147	赤色
比較例112	化合物1-38	化合物C-7	3.96	19.10	143	赤色
比較例113	化合物1-41	化合物C-7	4.02	19.25	148	赤色
比較例114	化合物1-45	化合物C-7	3.97	19.56	152	赤色
比較例115	化合物1-53	化合物C-7	3.97	19.38	143	赤色
比較例116	化合物1-60	化合物C-7	3.97	19.37	140	赤色
比較例117	化合物1-2	化合物C-8	4.40	14.14	64	赤色
比較例118	化合物1-14	化合物C-8	4.47	14.27	80	赤色
比較例119	化合物1-20	化合物C-8	4.34	14.96	64	赤色
比較例120	化合物1-27	化合物C-8	4.32	13.19	78	赤色
比較例121	化合物1-31	化合物C-8	4.42	14.56	66	赤色
比較例122	化合物1-52	化合物C-8	4.41	14.94	61	赤色
比較例123	化合物1-56	化合物C-8	4.37	14.48	60	赤色
比較例124	化合物1-65	化合物C-8	4.49	14.96	60	赤色
比較例125	化合物1-2	化合物C-9	4.20	15.26	99	赤色
比較例126	化合物1-11	化合物C-9	4.25	15.03	93	赤色
比較例127	化合物1-15	化合物C-9	4.23	14.21	88	赤色
比較例128	化合物1-28	化合物C-9	4.39	14.15	97	赤色
比較例129	化合物1-33	化合物C-9	4.35	14.42	95	赤色
比較例130	化合物1-40	化合物C-9	4.37	14.87	97	赤色
比較例131	化合物1-43	化合物C-9	4.29	14.65	91	赤色
比較例132	化合物1-68	化合物C-9	4.33	14.56	86	赤色

【0379】

実施例1～200および比較例1～132によって製作された有機発光素子に電流を印加した時、前記表1～表9の結果を得た。前記実施例1の赤色有機発光素子の構成要素としては、従来広く用いられている物質を使用し、電子遮断層として化合物EB-1、赤色発光層のドーパントとして化合物Dp-7を使用した。

【0380】

表6および表7のように、比較例化合物B-1～B-12のうちいずれか1つと本発明の化学式2で表される化合物を共に共蒸着して赤色発光層として使用した時、本発明の組み合わせよりも大体駆動電圧は上昇して、効率と寿命が落ちる結果を示し、表8および表9のように、比較例化合物C-1～C-9のうちいずれか1つと本発明の化学式1で表される化合物を共に共蒸着して赤色発光層として使用した時も駆動電圧は上昇して、効率と寿命が減少する結果を示した。

【0381】

このことから本発明の第1ホストである化学式1で表される化合物と第2ホストである化学式2で表される化合物の組み合わせを使用する場合、赤色発光層内の赤色ドーパント

へのエネルギー伝達が良好になり、発光層内でより安定した均衡によって、電子と正孔が結合してエキシトンを形成することによって、駆動電圧が改善されて効率および寿命が上昇することがわかる。

【0382】

結論的に本発明の化学式1で表される化合物と化学式2で表される化合物を組み合わせで共蒸着して赤色発光層のホストとして使用した時、有機発光素子の駆動電圧、発光効率および寿命特性が改善できることを確認することができた。

【符号の説明】

【0383】

- 1 基板
- 2 正極
- 3 発光層
- 4 負極
- 5 正孔注入層
- 6 正孔輸送層
- 7 電子遮断層
- 8 正孔阻止層
- 9 電子注入および輸送層

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【図面】

【図 1】

[図1]

4
3
2
1

【図 2】

[図2]

4
9
8
3
7
6
5
2
1

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