

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl.⁷
C08G 61/00

(11)
(43)

2003-0093334
2003 12 06

(21) 10-2003-7014231

(22) 2003 10 31

2003 10 31

(86) PCT/US2002/18399

(87)

WO 2002/90416

(86) 2002 05 06

(87)

2002 11 14

(30) 60/289,333

2001 05 07

(US)

(71)

(19898)

1007

(72)

19801

13 가129

19807

7

(74)

:

(54)

,

LED, (LED) 2
가

가 (1,4-) ; 가 (3-
); (p-) 5,708,130 5,900,327
가

가
1 I
R
, F, -CN, -OR¹, -CO₂R¹, -C H F, -OC H F, -SR¹, -N(R¹)₂, -P
(R¹)₂, -SOR¹, -SO₂R¹, -NO₂ 12 XII 가 XII'

R 5- 6-
, R¹

1 20 A1

$$+ = 2 + 1; \text{ A1}$$

R²
, -C H F
-C F₂₊₁ () 가 R
1 I 1 II
, (ii) 6 III, 6- (i) 2 IV 5-
, (iv) 8 IX V 가, (v) 9 7 VI VIII, 10
, (vi) VI VIII, 10

II, III, IV, V, VI, VII, VIII IX

R, R¹, R², I ;

E ;

IV

A₀ ; A 가 N C A N , 가 C⁰ , 1 2 ; A 가 C , A 가 N ,

Q O, S, SO₂ NR¹ ,
 , R¹ ;

V

Q¹ , O, S, SO₂ NR¹ ,
 , R¹ ;

W H, ; W 가 ;

VI

2 E 1,4-, 1,5-, 1,8-, 2,3- 2,6- ;

VII

2 E 1,4-, 1,5-, 1,8-, 2,3-, 2,6- 9,10- ;

VIII

E 1, 2 3 , E 6, 7 8 ;

IX

E 2, 3 4 , E 7, 8 9 ;

XII

R³ , , , ;

0 1 12 ,

-C F₂₊₁ (,) 가 R

1 I ;

(II) (i) (ii)

R (, R)
 IUPAC
 (CRC Handbook of Chemistry and Phys
 1-18
 ics, 81st Edition, 2000).

1	1	I	I(a)	.
2	2	II		.
3	2	II(a)	II(j)	.
4	2	II(k)	II(s)	.
5	2	II(t)	II(z)	.
6	2	III	III(a) III(g)	.
7	2	IV	IV IV(h)	.
8	2	V	V(a) V(e)	.
9	2	VI	VI(a) VI(d)	.
10	2	VII	VII(a)	.
11	2	VIII	XI	.
12	2		XII	.
13				.

II, III, IV, V, VI, VII, VIII, IX, X XI) (I) , 1 (

1
 I 2 1 I 1 R 1 30
 , 1 30 S, N O 1 , 2 20 (, 6 20
 () S, N O 18) , 2 20 (, 2 18
) S, N O 1 R

n- iso- , , 2- ()
 가); , , H, C₁-C₁₂ (, C₁ C₄ C₆ C₁₂) , C₆ C₁₂)
), , C₁-C₁₂ (, C₁ C₄ C₆ C₁₂) , C₆ C₁₂)
 R² 1 30 R² 1 30 S, N O 1
 C₁₀) C₆ C₁₂ (, C₆ C₁₀ C₁₂) (, C₆)
 1 I(a) 1

2

E , 12 XIII XIV , II, III, IV, V, VI, VII, VIII IX

XIII

R I, II, III, IV, V, VI, VII, VIII XI ;

E¹ ;

XIV

R Q I, II, III, IV, V, VI, VII, VIII XI ;

E¹ .

II

2 2, II . R

- ;
- ;
- ;
- ;
- ;

- F;
- CN;
- NO₂;
- 12 XII - ;
- C H F ;
- OC H F ;
- P(R¹)₂, -SOR¹, -OR¹, -CO₂R¹, -SR¹, -N(R¹)₂ -SO₂R¹ (, R¹) 1
 20) ;

R , 5- 6-

, II R

1 12 ;

1 12 , CF₃ ;

6 20 ;

4 20 가 O, S N ;

1 12 ;

3 15

II 가 2 II(a) II(z) 3 5 ,

II(v) II(y)

R I, II, III, IV, V, VI, VII, VIII XI

III

R , 2 6, III 가 6-
 (, C₁ C₁₂ (, C₁ C₅ C₆ C₁₂), C₆-C₂
₅ H₄ N-C₅ H₄ N-) E (-C₅ H₄ N-) (-C₆ H₄ N-)

III 2 III(a) III(g) 6

IV

R , 2 7, IV 5-
 (, C₁ C₁₂ (, C₁ C₅ C₆ C₁₂), C₆-C₂₀
 , C₆ C₁₀) C₂-C₂₀ (, C₆ C₁₀),
 C₆-C₁₂ E (-C₄ H₃ N-) (-C₄ H₃ S-

IV 2 IV(a) IV(h) 7 ,

IV(a)

R I, II, III, IV, V, VI, VII, VIII XI ;

IV(h)

R¹ , , ,

V

R , 2 8, V R
 (-C₁₂ C₁₀) (, C₁ C₆ (, C₆ C₁₂), C₆-C₂₀) (, C₆ C₁₀ W
 C₂-C₂₀)

2

V(a)

V(e)

V(a), V(b)

R I, II, III, IV, V, VI, VII, VIII XI ;

V(e)

R 1 , , ,

VI XI

, 2 9, VI VIII, 10, IX XI 가
C₁₂), C₆-C₂₀ R C₂-C₂₀ C₁-C₂₀ (, C₁ C₆ C₆

VI , E 9, 1,4-, 1,5-, 1,8-, 2,3- 2,6- VI 2
VI(a) VI(d)

VII , E 10, 1,4-, 1,5-, 1,8-, 2,3-, 2,6- 9,10- VII
2 VII(a)

, R , R

, , R 가 , 가 , 가

2 () , 1 2 가 1 1
99:1 20:80, 1 99:1 50:50 99.9:0.1 1:99 99.5:0.5 10:90, 가

가

R

-C F₂ +1 (, 1 20, 1 12) 가

5 100 %, 10 50 %

가

()

3가 [Yamamoto, Progress in Polymer Science, Vol. 17, p 1153 (1992)]
가 (1,5-) (0) 1 , 0
가 [Colon et al., Journal of Polymer Science, Part A, Polymer chemistry Edition, Vol. 28, p. 367 (1990)] 2 , 가 2가 0가

Ni(II)

5,962,631

PCT

WO 00/53565

3

가 ()Pd 0가
2

3

2

가

, 2- -9- 9- , 4- -1,2- , 1-
가

가 (II) (i) (ii)

, 1 20 , 1 12

, 1 20 , 1 12

(II)

(II) 가
Trans., 1, 1989, 1559]

() (II)
[N. Kamigata, T. Fukushima and M. Yoshida, J. Chem. Soc. Perkin

가

가

가

100
2

250

1

3

가

가

가

LUMO

가

,가

2

(110)

(150)

(110)

(150)¹³

(120, 130

(100)
140)

(140)

/

(120)

/

(120)

(130)

()

(130)

(140)

()

가

(110)

11

, 4, 5

6

, 8-10

가

, 12

, 13 14

(110)

['Flexible light-emitting diodes made from soluble conducting polymer,' Nature vol. 357, pp 477-479 (1 June 1992)]

(110)

e-

rf

(120) /
 N,N'- (3-)-[1,1'-]-4,4'- (TPD) [4-(N,N-
)-2-](4-) (MPMP) / (PVK), (
) (3,4-) (PEDOT), (PANI);
 4,4'-N,N'- (BCP); 가
 (8-) (Alq₃)

(120)

(120)

1

1

(100)

(130) 가

()

()
 [Markus, John, Electronics and N
 ucleonics Dictionary, 470 and 476 (McGraw-Hill, Inc. 1966)]

[Markus, John, Electronics and N
 ucleonics Dictionary, 470 and 476 (McGraw-Hill, Inc. 1966)]

(100)가

(130)

가

(130)
 4,356,429 (Tang), 4,539,507 (Van Slyke et al.)

5,247,190 (Friend et al.), 5,408,109 (Heeger et al.), 5,317,169 (Nakano et al.)

50 500 nm

(100)가

(130)

()

()

[MEH-

PPV ('Optocoupler made from semiconducting polymers', G. Yu, K. Pakbaz, and A.J. Heeger, Journal of Electronic Materials, Vol. 23, pp 925-928 (1994); and MEH-PPV Composites with CN-PPV ('Efficient Photodiodes from Interpenetrating Polymer Networks', J.J.M. Halls et al. (Cambridge group) Nature Vol. 376, pp. 498-500, 1995]

(130)

가

(150)

1

()
 1 (, Li, Cs) , 2 () , 12 , 2

(150)

(110)

(120) 가

(140)

(140) (Alq₃); (DPA), (8-DDPA) 4,7-)
 -1,10- 3-(4-)-4- -5-(4-t-)-1,2,4- -4,7- -1,10-)-1,3,4- (P
 BD) 가 (130) 가 (150) 가 (120) (130) 가 (110),
 (120), (130) (150) 가 가

(100)

가 가 가 가
 : (110) 500-5000 , 1000-2000 , (120) 50-2500 ,
 200-2000 ; (130) 10-1000 , 100-800 ; (140) 50-10
 00 , 200-800 ; (150) 200-10000 , 300-5000

1

, 2,7- (9,9- (2-))
 , DMF (5 Mℓ) 가 (1,5-) (0) (2.231 g, 8.11 mmol),
 2,2'- (1.267 g, 8.11 mmol) 1,5- (0.877 g, 8.11 mmol) 50 Mℓ (Schl
 enck) 가 / 60 30 (20 Mℓ) 2,7-
 75 -9,9- (2-) (2.00 g, 3.65 mmol) 가 (100 Mℓ), (100 Mℓ) (5 Mℓ)
 5 .2 (100 Mℓ), (100 Mℓ) (5 Mℓ) .1
 (NMR) (M_n) (GPC)

1A

75 5 24 , 1 ,
 1

2-4

2-4

2

, 가 1 가

R²가 , , , -C H F , 1 , , ,
 -C F₂₊₁ 가 R .

2.

1 , (i) 1 I , (ii) 2 , (iii)
 6 III 6- , (iv) 7 IV II 5- , (v)
 8 V , (vi) 9 VI VIII, 10 ,
 IX XI 가 , (vii)

II, III, IV, V, VI, VII, VIII IX

R, R¹, R², , ;

E , ;

IV

A ; A 가 N C A N , 0 1 2 ; A 가 C , A 가 N ,
 0 ; A 가 N A 가 C , 1 ; A 가 C , 2 ;

Q O, S, SO₂ NR¹ ,
 , R¹ , , , ;

V

Q¹ , O, S, SO₂ NR¹ ,
 , R¹ , , , ;

W H, ; W 가 ;

VI

2 E 1,4-, 1,5-, 1,8-, 2,3- 2,6- ;

VII

2 E 1,4-, 1,5-, 1,8-, 2,3-, 2,6- 9,10- ;

VIII

E 1, 2 3 , E 6, 7 8 ;

IX

E 2, 3 4 , E 7, 8 9 ;

XII

R³ , , , ;

0 1 12 , 2 가 .

3.

2 , 1 1 1 R 가 n- ;
 iso- ; ; (가); ,
 , , , .

4.

2 , 1 1 1 R 가 H, C₆-C₁₂ , ,
 C₆-C₁₂ , .

5.

2 , 2 1 II(a) II(z), III(a) III(g), IV(a) IV(
 h), V(a) V(e), VI(a) VI(d), VII(a) ,

II(v) II(y), IV(a), V(a) V(b)

R I, II, III, IV, V, VI, VII, VIII XI ;

IV(h)

R¹ , , , ,

V(e)

R¹ , , , , .

6.

1 , 2 1 , R

;

;

;

;

;

F;

-CN;

-NO₂;

12 XII - ;

-C H F ;

-OC H F ;

-P(R¹)₂, -SOR¹, -OR¹, -CO₂R¹, -SR¹, -N(R¹)₂ -SO₂R¹ (, R¹ II) .

7.

1 2 1 , R
 1 12 ;
 1 12 , CF₃ ;
 6 20 ;
 4 20 가 O, S N ;
 1 12 ;
 3 15 II .

8.

1 7 , .

9.

1 7 (120, 130, 140)
 (100).

10.

9 , 1 (130), / (120),
 / (140) .

11.

9 , 가 , .

12.

1 I 가 ,

R
 , F, -CN, -OR¹, -CO₂R¹, -C₁₂H₁₂F, -OC₁₂H₁₂F, -SR¹, -N(R¹)₂, -P
 (R¹)₂, -SOR¹, -SO₂R¹, -NO₂ ;

R 5- , 6- , 5- , 6- , 5- 6-
 ,

, R¹ ; , , ,

가 1 20 , 가 A1

< A1>

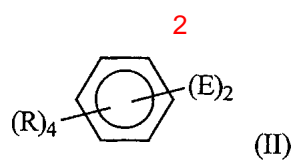
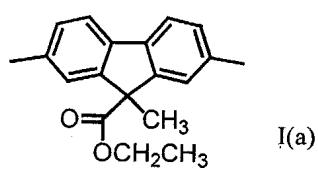
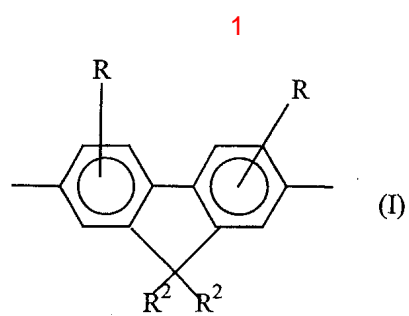
+ = 2 + 1;

R²가 , , , -C₁₂H₁₂F , 1 , , ,

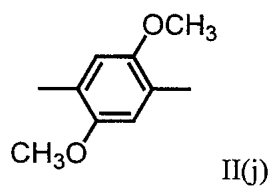
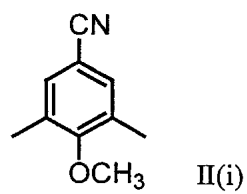
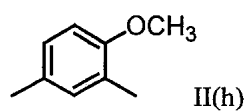
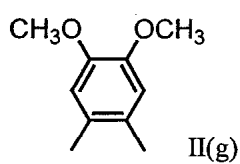
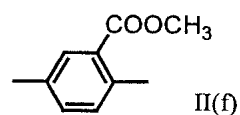
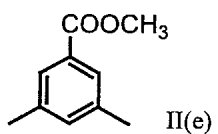
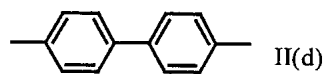
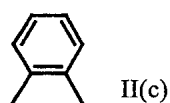
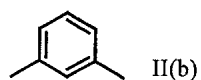
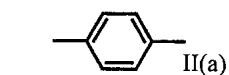
-C₁₂F₂₊₁ 가 R ;

(II) (i) (ii)

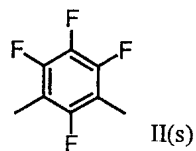
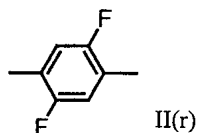
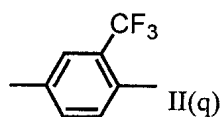
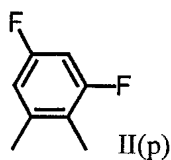
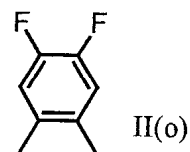
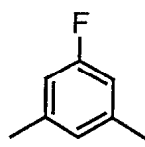
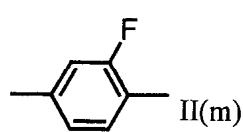
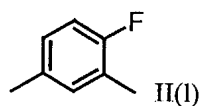
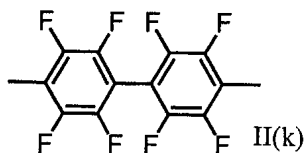
1 7



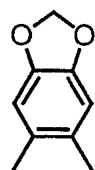
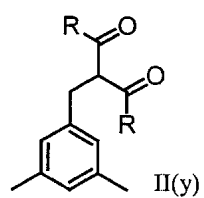
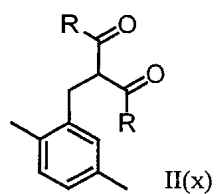
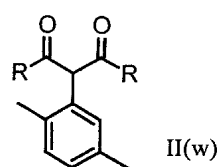
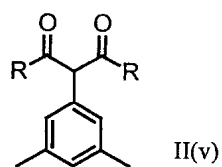
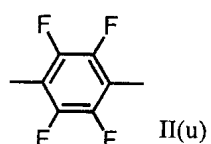
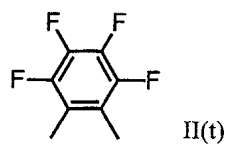
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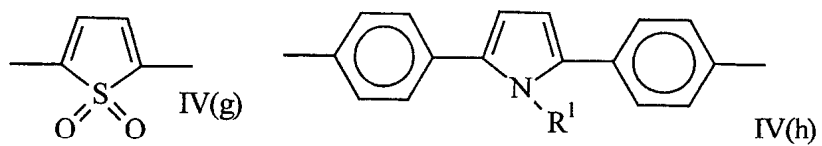
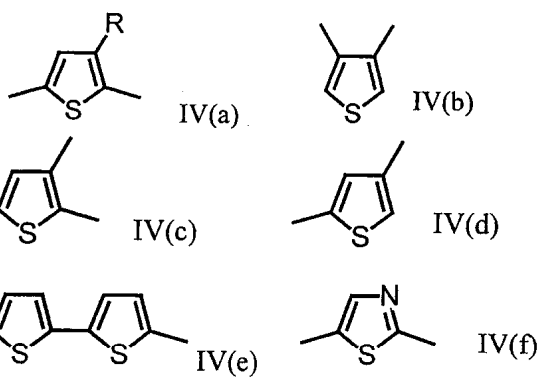
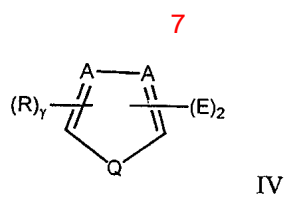
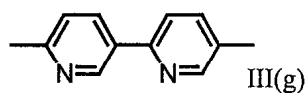
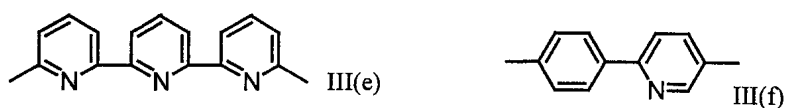
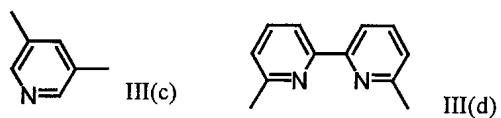
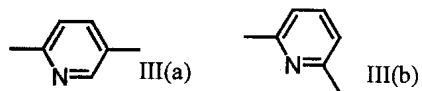
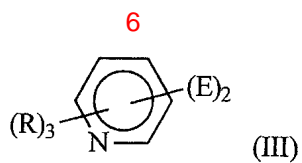
4



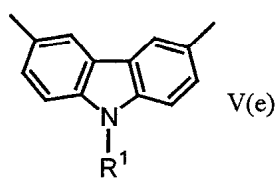
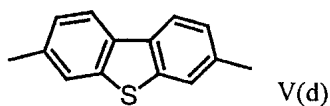
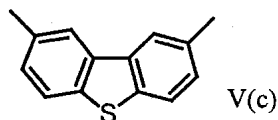
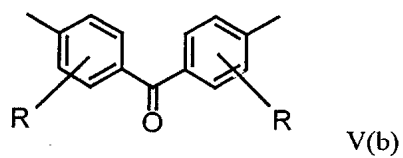
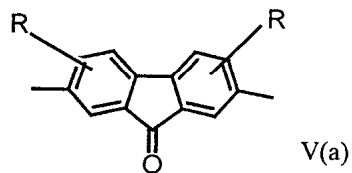
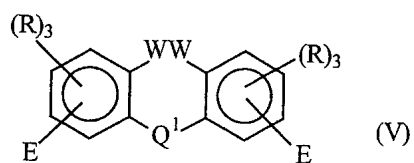
5



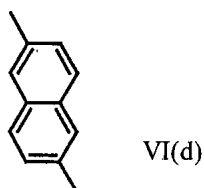
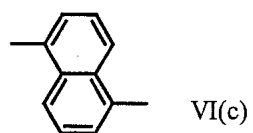
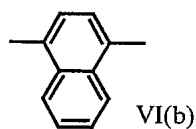
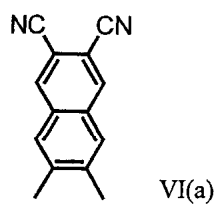
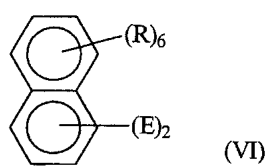
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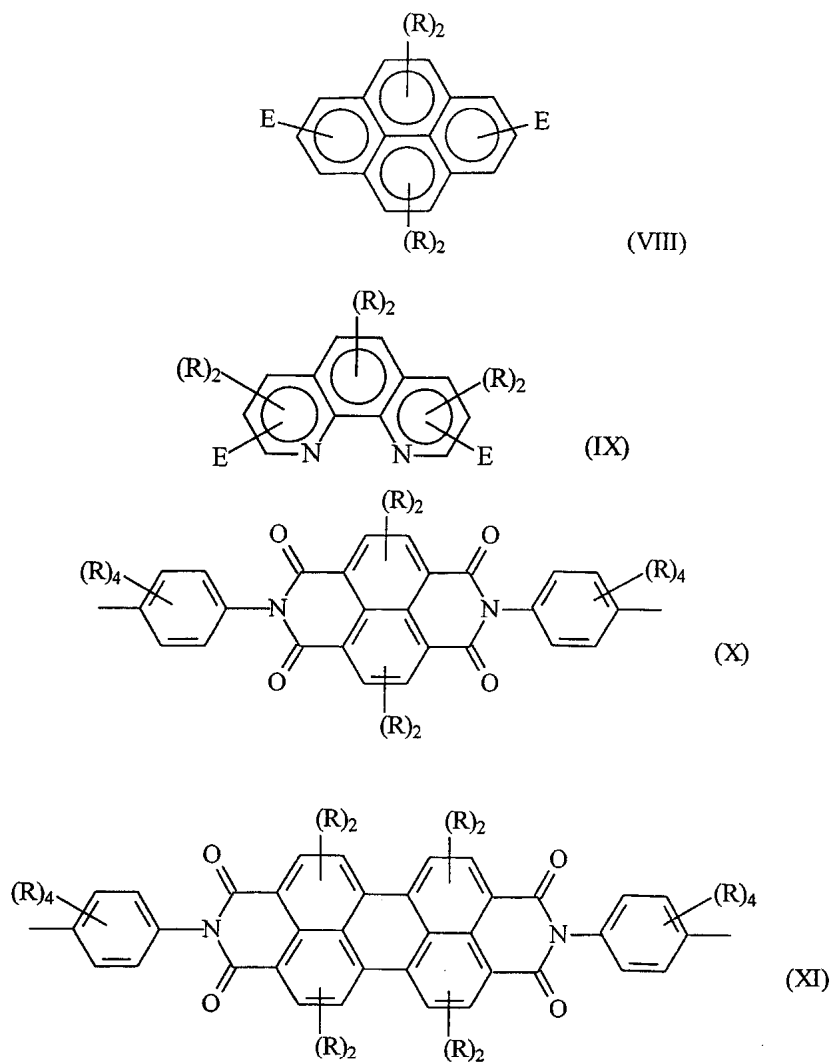
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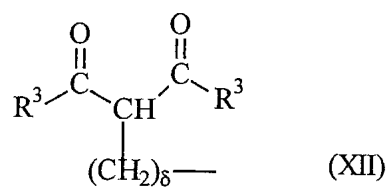
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