

(19)
(12)(KR)
(A)(51) 。 Int. Cl. ⁷
C09K 11/06(11)
(43)2001 - 0098854
2001 11 08(21) 10 - 2001 - 0022262
(22) 2001 04 25(30) 2000 - 128364 2000 04 27 (JP)
2000 - 288692 2000 09 22 (JP)
2001 - 125359 2001 04 24 (JP)(71) 가 가
가 가 가 가 4 1 - 1(72) 가 가 가 가 가 4 1 - 1 가 가
4 5 - 1,203 - 206
가 가 가 1 43 - 6
3 16 - 7 106

(74)

:

(54)

EL

,

,

.

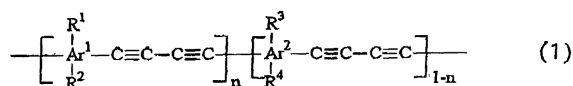
(1)

(3)

(2, 3)

.

[1]



, (1) , Ar¹, Ar² , R¹, R², R³, R⁴ , n .

1a

,

1 EL .

2 1 EL .

3 1 EL EL .

4 1 EL .

5 2 EL .

6 3 EL .

7 4 EL .

< >

1... (), 2... (), 3... ,

4

(EL, electroluminescence)) .

L , , , EL . E

, EL 가 , , 가 가 , 가 가 , 가 가 (LCD) 가 .

EL, (), , , 가 , mm .

, , , , EL , 가 .

EL LED .

EL 가 .

, . 가

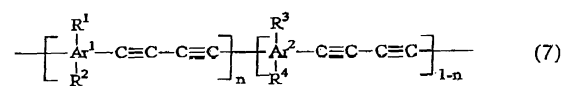
(PPV(poly p - phenylenevinylene))

EL 가 10 - 326675 .

PPV

(7)

[7]



(7) Ar^1 1, Ar^2 2, R^1, R^2, R^3, R^4 1, 2, 3, 4, n 0 < n ≤ 0.97, 1, 2.

, 1, 2, 3, 4 , , , 가 , .

(7)

(7)

(7)

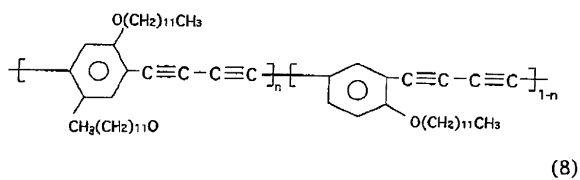
가

(8) , 1 , 2 가 n (8) n

가 , n 0.66 , n : (1 - n) = 2 : 1

가 가

[8]

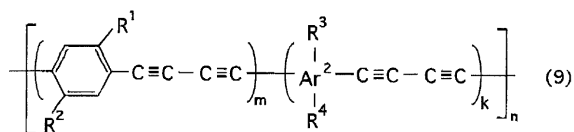


(8)

가

(9) 가 (7) 1

[9]



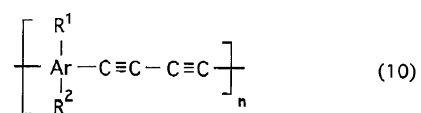
, (9) , Ar² , m k , R¹ 1 , R² 2 , R³ 3 , R⁴ 4 , n

. 1, 2, 3, 4 ,

(10)

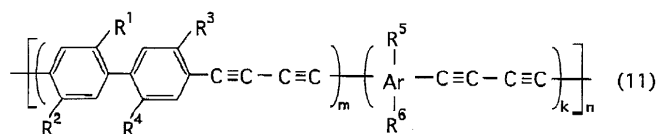
가

[10]



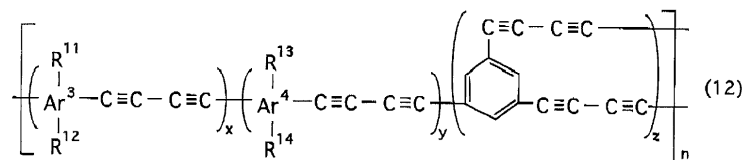
(10) Ar R¹ 1 , R² 2 , n
 .
 ,
 , (11) 가 .

[11]



(11) Ar, R¹, R², R³, R⁴, R⁵, R⁶, 1, 2, 3, 4, 5, 6, m, k, n, 1 ~ 6, (12) 가 .

[12]



$2^{(12)}, \text{Ar}^3, 1, \text{Ar}^4, 2, \text{R}^{11}, 1, \text{R}^{12}$
 $2, \text{R}^{13}, 3, \text{R}^{14}, 4, x, y, z, n$
 $1, 2, 1, 2, 3, 4$

(1)

1(a) ~ (d)

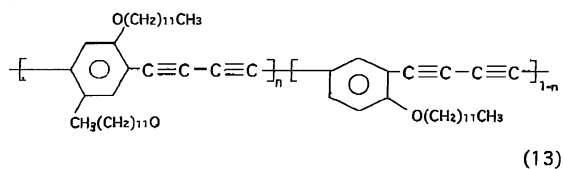
EL

1(a) , () (1) () (2) ITO() 200nm
ITO

(2) ITO, IDIXO()

(3) (13) (2) 1
50nm

[13]



(13) , $n = 0.5$.

(3a) 1(b) , (2) (CHCl₃)
150 , 150 30
90 60 .

(2) (13) 1(c) (3) .

1(d) , () (4) (Mg Ag) (3)
300nm

1 10 MgAg (4) (4)
(4)
, Na, NaK, Mg, Li, CaMg / Cu , Mg/In (4)

(2) (4)
(2) (1)

(13)

(13) 2 2
500 550nm 가 .

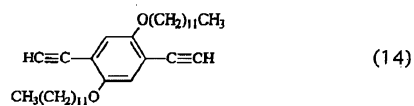
(13)

, 180Ml (THF) 150mg(1.5mmol) 180mg(1.5mmol) N,N,
N',N' - (TMEDA) 가 . 10

1.48g(3mmol) 2,5 - , 0.93g(3mmol) 4 - , 1
 80Mℓ THF 가 ,
 2 .

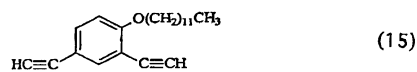
2,5 - - 1,4 - (14) .

[14]



, 4 - - 1,3 (15) .

[15]

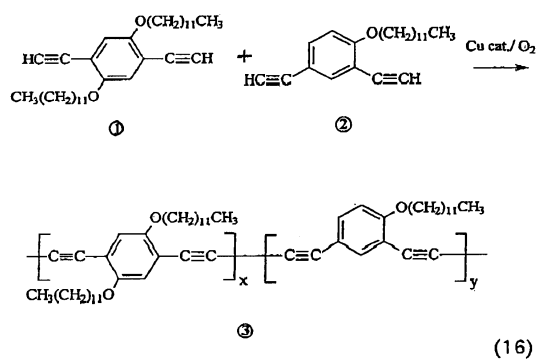


MeOH THF 10Mℓ , 1 2N - HCl/
 2N - HCl/MeOH
 , ,
 , , , 1 ℓ MeOH 10Mℓ THF
 . MeOH

(yield) 95% .

2,5 - - 1,4 - 4 - - 1,3 (16) ,
 (16) , cat.
 , (14), (15) 가 , x : y = 1 : 1 , (13) n 0.5

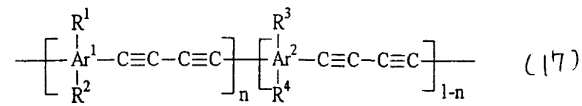
[16]



$$(16) \quad \quad \quad , \quad (13) \quad .$$

EL (3), (13), (17).

[17]



$$(17) \quad \begin{aligned} & \text{Ar}^1, \text{Ar}^2 \quad (2\text{가}) \\ & \text{2가}, \text{Ar}^1 \\ & \text{2가}, \text{Ar}^2 \end{aligned}$$

가 Ar^1 , Ar^2 , 1,4 - (p -) , 1,5
가 . 1,3 - (m -) , 1,2

R^1, R^2, R^3, R^4 , , , , , , , ,
 . , R^1, R^2, R^3, R^4 , 가 , .

(17) n , $0 < n \leq 0.9$. $n = 1$

$$R^1, R^2, R^3, R^4, Ar^1, Ar^2 \quad (3)$$

(3) $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{i=1}^n \frac{1}{i} = 0$, $\lim_{n \rightarrow \infty} \frac{1}{n} \sum_{i=1}^n \frac{1}{i^2} = \frac{1}{6}$.

$$n = 0.66, \quad n : (1 - n) = 2 : 1, \quad (3)$$

$$\begin{array}{ccccc} (13) & n : (1 - n) = 2 : 1 & (3) & , & (13) & n : (1 - n) \\ = 1 : 1 & & & & & \\ & 3 & & & 3 & \\ & & (3) & & & EL \\ & & & & 2 & \end{array}$$

3, n=0.5 (3) 40V, n=0.66 (3)
26V 가, n=0.66 n=0.5 40

(13) $n = 0.66$, (16) $x = 2, y = 1$, (16)
 2.96g(6mmol), (16) 0.93g(3mmol) 가
 , $n = 0.5$

EL

EL

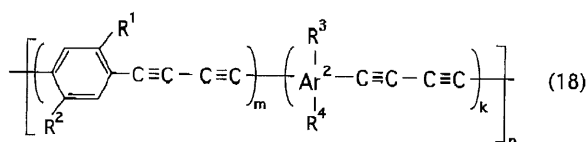
(正孔)

(13) 500 550nm

가

17) Ar^1 (3) R^4 (18) (18) (

[18]



(18) R^1, R^2, R^3, R^4

m, k

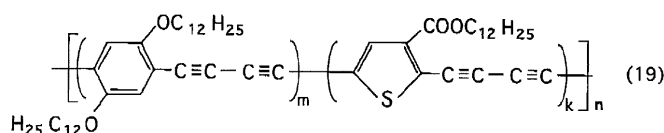
n

(18) R^1, R^2 가 , Ar^2 , R^3 가 , R^4 가

(2,5 - - 1,4 -) (3 -) (2 : 1) (copoly(2, 5 - didodecyloxy - 1,4 - phenylenebutadiynylene) (3 - dodecyloxycarbonylthienylenebutadiynylene) (2:1))

(19)

[19]



(19) (3) 4 가 , 574nm

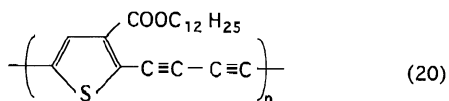
(19) (15) 4 - - 1,3 , 3 - - 2,5 - () (3 - dodecyloxycarbonyl - 2,5 - bis(trimethylsilylethynyl)thiophen

e)

(2)

(3) 가
 (20) (3 - 2,5 -) (poly(3 - dodecyloxyca
 rbonyl - 2,5 - thienylenebutadiynylene)) (19)
 596nm

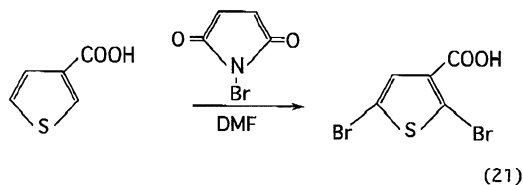
[20]



(20)

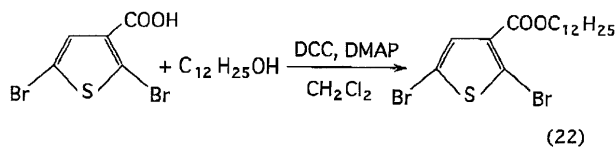
(thiophenecarboxylic acid) 3 - (3 - then
 oic acid) 5.12g(40mmol) 50Mℓ (dimethylfolmamide ; DMF) 가 ,
 N - (N - bromosuccinimide) 14.6g(82mmol) 가 ,
 (21) , 100Mℓ 600Mℓ
 9.38g, 82.0% (21) 2,5 - - 3
 - (2,5 - dibromo - 3 - thenoic acid)

[21]



, 4.13g(20mmol) (DCC) 2.44g(20mmol) (DMAP)
 - 3 - 5.72g(20mmol), (CH₂Cl₂) 가 , 2,5 -
 (22) (dodecanol;C₁₂H₂₅OH) 3.73g(20mmol) 가 3 ,

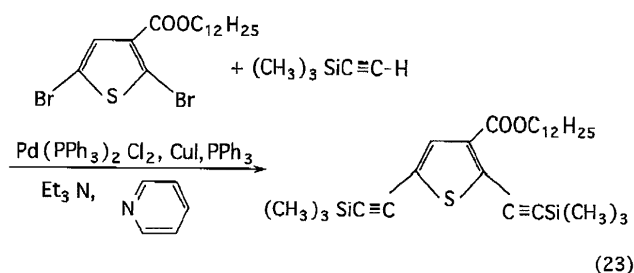
[22]



(18.8mmol), 94.2% (22) 2,5 - 3 - 8.56g
 (2,5 - dibromo - 3 - dodecyloxycarbonylthiophene), 2,5 - 3 - (dod
 ecyl2,5 - dibromo - 3 - thenoate)
 - 2,5 - (3 - dodecylester - 2,5 - dibromothiophene)
 6.81g(15mmol), (CuI) 103mg(0.54mmol), (triphenylphosphine ; PPh₃) 210m
 g(0.8mmol), 27Mℓ (Et₃N) 18Mℓ (pyridine) 가
 20 (trimethylsilylacetylene; (CH₃)₃SiC≡C-H) 3.44g(35mmol),
 p h ine)palladium dichloride;Pd(PPh₃)₂Cl₂) 105mg(0.15mmol) 가 85
 1:3 5.93g(11.8mmol), 78.
 9%

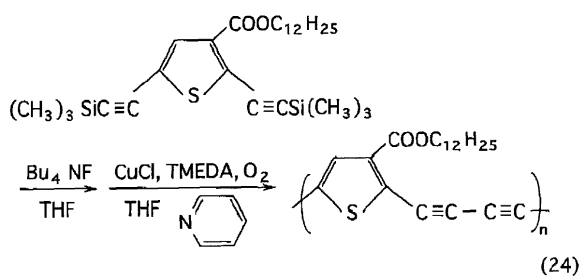
(23) 3 - - 2,5 - ()
 (3 - dodecyloxycarbonyl - 2,5 - bis(trimethyl silylethynyl)thiophene), 2,5 - ()
) - 3 - (dodecyl2,5 - bis(trimethylsilylethynyl) - 3 - thenoate)

[23]



0.500g(1mmol) 20Mℓ THF, THF 1M 5
 (1M tetra butylammonium flouride;Bu₄NF) 0.5Mℓ(0.5mmol) 가
 , THF 10m
 g(0.1mmol), N,N,N',N' - (TMEDA) 12mg (0.1mmol), THF 8Mℓ, 2Mℓ
 가 , 2 (24) THF 1
 OMℓ 가

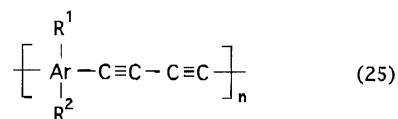
[24]



500M ℓ 2 (N) ,
203g(0.59mmol), 59.5% . (24) , (20)

(25)

[25]



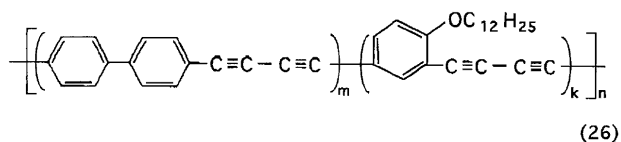
(25) $\text{Ar} \vdash \text{R}^1, \text{R}^2$

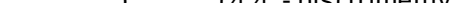
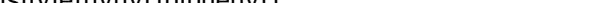
(3)

1, 2, EL, 가

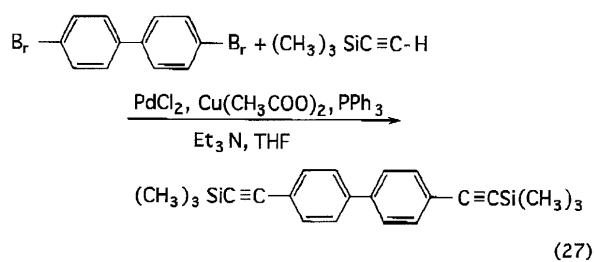
(3) (4 - m - loxy - m - pheny lenebutadiynylene) (26) (4,4' - (copoly (4,4' - biphenylenebutadiynylene) (4 - dodecy 6 428nm, 450nm

[26]



(26)  (27)  4,4' -

[27]

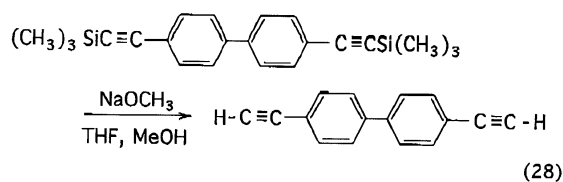


4,4'-dibromobiphenyl) 6.24g(20mmol), 100Mℓ, THF 130Mℓ, 4,4'-(Cu(CH₃COO)₂) 364mg(2mmol), 354mg(2mmol), 1.73g(6.6mmol), 3.24g(3.3mmol) 가 , 85 (27)

(27) 4'- (5.90 g(17mmol), 85.0%

henyl) (28) , 4,4' - (4,4' - diethylbip

[28]

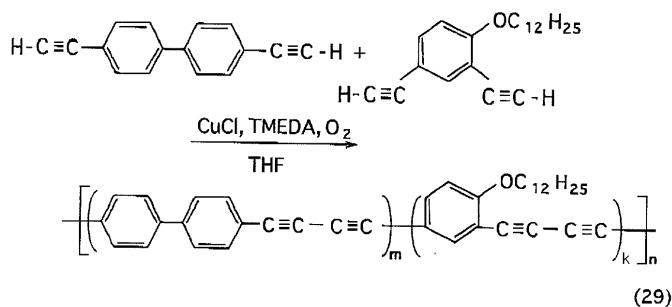


83g(34mmol) 5.9g(17mmol) 10Mℓ THF (NaOCH₃) 가 , 6Mℓ (CH₃OH: MeOH) 1. 10%

1:1 1.20g(5.9mmol), 34.8% (28) 4,4' -

(29) (4,4' -) (4 - m -) (copoly((4,4' - biphenylylnebutadiynylene)(4 - dodecyloxy - m - phenylenebu

[29]



, 20mg(0.2mmol) 1 24mg(0.2mmol) TMEDA 40Mℓ THF , 40Mℓ THF 24mg 4,4' - 31 1mg(1mmol) 4 - - m - (4 - dodecyloxy - m - diethynylbenzene) 가 , 2 . 4 - - m - (29)

(29)

500M ℓ

2

500M ℓ

248g(0.98mmol),

48,7%

(26)

1

(3)

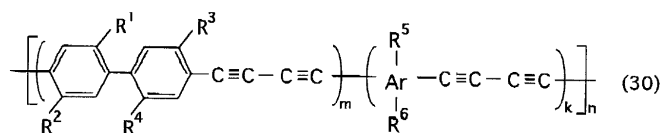
(3)

가

(26)

(30)

[30]



(30), Ar

, R¹

1

, R²

2

, R³

3

, R⁴

4

, R

5

5

, R⁶

6

, m k

, n

(4)

3

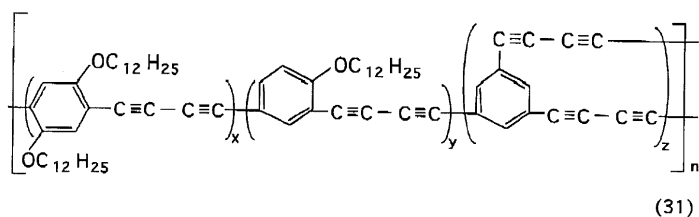
(31)

(31)

7

405nm, 495nm, 512nm

[31]



(31), x:y:z 6:3:1

(31)

10mg(0.1mmol), TMEDA 12mg(0.1 mmol), THF 20M ℓ

, 2,5 -

- p -

(2,5 - didodecyloxy -

p - diethynylbenzene) 297mg(0.6mmol), 4 -

- m -

93mg(0.3mmol), 1,3,5 -

(1,3,5 - triethynylbenzene) 15mg(0.1mmol)

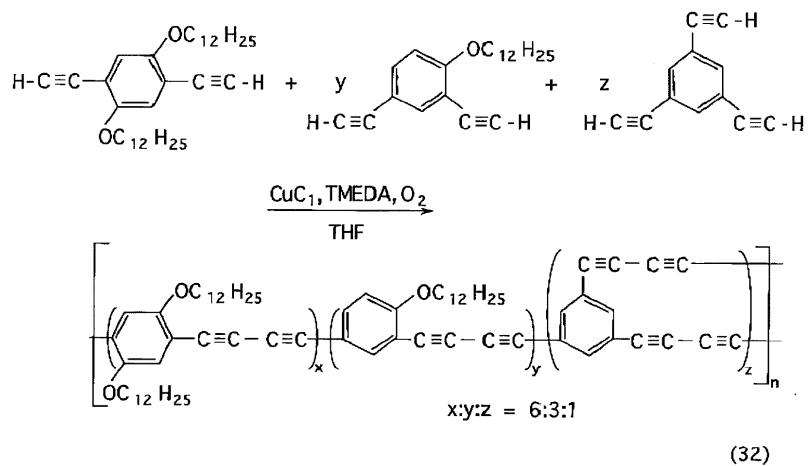
20M ℓ THF

가

가 2 , (32)

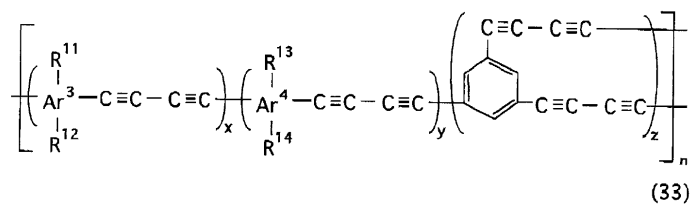
500Mℓ 2 , 500Mℓ ,
304g, 75.4%

[32]



(33)

[33]



(33) , Ar³, Ar⁴ (2가)

가

R¹¹, R¹², R¹³, R¹⁴

, R¹¹, R¹², R¹³, R¹⁴

가

x y z

, n

, (17), (18), (25), (30), (33)

가 , ,

가

가

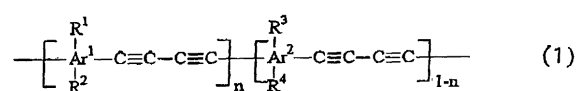
(16)

가 $x : y = 2 : 1$

(57)

1.

(1)

$$[\quad 1]$$

$$\left(\begin{array}{ccccccc} (1) & & & & & & \\ 2 & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \\ & & & & & & \end{array} \right), \text{Ar}^1 \quad 1 \quad , \text{Ar}^2 \quad 2 \quad , \text{R}^1 \quad 1 \quad , \text{R}^2 \quad 2 \quad , \text{R}^3 \quad 3 \quad , \text{R}^4 \quad 4 \quad , \text{n} \quad .)$$

2.

1 ,

1 2

3.

1 ,

1 가

2 가

4.

1 ,

1, 2, 3, 4

5.

4 ,

1, 2, 3, 4 , , 가 ,
.

6.

1 ,

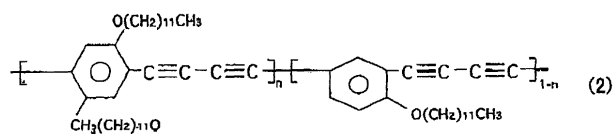
(1) , R^1 R^2 Ar^1 , R^3 R^4 Ar^2
.

7.

1 ,

(2) 1 , 2 가

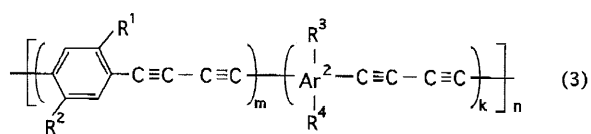
[2]



8.

(3)

[3]


 R^4 , (3) , Ar^2 , R^1 1 , R^2 2 , R^3 3 ,
4 , m k , n .

9.

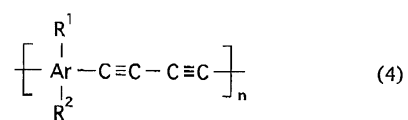
8 ,

4

10.

(4)

[4]



(4) Ar , R^1 , R^2 , n .

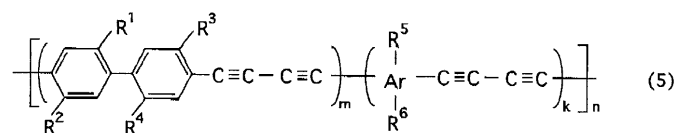
11.

10 ,

12.

(5)

[5]



(5) $\text{Ar} \xrightarrow{\text{R}^1} \text{R}^2 \xrightarrow{\text{R}^3} \text{R}^4$

13.

12

•

14.

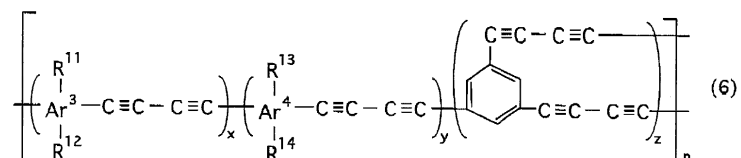
16

1 ~ 6

15.

(6)

[6]


$$\begin{array}{ccccccc} \text{(6)} & , \text{Ar}^3 & 1 & , \text{Ar}^4 & 2 & , R^{11} & 1 \\ , R^{13} & 3 & , R^{14} & 4 & , x, y, z & , n & 2 \end{array}$$

16.

15 ,

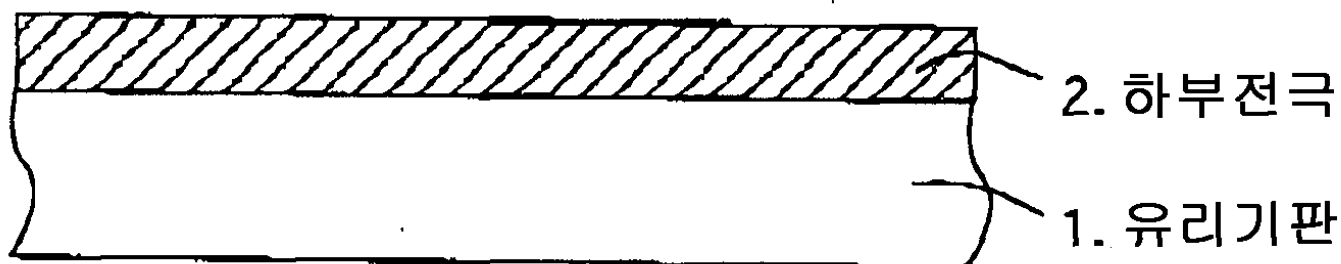
1 2

17.

15

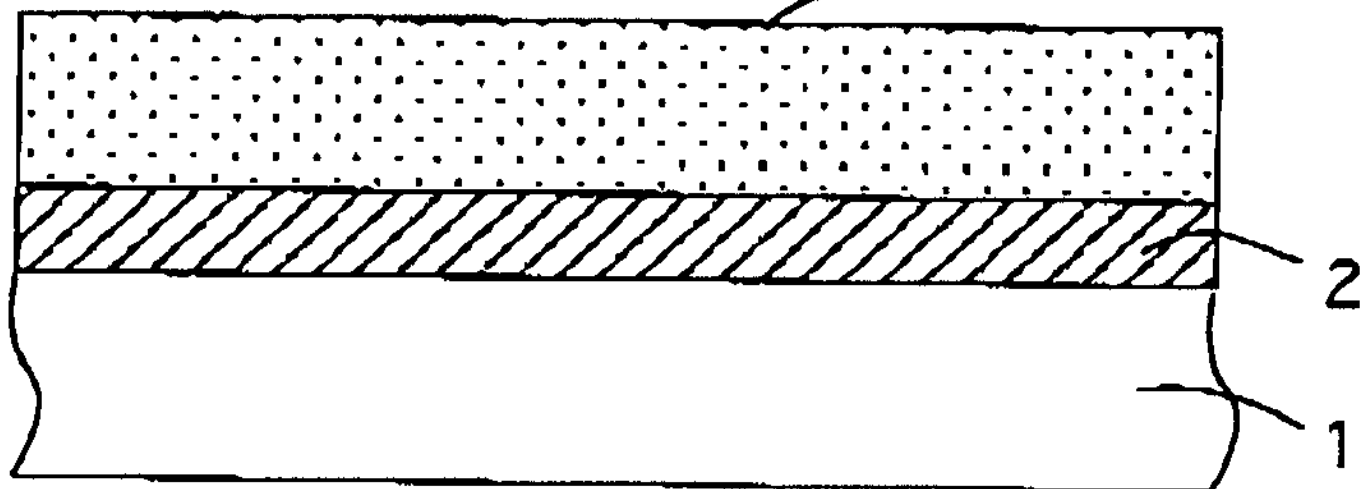
1, 2, 3, 4

1a



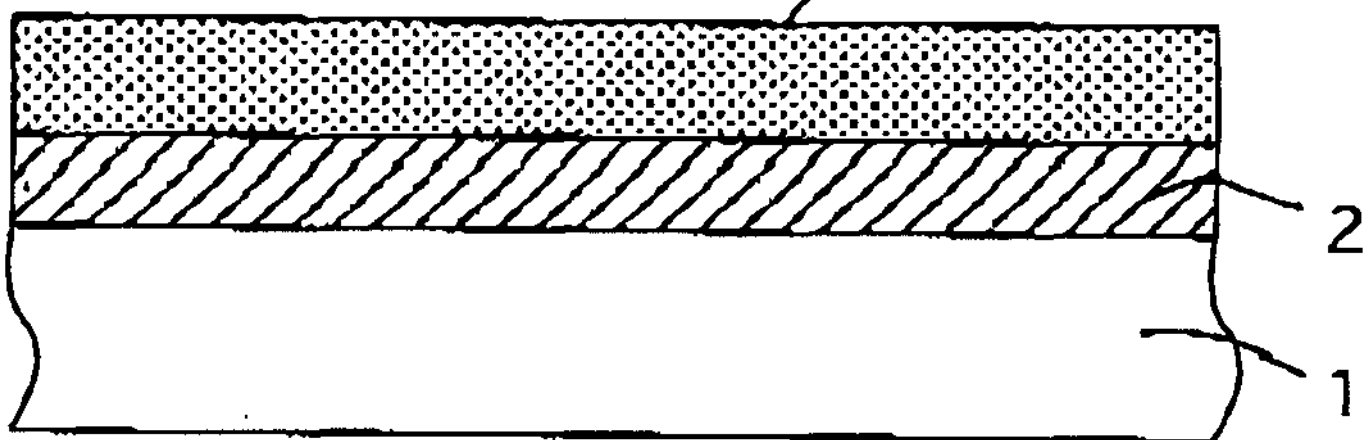
1b

3a



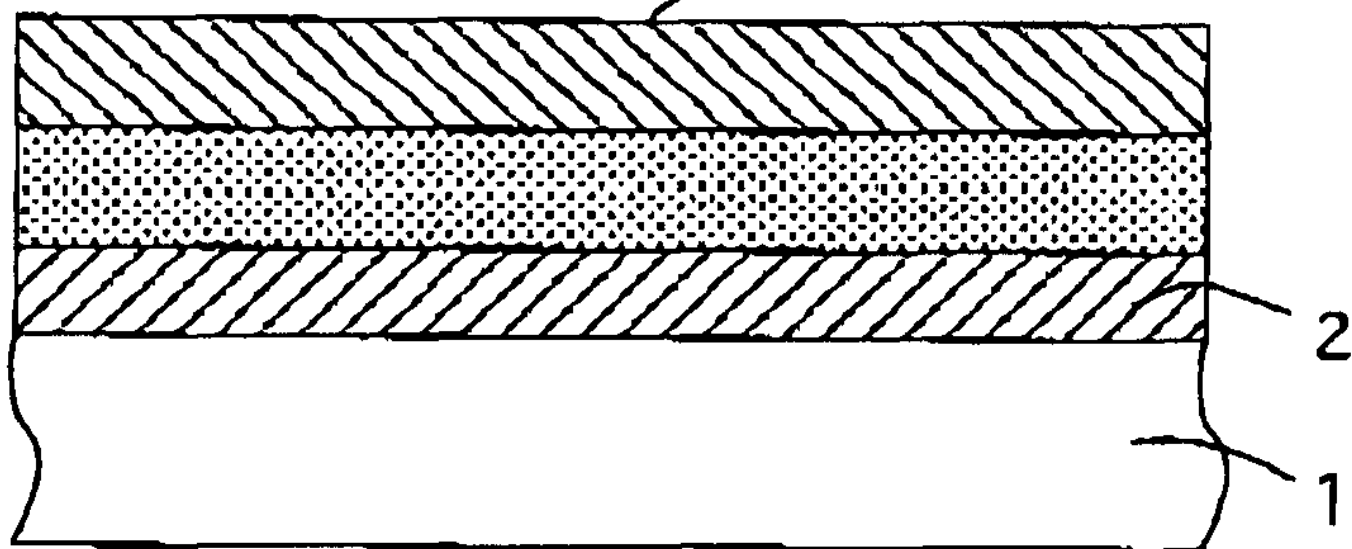
1c

3. 발광층

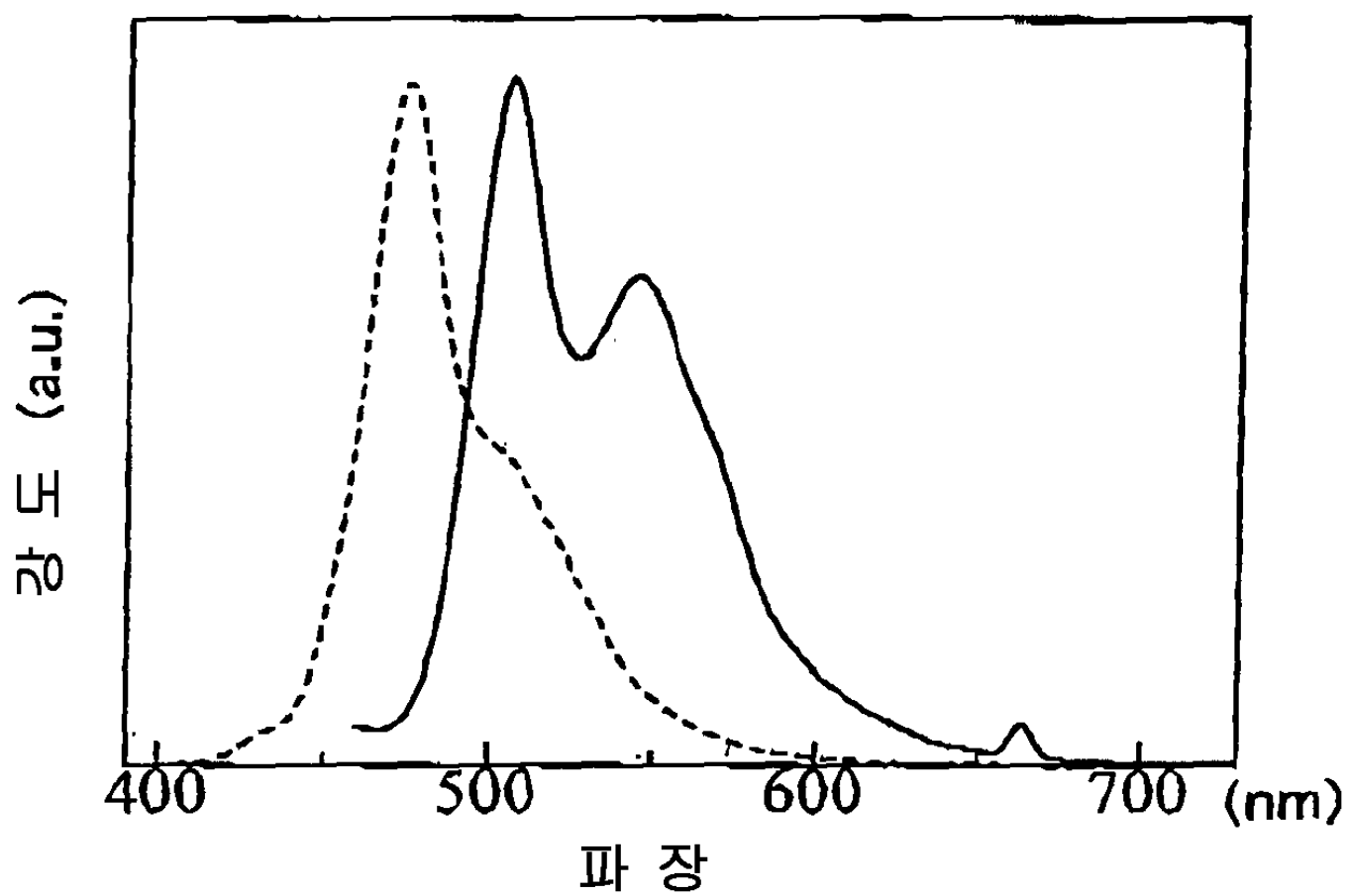


1d

4.상부전극

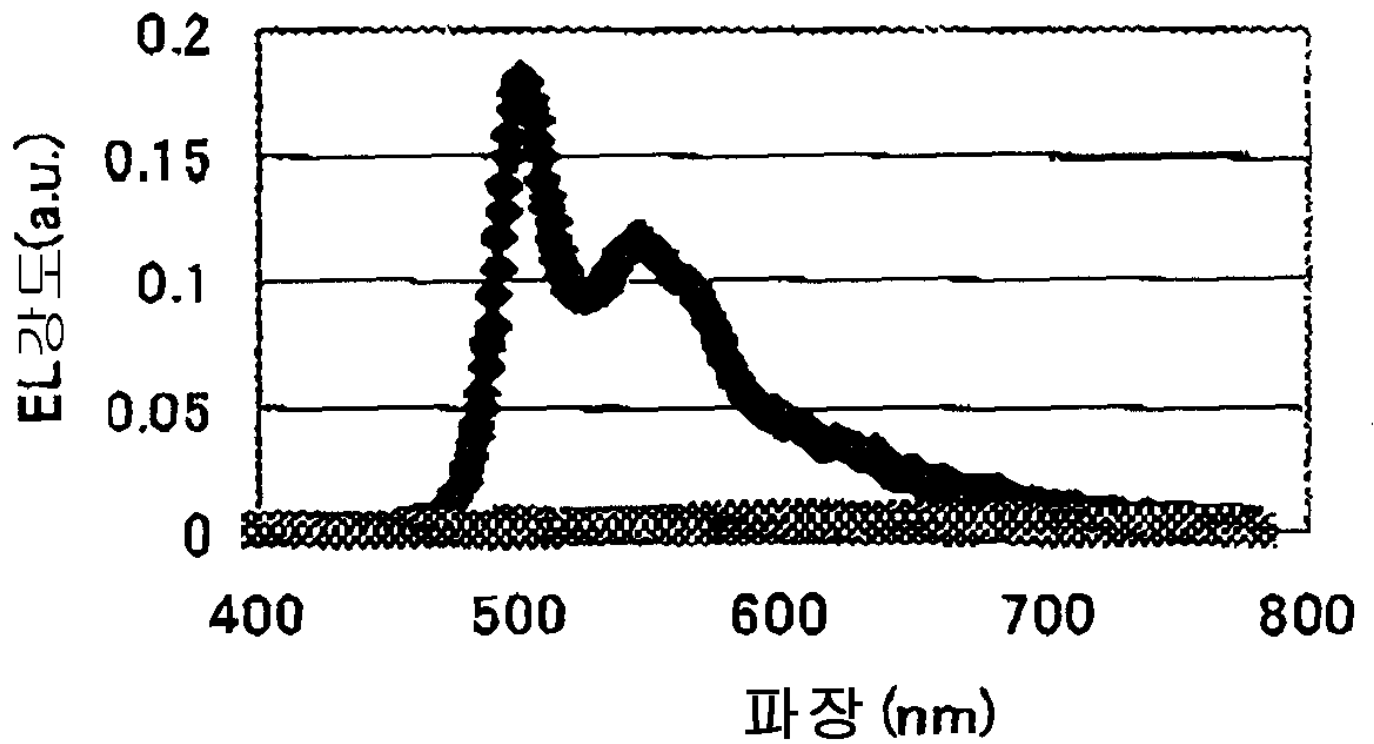


2

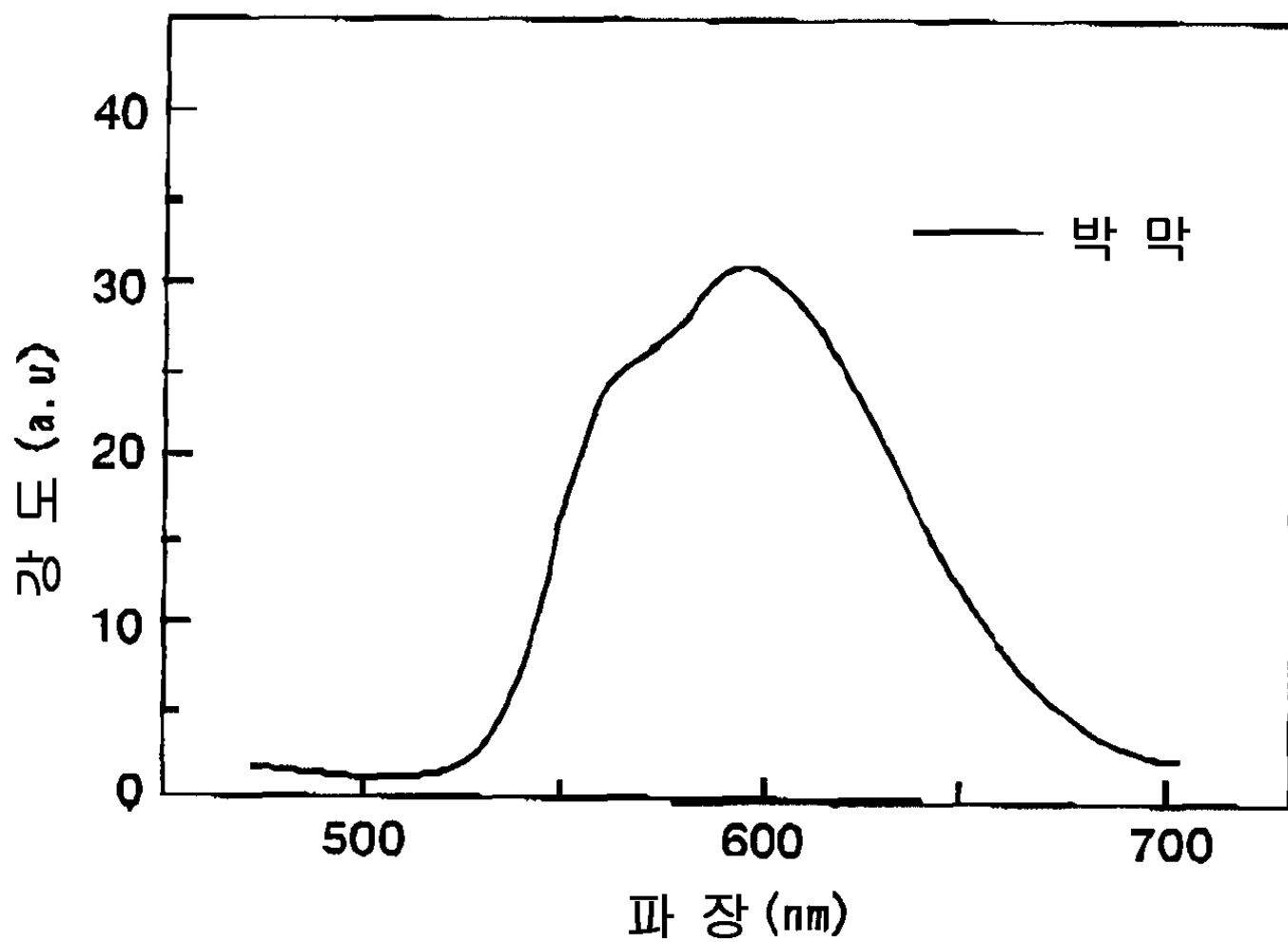


3

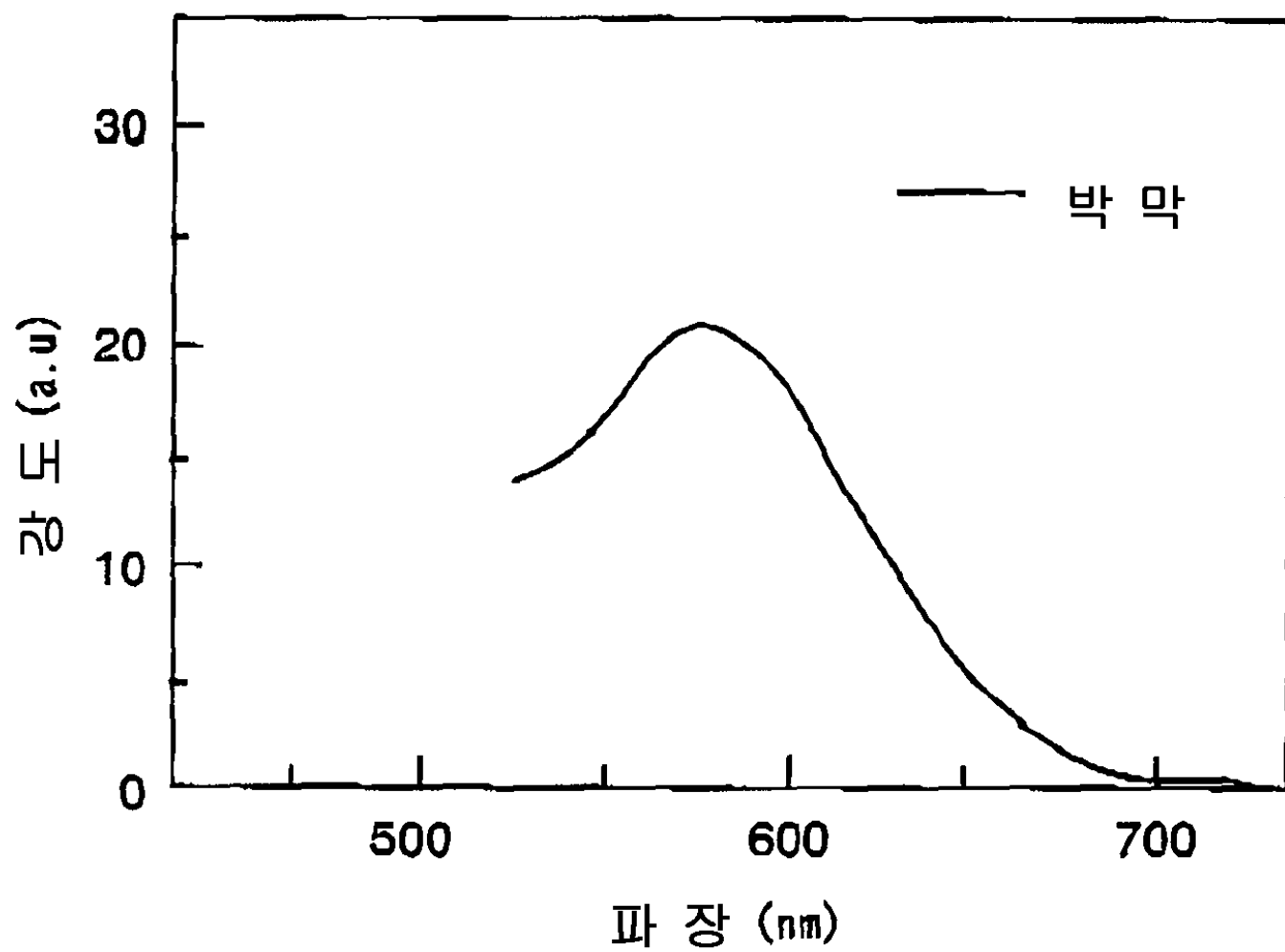
EL 스펙트럼

◆ $n:(1-n)=2:1$ (26V)⋈ $n:(1-n)=1:1$ (40V)

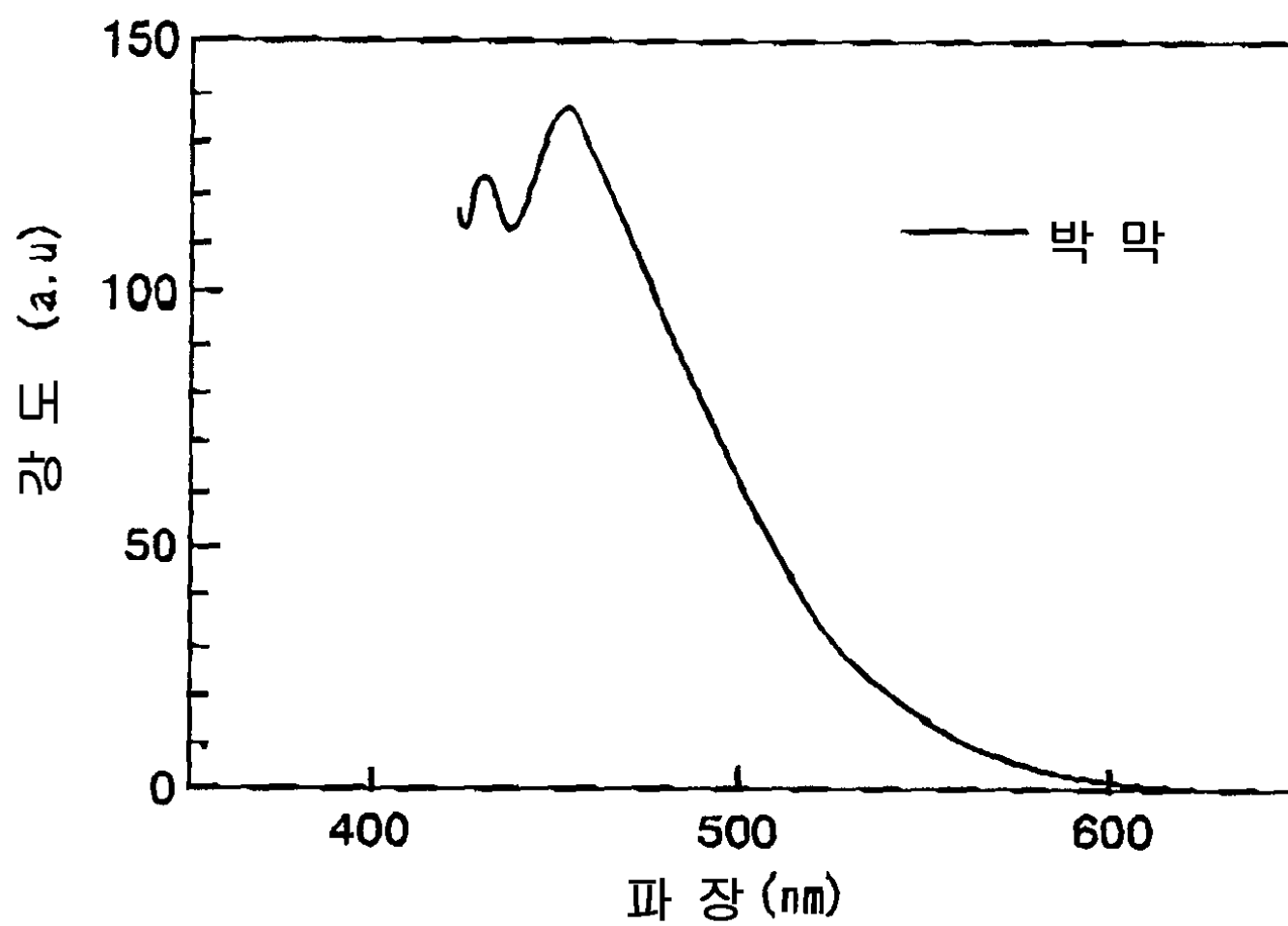
4



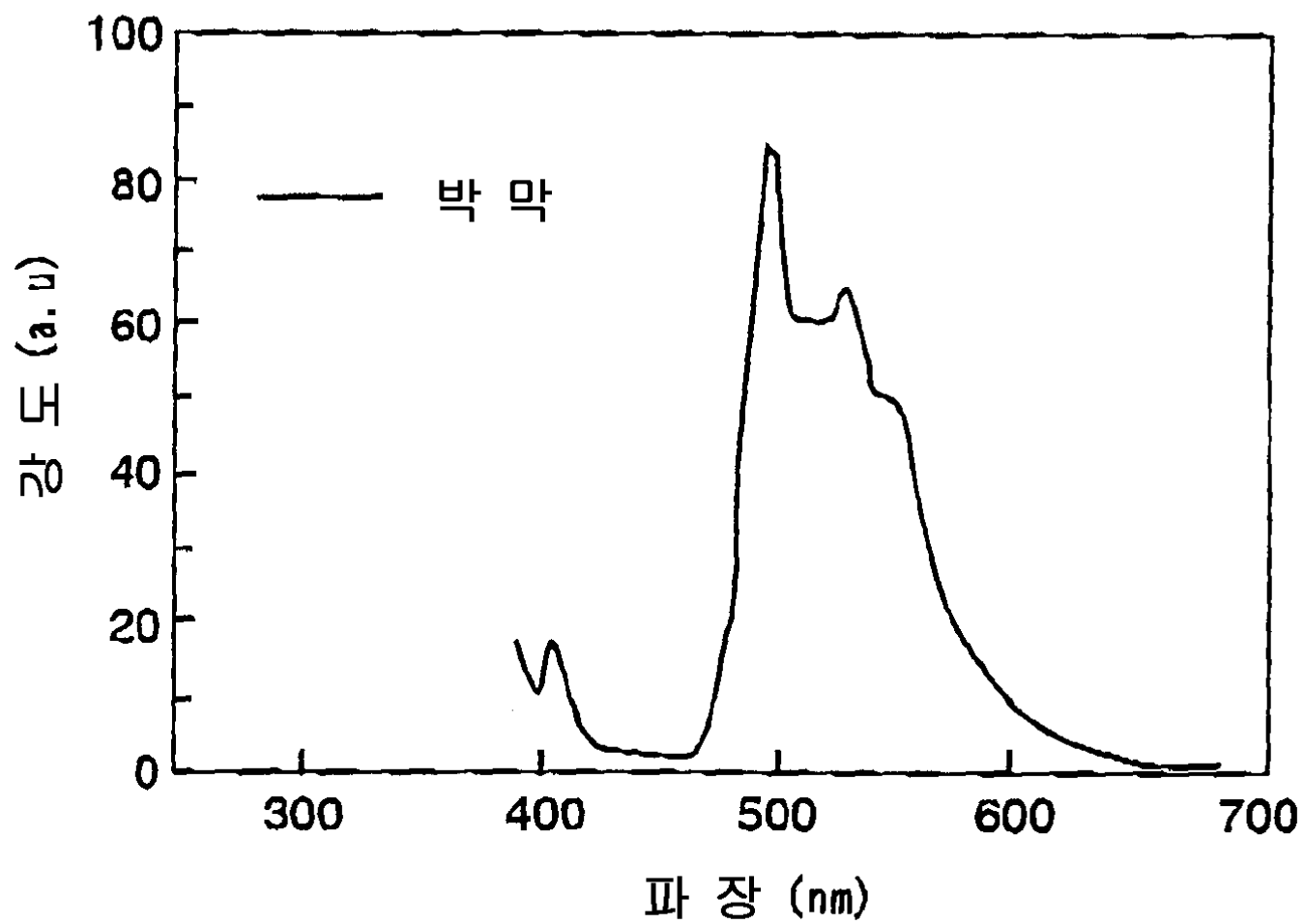
5



6



7



专利名称(译)	有机发光材料和有机发光器件		
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摘要(译)

本发明涉及使用该聚合物材料的有机电致发光显示器。并且它使发光层的平坦度和发光层构成材料的溶解度高。本发明涉及化学式(1)。并且包括插入顶部和底部的电极(2,3)之间的聚合物的发光层(3)的结构。[化学式1]然而,化学式(1)中的Ar 1和Ar 2表示亚芳基,R 1,R 2,R 3,R 4是取代基。并且n表现出共聚比。有机发光器件和有机发光材料。

