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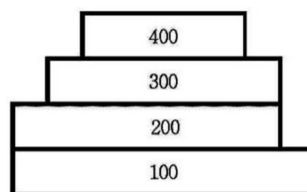
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(54) 发明名称

化合物以及包括其的有机发光组件

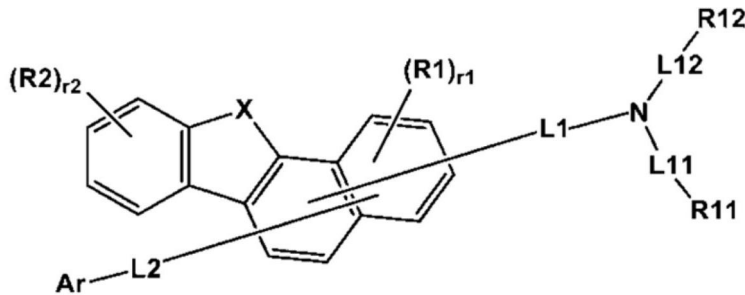
(57) 摘要

本说明书涉及一种由化学式1表示的化合物  
以及包括其的有机发光组件。



1. 一种化合物,具有以下化学式1:

[化学式1]



在化学式1中,

X为O;S;或CR'R",

R'及R"各自独立地为经取代或未经取代的C1至C60烷基;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基,

R'与R"彼此键结以形成经取代或未经取代的C3至C30环,

L1、L2、L11及L12各自独立地为直接键;经取代或未经取代的C6至C60亚芳基;或者经取代或未经取代的C2至C60亚杂芳基,

R11、R12及Ar各自独立地为经取代或未经取代的C1至C60烷基;经取代或未经取代的C3至C60环烷基;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基,

R1及R2各自独立地为氢;氘;卤素基;氰基;经取代或未经取代的C1至C60烷基;经取代或未经取代的C3至C60环烷基;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基,

r1为0至4的整数,并且当为2或大于2时,R1彼此相同或不同,并且

r2为0至4的整数,并且当为2或大于2时,R2彼此相同或不同。

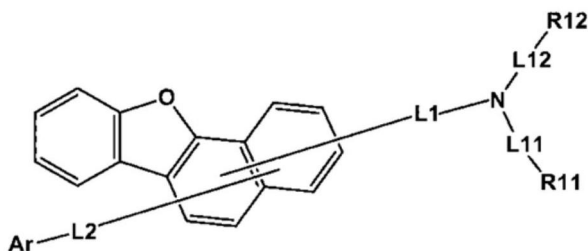
2. 根据权利要求1所述的化合物,其中L11为直接键,且L12为直接键;或者经取代或未经取代的C6至C30亚芳基。

3. 根据权利要求1所述的化合物,其中R11为经取代或未经取代的C6至C30芳基,且R12为经取代或未经取代的C6至C30芳基;或者经取代或未经取代的C2至C30杂芳基。

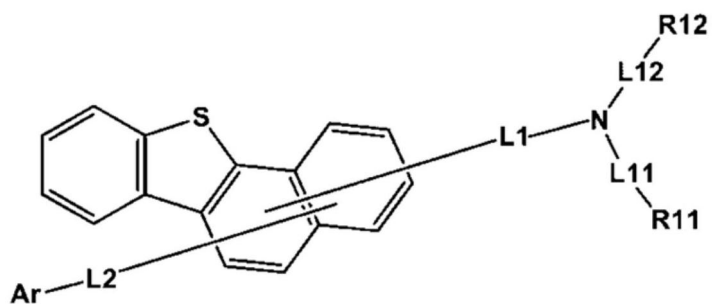
4. 根据权利要求1所述的化合物,其中Ar为经取代或未经取代的C6至C30芳基;或者经取代或未经取代的C2至C30杂芳基。

5. 根据权利要求1所述的化合物,其中化学式1由以下化学式1-1至化学式1-4中的任一者表示:

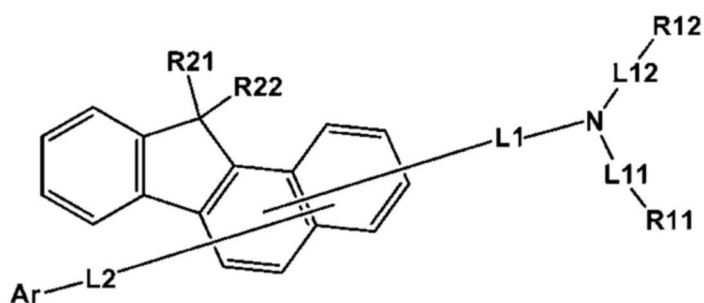
[化学式1-1]



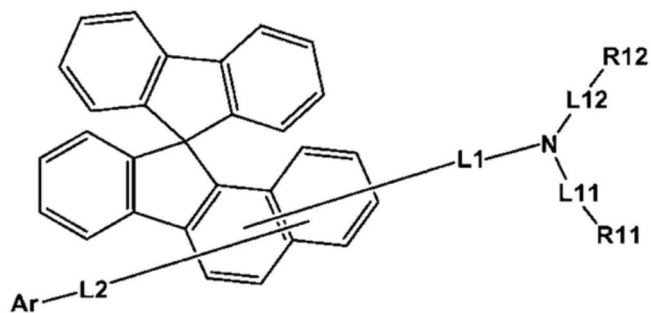
[化学式1-2]



[化学式1-3]



[化学式1-4]



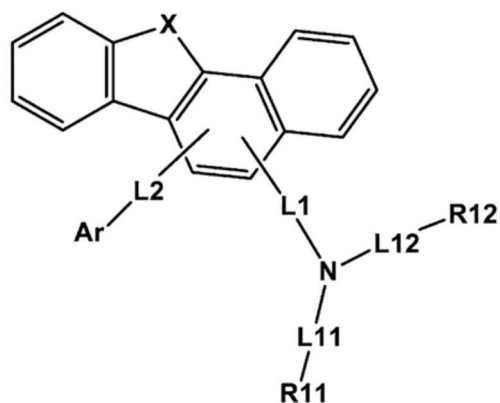
在化学式1-1至化学式1-4中，

L1、L2、L11、L12、R11、R12及Ar具有与化学式1中相同的定义，并且

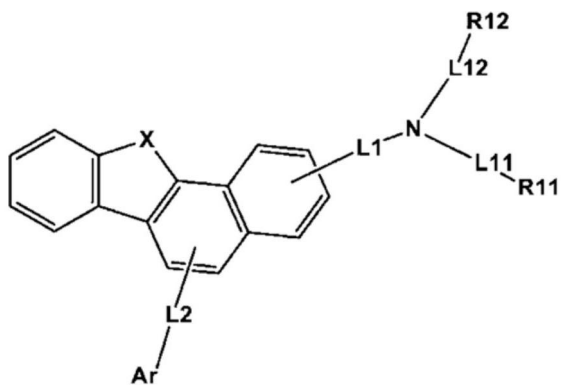
R21及R22各自独立地为经取代或未经取代的C1至C10烷基；或经取代或未经取代的C6至C20芳基。

6. 根据权利要求1所述的化合物，其中化学式1由以下化学式2至化学式5中的任一者表示：

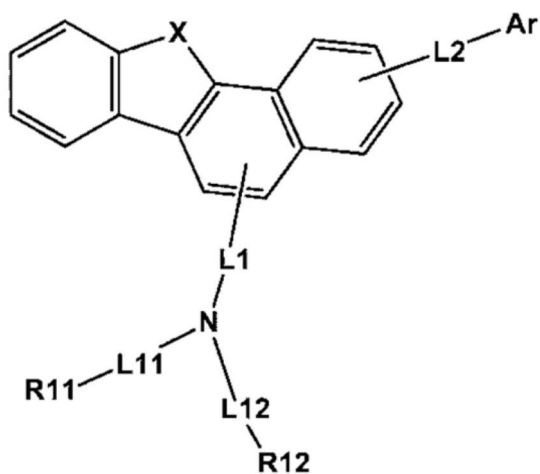
[化学式2]



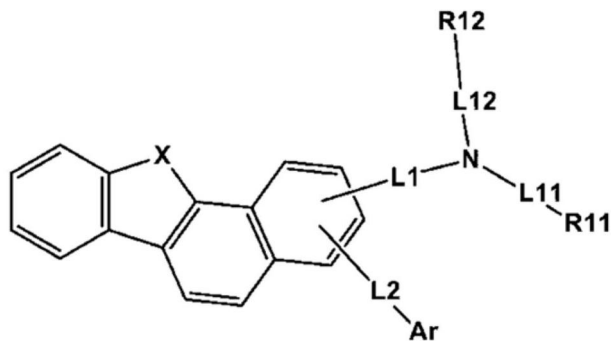
[化学式3]



[化学式4]



[化学式5]



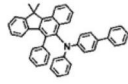
在化学式2至化学式5中，

X、L1、L2、L11、L12、R11、R12及Ar具有与化学式1中相同的定义。

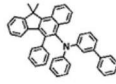
7. 根据权利要求1所述的化合物，其中化学式1由以下化合物中的任一者表示：



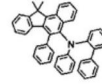
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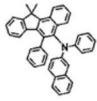
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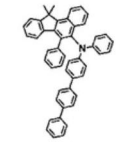
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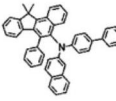
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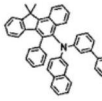
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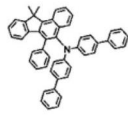
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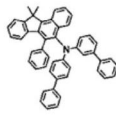
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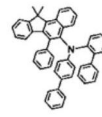
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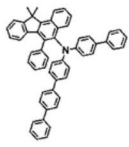
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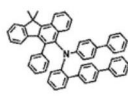
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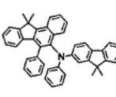
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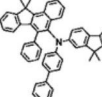
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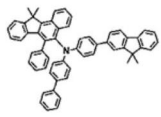
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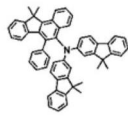
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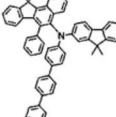
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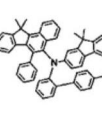
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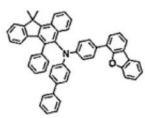
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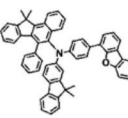
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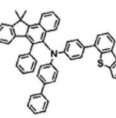
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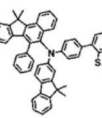
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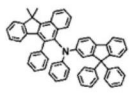
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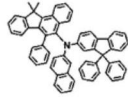
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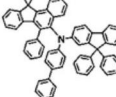
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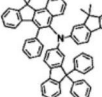
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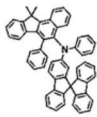
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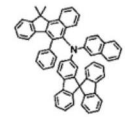
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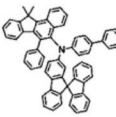
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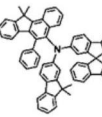
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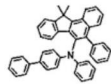
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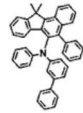
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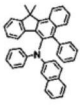
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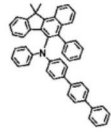
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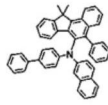
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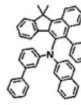
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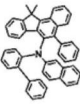
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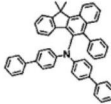
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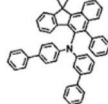
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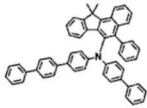
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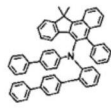
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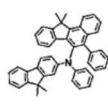
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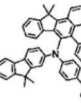
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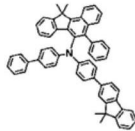
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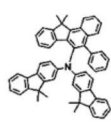
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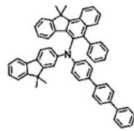
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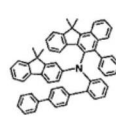
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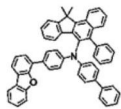
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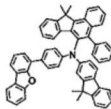
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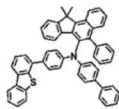
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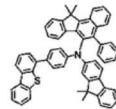
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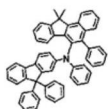
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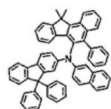
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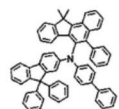
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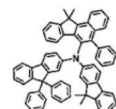
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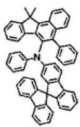
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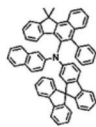
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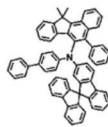
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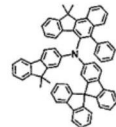
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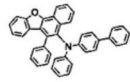
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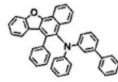
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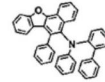
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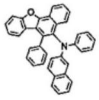
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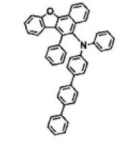
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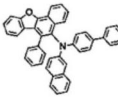
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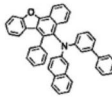
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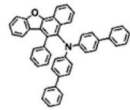
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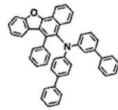
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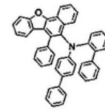
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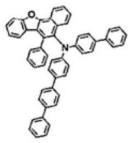
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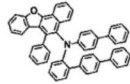
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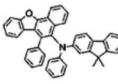
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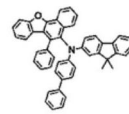
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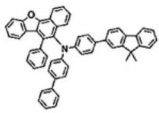
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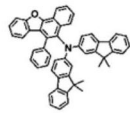
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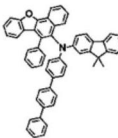
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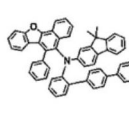
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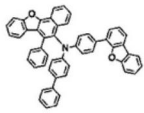
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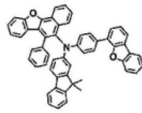
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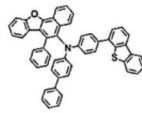
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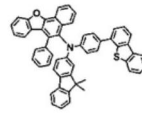
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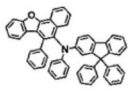
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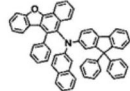
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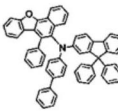
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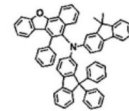
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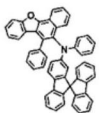
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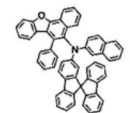
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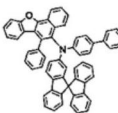
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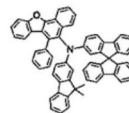
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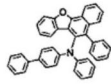
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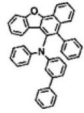
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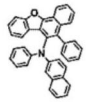
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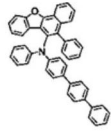
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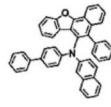
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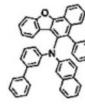
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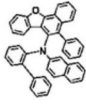
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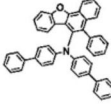
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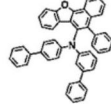
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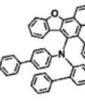
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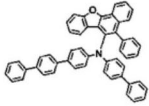
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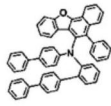
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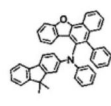
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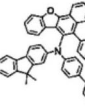
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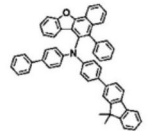
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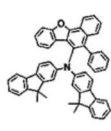
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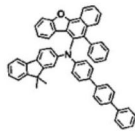
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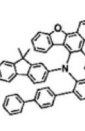
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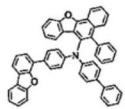
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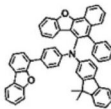
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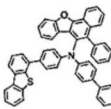
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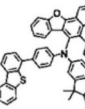
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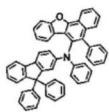
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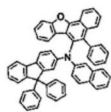
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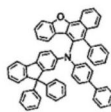
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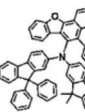
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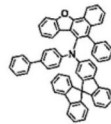
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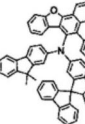
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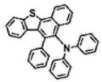
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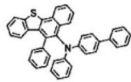
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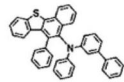
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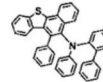
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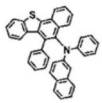
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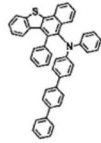
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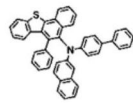
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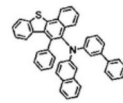
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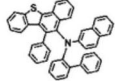
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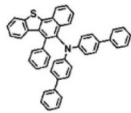
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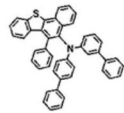
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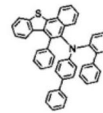
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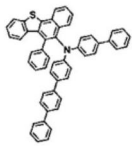
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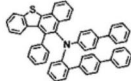
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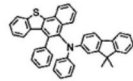
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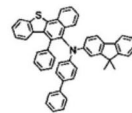
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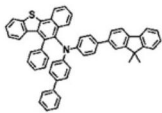
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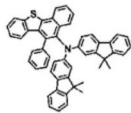
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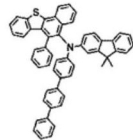
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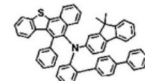
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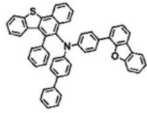
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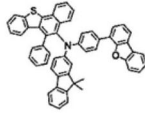
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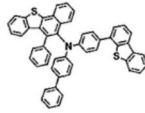
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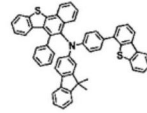
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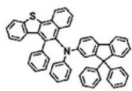
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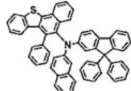
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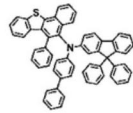
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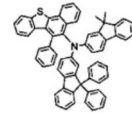
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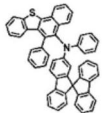
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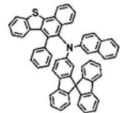
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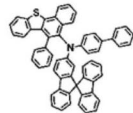
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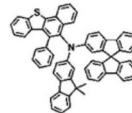
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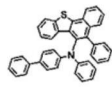
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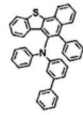
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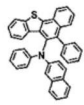
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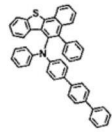
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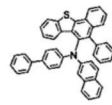
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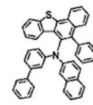
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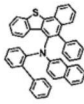
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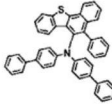
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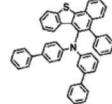
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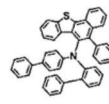
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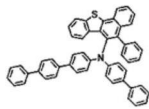
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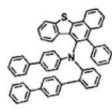
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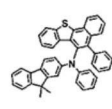
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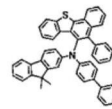
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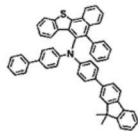
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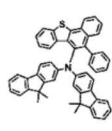
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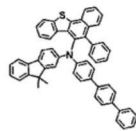
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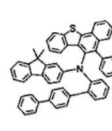
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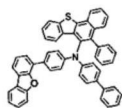
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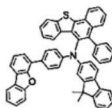
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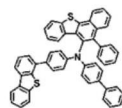
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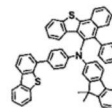
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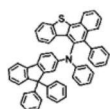
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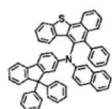
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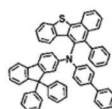
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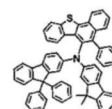
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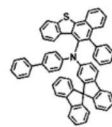
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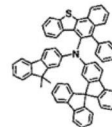
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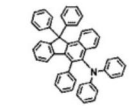
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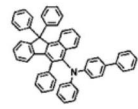
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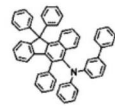
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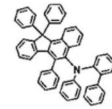
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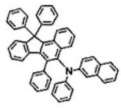
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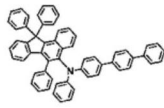
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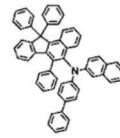
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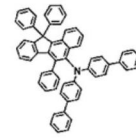
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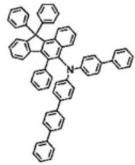
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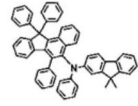
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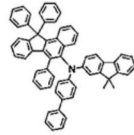
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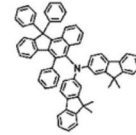
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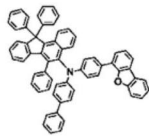
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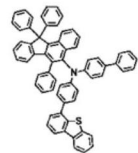
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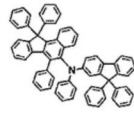
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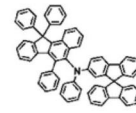
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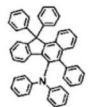
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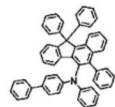
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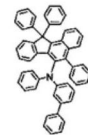
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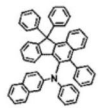
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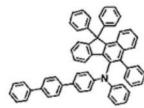
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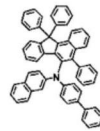
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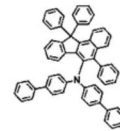
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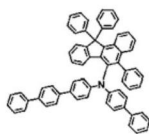
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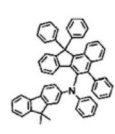
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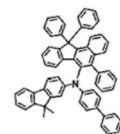
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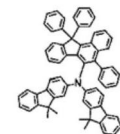
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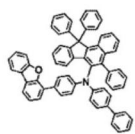
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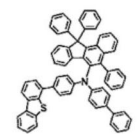
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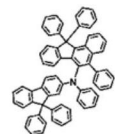
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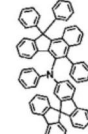
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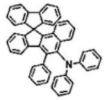
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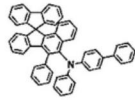
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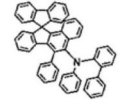
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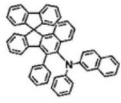
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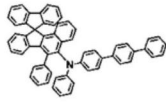
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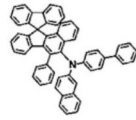
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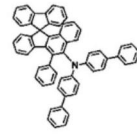
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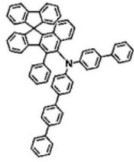
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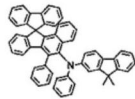
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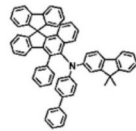
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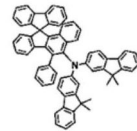
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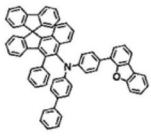
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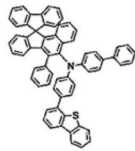
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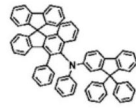
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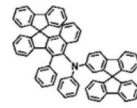
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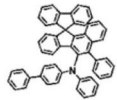
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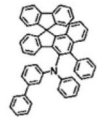
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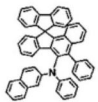
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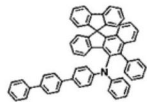
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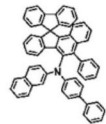
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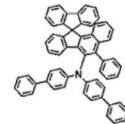
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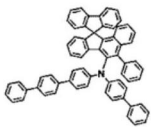
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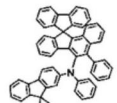
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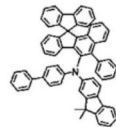
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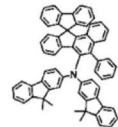
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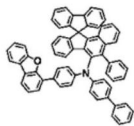
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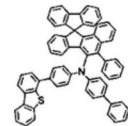
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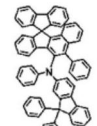
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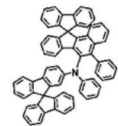
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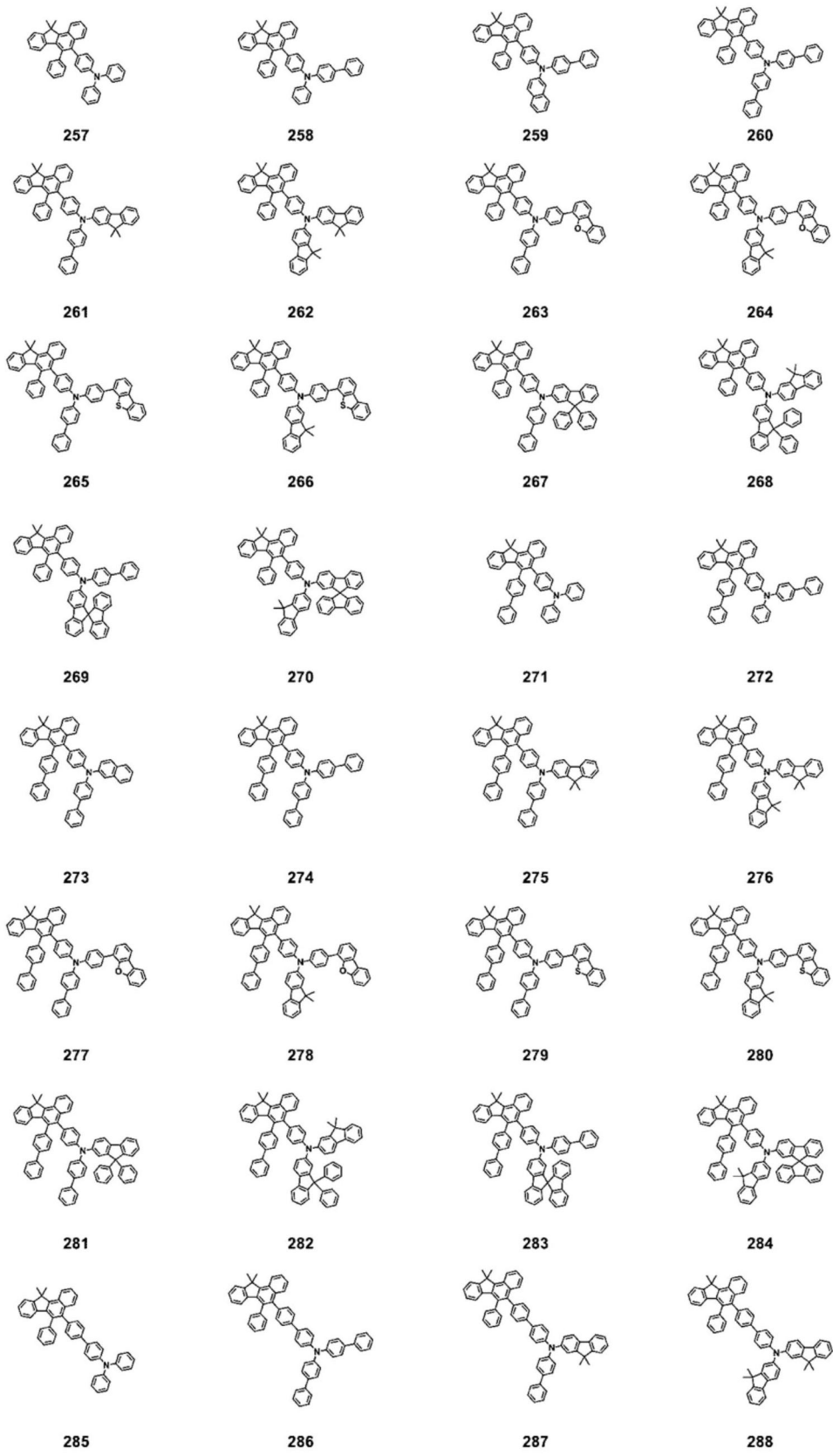
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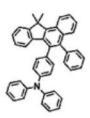


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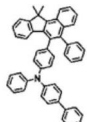


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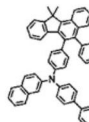




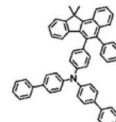
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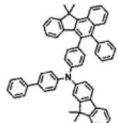
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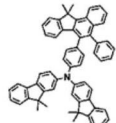
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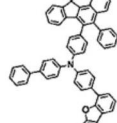
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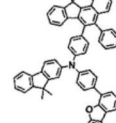
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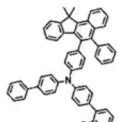
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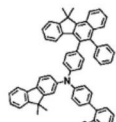
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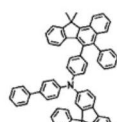
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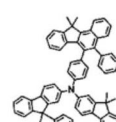
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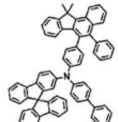
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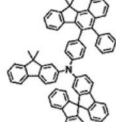
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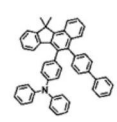
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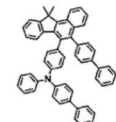
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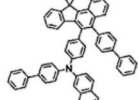
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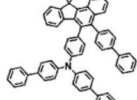
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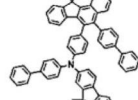
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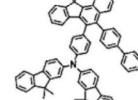
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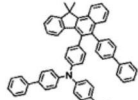
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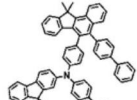
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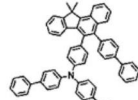
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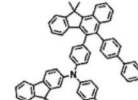
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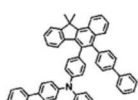
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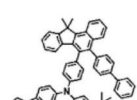
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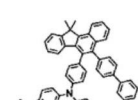
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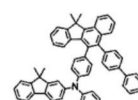
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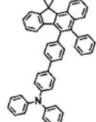
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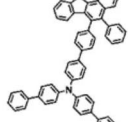
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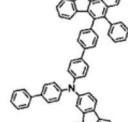
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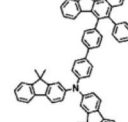
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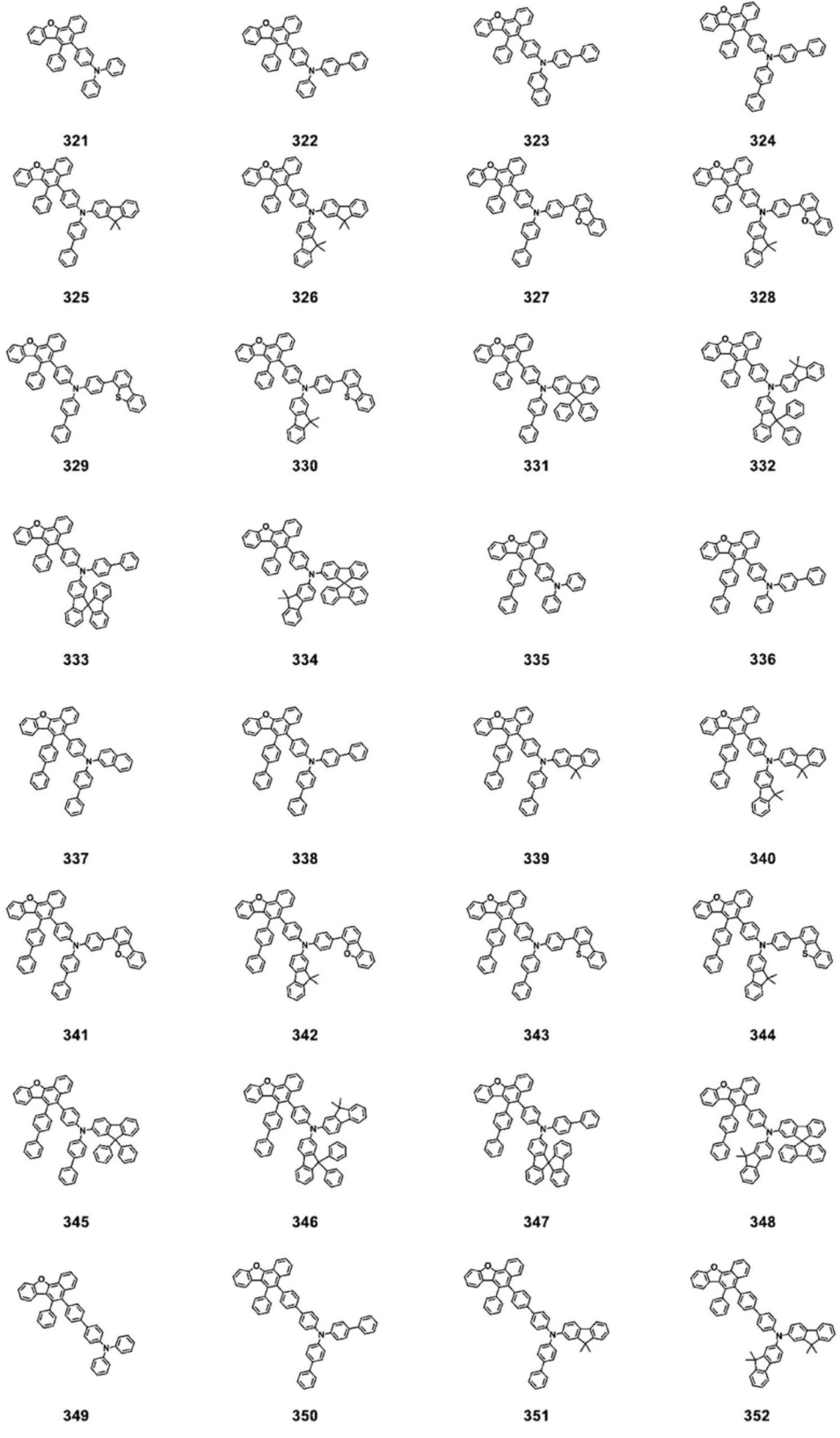
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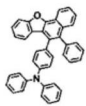


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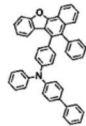


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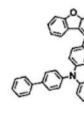
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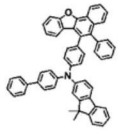
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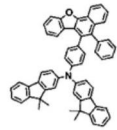
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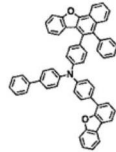
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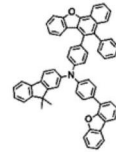
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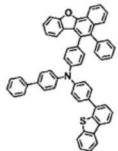
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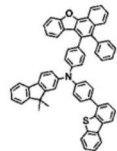
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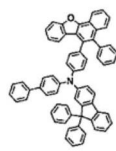
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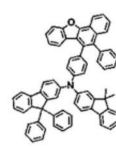
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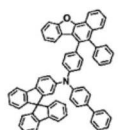
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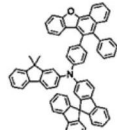
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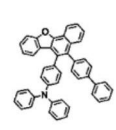
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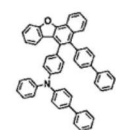
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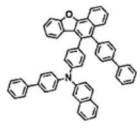
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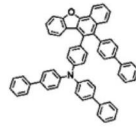
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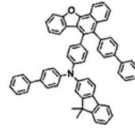
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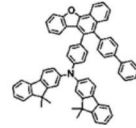
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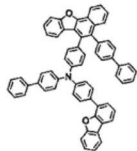
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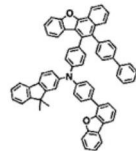
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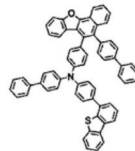
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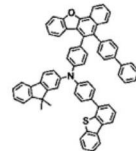
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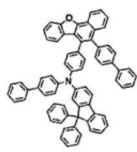
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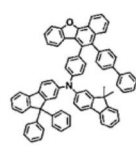
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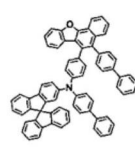
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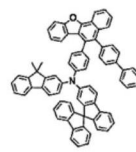
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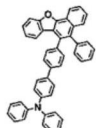
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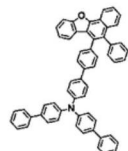
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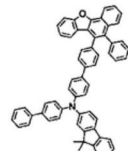


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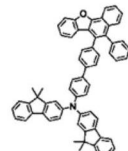


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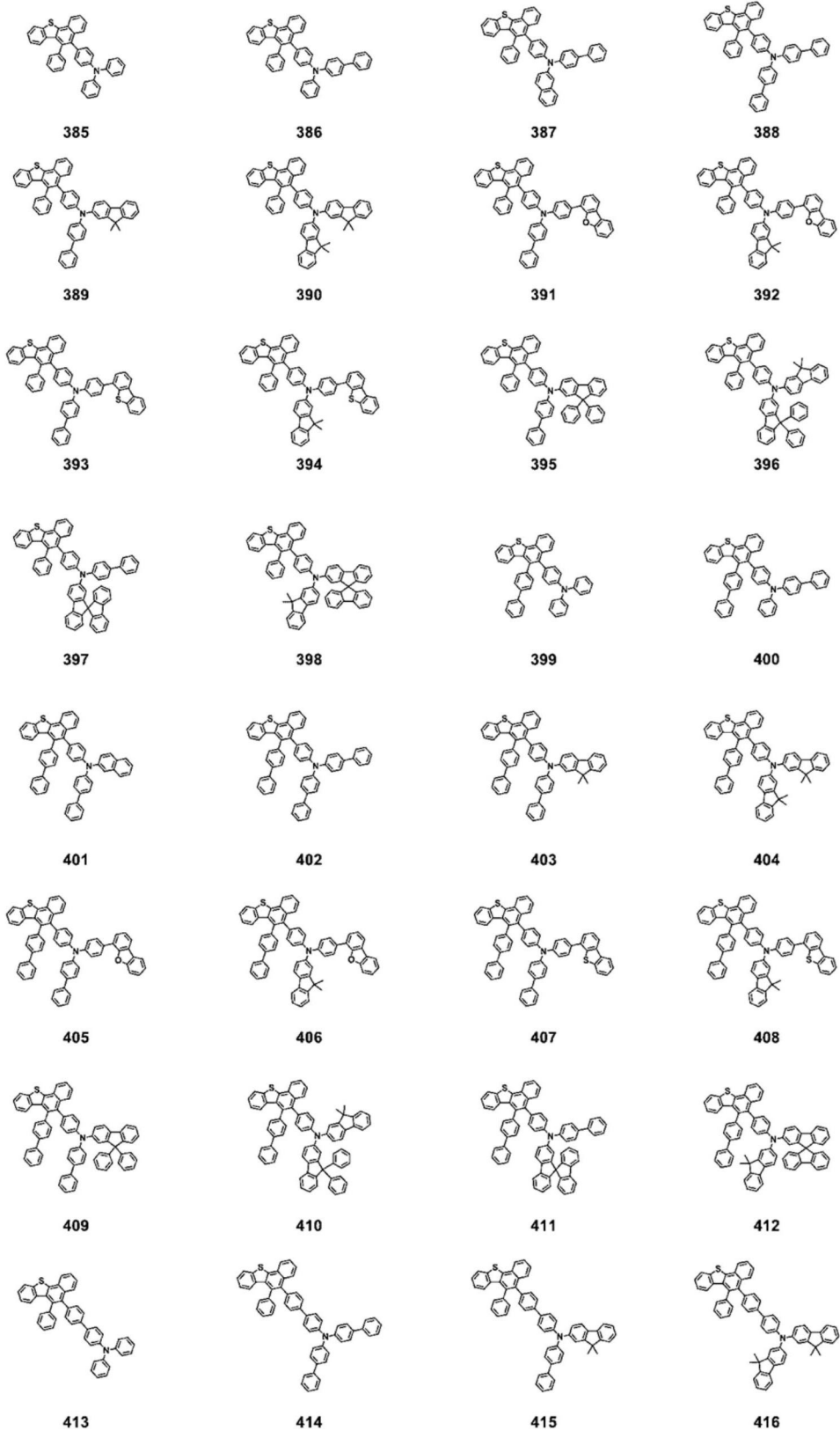
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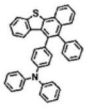


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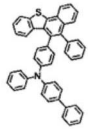


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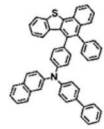




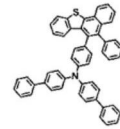
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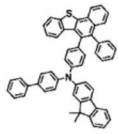
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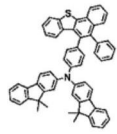
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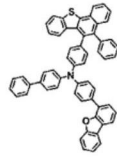
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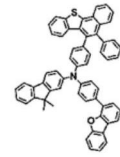
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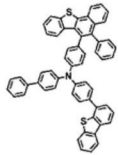
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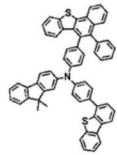
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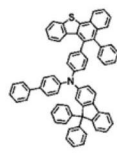
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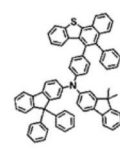
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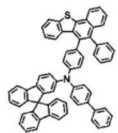
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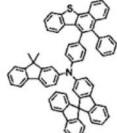
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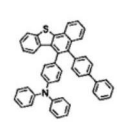
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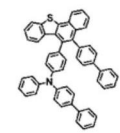
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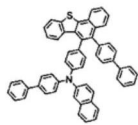
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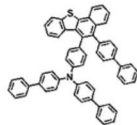
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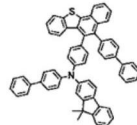
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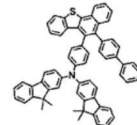
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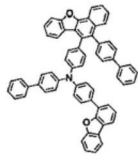
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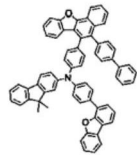
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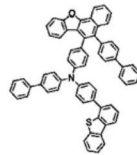
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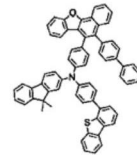
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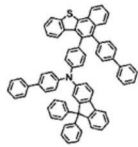
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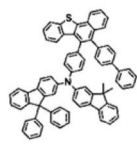
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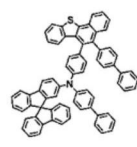
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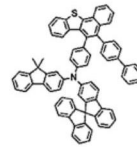
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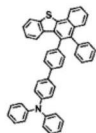
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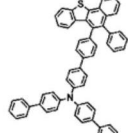
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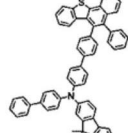
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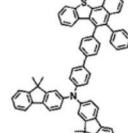
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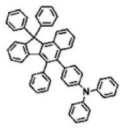
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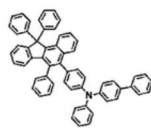
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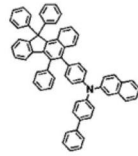
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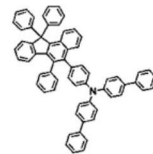
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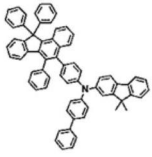
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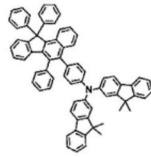
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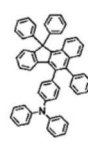
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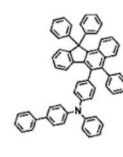
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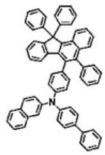
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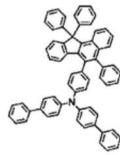
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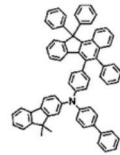
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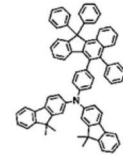
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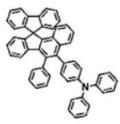
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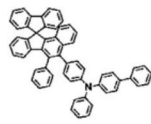
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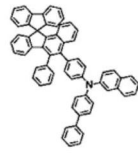
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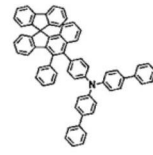
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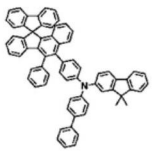
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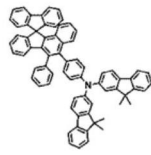
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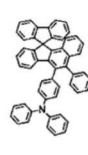
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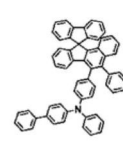
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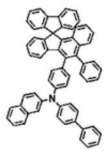
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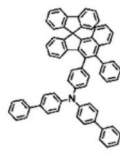
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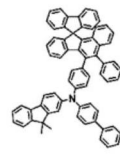
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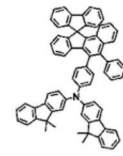
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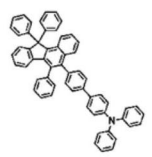
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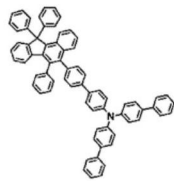
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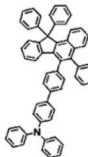
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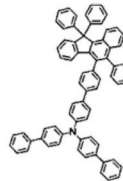
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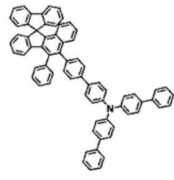
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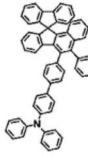
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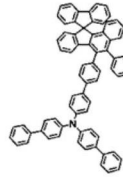
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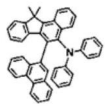
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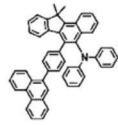
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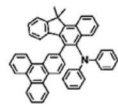
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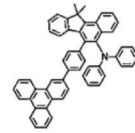
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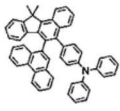
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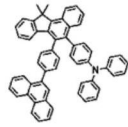
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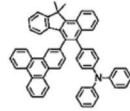
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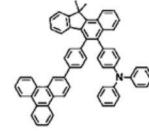
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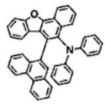
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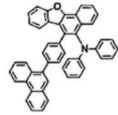
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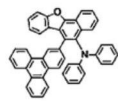
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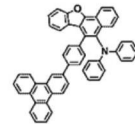
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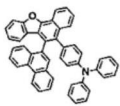
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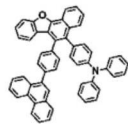
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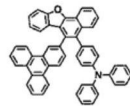
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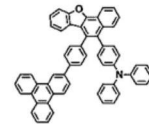
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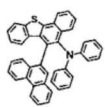
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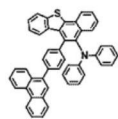
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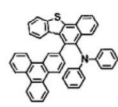
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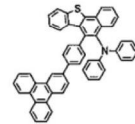
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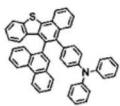
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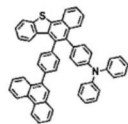
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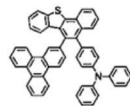
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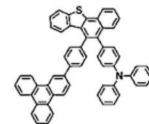
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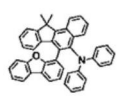
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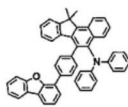
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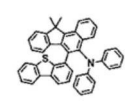
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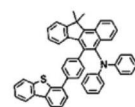
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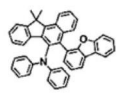
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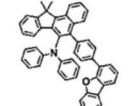
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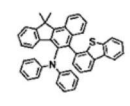
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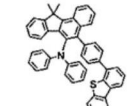
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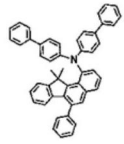
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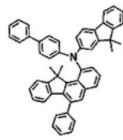
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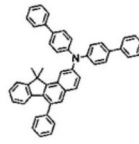
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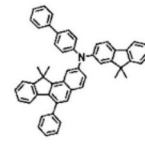
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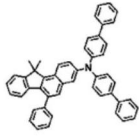
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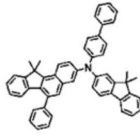
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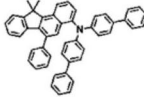
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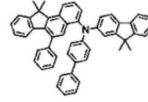
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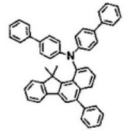
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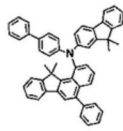
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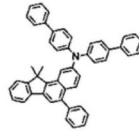
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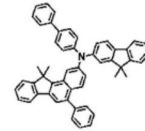
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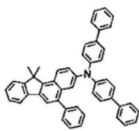
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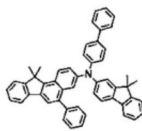
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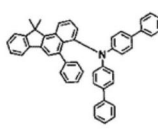
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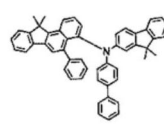
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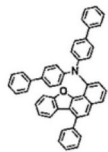
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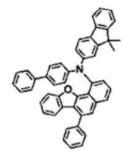
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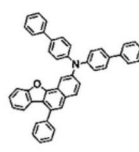
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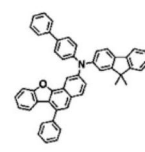
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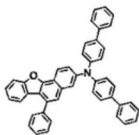
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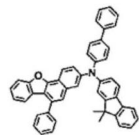
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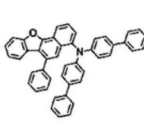
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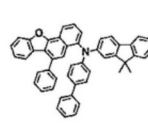
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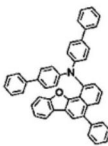
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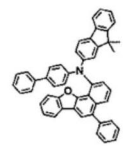
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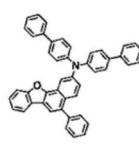
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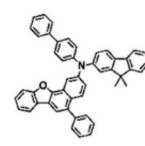
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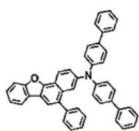
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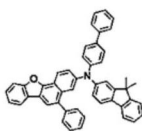
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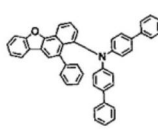
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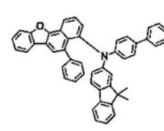
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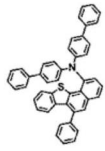
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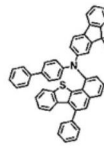
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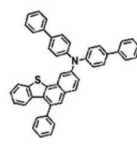
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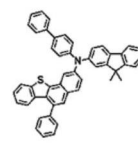
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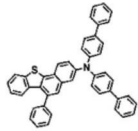
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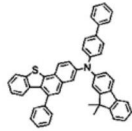
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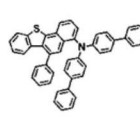
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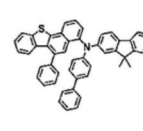
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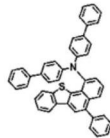
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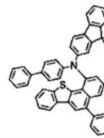
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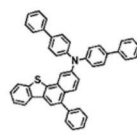
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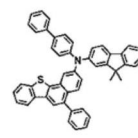
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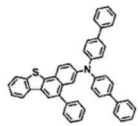
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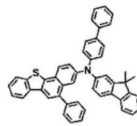
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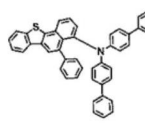
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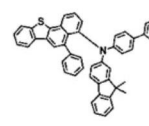
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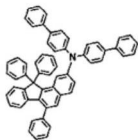
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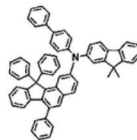
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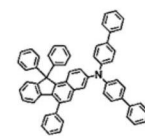
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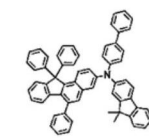
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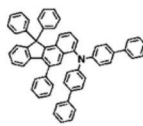
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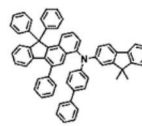
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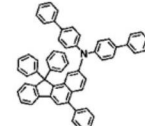
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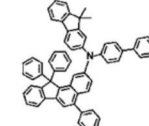
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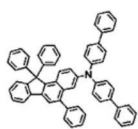
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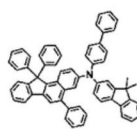
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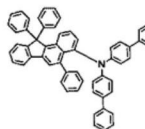
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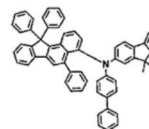
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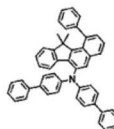
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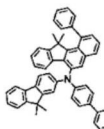
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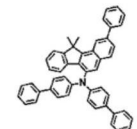
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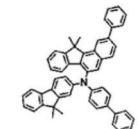
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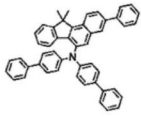
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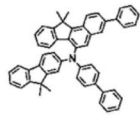
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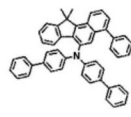
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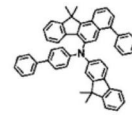
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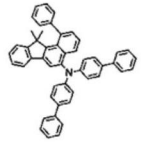
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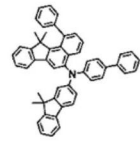
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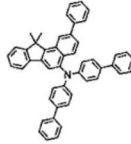
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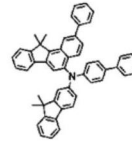
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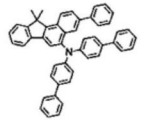
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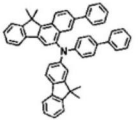
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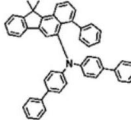
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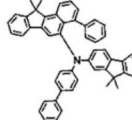
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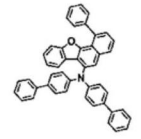
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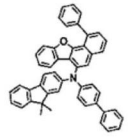
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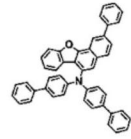
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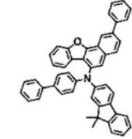
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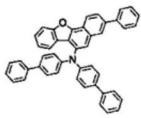
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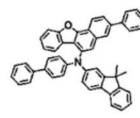
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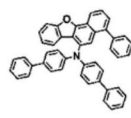
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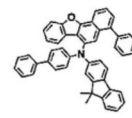
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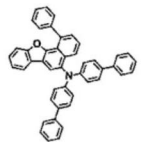
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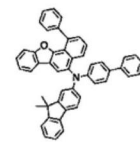
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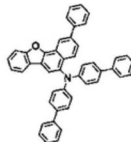
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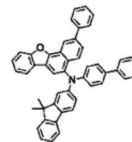
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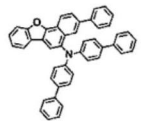
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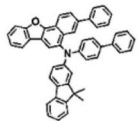
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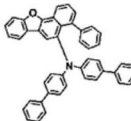
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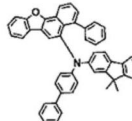
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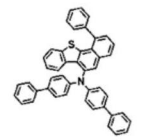
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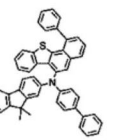
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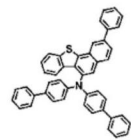
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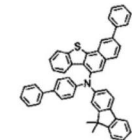
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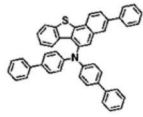
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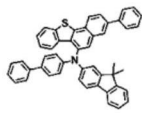
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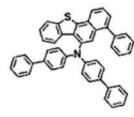
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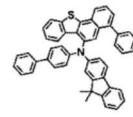
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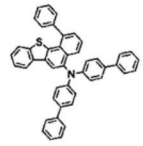
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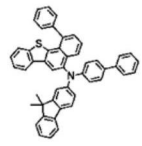
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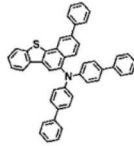
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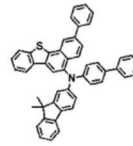
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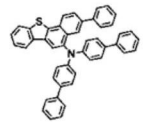
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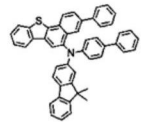
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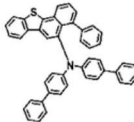
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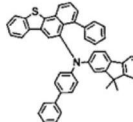
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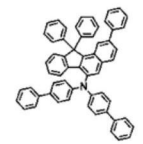
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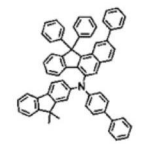
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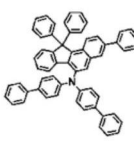
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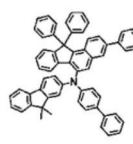
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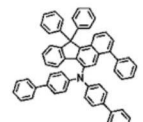
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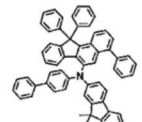
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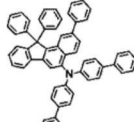
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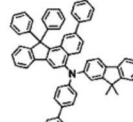
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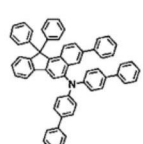
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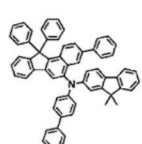
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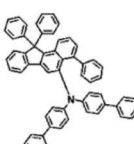
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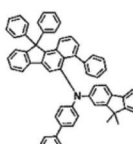
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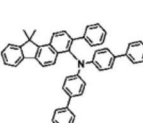
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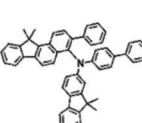
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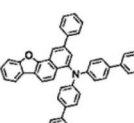
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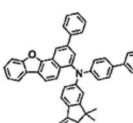
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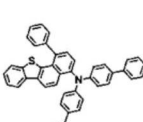
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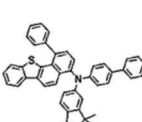
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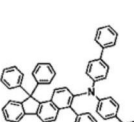
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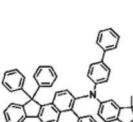
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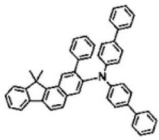
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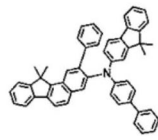
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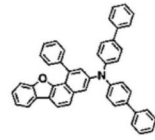
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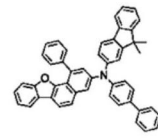
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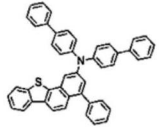
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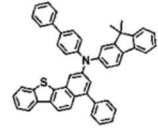
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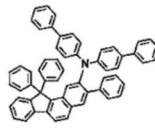
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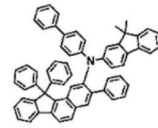
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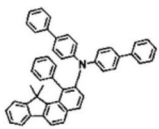
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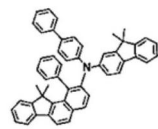
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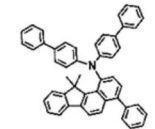
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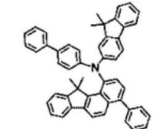
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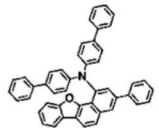
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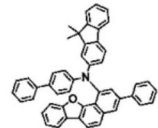
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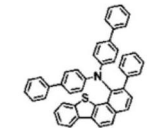
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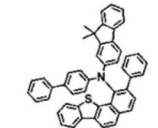
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8. 一种有机发光组件,包括:

第一电极;

第二电极;及

有机材料层,设置于所述第一电极与所述第二电极之间,

其中所述有机材料层包含一或多种如权利要求1至7中任一项所述的化合物。

9. 根据权利要求8所述的有机发光组件,其中所述有机材料层包括空穴传输层,并且所述空穴传输层包含所述化合物。

10. 根据权利要求8所述的有机发光组件,其中所述有机材料层包括电子阻挡层,并且所述电子阻挡层包含所述化合物。

11. 根据权利要求8所述的有机发光组件,还包括选自由发光层、空穴注入层、空穴传输层、电子注入层、电子传输层、电子阻挡层及空穴阻挡层组成的群组中的一个层。

## 化合物以及包括其的有机发光组件

### 技术领域

[0001] 本说明书涉及一种化合物以及包括其的有机发光组件。

[0002] 本申请案主张于2020年9月22日在韩国知识产权局提出申请的韩国专利申请案第10-2020-0122102号的优先权及权益,所述韩国专利申请案的全部内容并入本案供参考。

### 背景技术

[0003] 电致发光组件是一种自发光显示组件,且具有视角宽、响应速度高以及对比度优异的优点。

[0004] 有机发光组件具有在两个电极之间设置有机薄膜的结构。当向具有此种结构的有机发光组件施加电压时,自两个电极注入的电子与空穴在有机薄膜中结合成对,并且随着其湮灭而发光。有机薄膜可根据需要形成为单层或多层。

[0005] 有机薄膜的材料可根据需要具有发光功能。举例而言,作为有机薄膜的材料,可使用能够自身单独形成发光层的化合物,或者亦可使用能够发挥基于主体掺杂剂的发光层的主体或掺杂剂的作用的化合物。除此之外,能够发挥空穴注入、空穴传输、电子阻挡、空穴阻挡、电子传输、电子注入等作用的化合物亦可用作有机薄膜的材料。

[0006] 为提高有机发光组件的效能、寿命或效率,一直需要开发有机薄膜材料。

### 发明内容

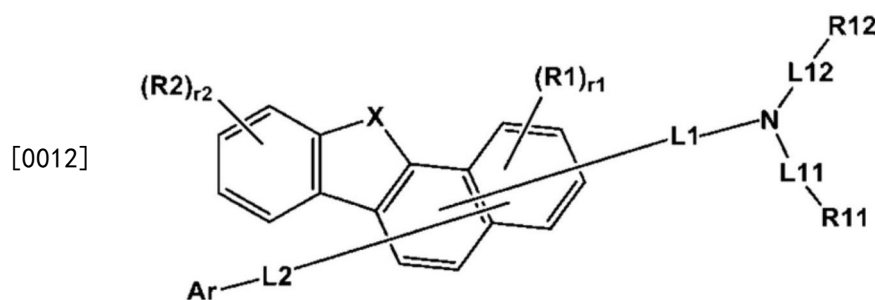
[0007] 技术问题

[0008] 本说明书是有关于提供一种化合物以及包括其的有机发光组件。

[0009] 技术解决方案

[0010] 本说明书的一个实施例提供一种具有以下化学式1的化合物。

[0011] [化学式1]



[0013] 在化学式1中,

[0014] X为O;S;或CR'R",

[0015] R'及R"各自独立地为经取代或未经取代的C1至C60烷基;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基,

[0016] R'与R"彼此键结以形成经取代或未经取代的C3至C30环,

[0017] L1、L2、L11及L12各自独立地为直接键;经取代或未经取代的C6至C60亚芳基;或者经取代或未经取代的C2至C60亚杂芳基,

[0018] R11、R12及Ar各自独立地为经取代或未经取代的C1至C60烷基；经取代或未经取代的C3至C60环烷基；经取代或未经取代的C6至C60芳基；或者经取代或未经取代的C2至C60杂芳基，

[0019] R1及R2各自独立地为氢；氘；卤素基；氰基；经取代或未经取代的C1至C60烷基；经取代或未经取代的C3至C60环烷基；经取代或未经取代的C6至C60芳基；或者经取代或未经取代的C2至C60杂芳基，

[0020] r1为0至4的整数，并且当为2或大于2时，R1彼此相同或不同，并且

[0021] r2为0至4的整数，并且当为2或大于2时，R2彼此相同或不同。

[0022] 此外，本申请案的一个实施例提供一种有机发光组件，所述有机发光组件包括：第一电极；第二电极，与所述第一电极相对设置；以及有机材料层，设置于所述第一电极与所述第二电极之间，其中所述有机材料层包含一或多种具有化学式1的所述化合物。

[0023] 有利效果

[0024] 在本说明书中描述的化合物可用作有机发光组件的有机材料层的材料。所述化合物能够充当空穴注入材料、空穴传输材料、发光材料、电子传输材料、电子注入材料、电荷产生材料等。具体而言，所述化合物可用作有机发光组件的空穴传输层或电子阻挡层的材料。

[0025] 通过增强化学式1的芴骨架中的空穴性质，调节带隙及T1值，且因此，当在有机发光组件中包括化学式1时，获得优异的效率及驱动。

[0026] 具体而言，当使用胺衍生物作为空穴传输层时，胺的非共享电子对改善空穴的流动，由此增强空穴传输层的空穴传输能力，并且当用作电子阻挡层时，可抑制由电子侵入空穴传输层引起的空穴传输材料的劣化。

[0027] 此外，通过将取代基键结至其上，胺衍生物的平面性及玻璃转变温度增加，此增加化合物的热稳定性，并且包含所述化合物的有机发光组件的寿命也得以改善。因此，在有机发光组件中使用具有化学式1的化合物作为空穴传输层或电子阻挡层的材料能够降低驱动电压、增强发光效率并增强组件的寿命性质。

## 附图说明

[0028] 图1至图4是各自示出根据本说明书的一个实施例的有机发光组件的层叠结构的图。

[0029] [符号说明]

[0030] 100:基板

[0031] 200:阳极

[0032] 300:有机材料层

[0033] 301:空穴注入层

[0034] 302:空穴传输层

[0035] 303:电子阻挡层

[0036] 304:发光层

[0037] 305:电子传输层

[0038] 306:电子注入层

[0039] 400:阴极

### 具体实施方式

[0040] 在下文中,将更详细地描述本说明书。

[0041] 在本说明书中,对特定部分“包括”特定构成成分的描述意指能够进一步包括其他构成成分,并且不排除其他构成成分,除非特别进行相反说明。

[0042] 在本说明书中,T1值是指三重态中的能级值。

[0043] 术语“取代”是指与化合物的碳原子键结的氢原子被改变为另一取代基,并且取代的位置不受限制,只要其为氢原子被取代的位置(即取代基能够取代的位置)即可,并且当二或更多个取代基进行取代时,所述二或更多个取代基可彼此相同或不同。

[0044] 在本说明书中,“经取代或未经取代”是指经选自以下组成的群组中的一或多个取代基取代:氘;卤素;氰基;C1至C60烷基;C2至C60烯基;C2至C60炔基;C3至C60环烷基;C2至C60杂环烷基;C6至C60芳基;C2至C60杂芳基;硅烷基;氧化膦基;及胺基,或未经取代,或经连接选自上述取代基中的二或更多个取代基的取代基取代,或未经取代。

[0045] 在本说明书中,“在化学式或化合物结构中未指明取代基的情况”是指氢原子与碳原子键结。然而,由于氘( $^2\text{H}$ )是氢的同位素,因此一些氢原子可为氘。

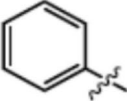
[0046] 在本申请案的一个实施例中,“在化学式或化合物结构中未指明取代基的情况”可指可作为取代基的位置可全部为氢或氘。换言之,由于氘是氢的同位素,因此一些氢原子可为作为同位素的氘,并且在本文中,氘的含量可为0%至100%。

[0047] 在本申请案的一个实施例中,在“在化学式或化合物结构中未指明取代基的情况”下,当未明确排除氘(例如,氘含量为0%、氢含量为100%或取代基全部为氢)时,氢与氘可混合在化合物中。

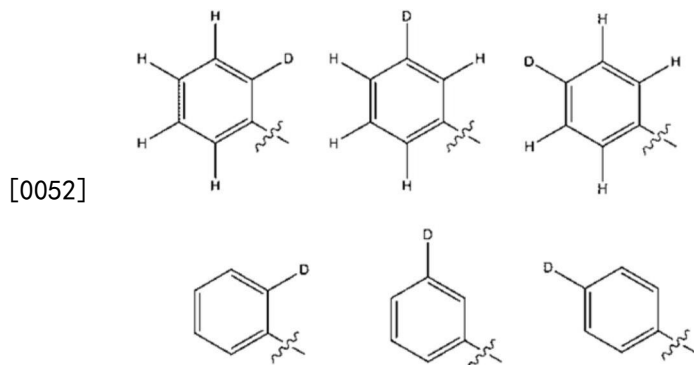
[0048] 在本申请案的一个实施例中,氘是氢的同位素中的一者,是具有以一个质子及一个中子形成的氘核作为核的元素,并且可表示为氢-2,并且元素符号亦可写成D或 $^2\text{H}$ 。

[0049] 在本申请案的一个实施例中,同位素是指具有相同原子序数(Z)但具有不同质量数(A)的原子,且亦可解释为具有相同质子数但具有不同中子数的元素。

[0050] 在本申请案的一个实施例中,当基本化合物可具有的取代基的总数被定义为T1,并且其中特定取代基的数量被定义为T2时,特定取代基的含量T%的含义可被定义为 $T2/T1 \times 100 = T\%$ 。

[0051] 换言之,在一个实例中,在由  表示的苯基中具有20%的氘含量是指苯基

可具有的取代基的总数是5(式中的T1),并且所述取代基中氘的数量是1(式中的T2)。换言之,在苯基中具有20%的氘含量可由以下结构式表示。



[0053] 此外,在本申请案的一个实施例中,“苯基的氘含量为0%”可指不包括氘原子的苯基,即具有5个氢原子的苯基。

[0054] 在本说明书中,卤素可为氟、氯、溴或碘。

[0055] 在本说明书中,烷基包括直链或支链烷基,并且可进一步被其他取代基取代。烷基的碳原子数可为1至60,具体而言为1至40,且更具体而言为1至20。其具体实例可包括甲基、乙基、丙基、正丙基、异丙基、丁基、正丁基、异丁基、第三丁基、第二丁基、1-甲基丁基、1-乙基丁基、戊基、正戊基、异戊基、新戊基、第三戊基、己基、正己基、1-甲基戊基、2-甲基戊基、4-甲基-2-戊基、3,3-二甲基丁基、2-乙基丁基、庚基、正庚基、1-甲基己基、辛基、正辛基、第三辛基、1-甲基庚基、2-乙基己基、2-丙基戊基、正壬基、2,2-二甲基庚基、1-乙基丙基、1,1-二甲基丙基、异己基、2-甲基戊基、4-甲基己基、5-甲基己基等,但并非仅限于此。

[0056] 在本说明书中,烯基包括直链或支链烯基,并且可进一步被其他取代基取代。烯基的碳原子数可为2至60,具体而言为2至40,且更具体而言为2至20。其具体实例可包括乙烯基、1-丙烯基、异丙烯基、1-丁烯基、2-丁烯基、3-丁烯基、1-戊烯基、2-戊烯基、3-戊烯基、3-甲基-1-丁烯基、1,3-丁二烯基、烯丙基、1-苯基乙烯基-1-基、2-苯基乙烯基-1-基、2,2-二苯基乙烯基-1-基、2-苯基-2-(萘基-1-基)乙烯基-1-基、2,2-双(二苯基-1-基)乙烯基-1-基、二苯乙烯基、苯乙烯基等,但并非仅限于此。

[0057] 在本说明书中,炔基包括直链或支链炔基,并且可进一步被其他取代基取代。炔基的碳原子数可为2至60,具体而言为2至40,且更具体而言为2至20。

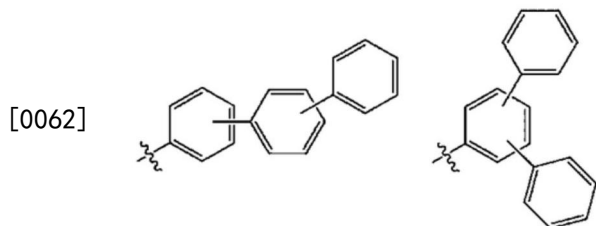
[0058] 在本说明书中,环烷基包括具有3至60个碳原子的单环或多环环烷基,并且可进一步被其他取代基取代。在本文中,多环是指其中环烷基直接连接至其他环状基团或与其他环状基团稠合的基团。在本文中,其他环状基团可为环烷基,但亦可为不同类型的环状基团,例如杂环烷基、芳基及杂芳基。环烷基的碳基团数可为3至60,具体而言为3至40,且更具体而言为5至20。其具体实例可包括环丙基、环丁基、环戊基、3-甲基环戊基、2,3-二甲基环戊基、环己基、3-甲基环己基、4-甲基环己基、2,3-二甲基环己基、3,4,5-三甲基环己基、4-第三丁基环己基、环庚基、环辛基等,但并非仅限于此。

[0059] 在本说明书中,杂环烷基包括O、S、Se、N或Si作为杂原子,包括具有2至60个碳原子的单环或多环杂环烷基,并且可进一步被其他取代基取代。在本文中,多环是指其中杂环烷基直接连接至其他环状基团或与其他环状基团稠合的基团。在本文中,其他环状基团可为杂环烷基,但亦可为不同类型的环状基团,例如环烷基、芳基及杂芳基。杂环烷基的碳原子数可为2至60,具体而言为2至40,且更具体而言为3至20。

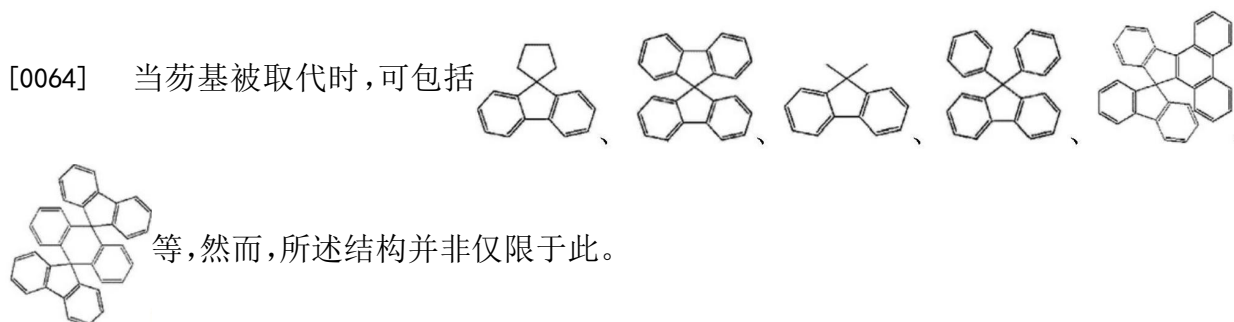
[0060] 在本说明书中,芳基包括具有6至60个碳原子的单环或多环芳基,并且可进一步被

其他取代基取代。在本文中,多环是指其中芳基直接连接至其他环状基团或与其他环状基团耦合的基团。在本文中,其他环状基团可为芳基,但亦可为不同类型的环状基团,例如环烷基、杂环烷基及杂芳基。芳基包括螺环基。芳基的碳原子数可为6至60,具体而言为6至40,且更具体而言为6至25。当芳基为二环或更高环的时,碳原子数可为8至60、8至40或8至30。芳基的具体实例可包括苯基、联苯基、三联苯基、萘基、蒽基、蒾基、菲基、花基、萤蒽基、联三亚苯基、萘基、苊基、稠四苯基、稠五苯基、芴基、茛基、茚基、茚基、苯并茛基、螺二茛基、2,3-二氢-1H-茛基、其稠环基等,但并非仅限于此。

[0061] 在本说明书中,三联苯基可由以下结构中的任一者表示。



[0063] 在本说明书中,茛基可被取代,并且相邻的取代基可彼此键结以形成环。



[0065] 在本说明书中,杂芳基包括O、S、S02、Se、N或Si作为杂原子,包括单环或多环杂芳基,且可进一步经其他取代基取代。在本文中,多环意指其中杂芳基与其他环状基直接连接或耦合的基团。在本文中,其他环状基可为杂芳基,但亦可为不同类型的环状基,例如环烷基、杂环烷基及芳基。杂芳基的碳原子数可为2至60、具体而言为2至40且更具体而言为3至25。杂芳基的具体实例可包括吡啶基、吡咯基、嘧啶基、哒嗪基、呋喃基、噻吩基、咪唑基、吡唑基、恶唑基、异恶唑基、噻唑基、异噻唑基、三唑基、呋咕基、恶二唑基、噻二唑基、二噻唑基、四唑基、吡喃基、噻喃基、二嗪基、恶嗪基、噻嗪基、二恶英基(dioxynyl group)、三嗪基、四嗪基、喹啉基、异喹啉基、喹唑啉基、异喹唑啉基、喹啉基(qninozolinyl group)、萘啶基、吡啶基、菲啶基、咪唑并吡啶基、二氮杂萘基、三氮杂茛基、吡啶基、中氮茛基、苯并噻唑基、苯并恶唑基、苯并咪唑基、苯并噻吩基、苯并呋喃基、二苯并噻吩基、二苯并呋喃基、咪唑基、苯并咪唑基、二苯并咪唑基、啡嗪基、二苯并硅杂环戊二烯基(dibenzosilole group)、螺环二(二苯并硅杂环戊二烯基)、二氢啡嗪基、啡恶嗪基、菲啶基、噻吩基、吡啶并[2,3-a]咪唑基、吡啶并[2,3-b]咪唑基、吡啶啉基、10,11-二氢-二苯并[b,f]氮环庚烯基、9,10-二氢吡啶基、吩嗪基、啡噻嗪基、酞嗪基、萘啶基、啡啉基、苯并[c][1,2,5]噻二唑基、5,10-二氢苯并[b,e][1,4]氮杂硅啉基、吡啶并[1,5-c]噻唑啉基、吡啶并[1,2-b]咪唑基、吡啶并[1,2-a]咪唑基、二氢吡啶基、苯并呋喃并[2,3-d]嘧啶基;苯并噻吩并[2,3-d]嘧啶基;苯并呋喃并[2,3-a]咪唑基、苯并噻吩并[2,3-a]咪唑基、1,3-二氢吡啶并[2,3-a]咪唑

基、苯并呋喃并[3,2-a]咪唑基、苯并噻吩并[3,2-a]咪唑基、1,3-二氢吲哚并[3,2-a]咪唑基、苯并呋喃并[2,3-b]咪唑基、苯并噻吩并[2,3-b]咪唑基、1,3-二氢吲哚并[2,3-b]咪唑基、苯并呋喃并[3,2-b]咪唑基、苯并噻吩并[3,2-b]咪唑基、1,3-二氢吲哚并[3,2-b]咪唑基、苯并呋喃并[2,3-c]咪唑基、苯并噻吩并[2,3-c]咪唑基、1,3-二氢吲哚并[2,3-c]咪唑基、苯并呋喃并[3,2-c]咪唑基、苯并噻吩并[3,2-c]咪唑基、1,3-二氢吲哚并[3,2-c]咪唑基、1,3-二氢茛并[2,1-b]咪唑基、5,11-二氢茛并[1,2-b]咪唑基、5,12-二氢茛并[1,2-c]咪唑基、5,8-二氢茛并[2,1-c]咪唑基、7,12-二氢茛并[1,2-a]咪唑基、11,12-二氢茛并[2,1-a]咪唑基等,但并非仅限于此。

[0066] 在本说明书中,硅烷基是包含Si、Si原子直接连接作为自由基的取代基,并且由-Si(R101)(R102)(R103)表示。R101至R103彼此相同或不同,并且可各自独立地为由以下中的至少一者形成的取代基:氢;氘;卤素基;烷基;烯基;烷氧基;环烷基;芳基;及杂环基。硅烷基的具体实例可包括三甲基硅烷基、三乙基硅烷基、第三丁基二甲基硅烷基、乙烯基二甲基硅烷基、丙基二甲基硅烷基、三苯基硅烷基、二苯基硅烷基、苯基硅烷基等,但并非仅限于此。

[0067] 在本说明书中,氧化磷基由-P(=O)(R104)(R105)表示,并且R104与R105彼此相同或不同,并且可各自独立地为由以下中的至少一者形成的取代基:氢;氘;卤素基;烷基;烯基;烷氧基;环烷基;芳基;及杂芳基。具体而言,氧化磷基可经烷基或芳基取代,并且作为烷基及芳基,可应用上述实例。氧化磷基的实例可包括二甲基氧化磷基、二苯基氧化磷基、二萘基氧化磷基等,但并非仅限于此。

[0068] 在本说明书中,胺基由-N(R106)(R107)表示,并且R106与R107彼此相同或不同,并且可各自独立地为由以下中的至少一者形成的取代基:氢;氘;卤素基;烷基;烯基;烷氧基;环烷基;芳基;及杂芳基。胺基可选自由-NH<sub>2</sub>;单烷基胺基;单芳基胺基;单杂芳基胺基;二烷基胺基;二芳基胺基;二杂芳基胺基;烷基芳基胺基;烷基杂芳基胺基;及芳基杂芳基胺基组成的群组,且尽管并非特别受限于此,但碳原子数较佳为1至30。胺基的具体实例可包括甲基胺基、二甲基胺基、乙基胺基、二乙基胺基、苯基胺基、萘基胺基、联苯基胺基、二联苯基胺基、蒽基胺基、9-甲基-蒽基胺基、二苯基胺基、苯基萘基胺基、二甲苯基胺基、苯基甲苯基胺基、三苯基胺基、联苯基萘基胺基、苯基联苯基胺基、联苯基茛基胺基、苯基联三苯基胺基、联苯基联三苯基胺基等,但并非仅限于此。

[0069] 在本说明书中,除了亚芳基是二价基团之外,上述芳基的实例可应用于亚芳基。

[0070] 在本说明书中,除了亚杂芳基是二价基团之外,上述杂芳基的实例可应用于亚杂芳基。

[0071] 在本说明书中,环包括烃环、杂环或其稠环。

[0072] 在本说明书中,烃环可包括仅由碳及氢形成的所有环,并且可使用上述环烷基及芳基的实例。

[0073] 在本说明书中,杂环可包括包含杂原子的所有环,并且可使用上述杂环烷基及杂芳基的实例。

[0074] 本说明书的一个实施例提供一种由化学式1表示的化合物。

[0075] 在本说明书的一个实施例中,X可为O。

[0076] 在本说明书的一个实施例中,X可为S。

[0077] 在本说明书的一个实施例中,X可为CR'R",R'及R"各自独立地为经取代或未经取代的C1至C60烷基;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基,并且R'与R"可彼此键结以形成经取代或未经取代的C3至C30环。

[0078] 在本说明书的一个实施例中,X可为CR'R",R'及R"各自独立地为经取代或未经取代的C1至C60烷基;或者经取代或未经取代的C6至C60芳基,并且R'与R"可彼此键结以形成经取代或未经取代的C3至C30环。

[0079] 在本说明书的一个实施例中,X可为CR'R",R'及R"各自独立地为经取代或未经取代的C1至C30烷基;或者经取代或未经取代的C6至C30芳基,并且R'与R"可彼此键结以形成经取代或未经取代的C3至C30环。

[0080] 在本说明书的一个实施例中,X可为CR'R",R'及R"各自独立地为经取代或未经取代的C1至C10烷基;或者经取代或未经取代的C6至C20芳基,并且R'与R"可彼此键结以形成经取代或未经取代的C3至C30环。

[0081] 在本说明书的一个实施例中,X可为CR'R",R'及R"各自独立地为C1至C10烷基;或者C6至C20芳基,并且R'与R"可彼此键结以形成C3至C30环。

[0082] 在本说明书的一个实施例中,X可为CR'R",并且R'及R"可各自独立地为C1至C10烷基;或者C6至C20芳基。

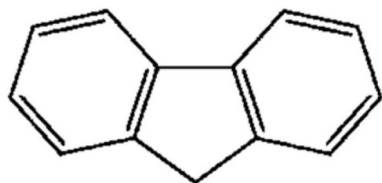
[0083] 在本说明书的一个实施例中,X可为CR'R",并且R'及R"可各自独立地为甲基;或苯基。

[0084] 在本说明书的一个实施例中,X可为CR'R",并且R'与R"可彼此键结以形成C3至C30环。

[0085] 在本说明书的一个实施例中,X可为CR'R",并且R'与R"可彼此键结以形成C3至C20环。

[0086] 在本说明书的一个实施例中,X可为CR'R",并且R'与R"可彼此键结以形成茱萸环。

[0087] 在本说明书的一个实施例中,X可为CR'R",并且R'与R"可彼此键结以形成以下结构的环。



[0088]

[0089] 在本说明书的一个实施例中,L1为直接键;或者经取代或未经取代的C6至C60亚芳基。

[0090] 在本说明书的一个实施例中,L1为直接键;或者经取代或未经取代的C6至C30亚芳基。

[0091] 在本说明书的一个实施例中,L1为直接键;或者经取代或未经取代的C6至C20亚芳基。

[0092] 在本说明书的一个实施例中,L1为直接键;或者C6至C20亚芳基。

[0093] 在本说明书的一个实施例中,L1为直接键;亚苯基;或者亚联苯基。

[0094] 在本说明书的一个实施例中,L2为直接键;或者经取代或未经取代的C6至C60亚芳基。

- [0095] 在本说明书的一个实施例中,L2为直接键;或者经取代或未经取代的C6至C30亚芳基。
- [0096] 在本说明书的一个实施例中,L2为直接键;或者经取代或未经取代的C6至C10亚芳基。
- [0097] 在本说明书的一个实施例中,L2为直接键;或者C6至C10亚芳基。
- [0098] 在本说明书的一个实施例中,L2为直接键;或者亚苯基。
- [0099] 在本说明书的一个实施例中,L2可为直接键。
- [0100] 在本说明书的一个实施例中,L11及L12各自独立地为直接键;或者经取代或未经取代的C6至C60亚芳基。
- [0101] 在本说明书的一个实施例中,L11及L12各自独立地为直接键;或者经取代或未经取代的C6至C30亚芳基。
- [0102] 在本说明书的一个实施例中,L11及L12各自独立地为直接键;或者经取代或未经取代的C6至C20亚芳基。
- [0103] 在本说明书的一个实施例中,L11及L12各自独立地为直接键;或者C6至C20亚芳基。
- [0104] 在本说明书的一个实施例中,L11及L12各自独立地为直接键;或者亚苯基。
- [0105] 在本说明书的一个实施例中,L11为直接键,且L12为直接键;或者经取代或未经取代的C6至C30亚芳基。
- [0106] 在本说明书的一个实施例中,L11为直接键,且L12为直接键;或者经取代或未经取代的C6至C10亚芳基。
- [0107] 在本说明书的一个实施例中,L11为直接键,且L12为直接键;或者C6至C10亚芳基。
- [0108] 在本说明书的一个实施例中,L11为直接键,且L12为直接键;或者亚苯基。
- [0109] 在本说明书的一个实施例中,R11及R12各自独立地为经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基。
- [0110] 在本说明书的一个实施例中,R11及R12各自独立地为经取代或未经取代的C6至C30芳基;或者经取代或未经取代的C2至C30杂芳基。
- [0111] 在本说明书的一个实施例中,R11及R12各自独立地为经取代或未经取代的苯基;经取代或未经取代的联苯基;经取代或未经取代的三联苯基;经取代或未经取代的萘基;经取代或未经取代的茚基;经取代或未经取代的二苯并呋喃基;或者经取代或未经取代的二苯并噻吩基。
- [0112] 在本说明书的一个实施例中,R11及R12各自独立地为经取代或未经取代的苯基;经取代或未经取代的联苯基;经取代或未经取代的三联苯基;经取代或未经取代的萘基;未经取代或经烷基或芳基取代的茚基;9,9'-螺二[茚];经取代或未经取代的二苯并呋喃基;或者经取代或未经取代的二苯并噻吩基。
- [0113] 在本说明书的一个实施例中,R11及R12各自独立地为苯基;联苯基;三联苯基;萘基;未经取代或经甲基或苯基取代的茚基;9,9'-螺二[茚];二苯并呋喃基;或二苯并噻吩基。
- [0114] 在本说明书的一个实施例中,R11为经取代或未经取代的C6至C30芳基,且R12为经取代或未经取代的C6至C30芳基;或者经取代或未经取代的C2至C30杂芳基。

[0115] 在本说明书的一个实施例中,R11为经取代或未经取代的苯基;经取代或未经取代的联苯基;经取代或未经取代的三联苯基;经取代或未经取代的萘基;未经取代或经烷基或芳基取代的苧基;或9,9'-螺二[苧],且R12为经取代或未经取代的苯基;经取代或未经取代的联苯基;经取代或未经取代的三联苯基;经取代或未经取代的萘基;未经取代或经烷基或芳基取代的苧基;9,9'-螺二[苧];经取代或未经取代的二苯并呋喃基;或者经取代或未经取代的二苯并噻吩基。

[0116] 在本说明书的一个实施例中,当R11为二苯并呋喃基或二苯并噻吩基时,L11为经取代或未经取代的C6至C30亚芳基。

[0117] 在本说明书的一个实施例中,当R11为二苯并呋喃基或二苯并噻吩基时,L11为C6至C30亚芳基。

[0118] 在本说明书的一个实施例中,当R11为二苯并呋喃基或二苯并噻吩基时,L11为亚苯基。

[0119] 在本说明书的一个实施例中,当R12为二苯并呋喃基或二苯并噻吩基时,L12为经取代或未经取代的C6至C30亚芳基。

[0120] 在本说明书的一个实施例中,当R12为二苯并呋喃基或二苯并噻吩基时,L12为C6至C30亚芳基。

[0121] 在本说明书的一个实施例中,当R12为二苯并呋喃基或二苯并噻吩基时,L12为亚苯基。

[0122] 在本说明书的一个实施例中,Ar为经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基。

[0123] 在本说明书的一个实施例中,Ar为经取代或未经取代的C6至C30芳基;或者经取代或未经取代的C2至C30杂芳基。

[0124] 在本说明书的一个实施例中,Ar为经取代或未经取代的C6至C20芳基;或者经取代或未经取代的C2至C20杂芳基。

[0125] 在本说明书的一个实施例中,Ar为经取代或未经取代的苯基;经取代或未经取代的联苯基;经取代或未经取代的菲基;经取代或未经取代的联三亚苯基;经取代或未经取代的二苯并呋喃基;或者经取代或未经取代的二苯并噻吩基。

[0126] 在本说明书的一个实施例中,Ar为C6至C60芳基;或者C2至C60杂芳基。

[0127] 在本说明书的一个实施例中,Ar为C6至C30芳基;或者C2至C30杂芳基。

[0128] 在本说明书的一个实施例中,Ar为C6至C20芳基;或者C2至C20杂芳基。

[0129] 在本说明书的一个实施例中,Ar为苯基;联苯基;菲基;联三亚苯基;二苯并呋喃基;或二苯并噻吩基。

[0130] 在本说明书的一个实施例中,R1及R2各自独立地为氢;氘;经取代或未经取代的C1至C60烷基;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基。

[0131] 在本说明书的一个实施例中,R1及R2各自独立地为氢;氘;经取代或未经取代的C6至C60芳基;或者经取代或未经取代的C2至C60杂芳基。

[0132] 在本说明书的一个实施例中,R1及R2各自独立地为氢;氘;经取代或未经取代的C6至C30芳基;或者经取代或未经取代的C2至C30杂芳基。

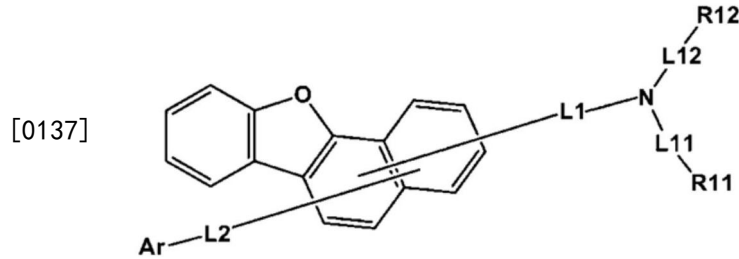
[0133] 在本说明书的一个实施例中,R1及R2各自独立地为氢;氘;C6至C30芳基;或者C2至

C30杂芳基。

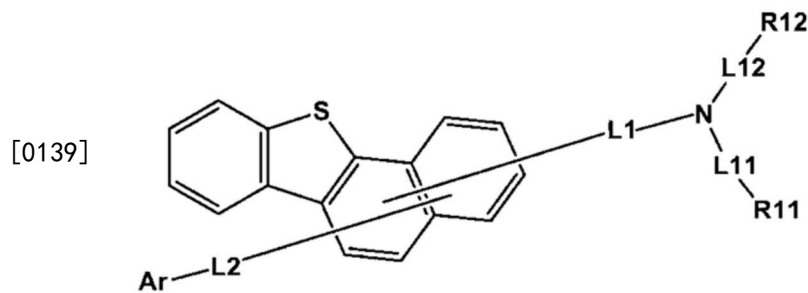
[0134] 在本说明书的一个实施例中,R1及R2各自独立地为氢;或者氘。

[0135] 在本说明书的一个实施例中,化学式1可由以下化学式1-1至化学式1-4中的任一者表示。

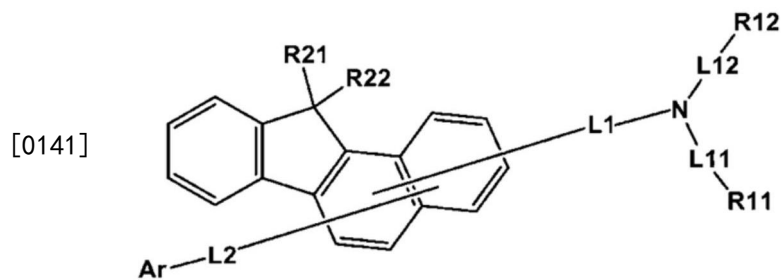
[0136] [化学式1-1]



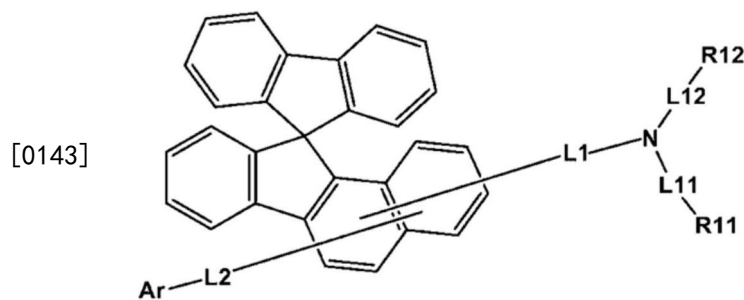
[0138] [化学式1-2]



[0140] [化学式1-3]



[0142] [化学式1-4]



[0144] 在化学式1-1至化学式1-4中,

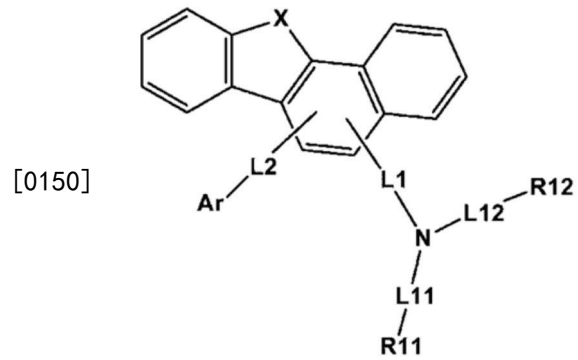
[0145] L1、L2、L11、L12、R11、R12及Ar具有与化学式1中相同的定义,并且R21及R22各自独立地为经取代或未经取代的C1至C10烷基;或者经取代或未经取代的C6至C20芳基。

[0146] 在本说明书的一个实施例中,R21及R22各自独立地为C1至C10烷基;或者C6至C20芳基。

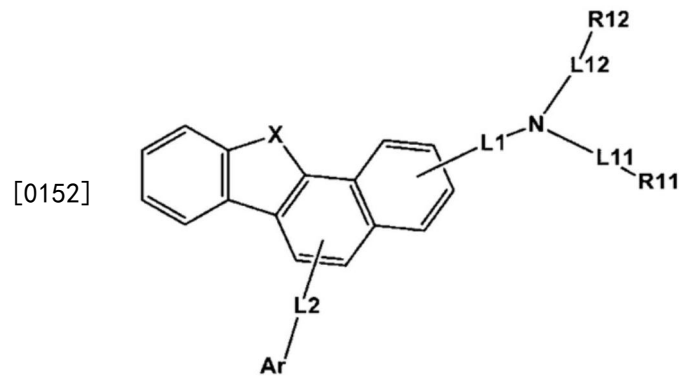
[0147] 在本说明书的一个实施例中,R21及R22各自独立地为甲基;或者苯基。

[0148] 在本说明书的一个实施例中,化学式1可由以下化学式2至化学式5中的任一者表示。

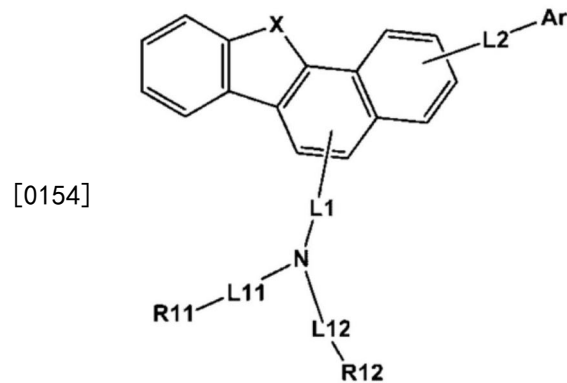
[0149] [化学式2]



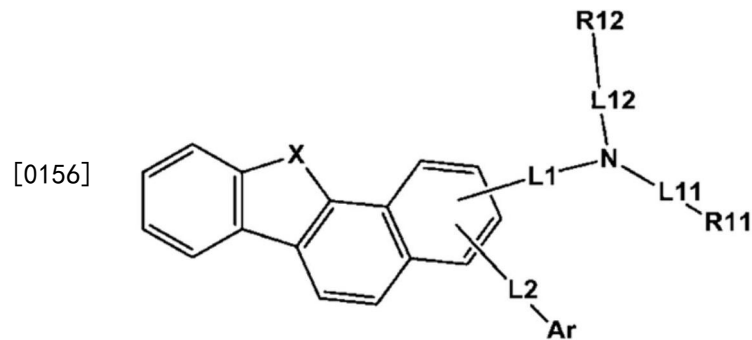
[0151] [化学式3]



[0153] [化学式4]



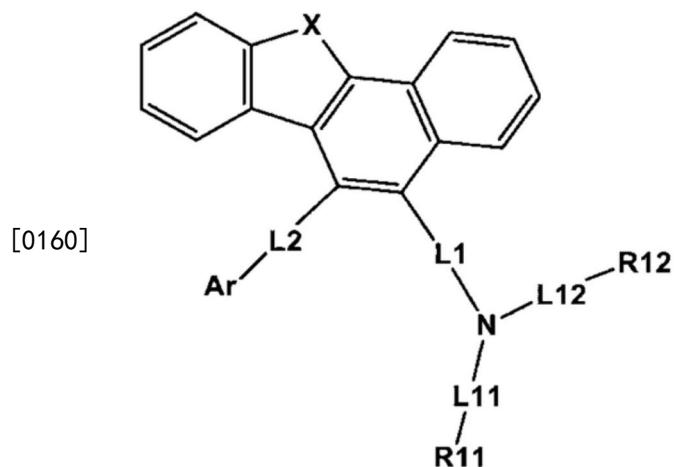
[0155] [化学式5]



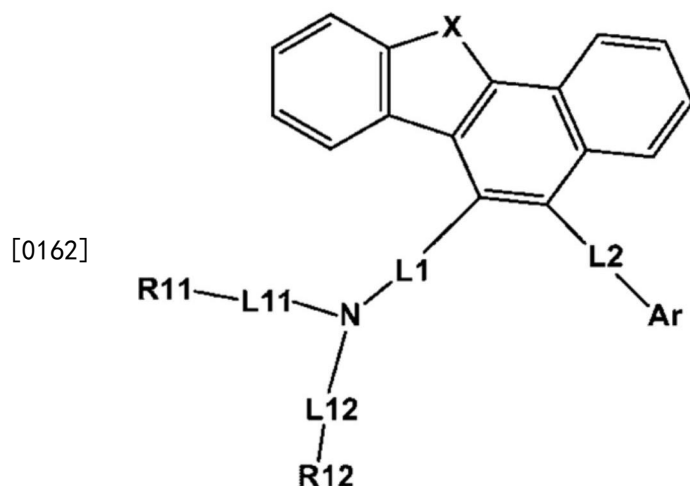
[0157] 在化学式2至化学式5中,

[0158] X、L1、L2、L11、L12、R11、R12及Ar具有与化学式1中相同的定义。在本说明书的一个实施例中，化学式1可由以下化学式2-1或化学式2-2表示。

[0159] [化学式2-1]



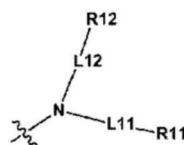
[0161] [化学式2-2]



[0163] 在化学式2-1及化学式2-2中，

[0164] X、L1、L2、L11、L12、R11、R12及Ar具有与化学式1中相同的定义。

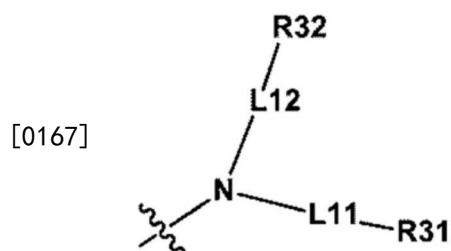
[0165] 在本说明书的一个实施例中，化学式1的



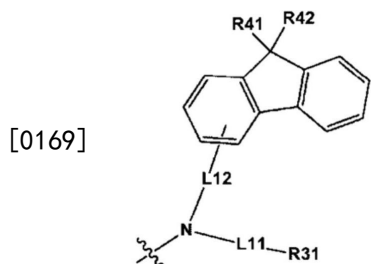
可由以下化学式N-1至化学

式N-3中的任一者表示。

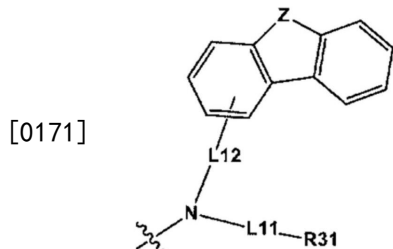
[0166] [化学式N-1]



[0168] [化学式N-2]



[0170] [化学式N-3]



[0172] 在化学式N-1至化学式N-3中，

[0173] L11及L12具有与化学式1中相同的定义，

[0174] R31为经取代或未经取代的C6至C60芳基，

[0175] R32为经取代或未经取代的C6至C12芳基，

[0176] R41及R42各自独立地为经取代或未经取代的C1至C10烷基；或者经取代或未经取代的C6至C30芳基，并且R41与R42可彼此键结以形成经取代或未经取代的C3至C30环，

[0177] Z为O；S；或者N(R51)，且

[0178] R51为氢；氘；经取代或未经取代的C1至C10烷基；或者经取代或未经取代的C6至C30芳基。

[0179] 在本说明书的一个实施例中，化学式N-1至化学式N-3的R31为经取代或未经取代的C6至C30芳基。

[0180] 在本说明书的一个实施例中，R31为经取代或未经取代的C6至C20芳基。

[0181] 在本说明书的一个实施例中，R31为经取代或未经取代的苯基；经取代或未经取代的联苯基；经取代或未经取代的三联苯基；经取代或未经取代的萘基；或者经取代或未经取代的苝基。

[0182] 在本说明书的一个实施例中，R31为苯基；联苯基；三联苯基；萘基；未经取代或经甲基或苯基取代的苝基；或者9,9'-螺二[苝]。

[0183] 在本说明书的一个实施例中，化学式N-1的R32为经取代或未经取代的苯基；经取代或未经取代的联苯基；或者经取代或未经取代的萘基。

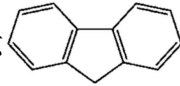
[0184] 在本说明书的一个实施例中，R32为苯基；联苯基；或者萘基。

[0185] 在本说明书的一个实施例中，化学式N-2的R41及R42各自独立地为C1至C10烷基；或者C6至C30芳基，并且R41与R42可彼此键结以形成经取代或未经取代的C3至C30环。

[0186] 在本说明书的一个实施例中，R41及R42各自独立地为C1至C5烷基；或者C6至C15芳基，并且R41与R42可彼此键结以形成C3至C30环。

[0187] 在本说明书的一个实施例中，R41及R42各自独立地为C1至C5烷基；或者C6至C15芳

基,并且R41与R42可彼此键结以形成环



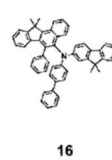
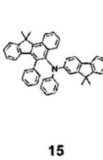
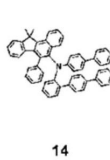
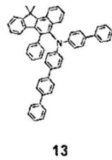
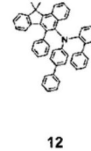
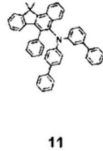
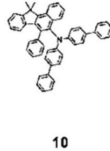
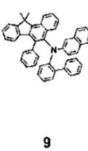
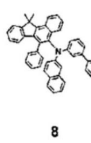
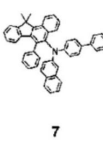
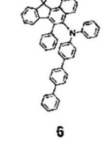
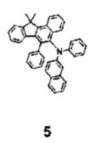
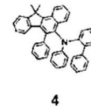
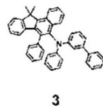
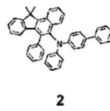
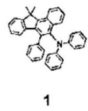
[0188] 在本说明书的一个实施例中,化学式N-3的Z可为0。

[0189] 在本说明书的一个实施例中,Z可为S。

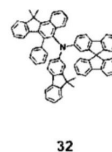
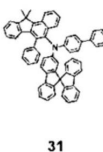
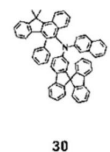
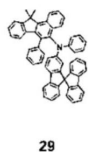
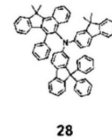
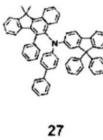
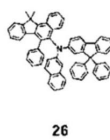
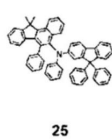
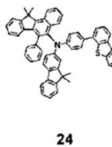
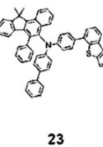
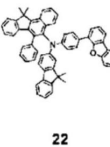
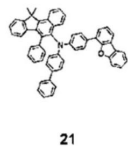
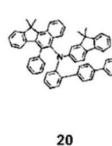
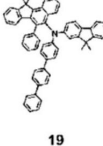
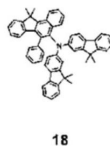
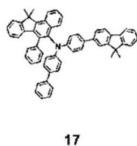
[0190] 在本说明书的一个实施例中,Z为N(R51),并且R51可为氢;氘;经取代或未经取代的C1至C10烷基;或者经取代或未经取代的C6至C30芳基。

[0191] 在本说明书的一个实施例中,Z为N(R51),并且R51可为氢;氘;C1至C10烷基;或者C6至C30芳基。

[0192] 在本说明书的一个实施例中,化学式1可由以下化合物中的任一者表示,但并非仅限于此。



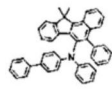
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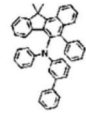
[0194]



33



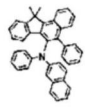
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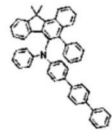
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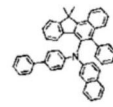
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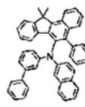
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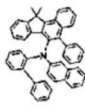
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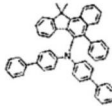
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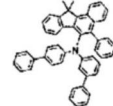
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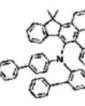
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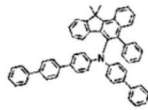
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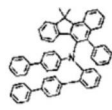
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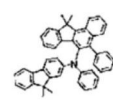
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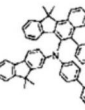
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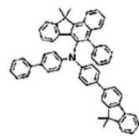
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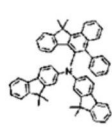
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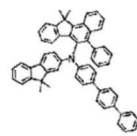
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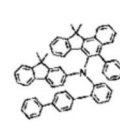
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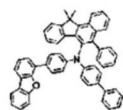
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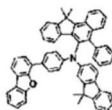
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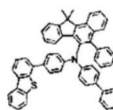
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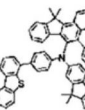
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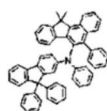
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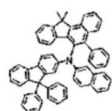
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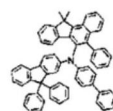
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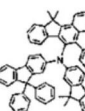
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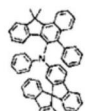
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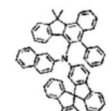
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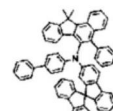
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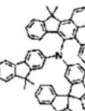
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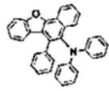
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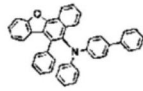
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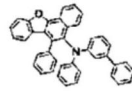
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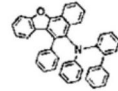
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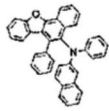
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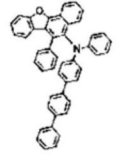
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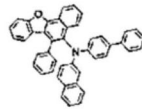
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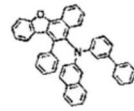
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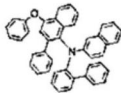
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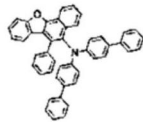
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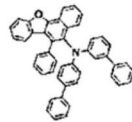
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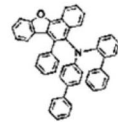
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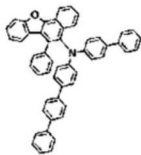
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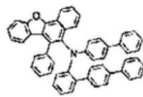
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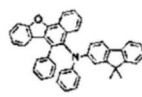
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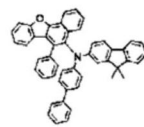
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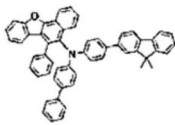


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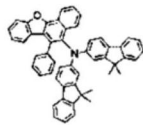


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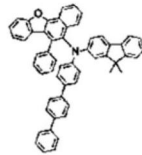
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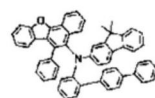
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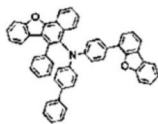
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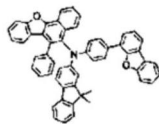
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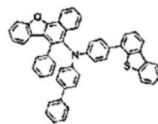
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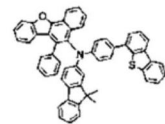
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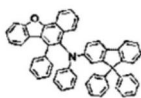
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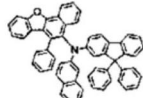
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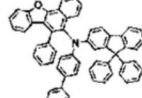
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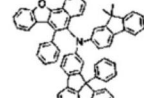
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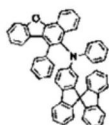
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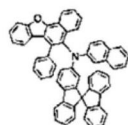
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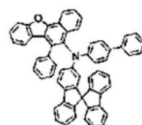
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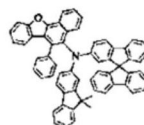
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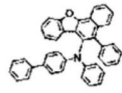
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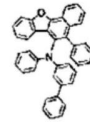
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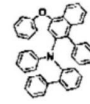
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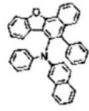
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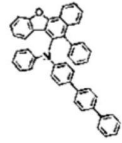
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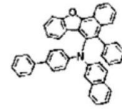
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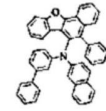
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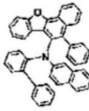
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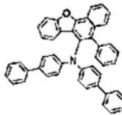
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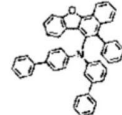
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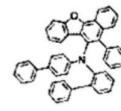
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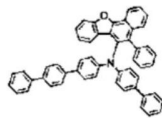
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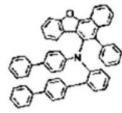
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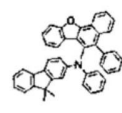
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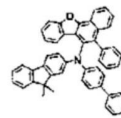
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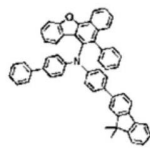


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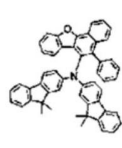


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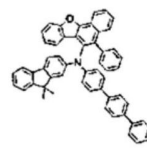
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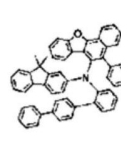
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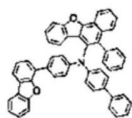
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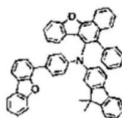
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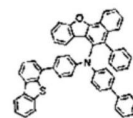
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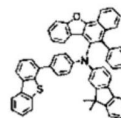
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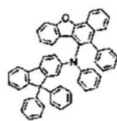
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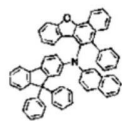
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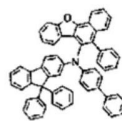
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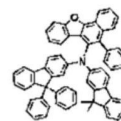
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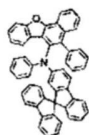
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123



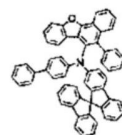
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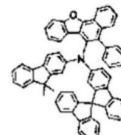
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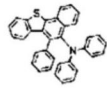
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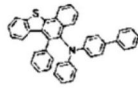
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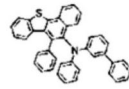
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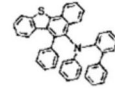
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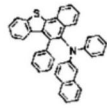
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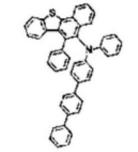
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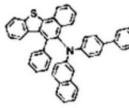
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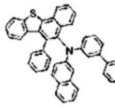
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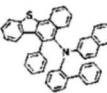
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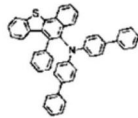
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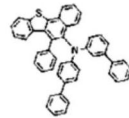
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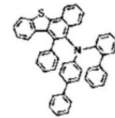
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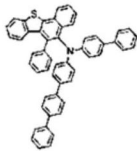
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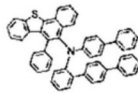
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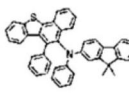
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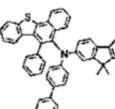
141



142

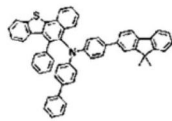


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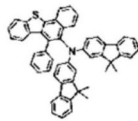


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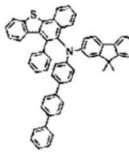
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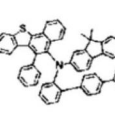
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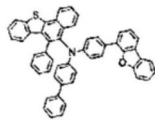
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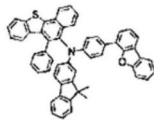
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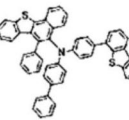
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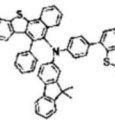
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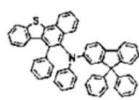
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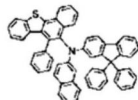
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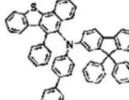
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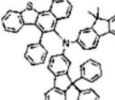
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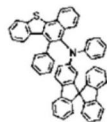
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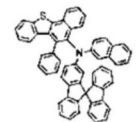
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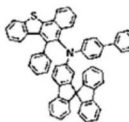
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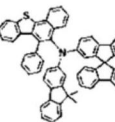
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158



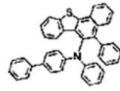
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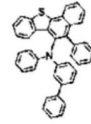
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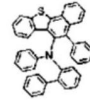
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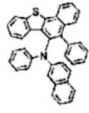
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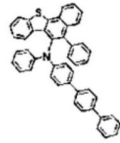
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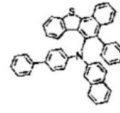
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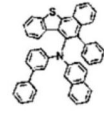
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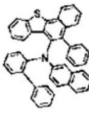
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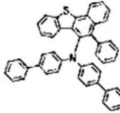
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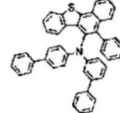
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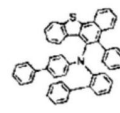
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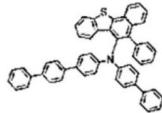
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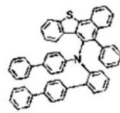
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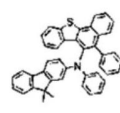
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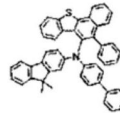
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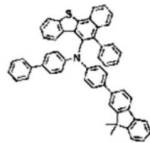


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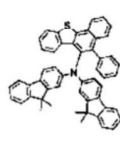


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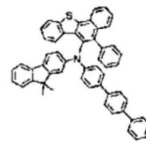
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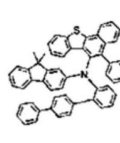
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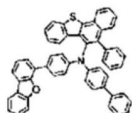
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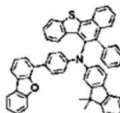
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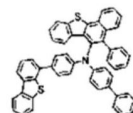
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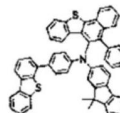
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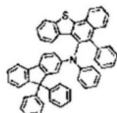
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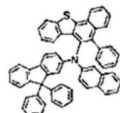
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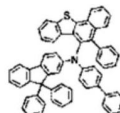
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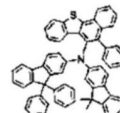
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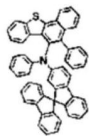
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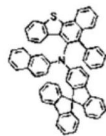
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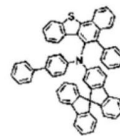
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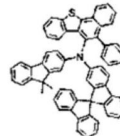
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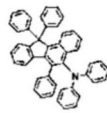
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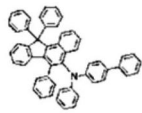
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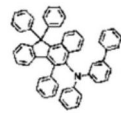
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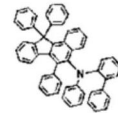
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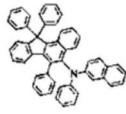
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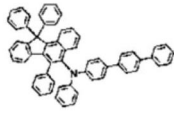
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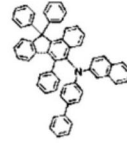
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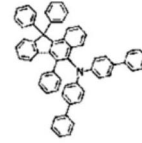
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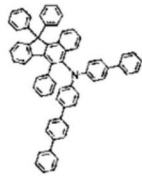
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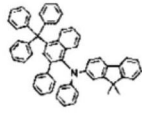
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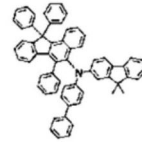
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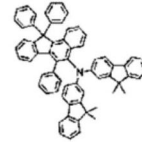
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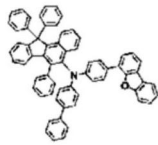
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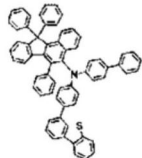
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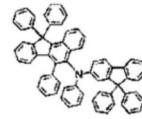
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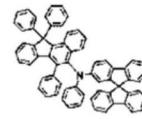
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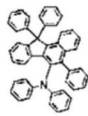


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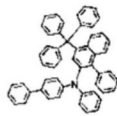


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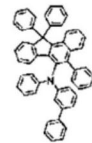
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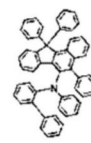
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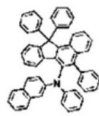
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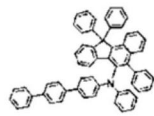
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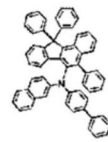
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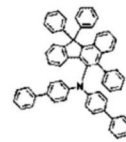
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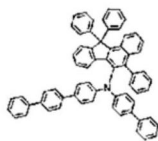
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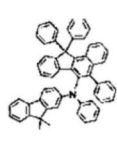
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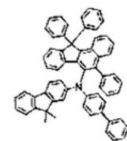
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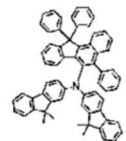
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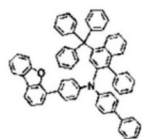
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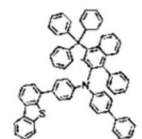
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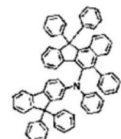
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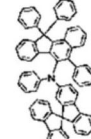
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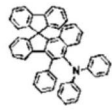
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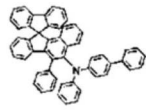
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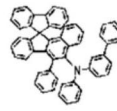
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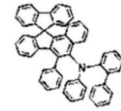
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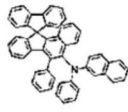
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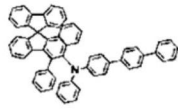
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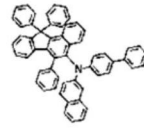
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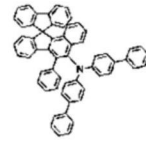
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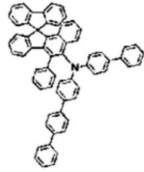
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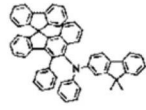
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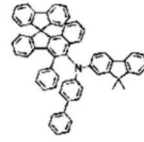
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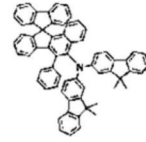
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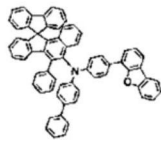
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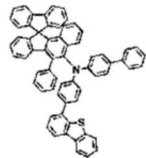
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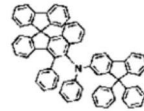
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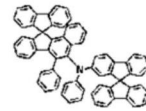
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238



239

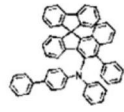


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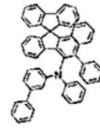
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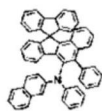
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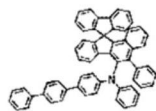
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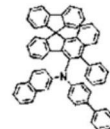
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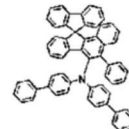
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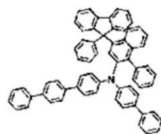
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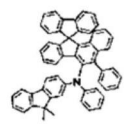
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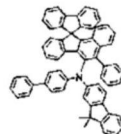
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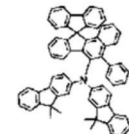
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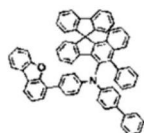
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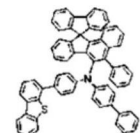
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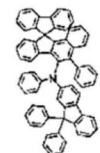
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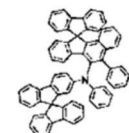
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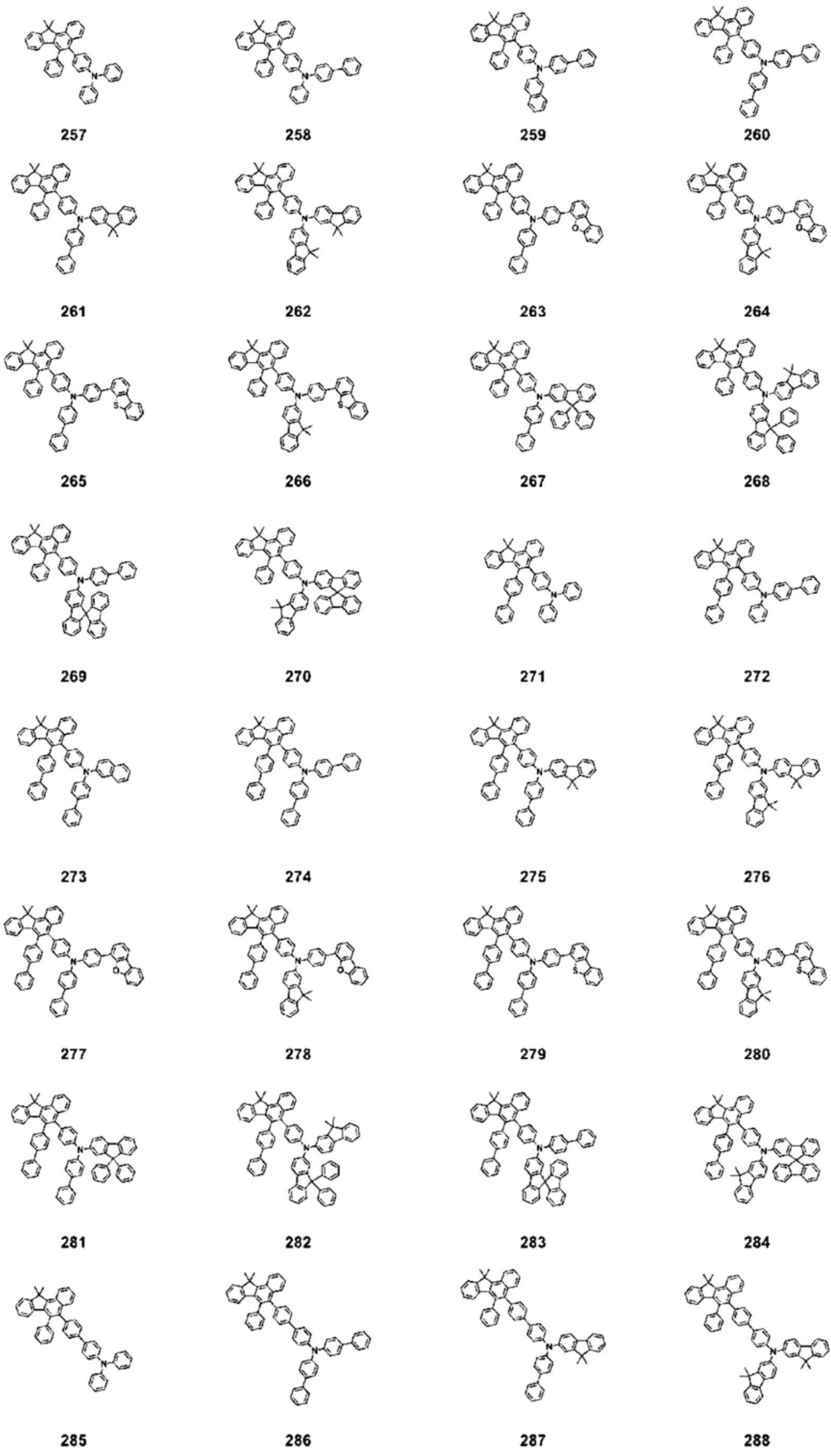
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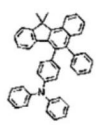


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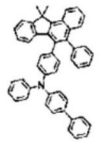


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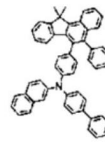




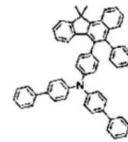
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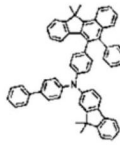
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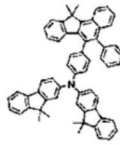
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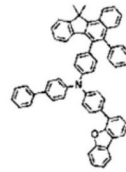
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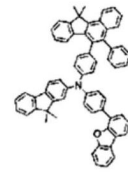
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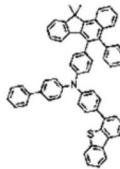
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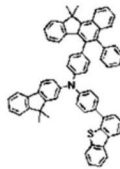
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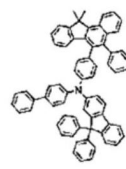
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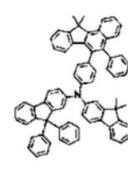
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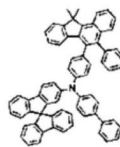
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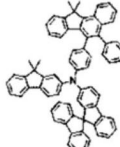
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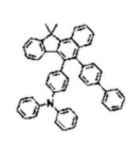
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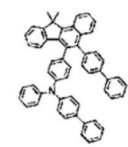
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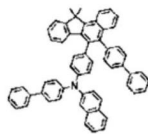


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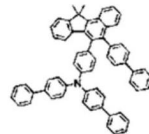


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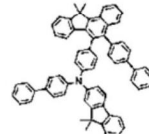
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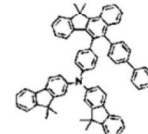
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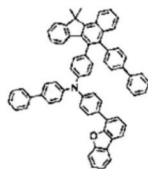
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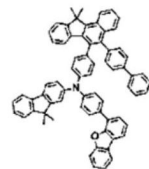
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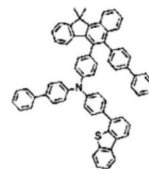
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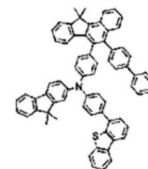
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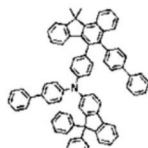
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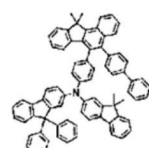
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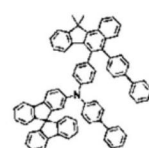
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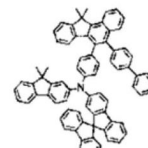
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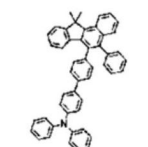
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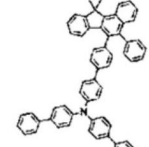
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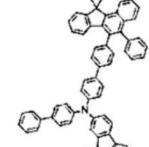
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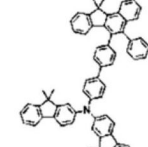
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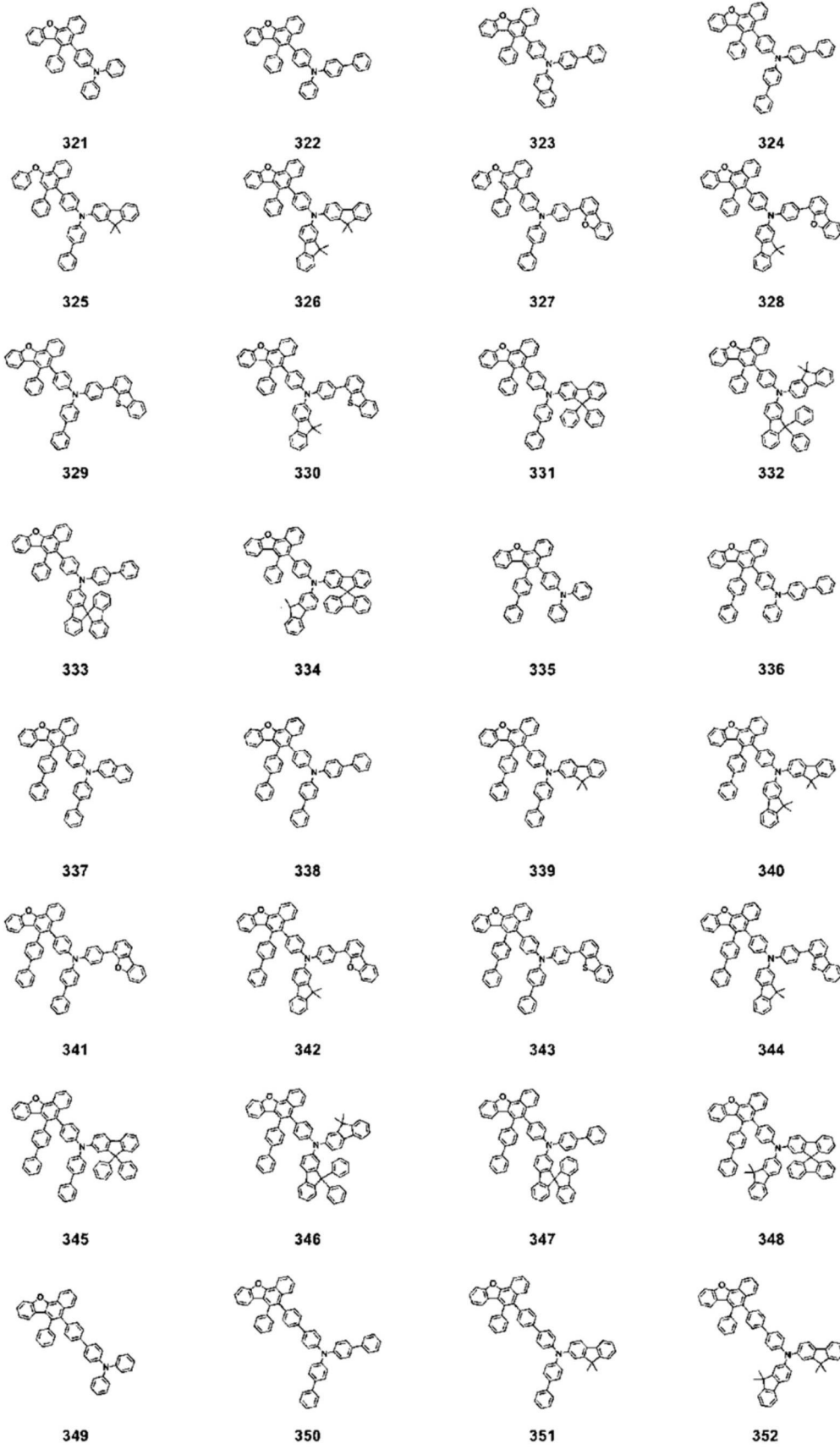
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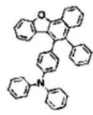


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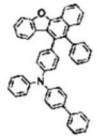


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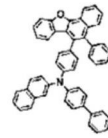




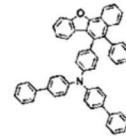
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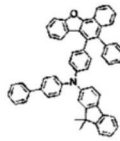
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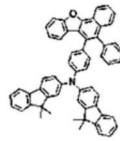
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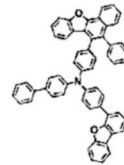
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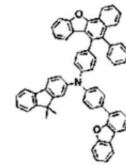
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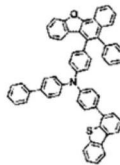
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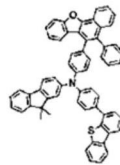
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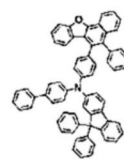
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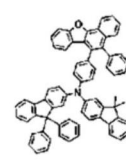
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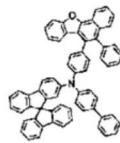
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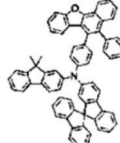
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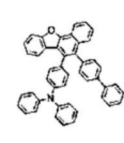
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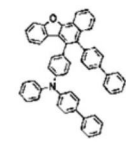
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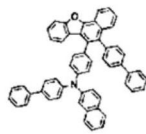


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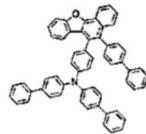


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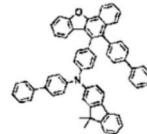
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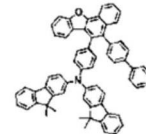
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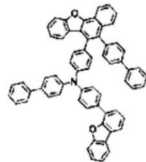
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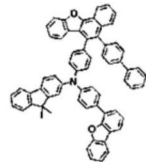
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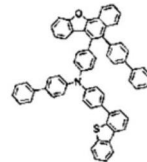
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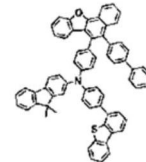
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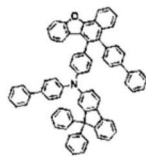
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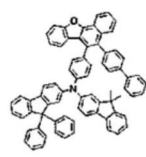
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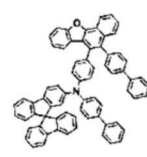
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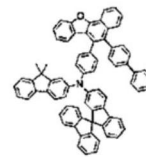
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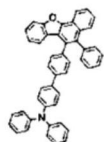
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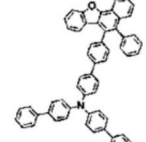
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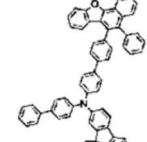


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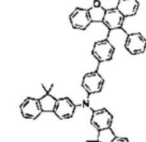


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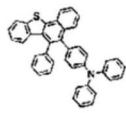
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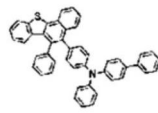
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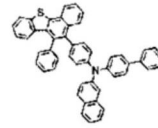
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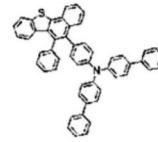
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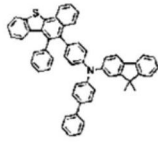
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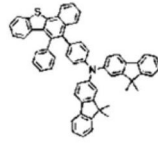
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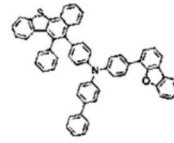
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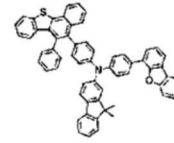
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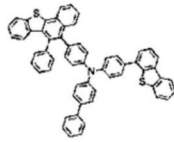
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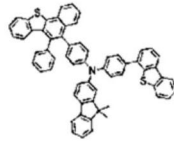
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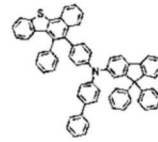
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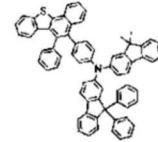
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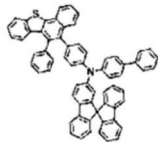
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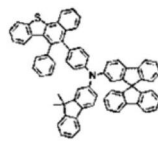
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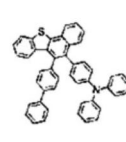
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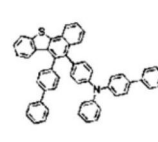
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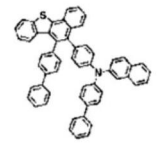


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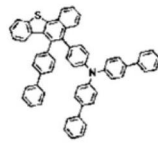


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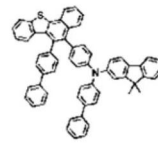
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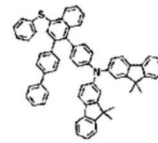
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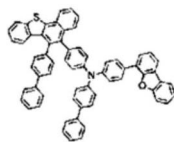
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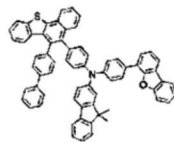
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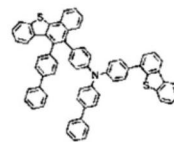
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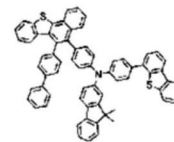
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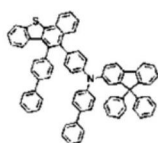
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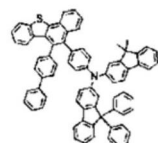
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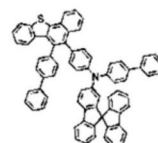
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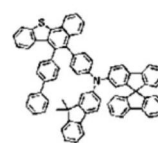
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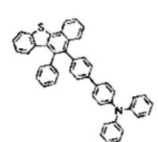
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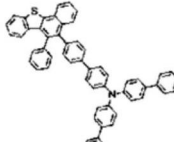
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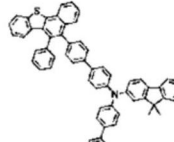
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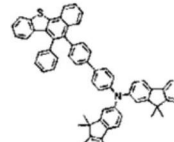
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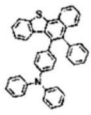
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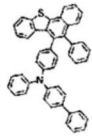
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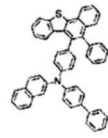
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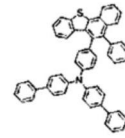
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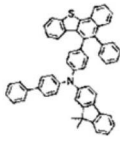
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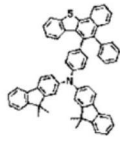
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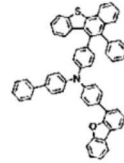
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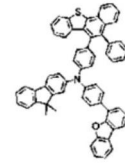
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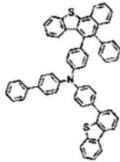
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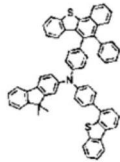
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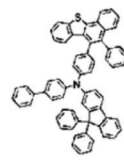
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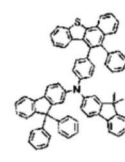
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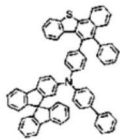
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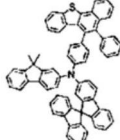
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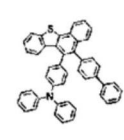
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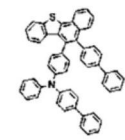
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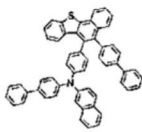


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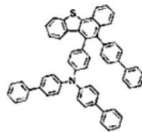


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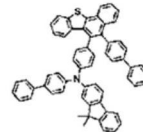
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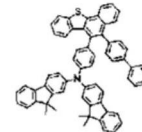
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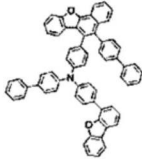
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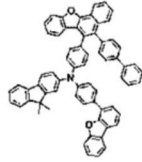
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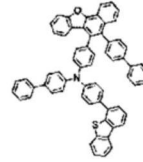
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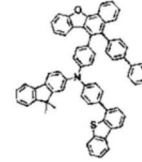
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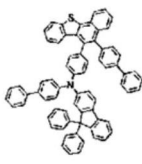
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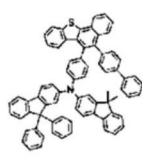
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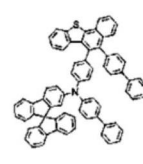
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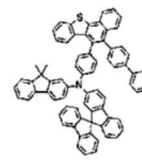
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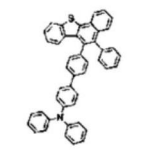
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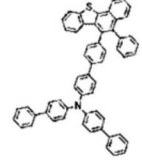
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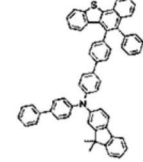
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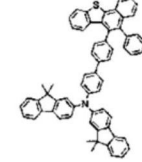
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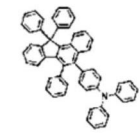


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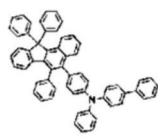


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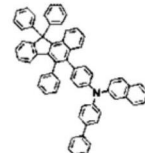
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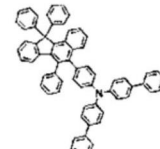
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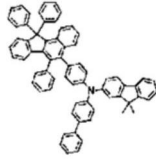
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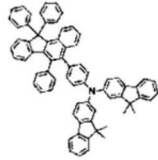
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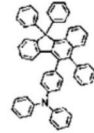
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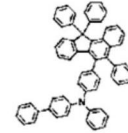
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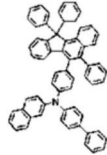
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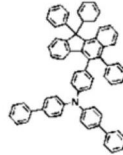
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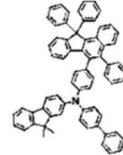
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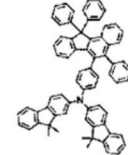
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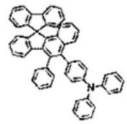
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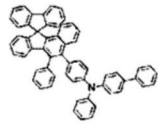
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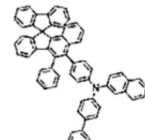
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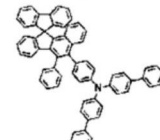
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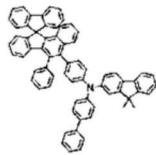
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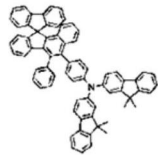
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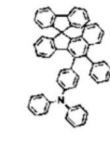
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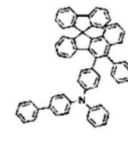
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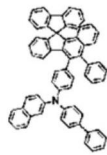
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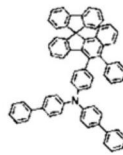
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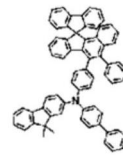
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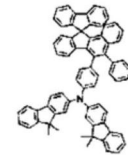
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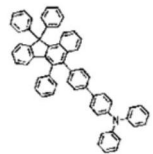
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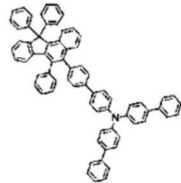
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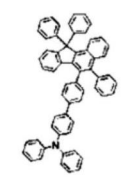
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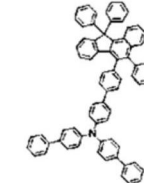
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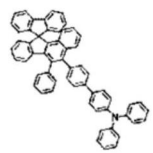
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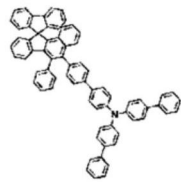
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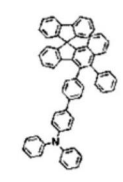
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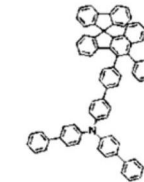
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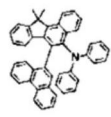
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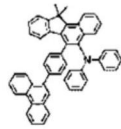
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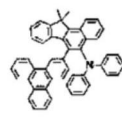
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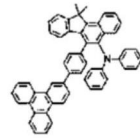
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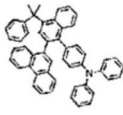
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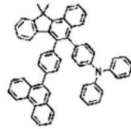
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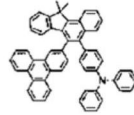
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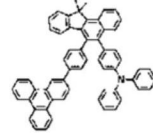
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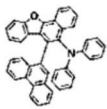
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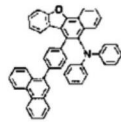
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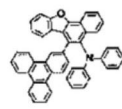
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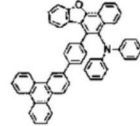
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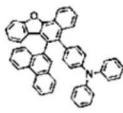
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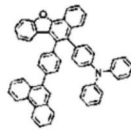
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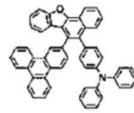
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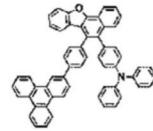
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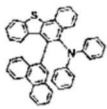


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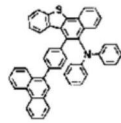


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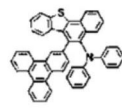
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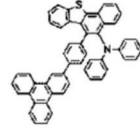
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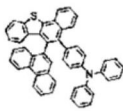
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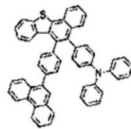
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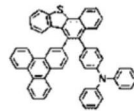
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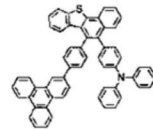
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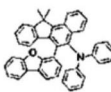
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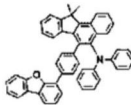
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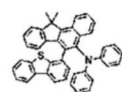
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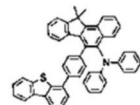
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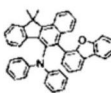
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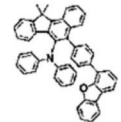
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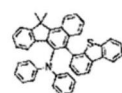
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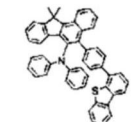
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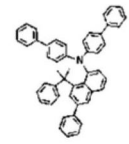
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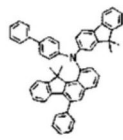
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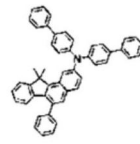
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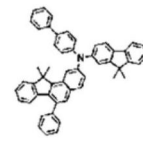
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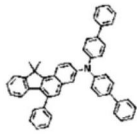
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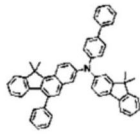
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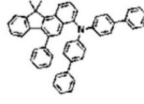
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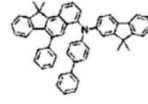
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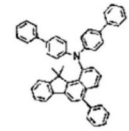
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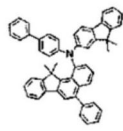
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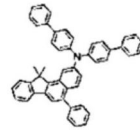
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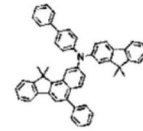
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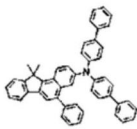
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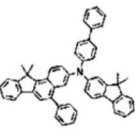
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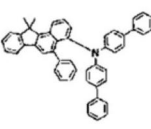
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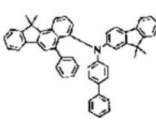
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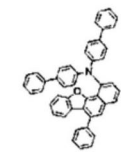


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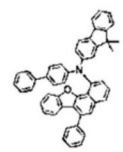


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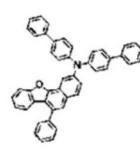
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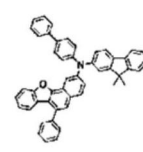
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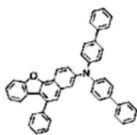
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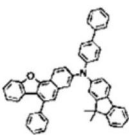
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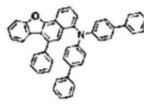
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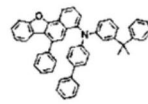
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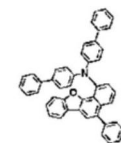
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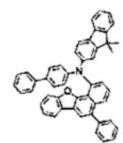
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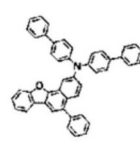
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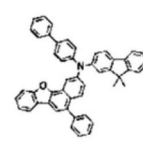
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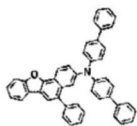
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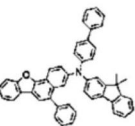
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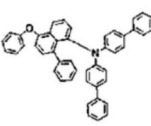
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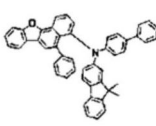
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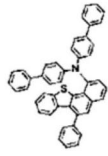
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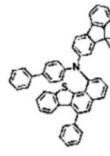
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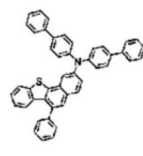
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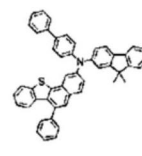
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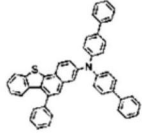
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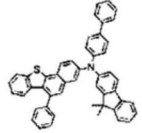
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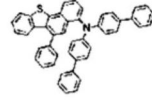
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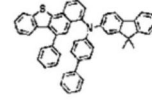
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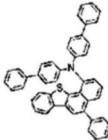
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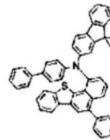
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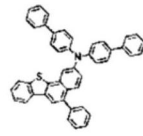
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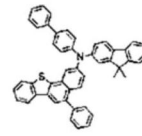
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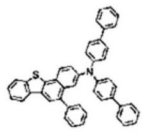
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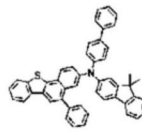
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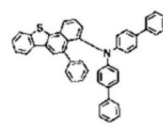
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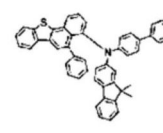
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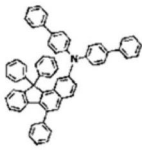


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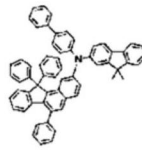


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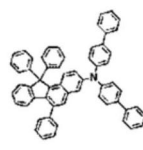
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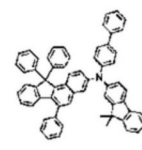
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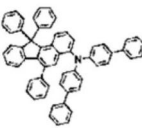
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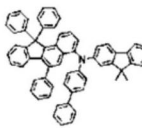
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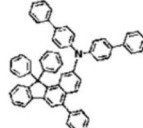
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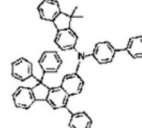
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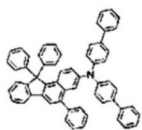
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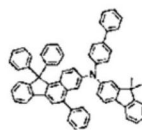
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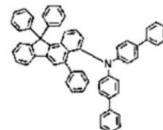
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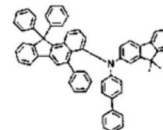
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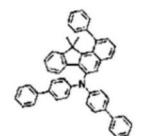
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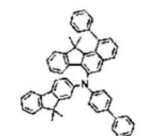
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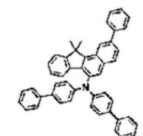
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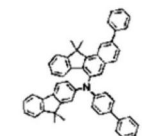
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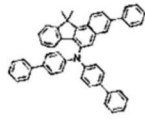
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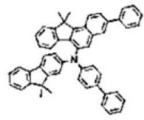
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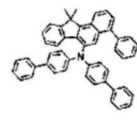
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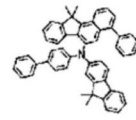
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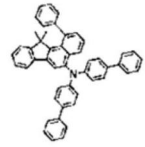
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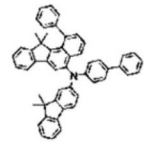
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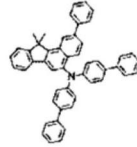
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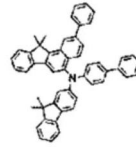
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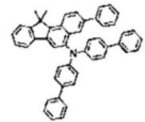
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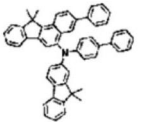
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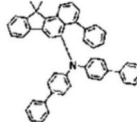
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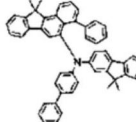
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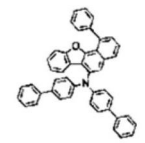
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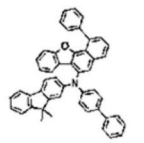
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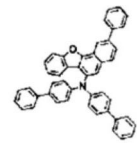
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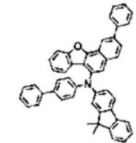
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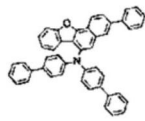


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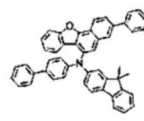


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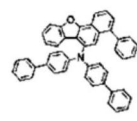
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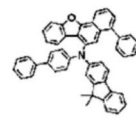
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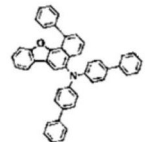
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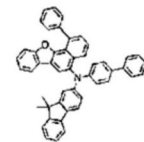
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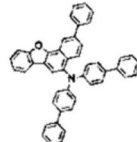
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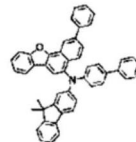
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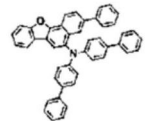
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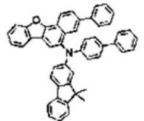
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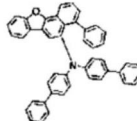
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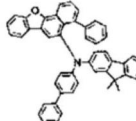
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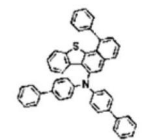
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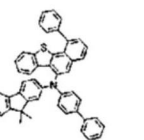
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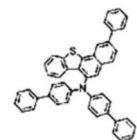
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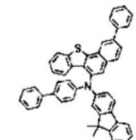
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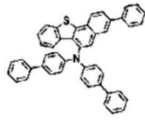
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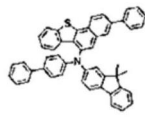
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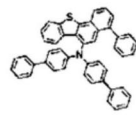
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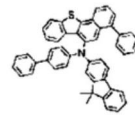
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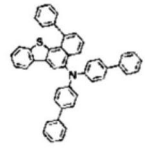
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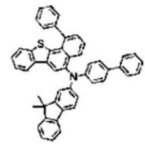
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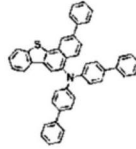
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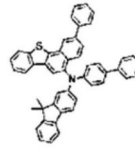
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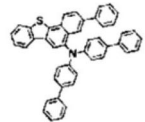
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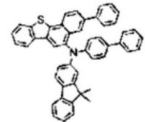
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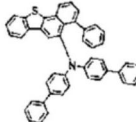
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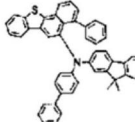
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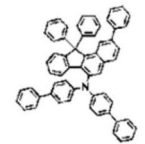
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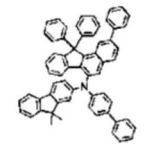
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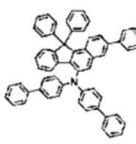
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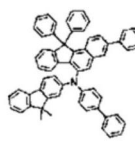
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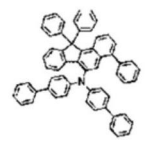


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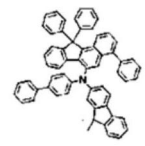


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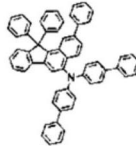
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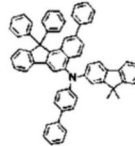
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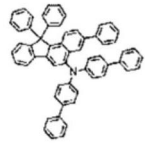
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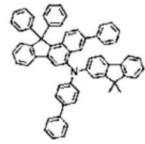
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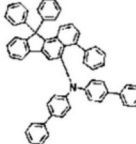
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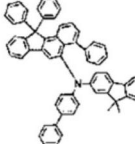
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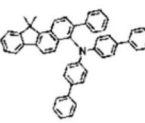
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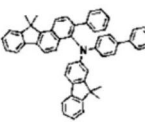
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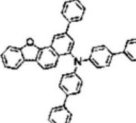
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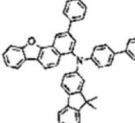
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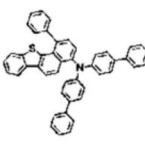
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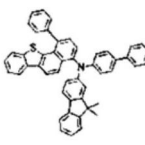
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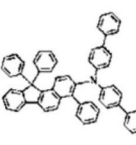
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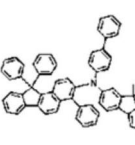
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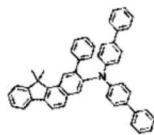
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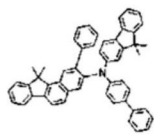
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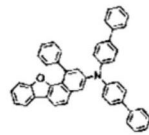
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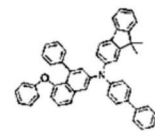
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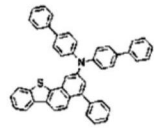
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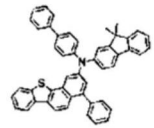
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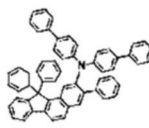
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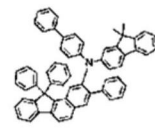
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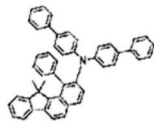


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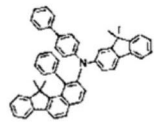


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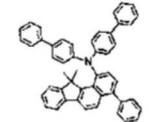
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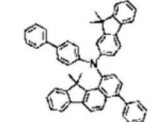
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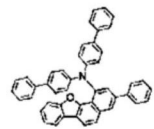
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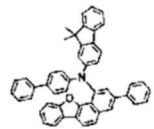
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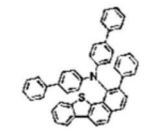
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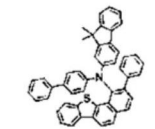
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654



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656

[0214] 此外,通过将各种取代基引入至化学式1的结构,可合成具有所引入取代基的独特性质的化合物。举例而言,通过将通常用于制造有机发光组件的空穴注入层材料、空穴传输层材料、发光层材料、电子传输层材料及电荷产生层材料的取代基引入至核心结构,可合成满足每一有机材料层所需要的条件的材料。

[0215] 此外,通过将各种取代基引入化学式1的结构,可精密地控制能带间隙,且同时增强有机材料之间的界面处的性质,且材料应用可变得多样化。

[0216] 本说明书的一个实施例提供一种有机发光组件,所述有机发光组件包括:第一电极;第二电极;以及一或多个有机材料层,设置于所述第一电极与所述第二电极之间,其中所述有机材料层中的一或多个层包含一或多种由化学式1表示的化合物。

[0217] 在本说明书的一个实施例中,所述有机材料层中的一或多个层包含一种由化学式1表示的化合物。

[0218] 在本说明书的一个实施例中,第一电极可为阳极,且第二电极可为阴极。

[0219] 在本说明书的另一实施例中,第一电极可为阴极,且第二电极可为阳极。

[0220] 在本说明书的一个实施例中,有机发光组件可为蓝色有机发光组件,并且由化学式1表示的化合物可用作蓝色有机发光组件的材料。举例而言,由化学式1表示的化合物可包含在蓝色有机发光组件的空穴传输层或电子阻挡层中。

[0221] 在本说明书的一个实施例中,有机发光组件可为绿色有机发光组件,并且由化学式1表示的化合物可用作绿色有机发光组件的材料。举例而言,由化学式1表示的化合物可包含在绿色有机发光组件的空穴传输层或电子阻挡层中。

[0222] 在本说明书的一个实施例中,有机发光组件可为红色有机发光组件,并且由化学式1表示的化合物可用作红色有机发光组件的材料。举例而言,由化学式1表示的化合物可

包含在红色有机发光组件的空穴传输层或电子阻挡层中。

[0223] 除了使用上述化合物形成一或多个有机材料层之外,本说明书的有机发光组件可使用常用的有机发光组件制造方法及材料来制造。

[0224] 当制造有机发光组件时,可使用溶液涂布方法以及真空沉积方法将化合物形成为有机材料层。在本文中,溶液涂布方法是指旋涂、浸涂、喷墨印刷、丝网印刷、喷涂方法、辊涂等,但并非仅限于此。

[0225] 本说明书的有机发光组件的有机材料层可形成为单层结构,但可形成为其中二或更多个有机材料层被层叠的多层结构。举例而言,本揭示的有机发光组件可具有包括空穴注入层、空穴传输层、发光层、电子传输层、电子注入层等作为有机材料层的结构。然而,有机发光组件的结构并非仅限于此,并且可包括更少数量的有机材料层。

[0226] 在本说明书的有机发光组件中,有机材料层包括空穴传输层,并且空穴传输层可包含由化学式1表示的化合物。

[0227] 在本说明书的有机发光组件中,有机材料层包括电子阻挡层,并且电子阻挡层可包含由化学式1表示的化合物。

[0228] 本揭示的有机发光组件可还包括选自自由发光层、空穴注入层、空穴传输层、电子注入层、电子传输层、电子阻挡层及空穴阻挡层组成的群组中的一层、两层或更多层。

[0229] 图1至图4示出根据本说明书的一个实施例的有机发光组件的电极及有机材料层的层叠顺序。然而,本申请案的范围不限于这些图,且此项技术中已知的有机发光组件的结构亦可用于本申请案中。

[0230] 图1示出其中阳极(200)、有机材料层(300)及阴极(400)连续层叠在基板(100)上的有机发光组件。然而,所述结构并非仅限于此种结构,且如图2所示,亦可获得其中阴极、有机材料层及阳极连续层叠在基板上的有机发光组件。

[0231] 图3及图4示出有机材料层为多层的情况。根据图3的有机发光组件包括空穴注入层(301)、空穴传输层(302)、发光层(304)、电子传输层(305)及电子注入层(306),且根据图4的有机发光组件更包括位于空穴传输层(302)与发光层(304)之间的电子阻挡层(303)。然而,本申请案的范围并非仅限于此种层叠结构,且根据需要,可不包括除发光层之外的层,并且可进一步添加其他需要的功能层。

[0232] 包含由化学式1表示的化合物的有机材料层可根据需要进一步包含其他材料。

[0233] 在根据本说明书的一个实施例的有机发光组件中,以下示出除了由化学式1表示的化合物之外的材料,然而,这些仅用于说明的目的,而非限制本申请案的范围,且这些材料可由此项技术中已知的材料代替。

[0234] 作为阳极材料,可使用具有相对大的功函数的材料,且可使用透明导电氧化物、金属、导电聚合物等。阳极材料的具体实例包括:金属,例如钒、铬、铜、锌、及金,或其合金;金属氧化物,例如氧化锌、氧化铟、氧化铟锡(indium tin oxide,ITO)、及氧化铟锌(indium zinc oxide,IZO);金属与氧化物的组合,例如ZnO:Al或SnO<sub>2</sub>:Sb;导电聚合物,例如聚(3-甲基噻吩)、聚[3,4-(乙烯-1,2-二氧)噻吩](poly[3,4-(ethylene-1,2-dioxy)thiophene], PEDOT)、聚吡咯、及聚苯胺等,但并非仅限于此。

[0235] 作为阴极材料,可使用具有相对小的功函数的材料,且可使用金属、金属氧化物、导电聚合物等。阴极材料的具体实例包括:金属,例如镁、钙、钠、钾、钛、铟、钇、锂、钇、铝、

银、锡、及铅,或其合金;多层结构材料,例如LiF/Al或LiO<sub>2</sub>/Al等,但并非仅限于此。

[0236] 作为空穴注入材料,可使用已知的空穴注入材料,且举例而言,可使用酞菁化合物,例如在美国专利第4,356,429号中揭示的铜酞菁;或星形猝发型胺衍生物,例如在文献[高级材料,6,第677页(1994)]中阐述的三(4-咪唑基-9-基苯基)胺(TCTA)、4,4',4''-三[苯基(间甲苯基)胺基]三苯基胺(m-MTDATA)或1,3,5-三[4-(3-甲基苯基苯胺基)苯基]苯(m-MTDAPB)、作为具有溶解度的导电聚合物的聚苯胺/十二烷基苯磺酸、聚(3,4-乙烯二氧噻吩)/聚(4-苯乙烯磺酸酯)、聚苯胺/樟脑磺酸或聚苯胺/聚(4-苯乙烯磺酸酯)等。

[0237] 作为空穴传输材料,可使用吡唑啉衍生物、芳基胺系衍生物、二苯乙烯衍生物、三苯基二胺衍生物等,且亦可使用低分子或高分子材料。

[0238] 作为电子传输材料,可使用恶二唑衍生物、蒽醌二甲烷及其衍生物、苯醌及其衍生物、萘醌及其衍生物、蒽醌及其衍生物、四氰基蒽醌二甲烷及其衍生物、芴酮衍生物、二苯基二氰基乙烯及其衍生物、二苯醌衍生物、8-羟基喹啉及其衍生物等的金属络合物,且亦可使用高分子材料以及低分子材料。

[0239] 作为电子注入材料的实例,此项技术中通常使用LiF,然而,本申请案并非仅限于此。

[0240] 作为发光材料,可使用红色、绿色或蓝色发光材料,且根据需要,可混合并使用二或更多种发光材料。在本文中,所述二或更多种发光材料在被使用时可用个别供应源沉积或者被预混合并用一个供应源沉积。此外,荧光材料亦可用作发光材料,然而,亦可使用磷光材料。作为发光材料,可单独使用通过结合分别自阳极及阴极注入的空穴及电子来发光的材料,然而,亦可使用具有一起参与发光的主体材料及掺杂剂材料的材料。

[0241] 在混合发光材料主体时,可混合相同系列的主体,或者可混合不同系列的主体。举例而言,可选择n型主体材料或p型主体材料中的任何二或更多种材料并作为发光层的主体材料。

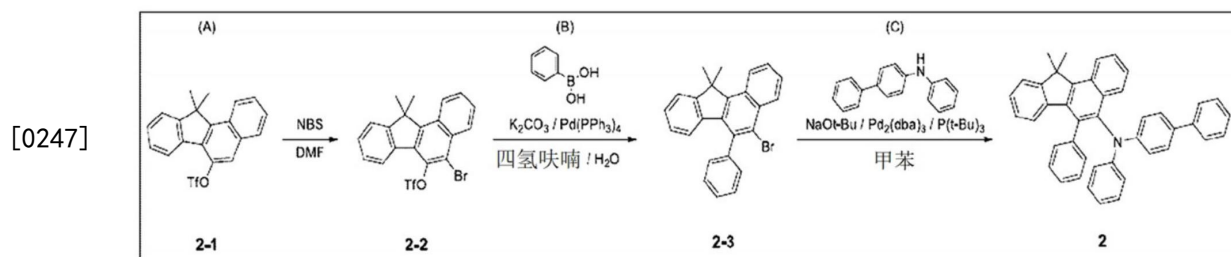
[0242] 根据本说明书的一个实施例的有机发光组件可依据所使用的材料为顶部发射型、底部发射型或双发射型。

[0243] 根据本说明书的一个实施例的化合物亦可在有机发光组件中使用的类似原理下用于包括有机太阳能电池、有机光导体、有机晶体管等的有机电子组件中。

[0244] 具体实施方式

[0245] 在下文中,将参照实例更详细地描述本说明书,然而,该些仅用于说明目的,并且本申请案的范围并非仅限于此。

[0246] [制备例1]化合物2的制备



[0248] 1) 化合物2-2的制备

[0249] 将二甲基甲酰胺(dimethylformamide,DMF) (200毫升) 引入11,11-二甲基-11H-苯

并[a]芴-6-基三氟甲磺酸酯(A) (20克, 0.050摩尔, 1当量) 及N-溴代琥珀酰亚胺(N-bromosuccinimide, NBS) (9.5克, 0.053摩尔, 1.05当量), 并将混合物在室温(room temperature, RT)下搅拌了6小时。通过向其中引入水终止了反应, 并使用二氯甲烷(methylene chloride, MC)及水对结果进行了萃取。之后, 用MgSO<sub>4</sub>移除了水分。使用硅胶管柱对结果进行了分离, 从而以83%的产率获得化合物2-2(20克)。

[0250] 2) 化合物2-3的制备

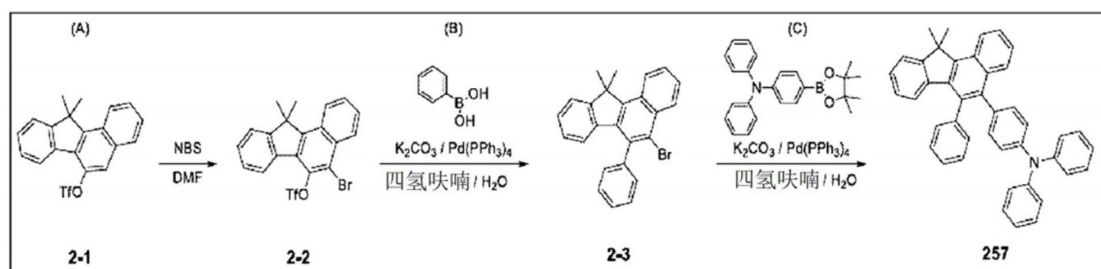
[0251] 将四氢呋喃(tetrahydrofuran, THF) (240毫升) 及H<sub>2</sub>O(60毫升) 引入化合物2-2(20克, 0.042摩尔, 1当量)、苯基硼酸(B) (5.7克, 0.046摩尔, 1.1当量)、K<sub>2</sub>CO<sub>3</sub>(12.9克, 0.093摩尔, 2.2当量) 及四(三苯基膦) 钯(0) (Pd(PPh<sub>3</sub>)<sub>4</sub>) (2.4克, 0.0021摩尔, 0.005当量), 并将混合物在100℃下搅拌了6小时。通过向其中引入水终止了反应, 并使用MC及水对结果进行了萃取。之后, 用MgSO<sub>4</sub>移除了水分。使用硅胶管柱对结果进行了分离, 从而以70%的产率获得化合物2-3(12克)。

[0252] 3) 化合物2的制备

[0253] 三-第三丁基膦(P(t-Bu)<sub>3</sub>) (0.6克, 0.003摩尔, 0.1当量) 及甲苯(120毫升) 引入化合物2-3(12克, 0.030摩尔, 1当量)、N-苯基-[1,1'-联苯]-4-胺(C) (7.7克, 0.031摩尔, 1.05当量)、第三丁醇钠(NaOtBu) (4.3克, 0.045摩尔, 1.5当量) 及三(二亚苄基丙酮) 二钯(0) (Pd<sub>2</sub>(dba)<sub>3</sub>) (1.4克, 0.0015摩尔, 0.05当量), 并将混合物在100℃下搅拌了8小时。通过向其中引入水终止了反应, 并使用MC及水对结果进行了萃取。之后, 用MgSO<sub>4</sub>移除了水分。使用硅胶管柱对结果进行了分离, 从而以59%的产率获得化合物2(10克)。

[0254] [制备例2] 化合物257的制备

[0255]

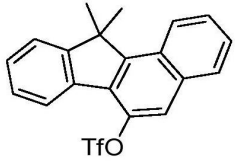
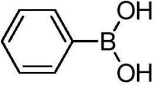
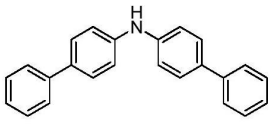
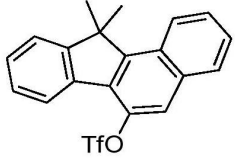
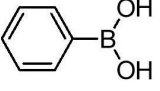
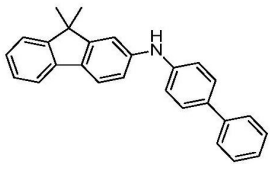
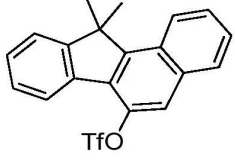
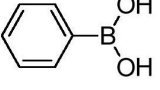
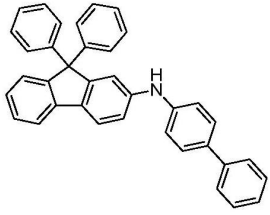
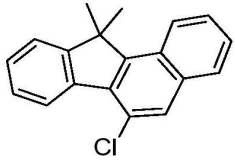
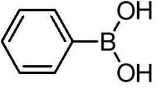
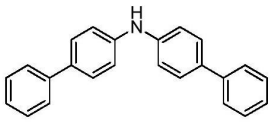
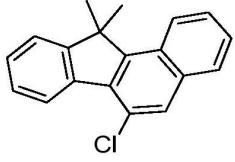
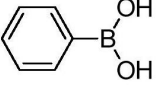
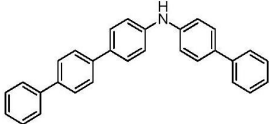
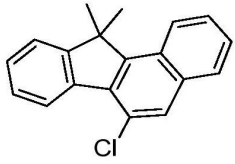
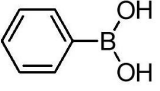
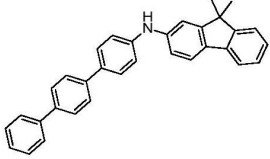


[0256] 1) 化合物257的制备

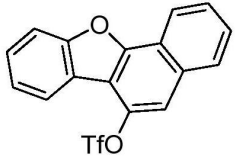
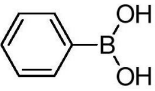
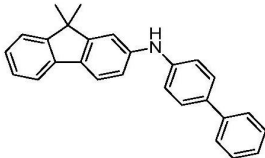
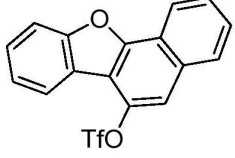
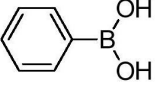
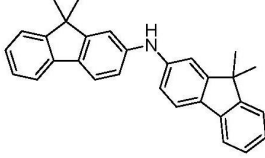
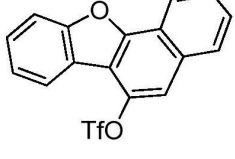
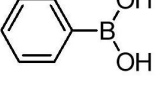
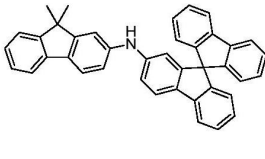
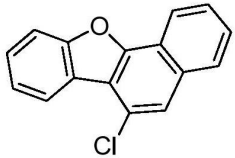
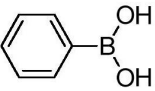
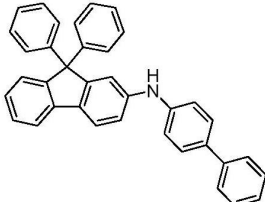
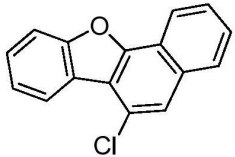
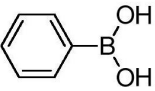
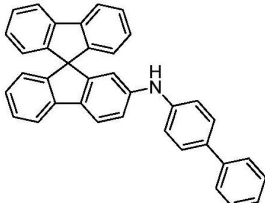
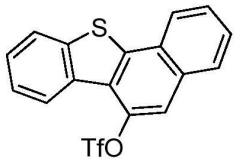
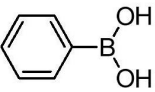
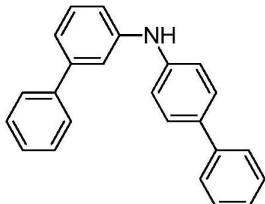
[0257] 将THF(120毫升) 及H<sub>2</sub>O(30毫升) 引入制备例1的化合物2-3(10克, 0.025摩尔, 1当量)、N,N-二苯基-4-(4,4,5,5-四甲基-1,3,2-二氧杂环戊硼烷-2-基) 苯胺(C) (10.2克, 0.027摩尔, 1.1当量)、K<sub>2</sub>CO<sub>3</sub>(7.6克, 0.055摩尔, 2.2当量) 及Pd(PPh<sub>3</sub>)<sub>4</sub>(1.4克, 0.0012摩尔, 0.005当量), 并将混合物在100℃下搅拌了6小时。通过向其中引入水终止了反应, 并使用MC及水对结果进行了萃取。之后, 用MgSO<sub>4</sub>移除了水分。使用硅胶管柱对结果进行了分离, 从而以70%的产率获得化合物257(10克)。

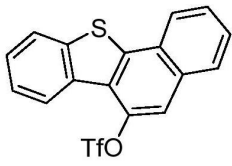
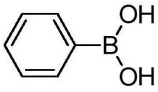
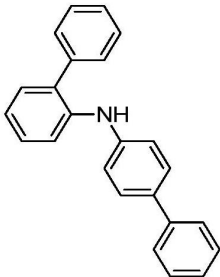
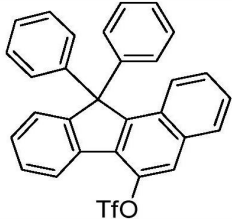
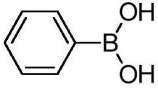
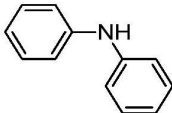
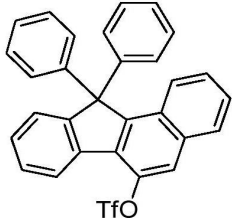
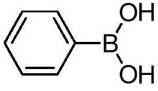
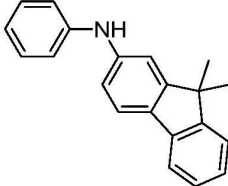
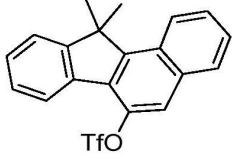
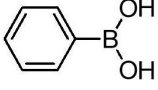
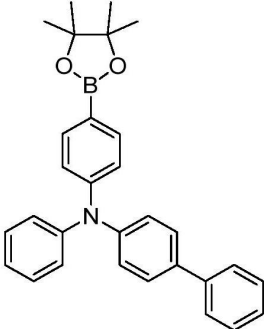
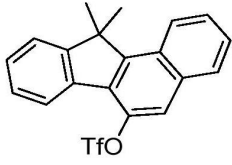
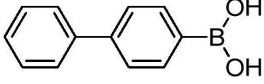
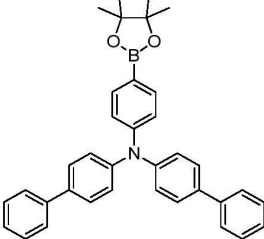
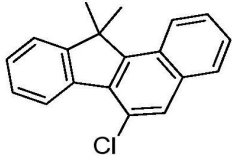
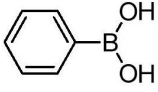
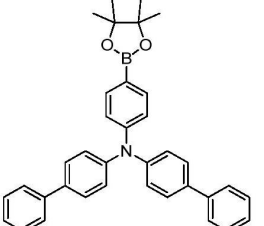
[0258] 除了使用下表1的中间物A、B及C代替11,11-二甲基-11H-苯并[a]芴-6-基三氟甲磺酸酯(A)、苯基硼酸(B) 及N-苯基-[1,1'-联苯]-4-胺(C) 或N,N-二苯基-4-(4,4,5,5-四甲基-1,3,2-二氧杂环戊硼烷-2-基) 苯胺(C) 之外, 以与制备例1或制备例2中相同的方式合成了化合物。

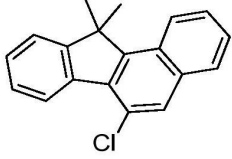
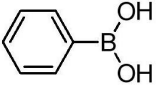
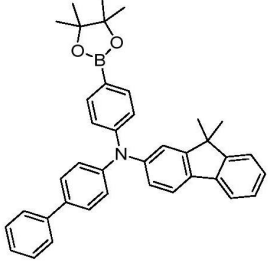
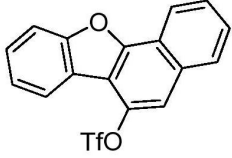
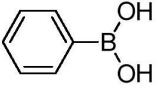
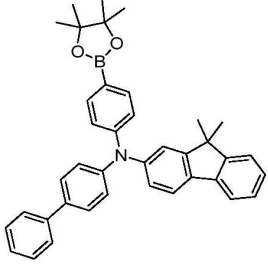
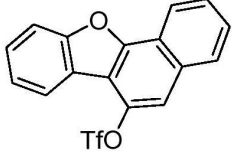
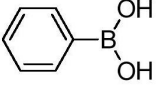
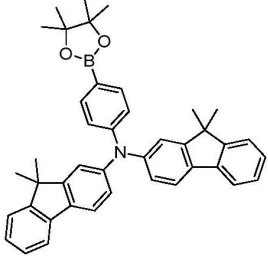
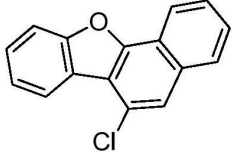
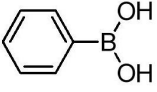
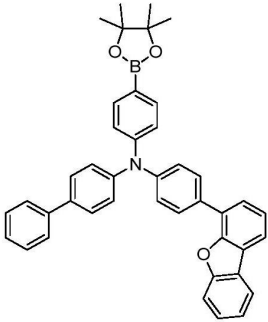
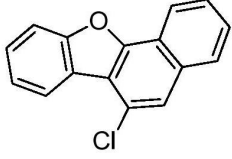
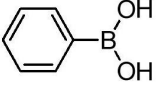
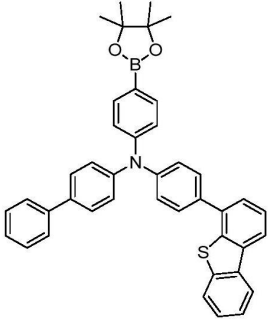
[0259] [表1]

化合物编号	中间物 A	中间物 B	中间物 C	产率
10				54%
16				60%
27				58%
42				50%
45				48%
51				54%

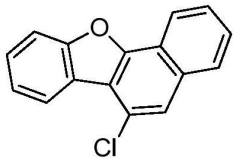
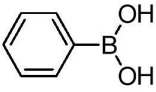
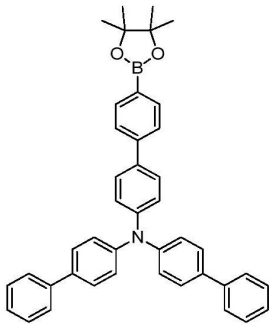
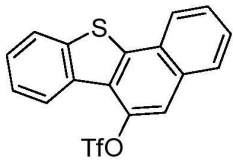
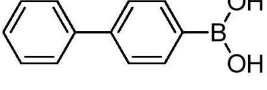
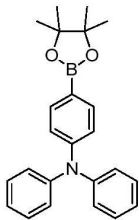
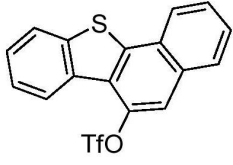
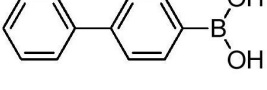
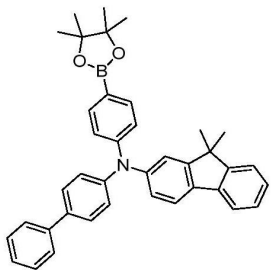
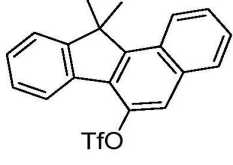
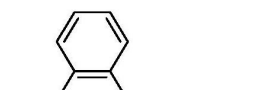
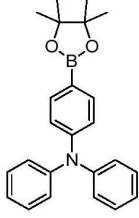
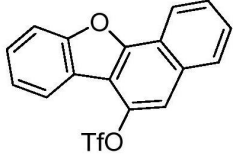
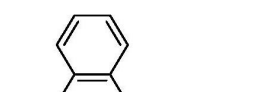
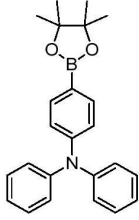
[0260]

80				53%
82				57%
96				50%
[0261] 123				49%
127				48%
139				41%

140				55%
193				61%
202				57%
[0262] 258				52%
274				48%
292				62%

293				55%
325				51%
326				64%
359				40%
361				43%

[0263]

382				59%
399				60%
[0264] 403				53%
487				48%
495				49%

[0265] 以与制备例中相同的方式制备了化合物,并且合成识别结果示于表2及表3中。表2示出<sup>1</sup>H NMR(CDC13, 200Mz)的测量值,且表3示出FD-质谱(场解吸质谱:FD-Mass)的测量值。

[0266] [表2]

[0267]

化合物	<sup>1</sup> H NMR (CDCl <sub>3</sub> , 200 Mz)
2	δ=8.09(3H, m), 7.61~7.41(16H, m), 7.24(3H, m), 6.81(1H, t), 6.69(4H, m), 1.85(6H, s)
10	δ=8.12(3H, m), 7.61~7.41(23H, m), 7.24(1H, t), 6.69(4H, m), 1.85(6H, s)
16	δ=8.12(3H, m), 7.87(1H, d), 7.61~7.41(19H, m), 7.28(2H, m), 6.75(1H, s), 6.69(2H, m), 6.58(1H, d), 1.85(6H, s), 1.72(6H, s)
27	δ=8.09(3H, m), 7.87(1H, d), 7.61~7.26(27H, m), 7.11(4H, m), 6.75(1H, s), 6.69(2H, m), 6.58(1H, d), 1.85(6H, s)
42	δ=8.29(1H, d), 8.06(2H, m), 7.61~7.41(22H, m), 7.24(2H, m), 6.69(4H, m), 1.85(6H, s)
45	δ=8.29(1H, d), 8.06(2H, m), 7.61~7.41(22H, m), 7.25(6H, m), 6.69(4H, m), 1.85(6H, s)
51	δ=8.29(1H, d), 8.06(2H, m), 7.87(1H, d), 7.61~7.41(25H, m), 6.75(1H, s), 6.69(2H, m), 6.58(1H, d), 1.85(6H, s), 1.72(6H, s)
80	δ=8.18(1H, d), 8.08(1H, d), 7.87(2H, m), 7.66~7.28(21H, m), 6.75(1H, s), 6.69(2H, m), 6.58(1H, d), 1.72(6H, s)
82	δ=8.18(1H, d), 8.08(1H, d), 7.89(3H, m), 7.66(11H, m), 7.38(7H, m), 6.75(2H, s), 6.58(2H, m), 1.72(12H, s)
96	δ=8.18(1H, d), 8.08(1H, d), 7.87(4H, m), 7.75(1H, d), 7.66~7.15(24H, m), 6.75(1H, s), 6.58(2H, m), 6.39(1H, d), 1.72(6H, s)
123	δ=8.55(1H, d), 8.18(1H, d), 7.87(2H, m), 7.66~7.26(27H, m), 7.11(4H, m), 6.75(1H, s), 6.69(2H, m), 6.58(1H, d)
127	δ=8.55(1H, d), 8.18(1H, d), 7.87(3H, m), 7.75(1H, d), 7.66(1H, d), 7.55~7.26(24H, m), 7.19(2H, m), 6.69(2H, m), 6.55(1H, s), 6.39(1H, d)
139	δ=8.45(1H, d), 8.08(2H, m), 7.98(1H, d), 7.55~7.41(22H, m), 6.68(2H, m), 6.69(2H, m), 6.59(1H, d)
140	δ=8.45(1H, d), 8.08(2H, m), 7.98(1H, d), 7.55~7.41(20H, m), 6.16(1H, t), 7.08(2H, m), 6.87(1H, t), 6.69(3H, d)
193	δ=8.09(3H, m), 7.61(1H, d), 7.55~7.20(23H, m), 6.81(2H, m), 6.63(4H, m)
202	δ=8.04(3H, m), 7.87(1H, d), 7.55~7.20(26H, m), 6.81(1H, t), 6.75(1H, s), 6.63(3H, m), 1.72(6H, s)
257	δ=8.52(1H, d), 8.18(1H, d), 8.09(1H, d), 7.61~7.44(11H, m), 7.20(5H, m), 6.81(2H, m), 6.63(6H, m), 1.85(6H, s)
258	δ=8.52(1H, d), 8.18(1H, d), 8.09(1H, d), 7.61~7.44(18H, m), 7.24(3H, m), 6.81(1H, t), 6.69(6H, m), 1.85(6H, s)
274	δ=8.52(1H, d), 8.18(1H, d), 8.09(1H, d), 7.61~7.44(25H, m), 7.25(5H, m), 6.69(6H, m), 1.85(6H, s)
292	δ=8.52(1H, d), 8.18(1H, d), 8.09(1H, d), 7.61~7.41(25H, m), 7.24(1H, t), 6.69(6H, m), 1.85(6H, s)
293	δ=8.52(1H, d), 8.18(1H, d), 8.09(1H, d), 7.87(1H, d), 7.61~7.41(21H, m), 7.28(2H, m), 6.75(1H, s), 6.69(4H, m), 6.58(1H, d), 1.85(6H, s), 1.72(6H, s)
325	δ=8.55(1H, d), 8.18(1H, d), 7.87(2H, m), 7.62~7.28(23H, m), 6.69(5H, m), 6.58(1H, d), 1.72(6H, s)
326	δ=8.55(1H, d), 8.18(1H, d), 7.87(3H, m), 7.55(13H, m), 7.28(7H, m), 6.69(4H, m), 6.58(2H, m), 1.72(12H, s)
359	δ=8.55(1H, d), 8.18(1H, d), 7.89(4H, m), 7.66(2H, m), 7.55~7.38(23H, m), 6.69(6H, m)
361	δ=8.55(1H, d), 8.41(2H, m), 8.20(2H, m), 7.98(1H, d), 7.89(1H, d), 7.66(1H, d), 7.58~7.38(23H, m), 6.69(6H, m)
382	δ=8.55(1H, d), 8.18(1H, d), 7.98(1H, d), 7.66(1H, d), 7.55~7.38(25H, m), 7.25(4H, m), 6.69(6H, m)
399	δ=8.55(1H, d), 8.45(1H, d), 8.08(1H, d), 7.98(1H, d), 7.50(11H, m), 7.20(8H, m), 6.81(2H, m), 6.63(6H, m)
403	δ=8.55(1H, d), 8.45(1H, d), 8.08(1H, d), 7.98(1H, d), 7.87(1H, d), 7.55~7.38(21H, m), 7.28(5H, m), 6.69(5H, m), 6.58(1H, d), 1.72(6H, s)
487	δ=9.15(1H, s), 8.93(2H, m), 8.52(1H, d), 8.12(6H, m), 7.88(4H, m), 7.54(6H, m), 7.20(5H, m), 6.81(2H, m), 6.63(6H, m), 1.85(6H, s)
495	δ=9.15(1H, s), 8.93(2H, m), 8.55(1H, d), 8.18(5H, m), 7.82(5H, m), 7.66(1H, d), 7.55(4H, m), 7.32(2H, m), 7.20(4H, m), 6.81(2H, m), 6.63(6H, m)

[0268]

[表3]

[0269]

化合物	FD-MS	化合物	FD-MS
2	m/z = 563.26 (C <sub>43</sub> H <sub>33</sub> N = 563.73)	10	m/z = 639.29 (C <sub>49</sub> H <sub>37</sub> N = 639.82)
16	m/z = 679.32 (C <sub>52</sub> H <sub>41</sub> N = 679.89)	27	m/z = 803.36 (C <sub>62</sub> H <sub>45</sub> N = 804.03)

42	m/z=639.29 (C49H37N=639.82)	45	m/z=715.32 (C55H41N=715.92)
51	m/z=755.36 (C58H45N=755.98)	80	m/z=653.27 (C49H35NO=653.81)
82	m/z=693.30 (C52H39NO=693.87)	96	m/z=815.32 (C62H41NO=816.00)
123	m/z=777.30 (C59H39NO=777.95)	127	m/z=775.29 (C59H37NO=775.93)
139	m/z=629.22 (C46H31NS=629.81)	140	m/z=629.22 (C48H31NS=629.81)
193	m/z=611.26 (C47H33N=611.77)	202	m/z=727.32 (C56H41N=727.93)
257	m/z=563.26 (C43H33N=563.73)	258	m/z=639.29 (C49H37N=639.82)
274	m/z=791.36 (C61H45N=792.02)	292	m/z=715.32 (C55H41N=715.94)
293	m/z=755.36 (C58H45N=756.00)	325	m/z=729.30 (C55H39NO=729.90)
326	m/z=769.33 (C58H43NO=769.97)	359	m/z=779.28 (C58H37NO2=779.92)
361	m/z=795.26 (C58H37NOS=795.99)	382	m/z=765.30 (C58H39NO=765.94)
399	m/z=629.22 (C46H31NS=629.81)	403	m/z=821.31 (C61H43NS=822.07)
487	m/z=713.31 (C55H39N=713.90)	495	m/z=687.26 (C52H33NO=687.82)

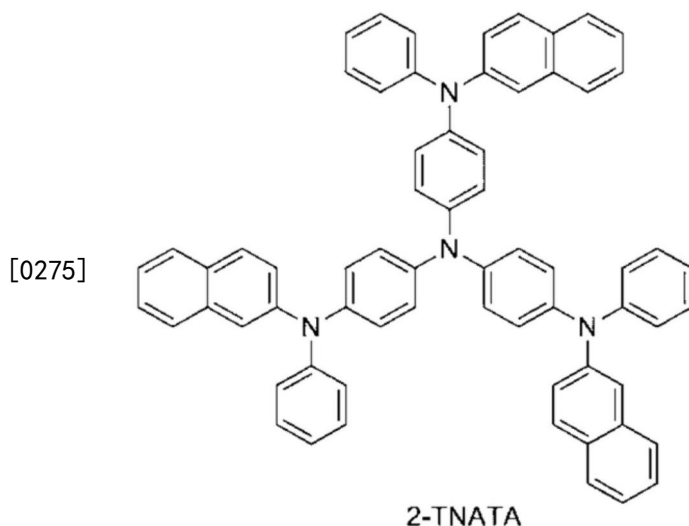
[0270] [实验例]

[0271] <实验例1>

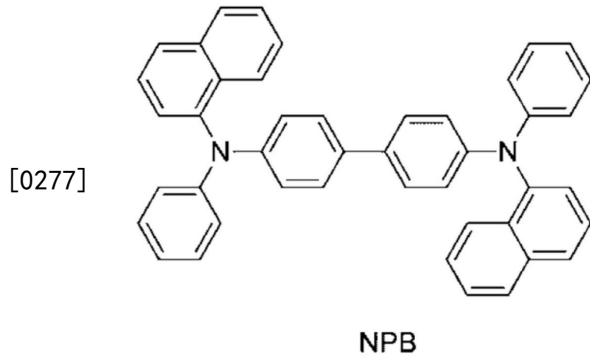
[0272] 1) 有机发光组件的制造

[0273] 比较例1

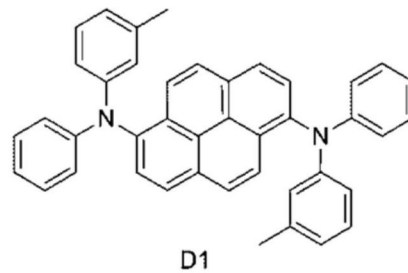
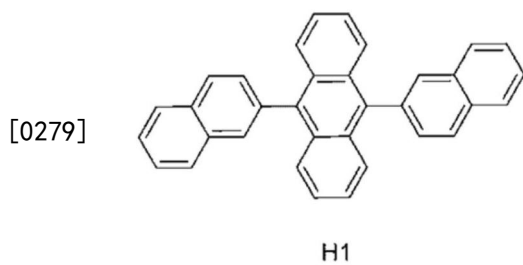
[0274] 使用三氯乙烯、丙酮、乙醇及蒸馏水对由有机发光二极管 (organic light emitting diode, OLED) 用玻璃 (由三星-康宁有限公司 (Samsung-Corning Co., Ltd.) 制造) 获得的透明氧化铟锡 (indium tin oxide, ITO) 电极薄膜连续超音清洗各5分钟, 将所述透明ITO电极薄膜存储在异丙醇中, 并使用。接下来, 将ITO基板安装在真空沉积设备的基板夹 (substrate folder) 中, 并将以下4,4',4''-三(N,N-(2-萘基)-苯胺基)三苯胺 (2-TNATA) 引入真空沉积设备中的单元中。



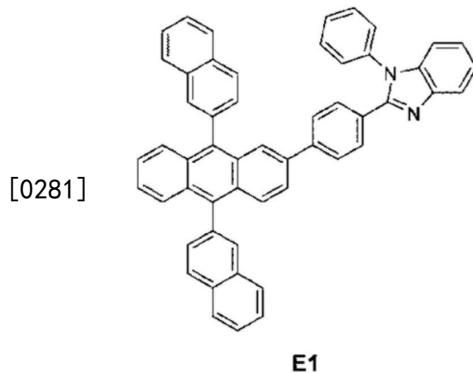
[0276] 随后, 将腔室抽真空, 直至其中的真空度达到 $10^{-6}$ 托, 且然后通过向所述单元施加电流来蒸发2-TNATA, 以在ITO基板上沉积厚度为600埃的空穴注入层。向真空沉积设备中的另一单元引入以下N,N'-双( $\alpha$ -萘基)-N,N'-二苯基-4,4'-二胺 (NPB), 并通过向所述单元施加电流来蒸发, 以在空穴注入层上沉积厚度为300埃的空穴传输层。



[0278] 在如上形成空穴注入层及空穴传输层之后,在其上沉积具有如下结构的蓝色发光材料作为发光层。具体而言,在真空沉积设备中的一侧单元中,将蓝色发光主体材料H1真空沉积至200埃的厚度,并且将蓝色发光掺杂剂材料D1相对于主体材料以5%真空沉积至其上。



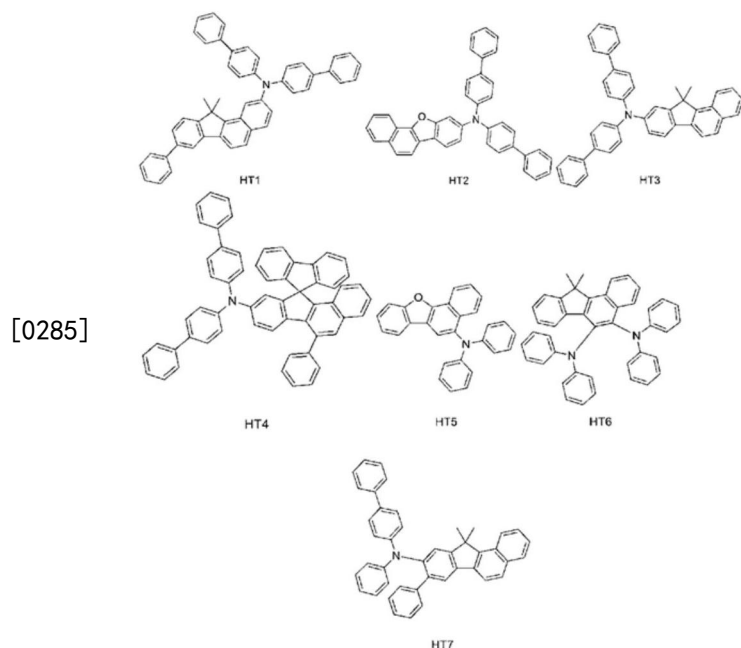
[0280] 随后,将具有以下结构式E1的化合物沉积至300埃的厚度作为电子传输层。



[0282] 作为电子注入层,将氟化锂(LiF)沉积至10埃的厚度,并将A1阴极采用至1,000埃的厚度,且因此,制造了OLED。同时,通过将用于OLED制造的每种材料在 $10^{-8}$ 托至 $10^{-6}$ 托下将制造OLED所需的所有有机化合物真空升华纯化。

[0283] 比较例2至比较例8及实例1至实例30

[0284] 除了使用下表4中所示的化合物代替在比较例1中形成空穴传输层时使用的NPB之外,以与比较例1中相同的方式制造了有机电致发光组件。



[0286] 2) 有机发光组件的评估

[0287] 对于如上制造的有机电致发光组件中的每一者,使用麦克赛恩斯公司 (McScience Inc.) 制造的M7000测量了电致发光 (electroluminescent, EL) 性质,并且利用测量结果,通过麦克赛恩斯公司制造的寿命测量系统 (M6000) 测量了当标准亮度为700坎德拉/平方米 (cd/m<sup>2</sup>) 时的T95。

[0288] 根据本揭示制造的蓝色有机发光组件的驱动电压、发光效率、颜色坐标 (color coordinate, CIE) 及寿命 (T95) 的测量结果如表4所示。

[0289] [表4]

[0290]

	化合物	驱动电压 (V)	发光效率 (cd/A)	CIE (x, y)	寿命 (T95)
实例 1	2	4.68	6.58	(0.134, 0.100)	49
实例 2	10	4.71	6.68	(0.134, 0.100)	45
实例 3	16	4.71	6.70	(0.134, 0.101)	44
实例 4	27	4.66	6.72	(0.134, 0.100)	43
实例 5	42	4.77	6.74	(0.134, 0.100)	47
实例 6	45	4.79	6.71	(0.134, 0.100)	45
实例 7	51	4.70	6.64	(0.134, 0.100)	48
实例 8	80	4.82	6.70	(0.134, 0.101)	43
实例 9	82	4.80	6.63	(0.134, 0.100)	49

实例 10	96	4.71	6.83	(0.134, 0.101)	47
实例 11	123	4.85	6.80	(0.134, 0.100)	45
实例 12	127	4.80	6.77	(0.134, 0.100)	48
实例 13	139	4.73	6.69	(0.134, 0.101)	50
实例 14	140	4.60	6.78	(0.134, 0.100)	49
实例 15	193	4.66	6.70	(0.134, 0.100)	48
实例 16	202	4.71	6.74	(0.134, 0.100)	44
实例 17	257	4.82	6.78	(0.134, 0.100)	48
实例 18	258	4.88	6.71	(0.134, 0.101)	51
实例 19	274	4.78	6.80	(0.134, 0.100)	50
实例 20	292	4.69	6.76	(0.134, 0.101)	47
实例 21	293	4.70	6.69	(0.134, 0.100)	41
实例 22	325	4.65	6.59	(0.134, 0.100)	45
实例 23	326	4.84	6.70	(0.134, 0.100)	45
[0291] 实例 24	359	4.77	6.73	(0.134, 0.101)	46
实例 25	361	4.69	6.60	(0.134, 0.101)	48
实例 26	382	4.66	6.62	(0.134, 0.101)	47
实例 27	399	4.70	6.71	(0.134, 0.100)	51
实例 28	403	4.72	6.81	(0.134, 0.101)	50
实例 29	487	4.69	6.78	(0.134, 0.100)	46
实例 30	495	4.71	6.73	(0.134, 0.100)	44
比较例 1	NPB	5.47	6.16	(0.134, 0.101)	36
比较例 2	HT1	5.30	6.21	(0.134, 0.100)	36
比较例 3	HT2	5.32	6.20	(0.134, 0.100)	33
比较例 4	HT3	5.37	6.23	(0.134, 0.101)	37
比较例 5	HT4	5.31	6.14	(0.134, 0.101)	34
比较例 6	HT5	5.38	6.17	(0.134, 0.100)	36
比较例 7	HT6	5.46	6.10	(0.134, 0.101)	31
比较例 8	HT7	5.43	6.13	(0.134, 0.100)	30

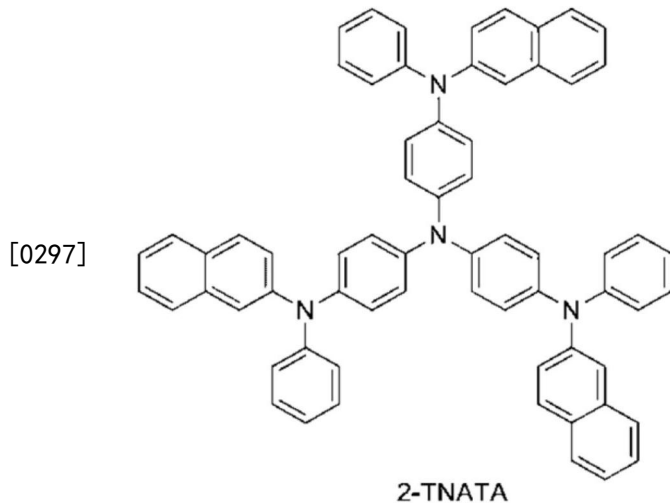
[0292] 如自表4的结果可见,识别出相较于比较例1至比较例8,使用本揭示的蓝色有机发光组件的空穴传输层材料的有机发光组件具有较低的驱动电压,并且显著提高了发光效率及寿命。当比较表4的比较例及本揭示的化合物时,具有芳基胺基是相似的,然而,不同之处在于苄基具有额外的取代基。具有取代基的苄基抑制芳环的 $\pi$ - $\pi$ 堆积,此防止由增加有机发光组件的驱动电压引起的组件性质劣化。因此,认为使用此种衍生物的本揭示的化合物增强了空穴传输性质或稳定性,从而在驱动电压、效率及寿命等所有方面具有优越性。

[0293] <实验例2>

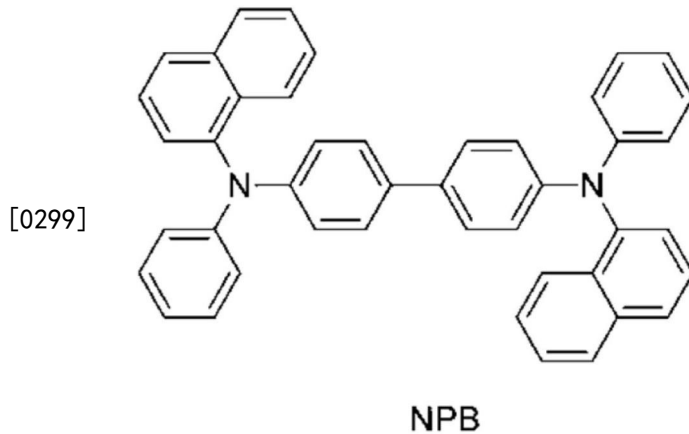
[0294] 1) 有机发光组件的制造

[0295] 比较例9

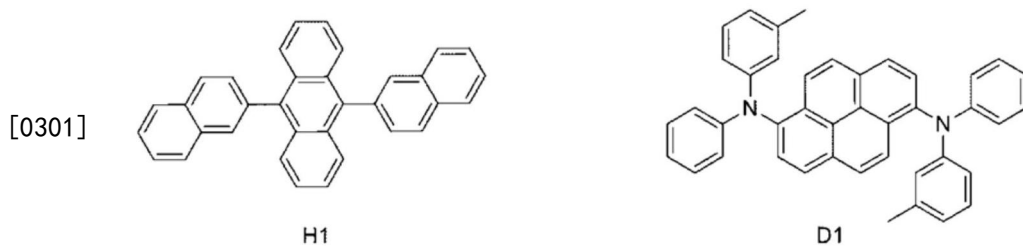
[0296] 使用三氯乙烯、丙酮、乙醇及蒸馏水对由有机发光二极管 (organic light emitting diode, OLED) 用玻璃 (由三星-康宁有限公司 (Samsung-Corning Co., Ltd.) 制造) 获得的透明氧化铟锡 (indium tin oxide, ITO) 电极薄膜连续超音清洗各5分钟,将所述透明ITO电极薄膜存储在异丙醇中,并使用。接下来,将ITO基板安装在真空沉积设备的基板夹 (substrate folder) 中,并将以下4,4',4''-三(N,N-(2-萘基)-苯胺基)三苯胺(2-TNATA)引入真空沉积设备中的单元中。



[0298] 随后,将腔室抽真空,直至其中的真空度达到 $10^{-6}$ 托,且然后通过向所述单元施加电流来蒸发2-TNATA,以在ITO基板上沉积厚度为600埃的空穴注入层。向真空沉积设备中的另一单元引入以下N,N'-双( $\alpha$ -萘基)-N,N'-二苯基-4,4'-二胺(NPB),并通过向所述单元施加电流来蒸发,以在空穴注入层上沉积厚度为300埃的空穴传输层。

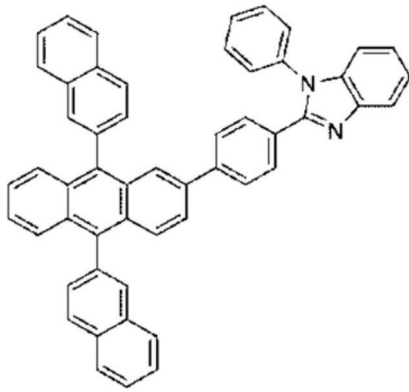


[0300] 在如上形成空穴注入层及空穴传输层之后,在其上沉积具有如下结构的蓝色发光材料作为发光层。具体而言,在真空沉积设备的一侧单元中,将蓝色发光主体材料H1真空沉积至200埃的厚度,并且将蓝色发光掺杂剂材料D1相对于主体材料以5%真空沉积至其上。



[0302] 随后,将具有以下结构式E1的化合物沉积至300埃的厚度作为电子传输层。

[0303]

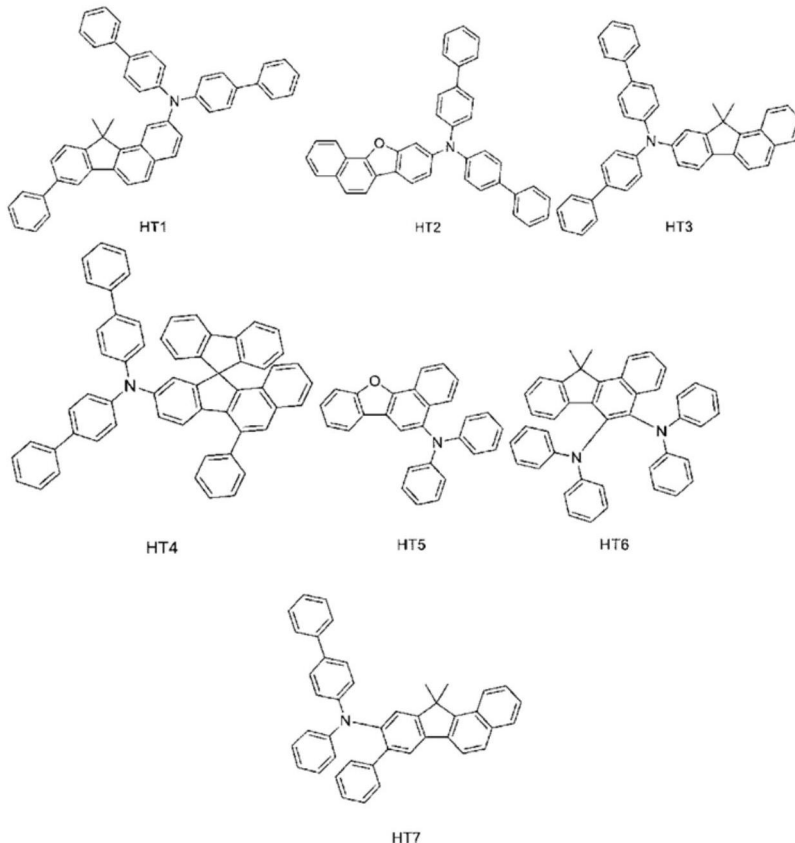
**E1**

[0304] 作为电子注入层,将氟化锂(LiF)沉积至10埃的厚度,并将Al阴极采用至1,000埃的厚度,且因此,制造了OLED。同时,通过将用于OLED制造的每种材料在10<sup>-8</sup>托至10<sup>-6</sup>托下将制造OLED所需的所有有机化合物真空升华纯化。

[0305] 比较例10至比较例16及实例31至实例60

[0306] 除了比较例9中将空穴传输层NPB形成至250埃的厚度之后使用下表5中所述的化合物在空穴传输层上将电子阻挡层形成至50埃的厚度之外,以与比较例9中相同的方式制造了有机电致发光组件。

[0307]



[0308] 2) 有机发光组件的评估

[0309] 对于如上制造的有机电致发光组件中的每一者,使用麦克赛恩斯公司制造的M7000测量了电致发光(EL)性质,并且利用测量结果,通过麦克赛恩斯公司制造的使用寿命测量系统(M6000)测量了当标准亮度为700坎德拉/平方米时的T95。

[0310] 根据本揭示制造的蓝色有机发光组件的驱动电压、发光效率、颜色坐标(CIE)及寿命(T95)的测量结果如下表5所示。

[0311] [表5]

	化合物	驱动电压 (V)	发光效率 (cd/A)	CIE (x, y)	寿命 (T95)	
[0312]	实例 31	2	4.77	6.79	(0.134, 0.101)	47
	实例 32	10	4.71	6.71	(0.134, 0.100)	46
	实例 33	16	4.73	6.70	(0.134, 0.100)	47
	实例 34	27	4.83	6.69	(0.134, 0.100)	44
	实例 35	42	4.80	6.70	(0.134, 0.101)	46
	实例 36	45	4.71	6.70	(0.134, 0.101)	44
	实例 37	51	4.73	6.73	(0.134, 0.100)	47
	实例 38	80	4.80	6.76	(0.134, 0.100)	45
	实例 39	82	4.88	6.68	(0.134, 0.100)	44
	实例 40	96	4.70	6.79	(0.134, 0.100)	47
	实例 41	123	4.73	6.71	(0.134, 0.100)	50
	实例 42	127	4.82	6.79	(0.134, 0.100)	46
	实例 43	139	4.75	6.68	(0.134, 0.101)	49
	实例 44	140	4.77	6.73	(0.134, 0.101)	43

[0313]	实例 45	193	4.82	6.80	(0.134, 0.100)	45
	实例 46	202	4.84	6.79	(0.134, 0.100)	47
	实例 47	257	4.82	6.83	(0.134, 0.101)	43
	实例 48	258	4.73	6.70	(0.134, 0.101)	48
	实例 49	274	4.71	6.66	(0.134, 0.100)	50
	实例 50	292	4.80	6.81	(0.134, 0.100)	51
	实例 51	293	4.83	6.83	(0.134, 0.101)	50
	实例 52	325	4.75	6.76	(0.134, 0.100)	48
	实例 53	326	4.78	6.75	(0.134, 0.100)	46
	实例 54	359	4.80	6.59	(0.134, 0.100)	44
	实例 55	361	4.77	6.69	(0.134, 0.101)	51
	实例 56	382	4.69	6.70	(0.134, 0.101)	49
	实例 57	399	4.75	6.73	(0.134, 0.100)	45
	实例 58	403	4.75	6.76	(0.134, 0.100)	46
	实例 59	487	4.81	6.78	(0.134, 0.100)	47
	实例 60	495	4.76	6.74	(0.134, 0.100)	45
	比较例 9	NPB	5.49	6.06	(0.134, 0.100)	35
	比较例 10	HT1	5.44	6.06	(0.134, 0.100)	38
	比较例 11	HT2	5.39	6.08	(0.134, 0.101)	35
	比较例 12	HT3	5.42	6.08	(0.134, 0.101)	36
	比较例 13	HT4	5.40	6.12	(0.134, 0.101)	35
	比较例 14	HT5	5.43	6.09	(0.134, 0.100)	35
	比较例 15	HT6	5.55	6.01	(0.134, 0.101)	31
	比较例 16	HT7	5.54	6.03	(0.134, 0.100)	30

[0314] 如自表5的结果可见出,相较于比较例,使用本揭示的蓝色有机发光组件的电子阻挡层材料的有机发光组件具有较低的驱动电压,并且显著提高了发光效率及寿命。当电子穿过空穴传输层并移动至阳极而不结合在发光层中时,OLED的效率及寿命降低。当使用具有高LUMO能级的化合物作为电子阻挡层以防止此种现象时,穿过发光层并移动至阳极的电子被电子阻挡层的能量障壁阻挡。因此,空穴及电子极可能形成激子,由此增加了在发光层中作为光发射的可能性,且因此,认为所述化合物在驱动电压、效率及寿命等所有方面皆带

来优越性。

[0315] 具体而言,识别出当在本申请案的具有化学式1的化合物中使用胺衍生物作为空穴传输层时,胺的非共享电子对改善空穴的流动,由此增强空穴传输层的空穴传输能力,并且当用作电子阻挡层时,抑制了由电子侵入空穴传输层引起的空穴传输材料的劣化,且此外,胺衍生物的平面性及玻璃转变温度由于具有增强的空穴性质的取代基与胺位点彼此键结而增加,此增加了化合物的热稳定性。

[0316] 此外,识别出通过调节带隙及T1值,空穴传输能力增强,且分子稳定性也增加,且因此,组件的驱动电压降低,光效率增强,并且通过化合物的热稳定性增强了组件的寿命性质。

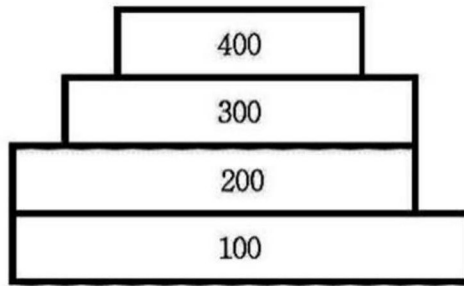


图1

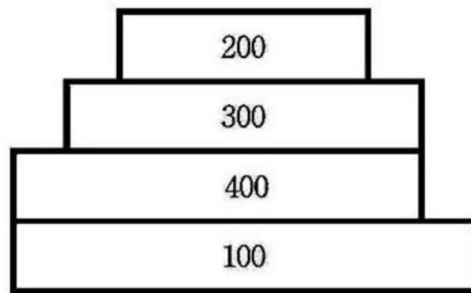


图2

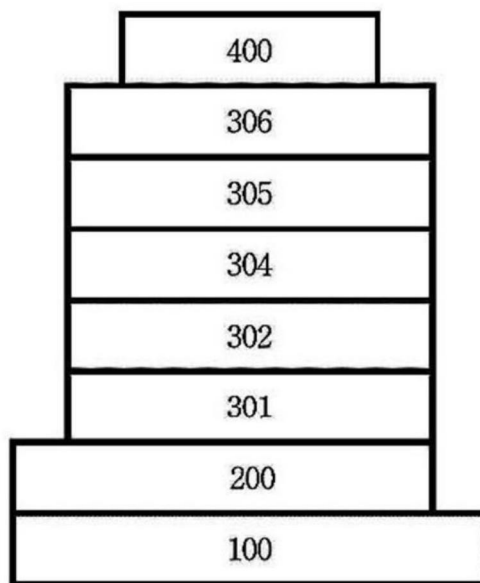


图3

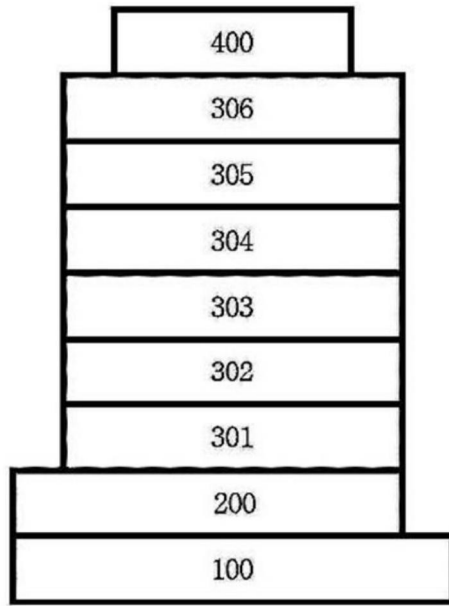


图4