

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl.⁷
C09K 11/06

(11)
(43)

10-2004-0055236
2004 06 26

(21)

10-2002-0081870

(22)

2002 12 20

(71)

99

(72)

212 1403

106 1002

110 905

106 906

105 507

가 900

가 900

(74)

:

(54)

,

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

1 / / / / /

2 .

3 .

11 : 12 : (anode)

13 : 14 :

15 : 16 : (cathode)

17 : () (PSS)가 (3,4- -) (PEDT) (500)

18 : (700)

19 : (LiF) (20)

20 : (Al) (700)

21 : (650)

22 : (Ca) (500)

23 : (Al) (1,500)

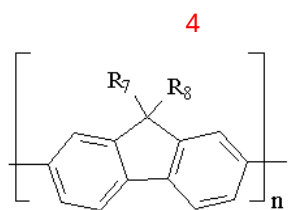
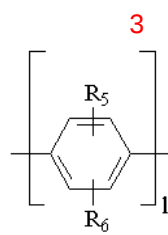
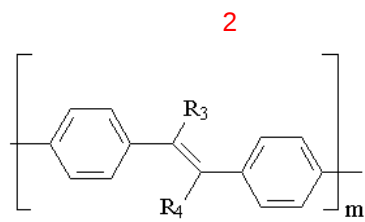
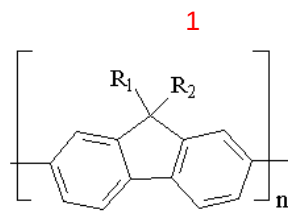
science device: EL device) , (electroluminescence device)

가 ,

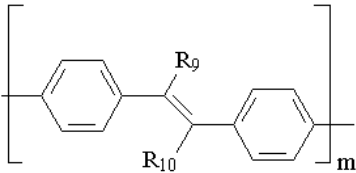
(photon) (electron) , (electron) (photon) 가 . (op toelectronic device)

(electroluminescence display) (backlight) , 가 가
 가
 (electroluminescence, EL) (hole) .
 e et al) , 가 , 1987 (Eastmann Kodak) 1963 (Pop
 (alumina-quinone) π - 10V 1% ,
 가 1000cd/m² 가 가
 , 가 (Joule) 가
 가
 1 / / / /
 (13), (13), 1 (14), (11) (anode; 12)가 (12)
 (13), (14) (14), (15) (cathode; 16)가
 (12) (16) 가 (12) (hole) (13)
 (14) (14) (16) (exciton) (15) (14)
 가
 가 , 가
 , 가 , 가
 π - (band gap) 가 가 (full color) 가
 π - (π - conjugated polymer)
 (Cambridge) R. H. Friend (p-
)(poly(p-phenylenevinylene): PPV) 가 1990 가
 가 가
 (PPV) , (Pth)
 3
 가 가 가 가
 가 가 가 가
 가 가

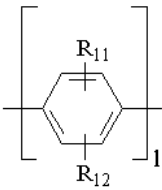
], $\begin{matrix} [E_1] - [E_2] - [Ar_1] - [Ar_2] \\ 2, \quad 3 \end{matrix}$ 6, $\begin{matrix} [Ar_1] \\ \vdots \end{matrix}$, $\begin{matrix} [E_1] - [Ar_1] - [Ar_2], [E_1] - [E_2] - [Ar_1] \\ [E_1] \quad [E_2] \end{matrix}$ 4, 5, 1,



5



6



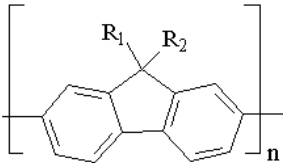
, R₁ R₆ (carbazole), (amine); 1 30 , , ,
(oxadiazole) , R₇ R₁₂ 1 30 , 1 , 30 ,
, , n, m 1 100,000 .

[E₁]-[Ar₁]-[Ar₂], [E₁]-[E₂]-[Ar₁], [E₁]-[E₂]-[A

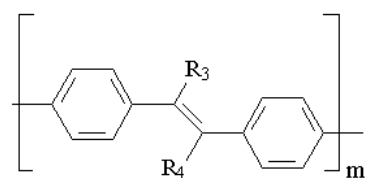
r₁]-[Ar₂],

, [E₁] [E₂] 1, 2, 3 , , :

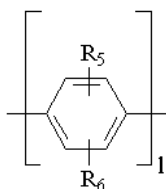
1



2

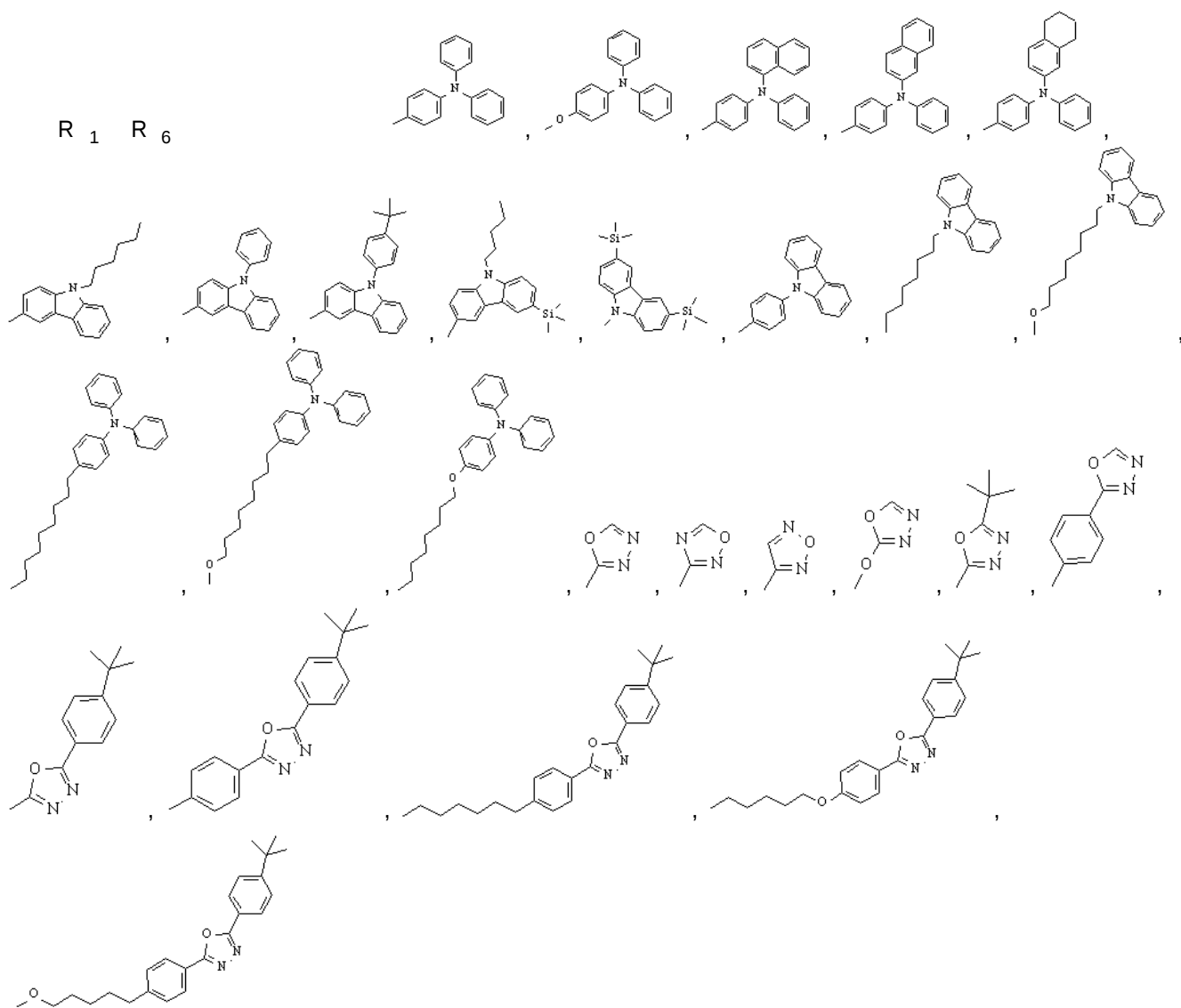


3



, R_1 R_6
(carbazole), (amine); n, m 1 30 30 1 100,000
(oxadiazole),

R_1 R_6



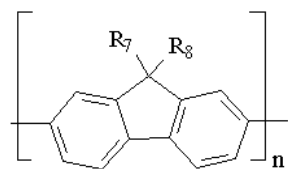
[Ar₁] [Ar₂]

4,

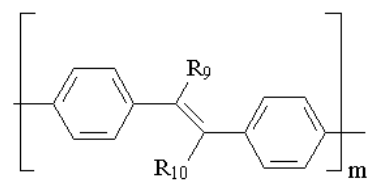
5,

6

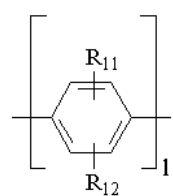
4



5



6

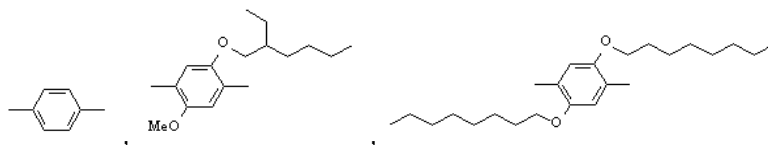
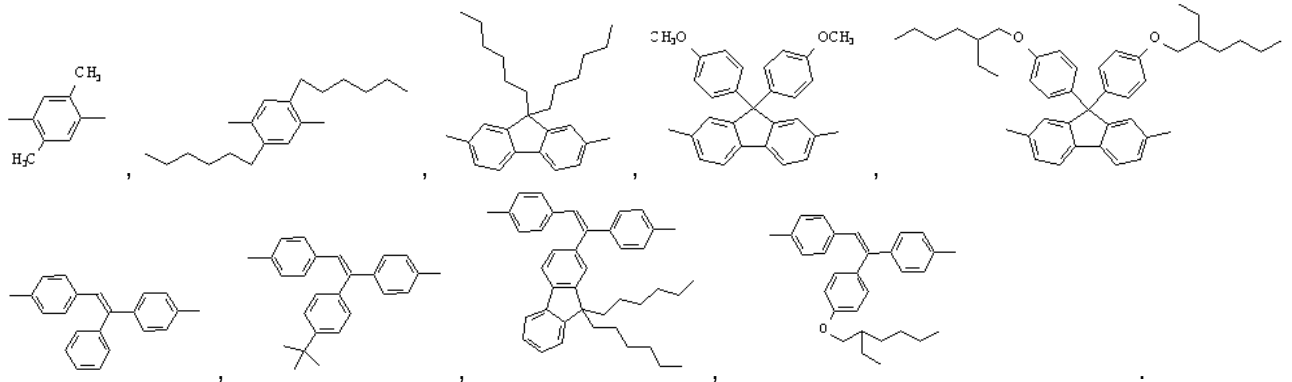

$$, n, m \quad 1 \quad R_7 \quad R_{12}$$

1 100,000

1

30

;


$$[\text{Ar}_1] \quad [\text{Ar}_2]$$


12

$$\vdots$$

7,

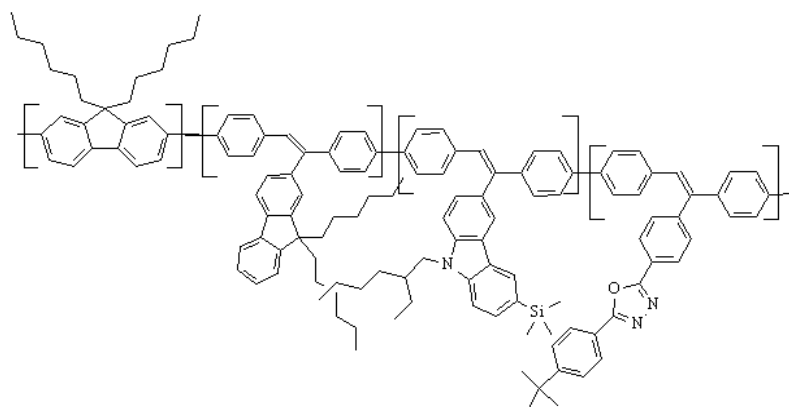
8,

9,

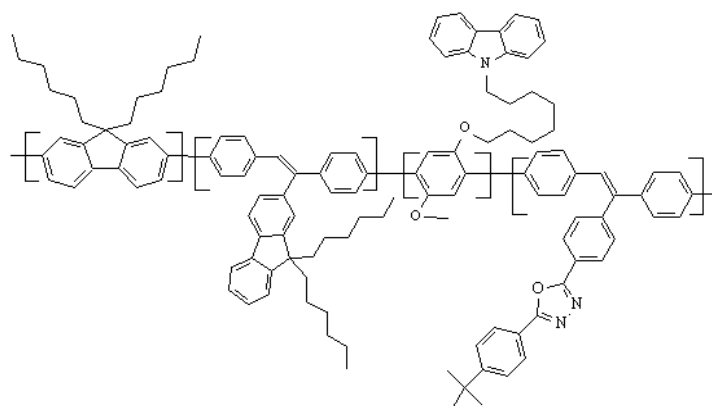
10,

11,

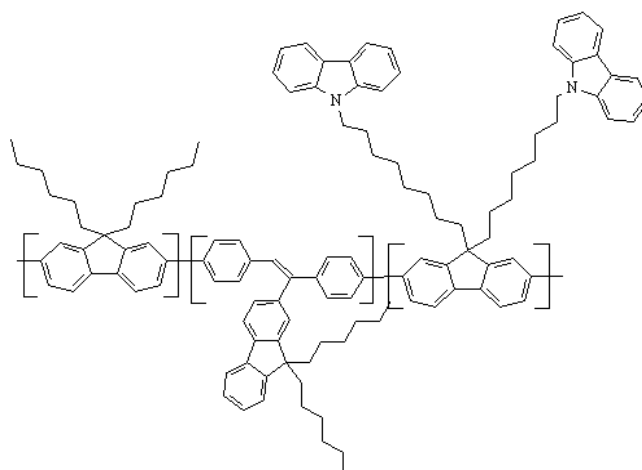
7



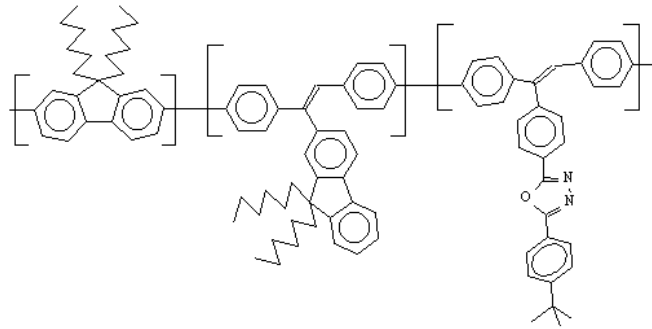
8



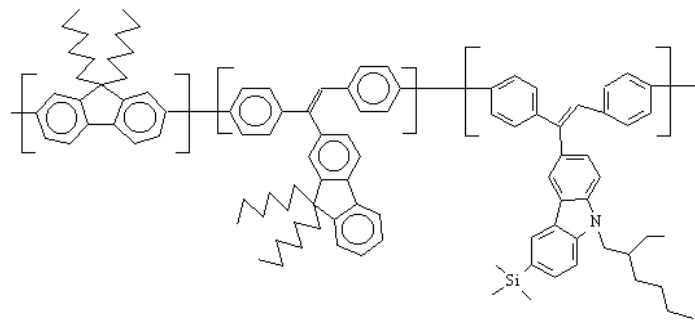
9



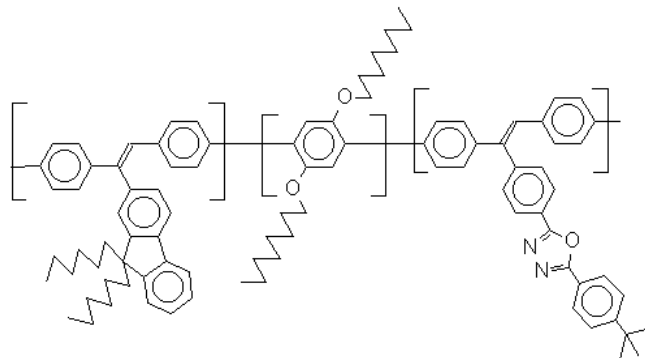
10



11



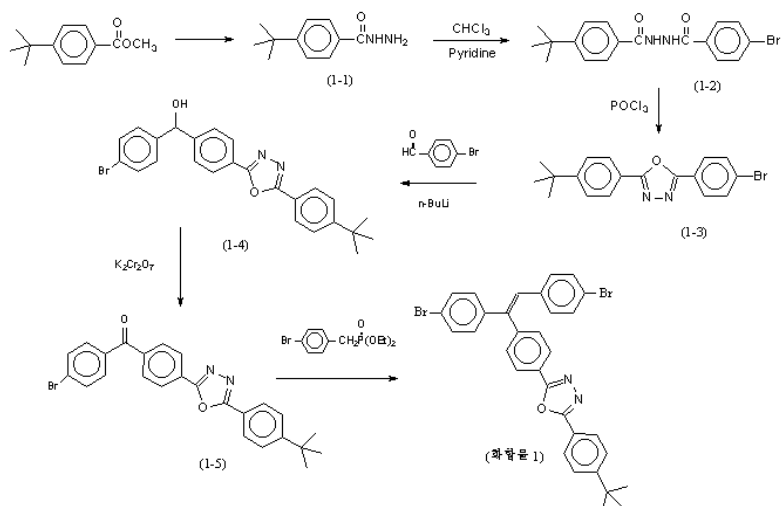
12



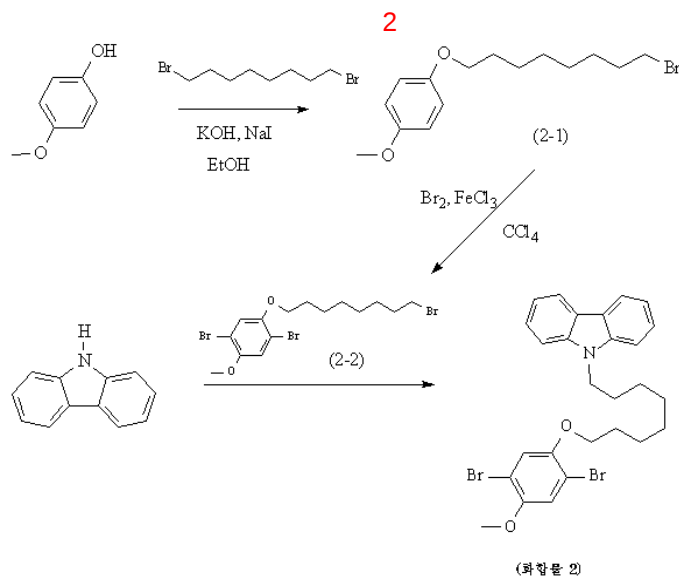
p- (p-stacking) , (band gap) 가 가
 (bulky) 2 3
 ight emitting layer) (I
 (hole)

, (Wittig) , (Suzuki)
 (yamamoto) C-C
 1,000 10,000,000 , 1 100 가 .
 , 2 3 .
 2 (PSS)가 , (3,4- (11), (12), ((18),
 (LiF) ,)(PEDT) (17), 가 (20)
 , 3 (PSS)가 , (3,4- (11), (12), ((18),
 (21), (Ca) ,)(PEDT) (17), 가 (20)
 , (12) , (11)
 (ZnO) , (12) (ITO), (SnO₂),
 (Mg), (Al), Al:Li (20) (work function)가 (Li),
 le transport layer) / (electron transport layer) (ho
 , 10 10,000 .
 10 10,000 .
 -)-N,N- -[1,1'-]-4,4'- (TPD) , N,N'- (3
 (aluminum trihydroxyquinoline; Alq₃), 1,3,4- PBD(2-(4-biphenyl)-5-phenyl-
 l-1,3,4-oxadiazole), TPQ(1,3,4-tris[(3-phenyl-6-trifluoromethyl)quinoxaline-2-yl]benzene),
 e),
 , / / / / / /
 , / / / / / /
 ,
 1
 (1,2- (4-)- α -(4-(5-(4-t-)-1,2,4-))) (1)
 1 .

1



4-tert-butylbenzoic acid 25g 7.3g 250ml 가 10 가
(EA) 4-tert-butylbenzohydrazide (1-1)
17g(68%)
(1-1) 5.5g 100ml 0 , 4- 6.3g(1
50ml 가 , 3.4ml(1.5) 5
8.5g(92%) (1-2)
(1-2) 8.5g 100ml 90 24 가
7.2g (1-3)
(1-3) 7.2g THF 78 n-BuLi(1.6M) 6.9ml(1.2)
30 1.9g(1.1) 4- 2.3g (1-4)
(: 53%).
(1-4) 2.0g 10ml DMF , 10ml DMF 1.27g
100 2 (1-5) (: 80%).
1.6g
(1-5) 1.4g 4- 1.12g(1.2) THF 300ml
t- (1.4) 4 가 (1,2- (4-)- α
(4-(5-(4-tert-butyl)-1,2,4-oxadiazol-3-yl)-4-tert-butylbenzohydrazide) (1) 1.5g (: 80%).
2
(1,4- -5- -2-(8-N-)) (2)



5g 4- 50ml 4.38g(2) 1
 0.6g(0.1) 21.7g(2) 40 가 (2-1)(4- -1-(8-
)) (2.3g, 25%).

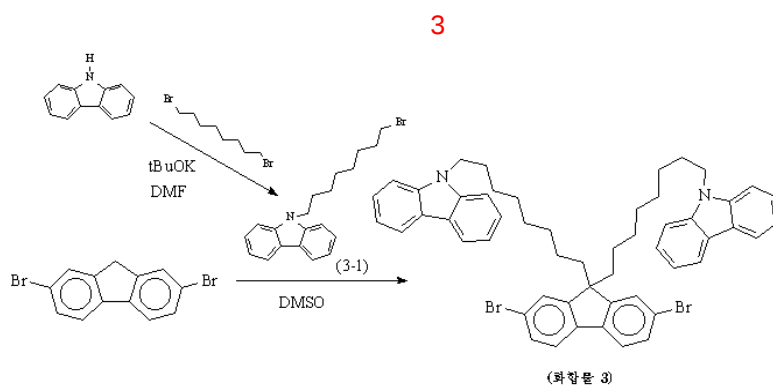
(2-1) 2.1g 50ml (iodine) 0.01g (Br₂) 2.2g(2.1
) 30ml 가 . (2-2)(2,5- -4- -1-(8-
)) (2.5g, 80%).

(carbazole) 2.2g DMF 5ml t- 1.6g 1
 (2-2) 5.2g DMF 10ml . (2)(1,4- -5- -2-(
 8-N-)) 5.5g (75%).

3

(2,7- -9,9-(8-carbazolyloctyl)fluorene) (3)

3



10g t- 6.7g DMF 50ml 1 25.6g(1.5
) 78 DMF 50ml 가 .

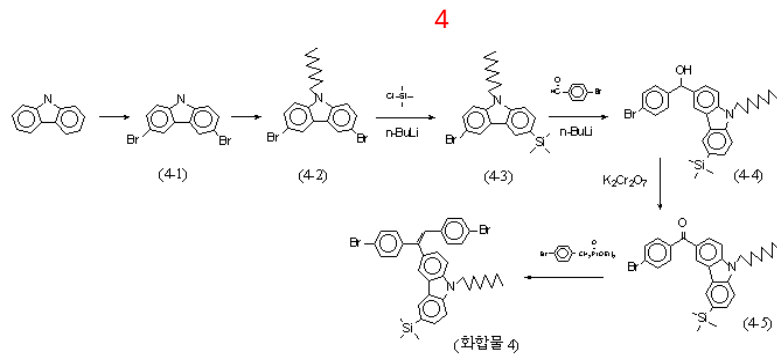
(3-1)(8-N- -1-) 15.0g (76%).

, 2,7- 4.1g (3-1) 10.8g(2.4) 500ml
0 , t- 3.8g (2.8) DMSO 250ml 가 . 12
- 9,9-(8-)) (: 76%). 8.5g (3)(2,7

4

(1,2- (4-)- α -(3-(N-(2-)-6-))) (4)

4



가 30.0g DMF 350ml 0 , N- (NBS) 64.7g(2.1)
) 50.5g(90%) (4-1)(3,6-

(4-1) 25.0g DMF 80ml 31.9g(3) 가 1
. 2- 17.6g(1.05) 50 24 ,
28.0g (4-2)(N-(2-)-3,6-) (: 83%).

, (4-2) 12.0g THF 240ml 78 , n- 1.76g(1)
1 3.3g(1.1) 가 .
(4-3)((N-(2-)-3- -6-) 6.5g (: 55%).

(4-3) 6.5g THF 240ml 78 , n- 1.0g(1) 1
. 4- 3.05g(1.1) 가 .
) 6.0g (: 75%). (4-4)(4-)-(N-(2-)-3-

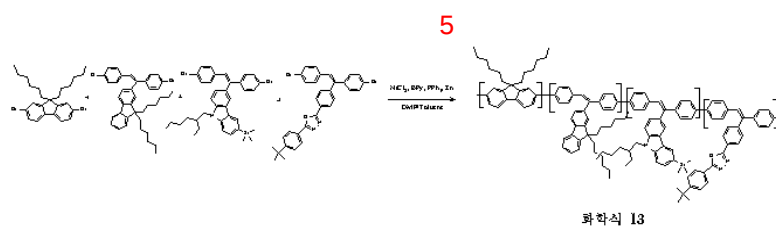
가 , (4-4) 6.0g 10ml DMF , 3.28g(1) 90ml DMF
100 2 . (4-5)(4-)-(N-(2-)-3-
) 4.9g(: 82%) .

(4-5) 4.8g 4- 3.2g (1.2) THF 150ml
. t- (1.3) 4 가
3-) 5.5g (: 89%). (4)(1,2- (4-)- α -(N-(2-)-

1

13

5

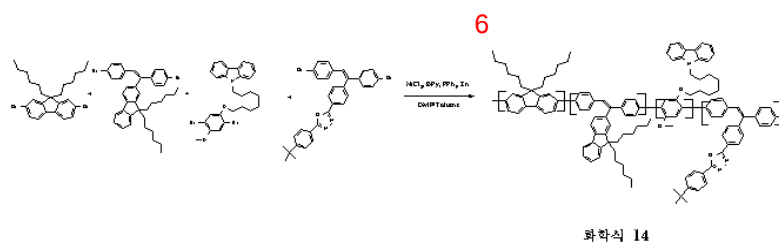


(II) 0.015g, 2,2- 0.021g, 0.66g, 0.29g DMF 4ml
 , 60 15
 0.45g, 1,2- (4-) - α - (2-(9,9-)) 0.12g, (4) 0.25g, (1) 0.2
 3g 4ml 가 90 48 THF (end)
 -capping agent) 0.2ml 24 0.9g

2

14

6



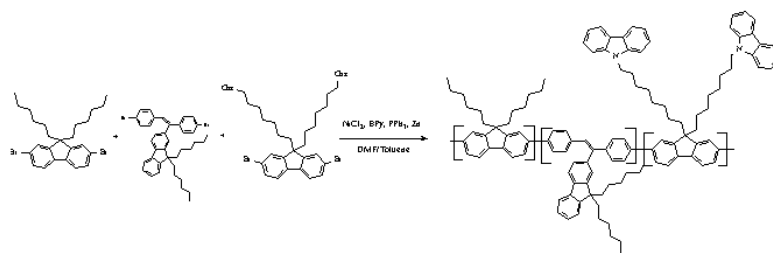
(II) 0.025g, 2,2- 0.034g, 0.88g, 0.69g DMF 4ml
 , 60 15
 0.44g, 1,2- (4-) - α - (2-(9,9-)) 0.38g, (2) 0.25g, (1) 0.2
 0g 4ml 가 90 48 THF
 0.2ml 24 0.8g

3

15

7

7



화합식 15

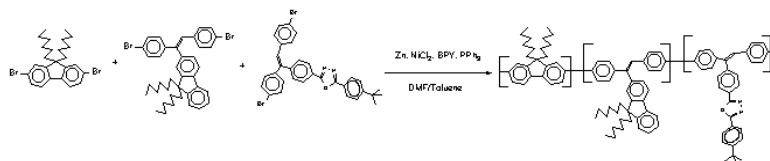
(II) 0.036g, 2,2- 0.047g, 1.48g, 0.65g DMF 5ml
 , 60 15
 0.14g, 1,2- (4-) - α - (2- (9,9-)) , 9,9- -2,7- 5ml
 24 가 90 . 48 , (3) 0.38g 0.2ml
 0.4g . THF 15

4

16

8

8



화합식 16

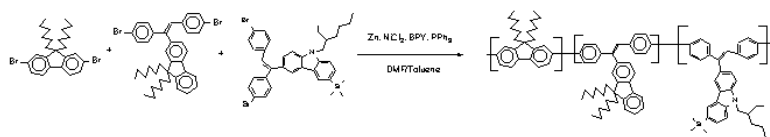
(II) 0.011g, 2,2- 0.015g, 0.46g, 0.24g DMF 4ml
 , 60 15
 0.30g, 1,2- (4-) - α - (2- (9,9-)) , 9,9- -2,7- 5ml
 24 가 90 . 48 , (1) 0.073g 0.1ml
 0.5g . THF 16

5

17

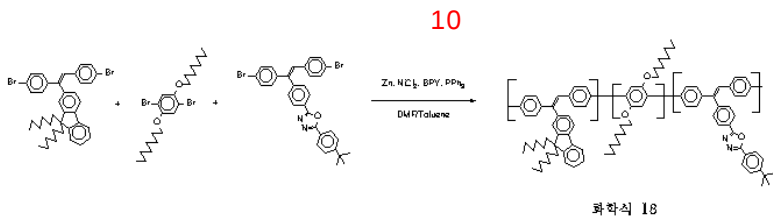
9

9



화합식 17

(II) 0.011g, 2,2- 0.015g, 0.47g, 0.24g DMF 5ml
, 60 15 , 9,9- -2,7-
0.30g, 1,2- (4-) - α -(2-(9,9-)) 0.24g, (3) 0.17g 5ml
24 가 90 . 48 , 0.2ml
0.4g THF 17
6
18
10



(II) 0.033g, 2,2- 0.046g, 1.43g, 0.74g DMF 8ml
, 60 15 , 1,2- (4-) - α -(
2-(9,9-)) 2.0g, 1,4- -2,5- 0.36g, (1) 0.45g 8ml
24 가 90 . 48 , 0.2ml
0.4g THF 18
7 12

1 6

ITO Baytron 4083(Bayer) 500 (spin-coating)
, 120 (hot-plate) 5 , 800
(Lithium fluoride) 10
700

1

[1]

		(Mw)	(PDI)	(Cd/A)	(Im/W)	
7	13	15,122	1.640	1.075	0.671	(0.220, 0.390)
8	14	12,711	1.704	0.186	0.077	(0.193, 0.336)
9	15	3,437	1.471	0.476	0.237	(0.199, 0.323)
10	16	20,568	1.742	0.536	0.279	(0.186, 0.298)

11	17	20,520	1.814	0.425	0.234	(0.234, 0.370)
12	18	13,367	1.650	0.825	0.562	(0.197, 0.347)

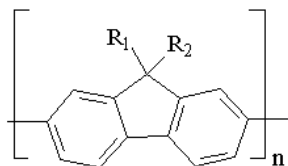
1

(57)

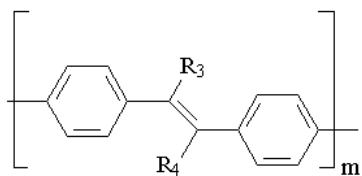
1.

$$\begin{array}{l}
[E_1] - [Ar_1] - [Ar_2], [E_1] - [E_2] - [Ar_1], \quad [E_1] - [E_2] - [Ar_1] - [Ar_2] \\
, \quad [E_1] \quad [E_2] \quad 1, \quad 2, \quad 3 \\
[Ar_1] \quad [Ar_2] \quad 4, \quad 5, \quad 6
\end{array}$$

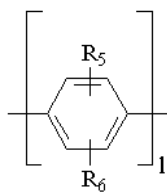
1



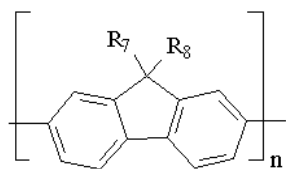
2



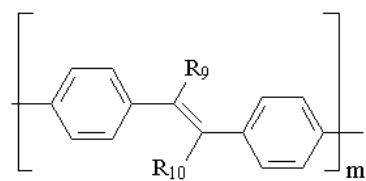
3



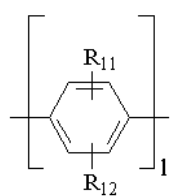
4



5



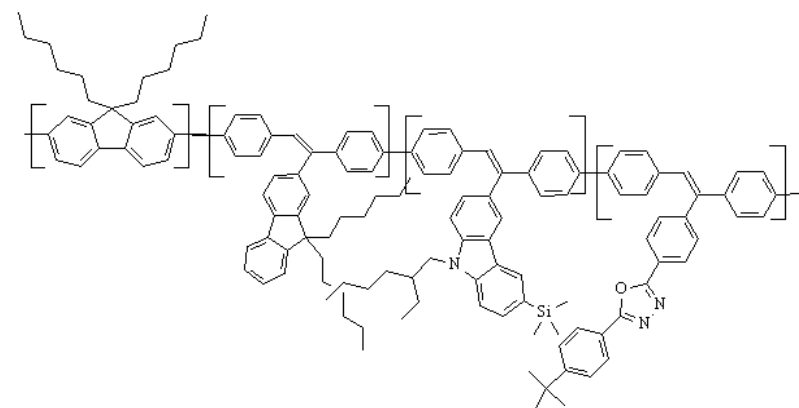
6



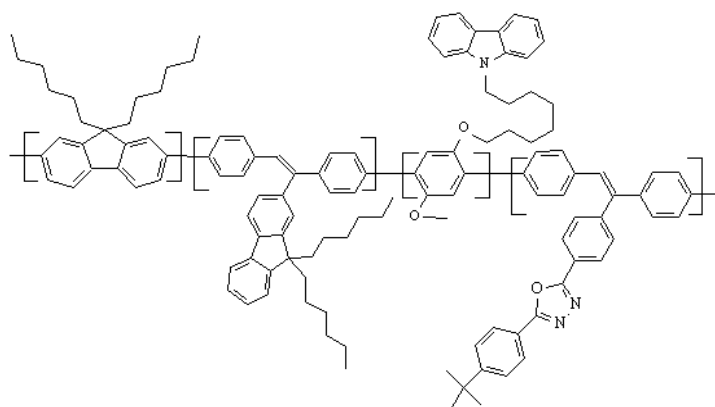
2.

1, 12, 7, 8, 9, 10, 11, :

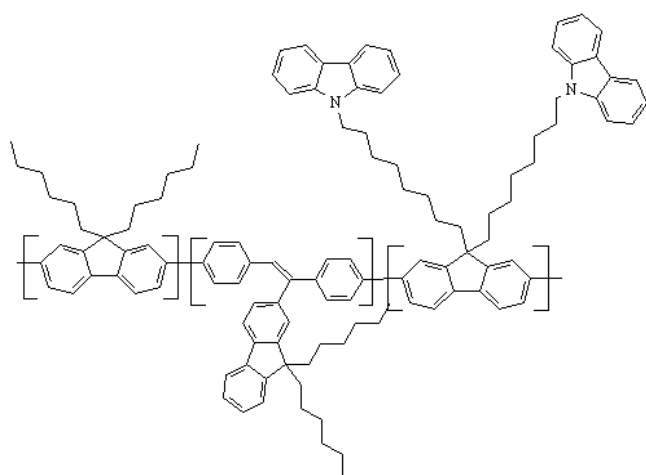
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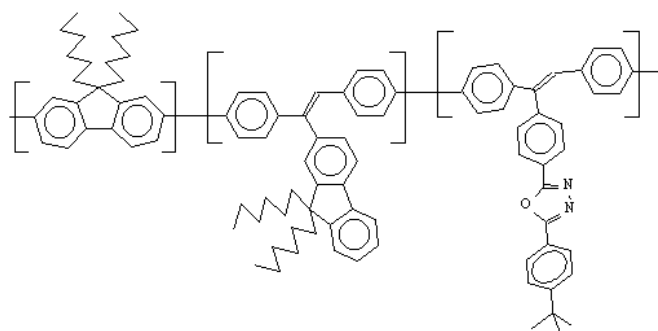
8



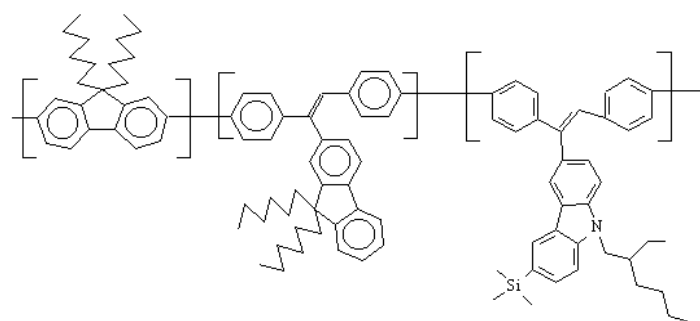
9



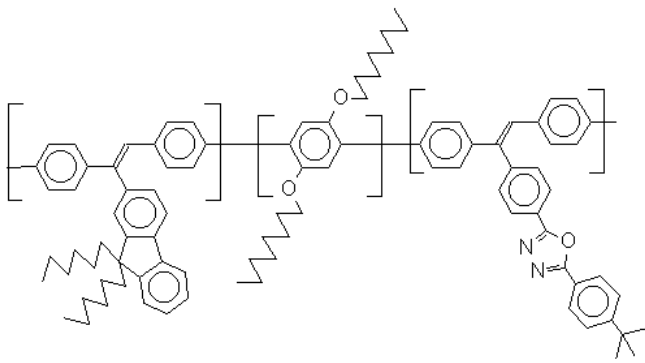
10



11



12



3.

1 2

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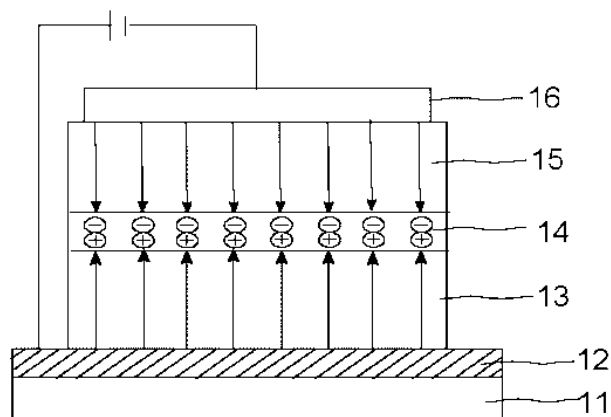
4.

3 ,

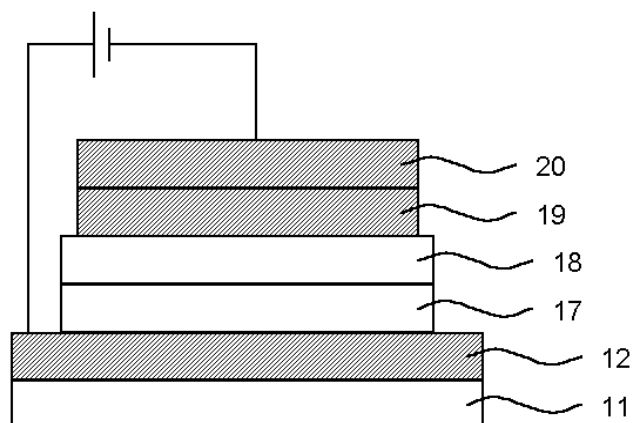
가 / / , / / ,

/ / / /

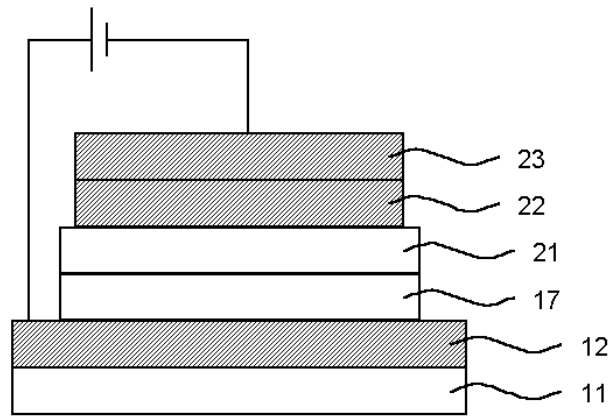
1



2



3



专利名称(译)	蓝色有机发光聚合物包括电子供体和电子受体替代物，以及使用其的电致发光器件		
公开(公告)号	KR1020040055236A	公开(公告)日	2004-06-26
申请号	KR1020020081870	申请日	2002-12-20
申请(专利权)人(译)	SK株式会社		
当前申请(专利权)人(译)	SK株式会社		
[标]发明人	YOU HONG 유홍 JOO DONGJIN 주동진 JIN JAEKYU 진재규 SHIN DONGCHEOL 신동철 KIM JONGWOOK 김중욱 KWON SOONKI 권순기 KIM YUNHI 김윤희		
发明人	유홍 주동진 진재규 신동철 김중욱 권순기 김윤희		
IPC分类号	C09K11/06		
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摘要(译)

本发明涉及包含电子供体和电子受体取代基的蓝色有机发光聚合物和使用其的电致发光元件，更具体地，涉及包含电子供体和电子受体取代基的苝，以及蓝色有机发光聚合物。包括电子给体的二苯乙烯衍生物到元素和电子受体取代基以及使用它们的电致发光元件。根据本发明的蓝色有机发光聚合物表现出优异的发光效率，促进了能量转移，使分子间相互作用最小化，同时具有高的热和氧化稳定性。此外，它具有的优点是，其中施加发光聚合物并制造的电致发光元件的蓝色发光材料显示出高的热稳定性和发光效率。此外，通过促进能量转移和空穴或电子注入和透射，分子之间引入的各种取代基可以提高分子内的发光效率。发光聚合物，发光器件，蓝光发光，发光效率，苝，芪，电子给体，电子受体。

