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	1996	2000	08	23	(JP)

(71) 가 가

가 가 6 7 35

(72)

가	가 6 7 35	가	가
가	가 6 7 35	가	가
가	가 6 7 35	가	가

(74)

$$\vdots$$

(54)

가 Φ EL, L, (L)가
 λ , $(2L)/\lambda + \Phi/(2\pi) = m(m$
 가 $(\lambda))$.

4

(Electroluminescence)

(「 EL 」.) , 1 2

가

1 , EL , EL 1 EL ,
 (1) , (2), (3), (4), (5) (6)
 , (5) (h) (1)

1 EL , (5)
 (h) 2 EL , (h)
 , EL 가 가 ,

, (1) (2) () ,
 , (3), (4), (5) (6)
 EL , (5) (h)
 (6) , (1)
 , 가 (h) , EL
 가

, EL (h)
 , (h) 가 , 가
 , EL 가
 , EL 가 ,

, EL , (h) 가 ,

, 1 EL , (6)
 , 가 , ()
 9 - 127885 , 3 1/4
 EL 가 , EL , 1 EL
 (1) , 1/4 (8) (9)
 ,
 ,
 , 가 50%

, (R), (G), (B)
 , 가 ,

, 가

, 1 2
 , 2 가
 1 , L, Φ ,
 (L)가 가 (1)
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$ (1)

1 , (L)가 (1)
 (λ) , (L)가 (1)
 가 , (λ) 가
 , , (λ)
 ,

2, L', λ , (2) Φ , L
 가 (m1) 4 (3) (L')가 .

$$(2L)/\lambda + \Phi/(2\pi) = m(m) \quad (2)$$

$$(2L')/\lambda + \Phi/(2\pi) = m1 + 4 \quad (3)$$

2, (R), (G), (B)
 ., (L')
 ., (L')

3, L', λ , (4) Φ , L
 가 (m1) 10 (q) (5) (L')가 .

$$(2L)/\lambda + \Phi/(2\pi) = m(m) \quad (4)$$

$$(2L')/\lambda + \Phi/(2\pi) = m1 + q \quad (5)$$

, (R), (G), (B)
 ., (L')
 , (h)
 , (λ)
 .

, 4, 2, 2

, 2
 ., 2
 , 가
 2, 가
 2, 가

, 5 7, 4 1 3

, 2, 1 가 2, 1
 , 1 7 가 가

2, 1, 7, 2, 1, 가 가 가

가

(13c) $\frac{1}{L}$ (FWHM)

1 EL .

2 EL .

4 1 EL .

5 1 EL

6 1 EL

7 1 EL

8 EL .

9 EL

10 1 EL (G) .

11 EL (G) .

12 1 EL

13 2 EL

14 2 EL

15 3 EL

16 3 EL

17 3 EL (G)

18 EL

19 4 EL

20 4 EL

21 4 EL

22 4 EL

23 4 EL

, EL

4 EL 1 EL 4 EL ,
(15) , (11) 1 (12), (13), (14) 2

(11) , ,

1 (12) , (anode) , (Pt), (Au), (C
r), (W) , 1 (12) , 가 100nm 300nm

(13) , (13a), (13b) (13c)

(13c) (13a) ,

(leakage) , m - MTDATA [4, 4', 4'' - tris(3 - methylphenylphenylamin
o)triphenylamine] , 2 - TNATA [4, 4', 4'' - tris(2 - naphthylphenylamino)triphenylamine]

(13a) , 가 (13b) α - NPD [N, N' - di(l - naphthyl) - N, N' - diphenyl - [1, 1' - biphenyl] - 4, 4' - diamine] (13c) (R), (G), (B) G Alq3((tris - quinolinol aluminum complex))

m, (13) (13a) 15nm 300nm, (13b) 15nm 100nm (13c) 15nm 100nm 가

(14) , (14) 가 5nm 50nm (Mg) (Ag),

(15) , (Indium Tin Oxide: ITO) (15) , 가 30nm 1000nm (15) (SiO₂), (SiN) 500nm 10000nm

EL 가 (13) (12) (13) (14) (L), (13) (6) (14) 가 (L_{min})가 (13c) (h) 1 (12) (14) Φ (13c) (h) (h) λ

$$(2L)/\lambda + \Phi/(2\pi) = m(m) \quad (6)$$

(13) (L) (13) (1) (13a), (13b) (13c)) (n₁, n₂, ..., n_k) (d₁, d₂, ..., d_k) (7)

$$L = n_1 \times d_1 + n_2 \times d_2 + \dots + n_k \times d_k \quad (7)$$

L (13a) 2 - TNATA, (13b) α - NPD, (13c) Alq3 가 d₁=32nm, d₂=30nm, d₃=50nm , λ = 535nm , n₁=1.9, n₂=1.8, n₃=1.7

$$L = 1.9 \times 32 + 1.8 \times 30 + 1.7 \times 50 = 200\text{nm}$$

Φ g, Ag, Mg - Ag) 200nm (, Si) (Cr) (M (, SOPRA) (spectroellipsometric) (n) (k)

, n, k , (n) (, Principles of Optics, Max Born and Emil Wolf, 1974(PERGAMON PRESS)).

가 , n, k , (n),

가 .

2 Φ .

Φ , $\lambda = 535\text{nm}$ $\Phi = -4.7$.

EL , 1 (12) (13) (14) 가

, (13) 가 , (λ) (h)

2 (15) , 가 (h)

. 가, (13) ((L)) 1 (12) (13) (λ)

(14) 가 , (h)

가 .

5, (6) m=0 EL (14) -

6 (13)

7 (13c) 5

8 (6) (L)가 가 (m=1) EL

(13a) (L) 1 EL (R) EL (13a) 190nm (B)

9 (13a) 150nm (13) (single)

7 (13c) 8

(h) EL

(λ)

10, 1 EL (m=0), 0° (), 30°, 60°
(G) 11 EL (m=1)

10 11 , 1 EL , 30 °
 , 60 ° 10nm
 . EL , 11 , 60 °
 가 30nm , 1

EL , , (h) 가 ,
EL .

θ , (6) , (8)

$$(2L)/\lambda' \times \cos \theta + \Phi/(2\pi) = m(m) \quad (8)$$

$$\lambda' = \lambda + \lambda(\lambda) \quad (8)$$

$$\lambda = (1 - \cos \theta) \lambda \quad (m)$$

$$(\lambda)$$

, m , 가 ,
1 EL (direct view type)

$$1 \quad (12) \quad (14) \quad \Phi \quad (13)$$

$$L, \lambda, 1 \quad \delta$$

$$\delta = 2\pi \cdot 2L/\lambda + \Phi \quad (9)$$

$$\delta = 2\pi \cdot m(m) \quad (10)$$

가 λ 가 $\lambda_{\max}$, (9), (10) ,

$$2L/\lambda_{\max} + \Phi/2\pi = m(m) \quad (11)$$

(9) (13) (L)가 , λ δ
, m (broad)가 .

12 ((Topcon) BM - 7) 1 EL
() , CRT(cathod - ray tube) (CRT) 1
EL () ,
12 , (spectrum locus), (purple boundary)
, 1 EL ,
가 , CRT 가 .

13 , 2 EL 13 EL , 4
1 EL , (14) 2 (15) , 2 (15)
(,) . 2 (15)
10% , , 2 (15) .

, 1 (14) , 2 (15) (L)(
 m m_1) 4 L_2 (12) m , L_1 가 m (
 13c) (h) (2 (13) (L_2)가 Φ , (
 λ . , 2 (15) , 2 (15) 2 (15) 가 .

$$(2L_1)/\lambda + \Phi/(2\pi) = m(m) \quad (12)$$

$$(2L_2)/\lambda + \Phi/(2\pi) = m_1 + 4 \quad (13)$$

(2 (15)) 14 , (R), (G), (B) (L_2)
 , EL , 2 (15)
 (L₂) .

15 , 3 EL EL 15 EL , 4
 1 EL , (14) 2 (15) , 2 (15)
 () .

EL (14) , 2 (15)
 (L)(1 2) (14) m , L_1
 가 m (m m_1) 10 (q), 18 (q1)
 (15) (L_3)가 . , (13c) (h) (2 (1
 5)) Φ , λ . , 2
 (15) 2 (15) 2 (15) 가 .

$$(2L_1)/\lambda + \Phi/(2\pi) = m(m) \quad (14)$$

$$(2L_3)/\lambda + \Phi/(2\pi) = m_1 + q \quad (15)$$

(2 (15)) 16 , (R), (G), (B)
 . , 2 가 ,
 (L_3) 가 , EL (h)(17
 (L_3) . 가, 17
 (G)) , (h)
 . , 1 EL 가 ,
 . , EL .

, 2 3 1 가 . , 2
 3 , (13) 가 , 2
 3 가
 가 2 (15) . , 1
 , 2 (15)() 가 .

, 4 EL
 , (high work function) 1 (12)
 , (Al) 2
 , 1 . , .
 , 18 , 1 (12) , 2 (15)
 (13b) (13c) , 1 (12) (13c),
 가 (13) 2 (15)
 (13c) (13) (1 (12))
 2 (14) () , , Pt, Au, Cr
 () (13) 2 (15)
 , 1 3 .
 , EL
 (11) EL 가 , (11) EL
 가 .
 (4)
 19 4 EL 19 EL
 , 4 1 EL ,
 (13) , 1 (12) (13) (14)
 가 , (14) , 2 () (15) (16) (20)
 가 .
 , (20) , EL (λ) (h)
 , (R) (R) (20R)가 , (G)
 (B) (B) (20G)가 , (B)
 (B) (20B)가 .
 , (13) (L) , 1 ,
 (λ) (h) 가 .
 , (20) , (13) (h)
 .
 EL , ((20)) (h) , EL
 (λ) (H₁) (20) ((13))
 , (external light) (20) .
 , ((13)) (λ) ,
 (λ) (H₁) , (H₁) ,
 (20) (λ) (H₁) (13) 가 ,
 (20) .
 20 , EL (4 EL)

20, B (B) EL, G (G)
 EL, R (G) EL 20
 EL (λ)
 EL, (B) 가
 EL, 가 가
 .
 21, EL (20R, 20G, 20B) 21, B (B)
 EL, R (R) EL, G (G) EL
 21, (λ)
 , 가 4 EL R(λ),
 T(λ), 가 19 EL Rt(λ),
 (16)

$$Rt(\lambda) = T(\lambda) \times R(\lambda) \times T(\lambda) \quad (16)$$

22, 19 EL, (16), 20 21, G (G)
 22, B (B) EL EL 22
 EL, R (G) EL (λ)
 , EL, .
 (13), (λ) (h), (13))
 (20), EL, EL
 (λ), 가 EL, EL
 , .

, EL (λ) (h) 가 (h),
 가 가 .
 가, EL (20), (20) (H₁)
 13) (13)

가, 1 가, EL (h)
 가
 , 4 , 4 1 EL, 1
 EL
 , 2 3 EL
 EL

, 2 EL 가 ,
 2 (L)
 .
 , 3 EL 가 , 3
 .
 , 4 EL , EL 2
 23 (31)
 (32), (33), (34a), (34b) (34c)
 (34), 1 (35) , (31)
 (20) , (20) , (31) 2 (32)
 .
 , 1 가 , 가
 (λ) (λ)
 , 가
 .
 , 2 가 , (R), (G), (B)
 (L) (L)
 , 3 , (R), (G), (B)
 가 (L) , 가,
 (L) 가
 (λ)
 , 가
 .
 , 4 ,
 가 , 가
 .

(57)

1.

2 1 2 가 ,
2 ,

L, λ , Φ ,
(2L)/λ + Φ/(2π) = m(m)

L 가 .

2.

1 2 가 ,
2 ,

L', λ , Φ ,
(2L)/λ + Φ/(2π) = m(m)

m L 가 m1 4

(2L')/λ + Φ/(2π) = m1 + 4

L' .

3.

1 2 가 ,
2 ,

L', λ , Φ ,
(2L)/λ + Φ/(2π) = m(m)

m L 가 m1 10 q

(2L')/λ + Φ/(2π) = m1 + q

L' .

4.

1 2 가 ,
2 ,

2 , 2 가

5.

2 1 2 ,
2 가

2 2 가

L, λ , Φ ,
(2L)/ λ + $\Phi/(2\pi)$ = m(m)

L 가 .

6.

2 1 2 ,
2 가

2 2 가

L', λ , Φ ,
(2L)/ λ + $\Phi/(2\pi)$ = m(m)

m L 가 m1 4

(2L')/ λ + $\Phi/(2\pi)$ = m1+4

L' .

7.

2 1 2 ,
2 가

2 2 가

L', λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m \quad)$$

$m \quad L$ 가 $m1 \quad 10 \quad q$

$$(2L')/\lambda + \Phi/(2\pi) = m1 + q$$

L' .

8.

$1 \quad 2$, $1 \quad 2$ 가

,

L , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m \quad)$$

L 가 .

9.

$1 \quad 2$, $1 \quad 2$ 가

,

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m \quad)$$

$m \quad L$ 가 $m1 \quad 4$

$$(2L')/\lambda + \Phi/(2\pi) = m1 + 4$$

L' .

10.

$1 \quad 2$, $1 \quad 2$ 가

,

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m \quad)$$

$m \quad L$ 가 $m1 \quad 10 \quad q$

$$(2L')/\lambda + \Phi/(2\pi) = m_1 + q$$

L' .

11.

1 2 , 1 2 가
 ,

1 2 가 , .

12.

1 2 , 1 2 가
 ,

1 2 가 ,

L , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

L 가 .

13.

1 2 , 1 2 가
 ,

1 2 가 ,

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

m L 가 m_1 4

$$(2L')/\lambda + \Phi/(2\pi) = m_1 + 4$$

L' .

14.

1 2 , 1 2 가
 ,

1 2 가 ,

L' , λ , Φ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$

m L 가 $m1$ 10 q
 $(2L')/\lambda + \Phi/(2\pi) = m1 + q$

L' .

15.

1 , 2 가 ,
 2 ,

L , λ , Φ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$

L 가 .

16.

1 , 2 가 ,
 2 ,

L' , λ , Φ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$

m L 가 $m1$ 4
 $(2L')/\lambda + \Phi/(2\pi) = m1 + 4$

L' .

17.

2 1 , 2 가 ,
2 ,

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

m L 가 $m1$ 10 q

$$(2L')/\lambda + \Phi/(2\pi) = m1 + q$$

L' .

18.

2 1 , 2 가 ,
2 ,

2 , 2 가
.

19.

2 1 , 2 가 ,
2 ,

2 , 2 가
.

L , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

L 가 .

20.

2 1 , 2 가 ,
2 ,

2 , 2 가
.

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

m L 가 $m1$ 4

$$(2L')/\lambda + \Phi/(2\pi) = m1 + 4$$

L' .

21.

1 , 2 가 ,

2 ,

2 2 가 ,

L', λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

m L 가 $m1$ 10 q

$$(2L')/\lambda + \Phi/(2\pi) = m1 + q$$

L' .

22.

1 , 2 가 ,

L, λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

L 가 .

23.

1 , 2 가 ,

L', λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

$$m = L \quad \text{가} \quad m1 = 4$$

$$(2L')/\lambda + \Phi/(2\pi) = m1 + 4$$

$$L' \quad .$$

24.

$$1 \quad , \quad \text{가} \quad 2 \quad ,$$

$$\Phi \quad ,$$

$$L', \quad \lambda \quad ,$$

$$(2L)/\lambda + \Phi/(2\pi) = m(m \quad)$$

$$m = L \quad \text{가} \quad m1 = 10 \quad q$$

$$(2L')/\lambda + \Phi/(2\pi) = m1 + q$$

$$L' \text{가} \quad .$$

25.

$$1 \quad , \quad \text{가} \quad 2 \quad ,$$

$$2 \quad , \quad 2 \quad \text{가}$$

26.

$$1 \quad , \quad \text{가} \quad 2 \quad ,$$

$$2 \quad , \quad 2 \quad \text{가}$$

$$\Phi \quad ,$$

$$L, \quad \lambda \quad ,$$

$$(2L)/\lambda + \Phi/(2\pi) = m(m \quad)$$

$$L \quad \text{가} \quad .$$

27.

$$1 \quad , \quad \text{가} \quad 2 \quad ,$$

2 , 2 가

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

m L 가 $m1$ 4

$$(2L')/\lambda + \Phi/(2\pi) = m1 + 4$$

L' .

28.

1 , 2 ,

2 , 2 가

L' , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

m L 가 $m1$ 10 q

$$(2L')/\lambda + \Phi/(2\pi) = m1 + q$$

L' .

29.

1 , 2 ,

L , λ , Φ ,

$$(2L)/\lambda + \Phi/(2\pi) = m(m)$$

L 가 .

30.

1 , 2 ,

2 가 ,

L' , λ , Φ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$
 $m = L$ 가 $m1 = 4$
 $(2L')/\lambda + \Phi/(2\pi) = m1 + 4$
 L'

31.

1 , 2 ,
 2 가
 L' , λ , Φ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$
 $m = L$ 가 $m1 = 10$ q
 $(2L')/\lambda + \Phi/(2\pi) = m1 + q$
 L'

32.

1 , 2 ,
 2 가
 2 , 2 가

33.

1 , 2 ,
 2 가
 2 , 2 가
 L , λ , Φ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$
 L 가

34.

λ_1 , λ_2 가 ,
 λ_1 , λ_2 가
 Φ ,
 L' , λ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$
 $m = L$ 가 $m_1 = 4$
 $(2L')/\lambda + \Phi/(2\pi) = m_1 + 4$
 L' .

35.

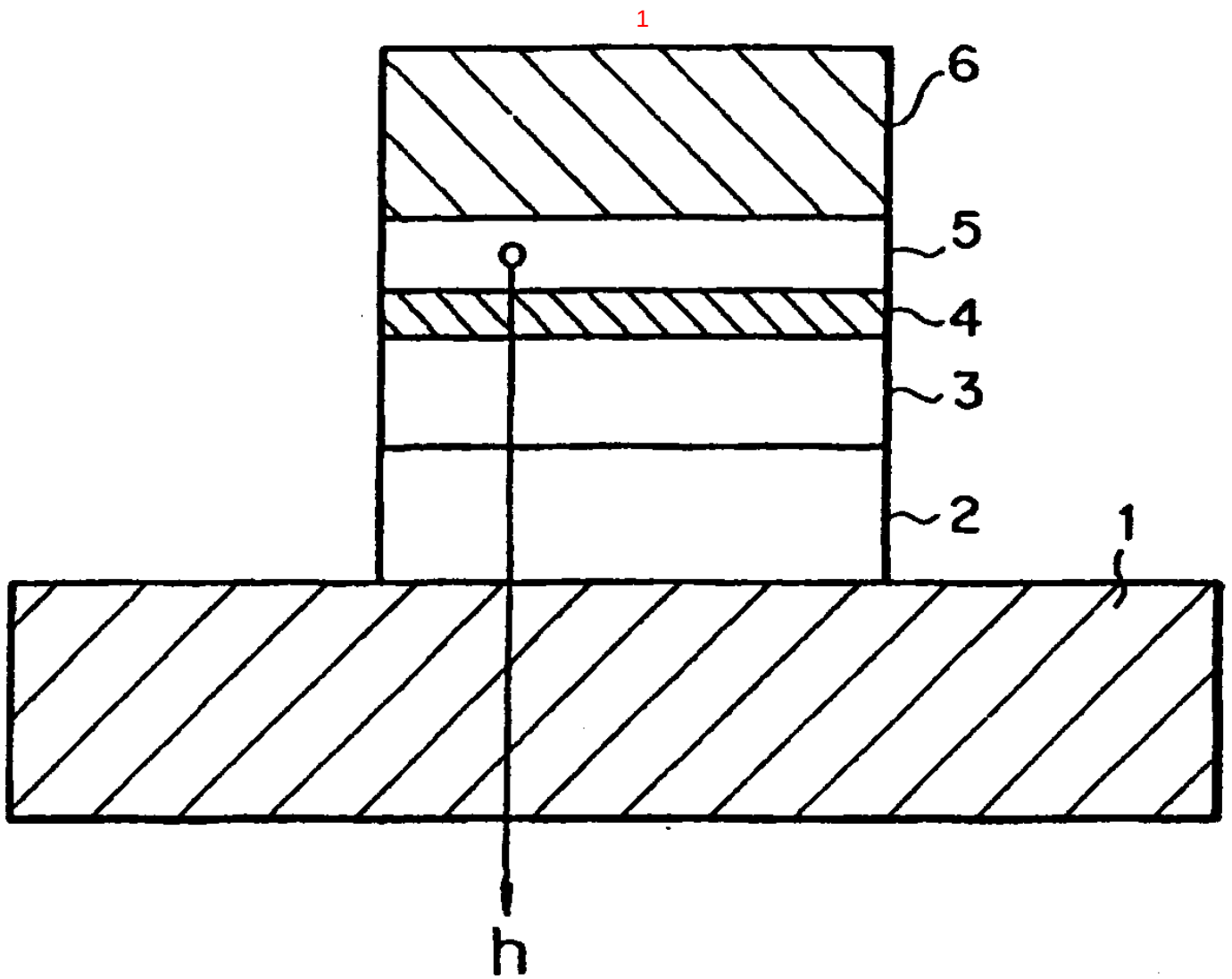
λ_1 , λ_2 가 ,
 λ_1 , λ_2 가
 Φ ,
 L' , λ ,
 $(2L)/\lambda + \Phi/(2\pi) = m(m)$
 $m = L$ 가 $m_1 = 10$ q
 $(2L')/\lambda + \Phi/(2\pi) = m_1 + q$
 L' .

36.

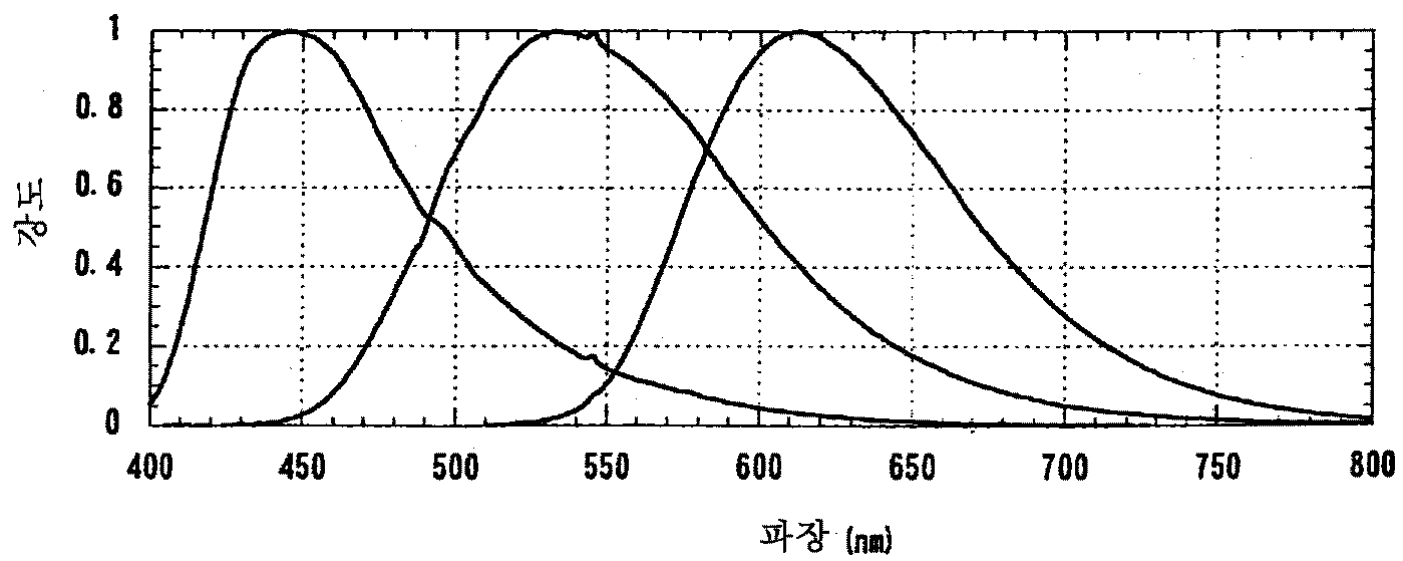
λ_1 , λ_2 가 ,
 λ_1 , λ_2 가
 L ,
 L 가, L
 L .

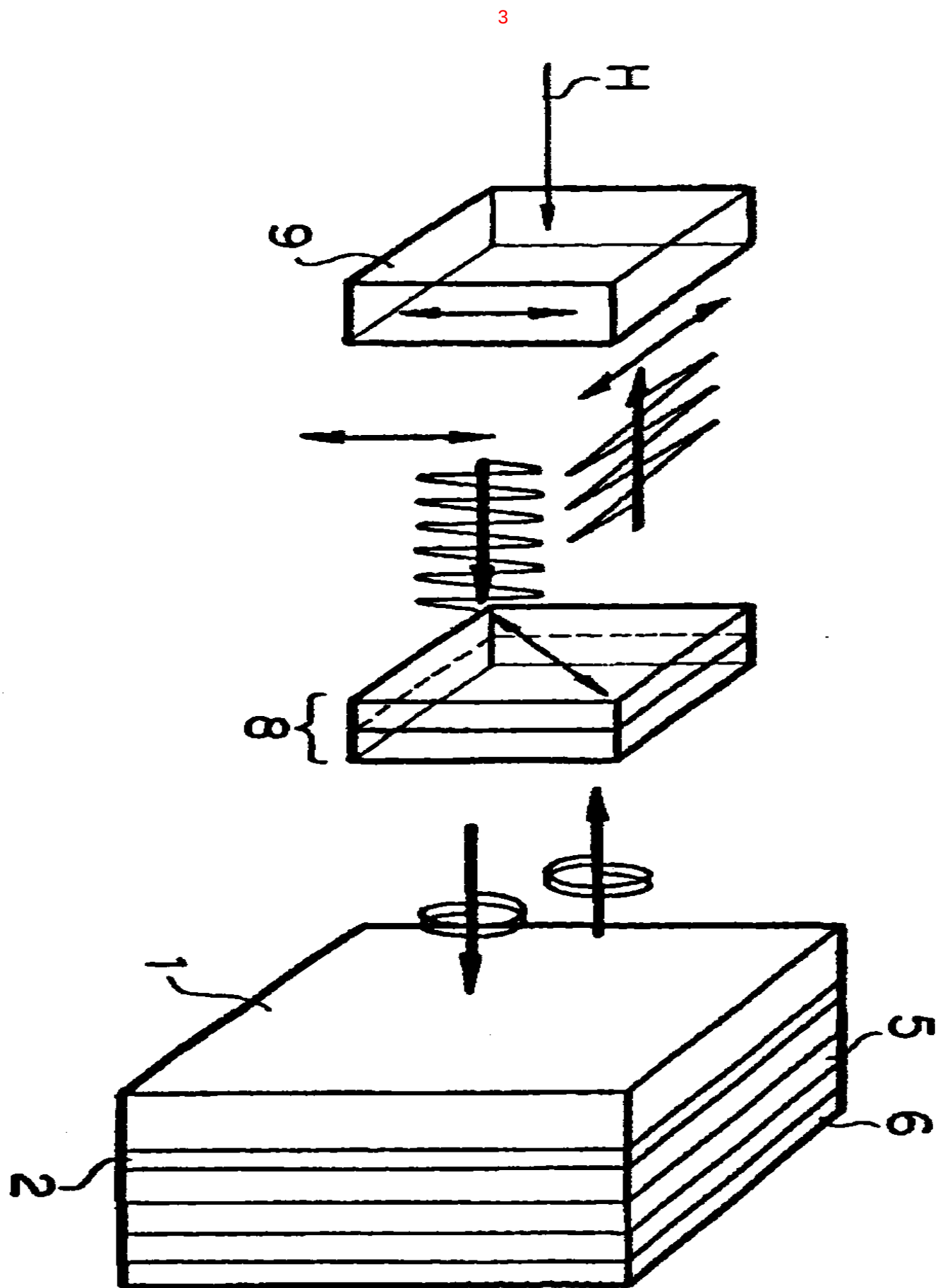
37.

2 1 2 가 ,
 2 , 2 가
 L ,
 가 L

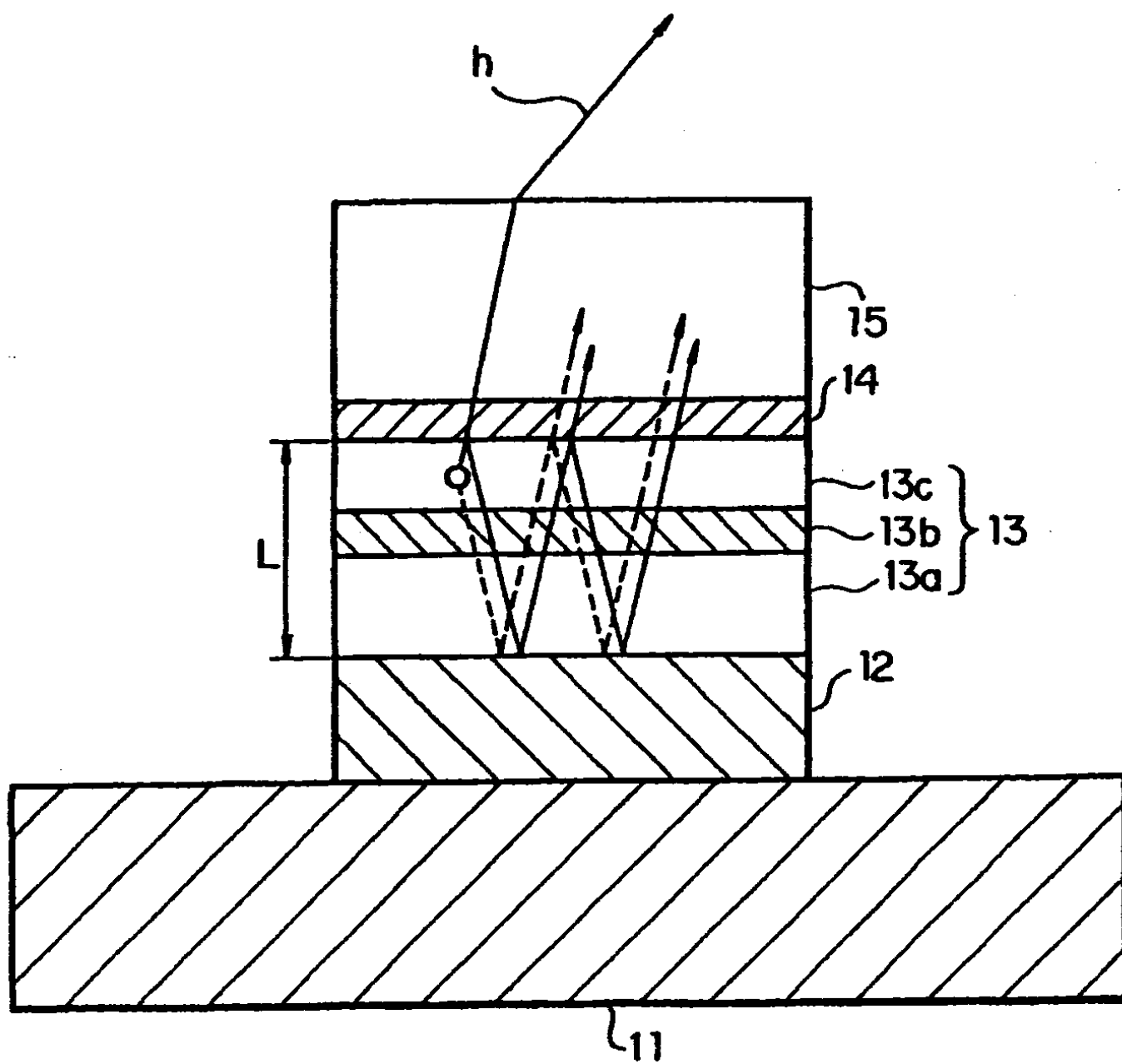


2

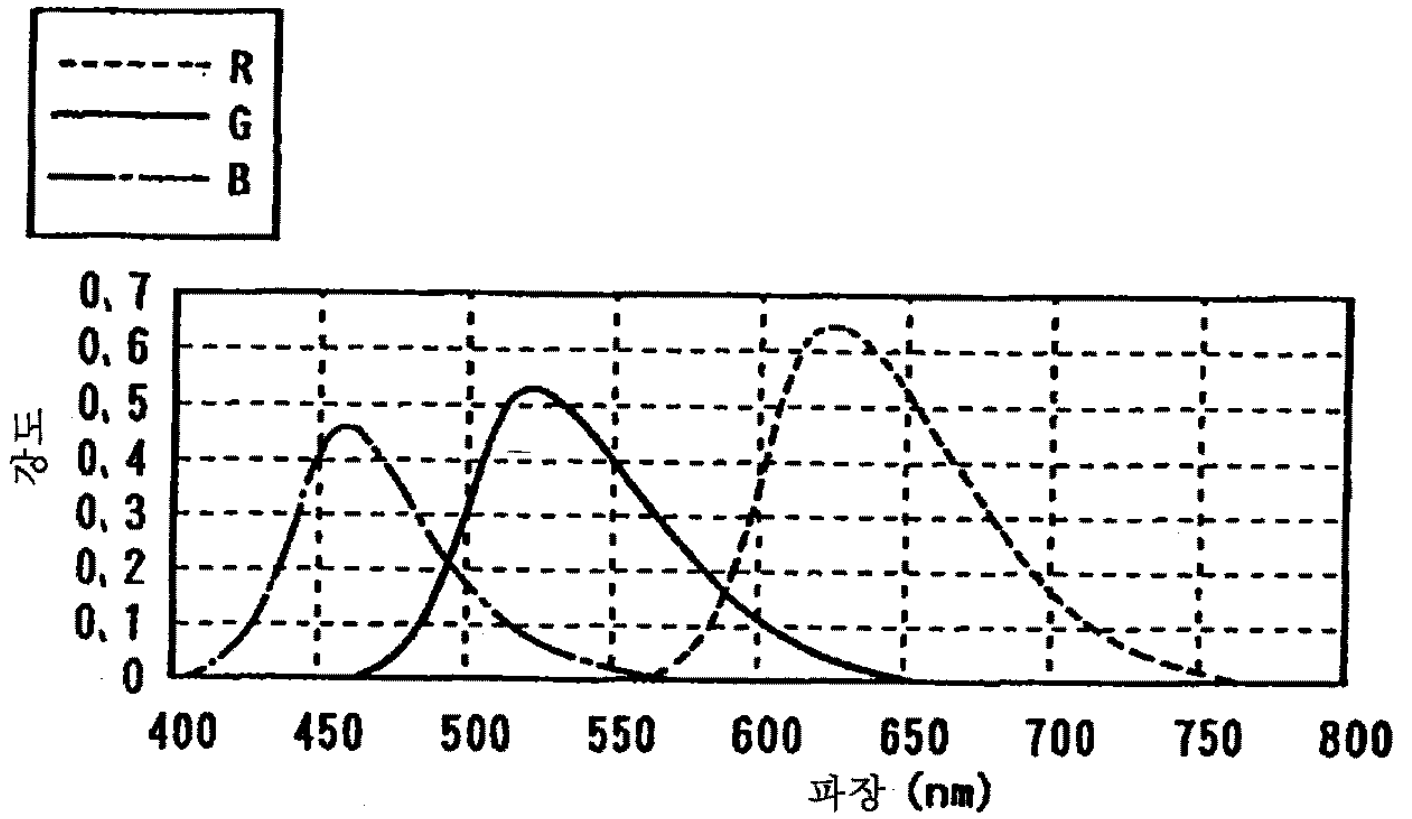




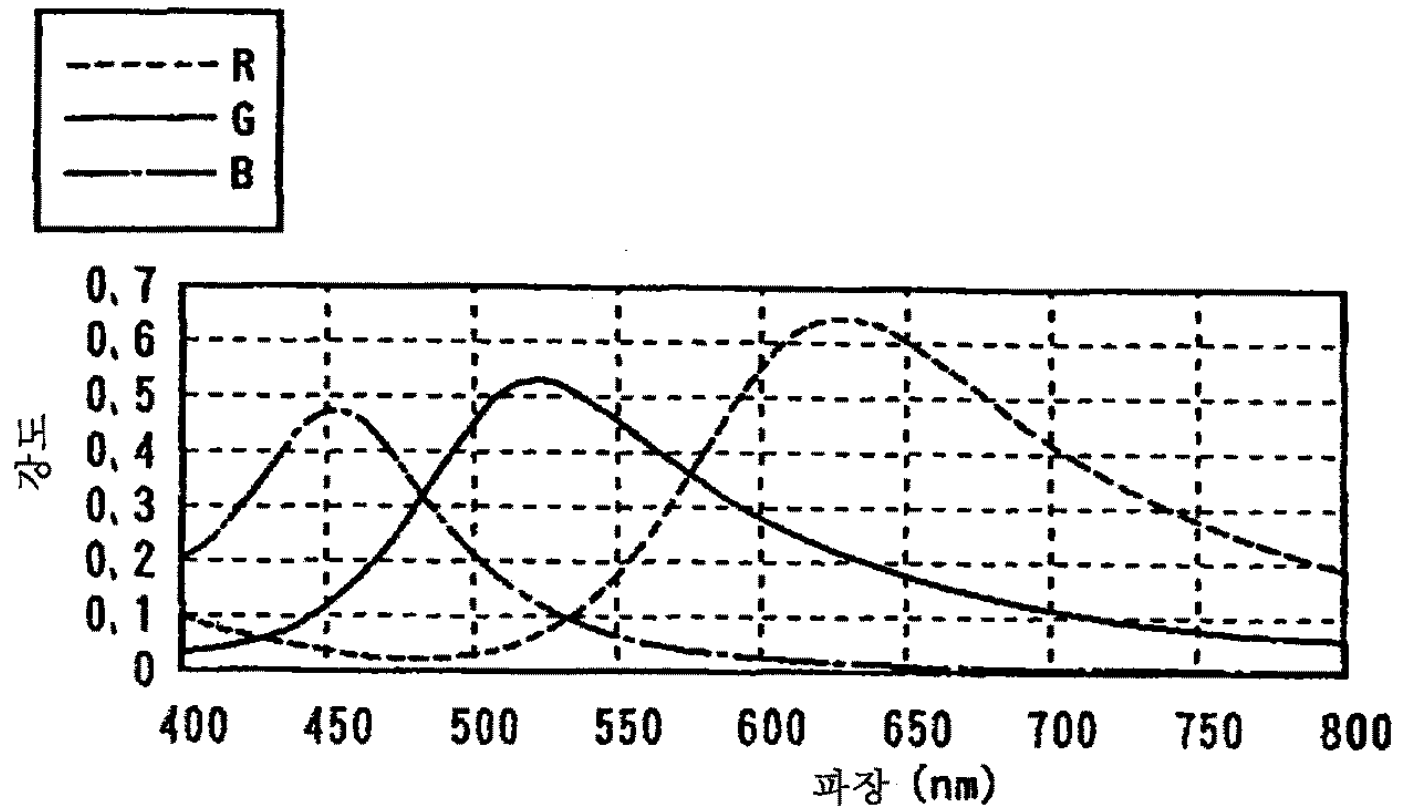
4



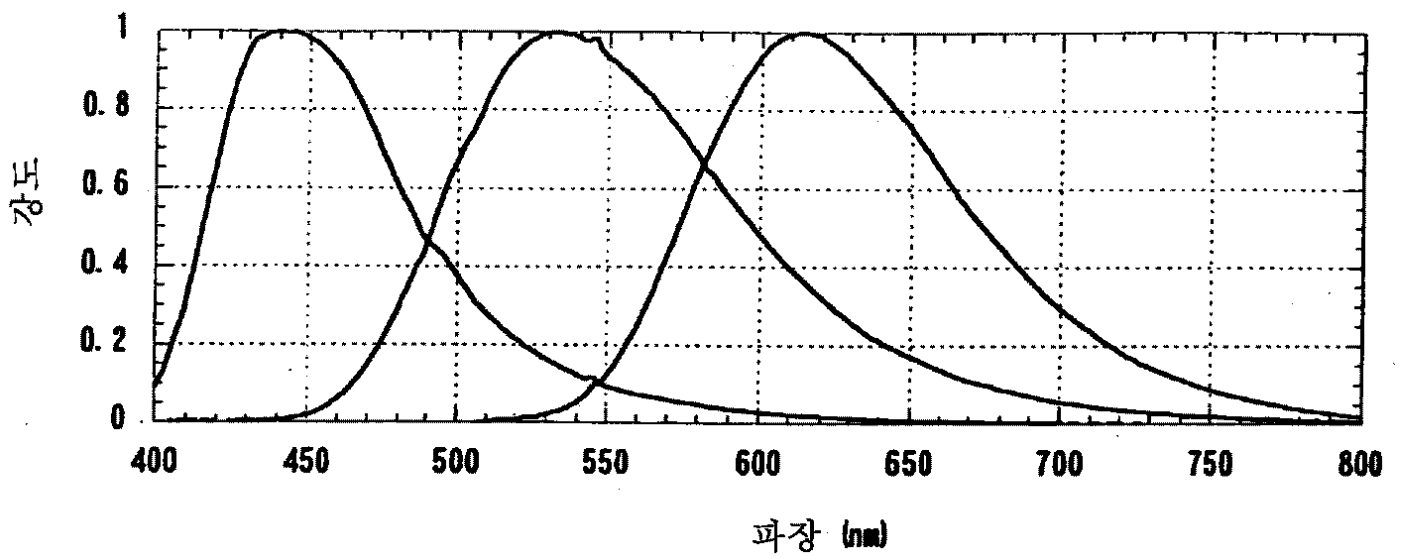
5



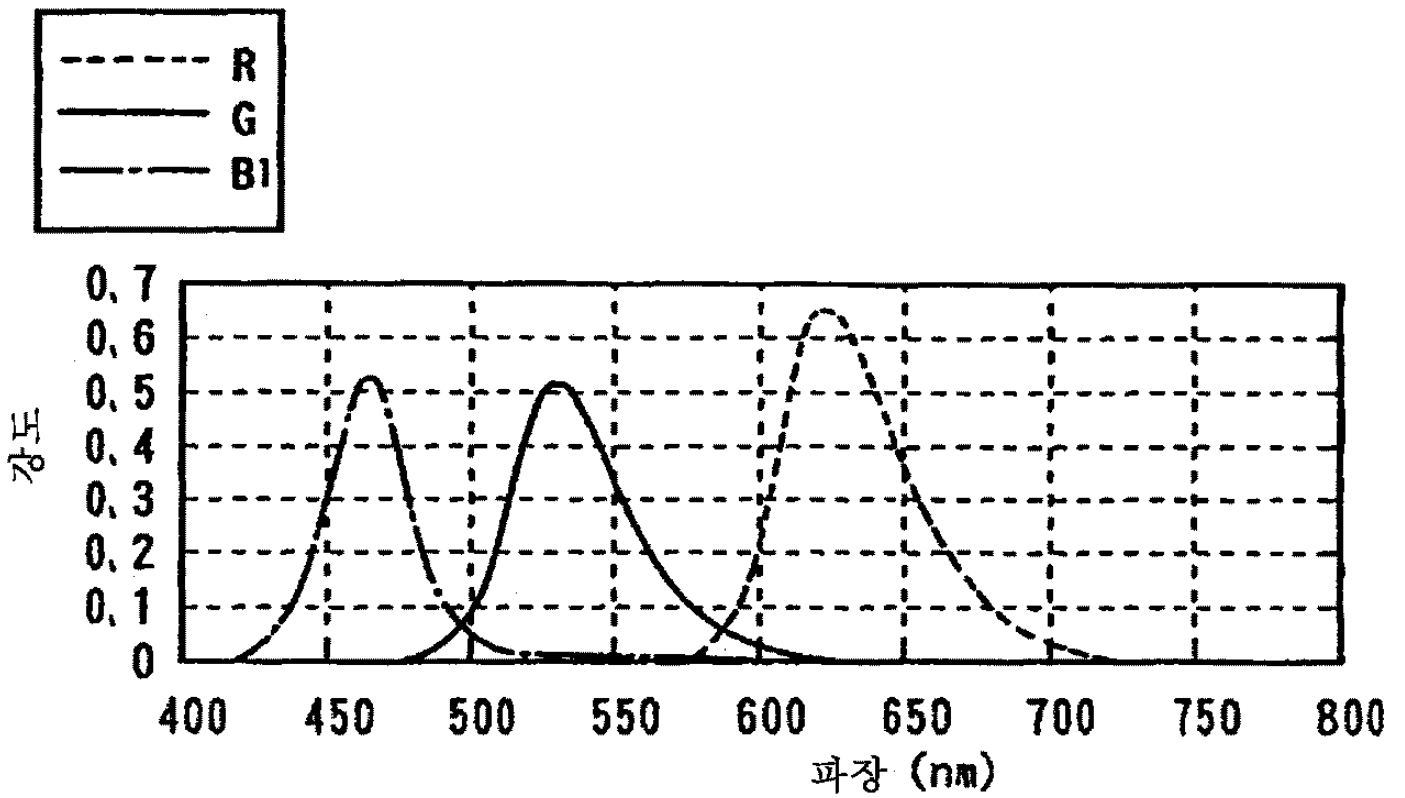
6



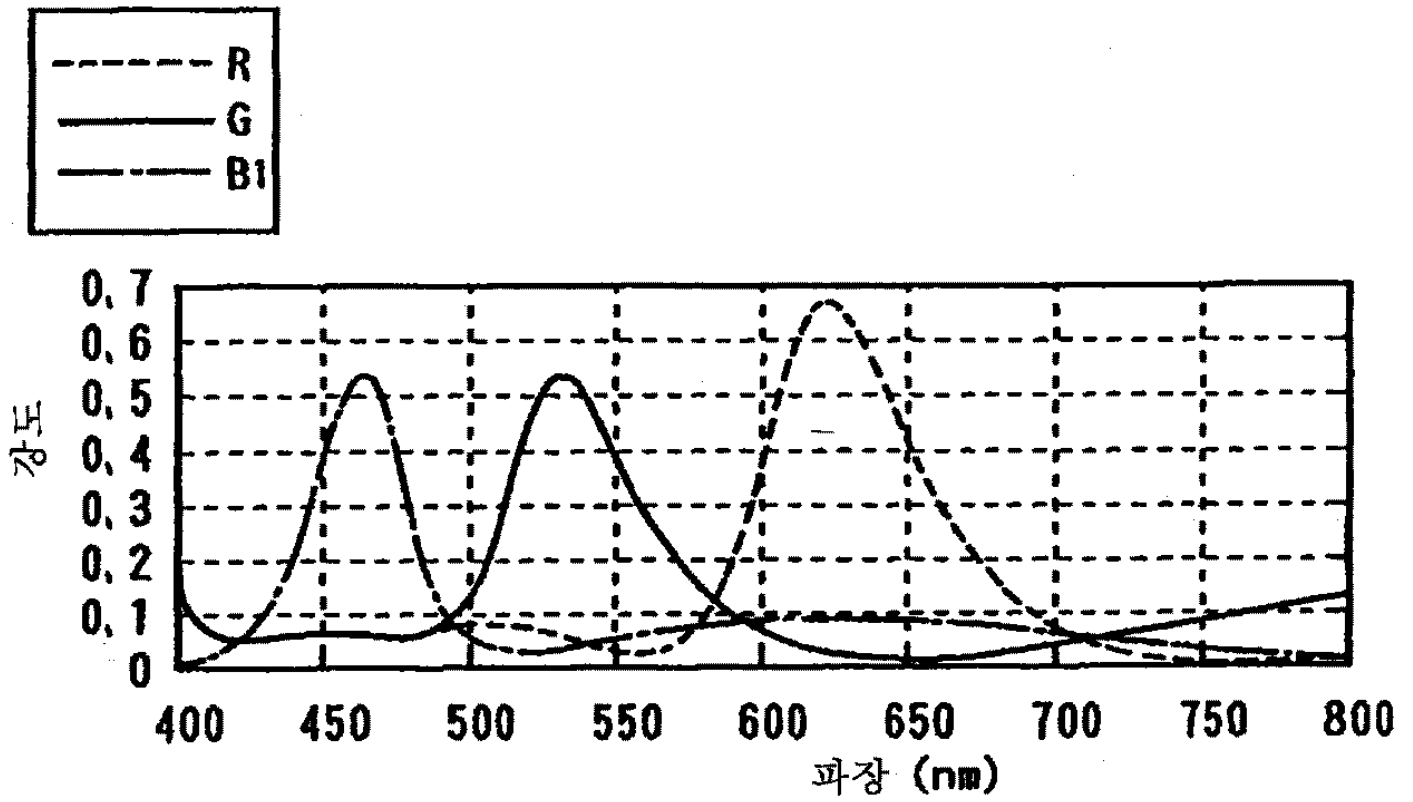
7



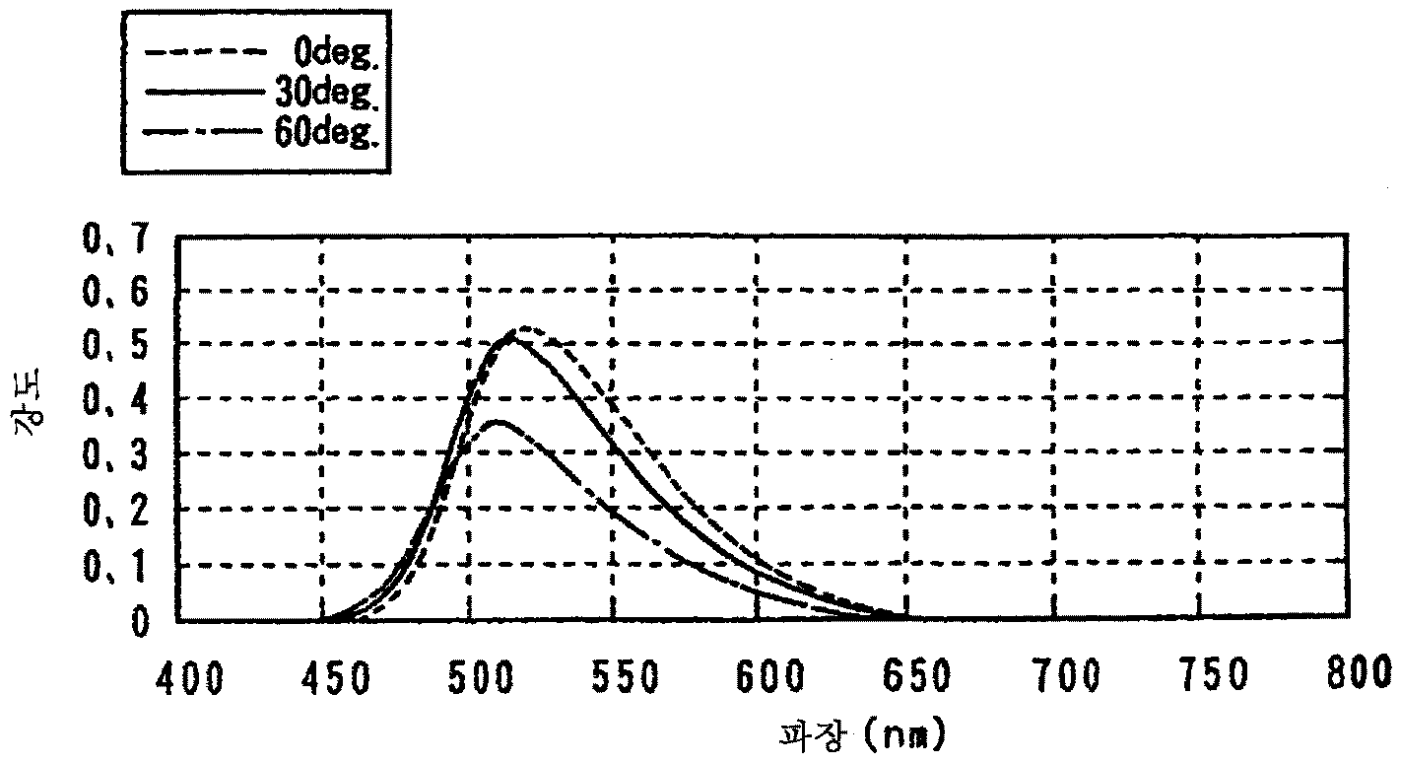
8



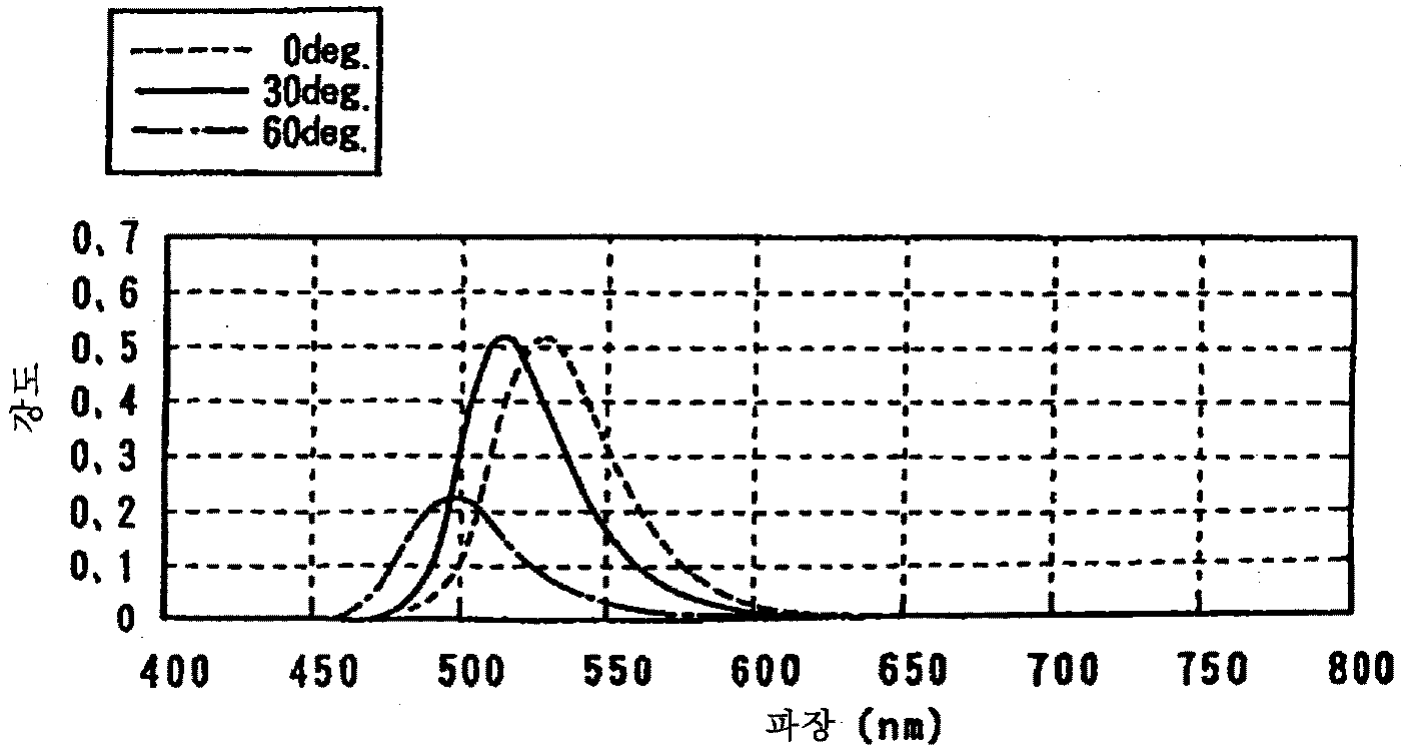
9



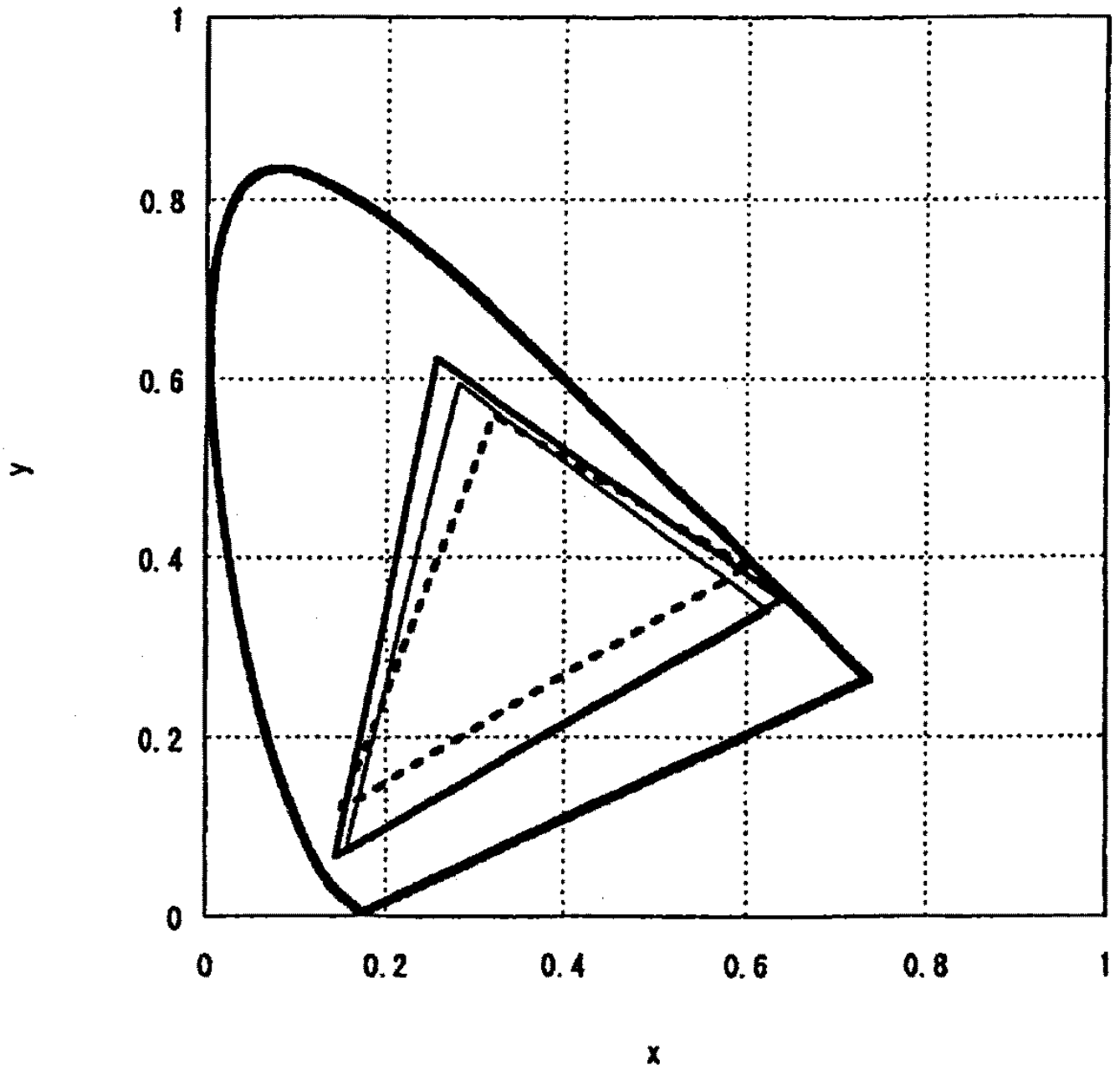
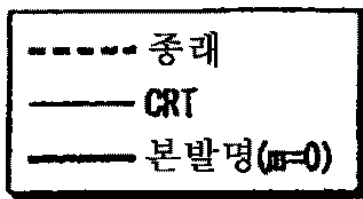
10



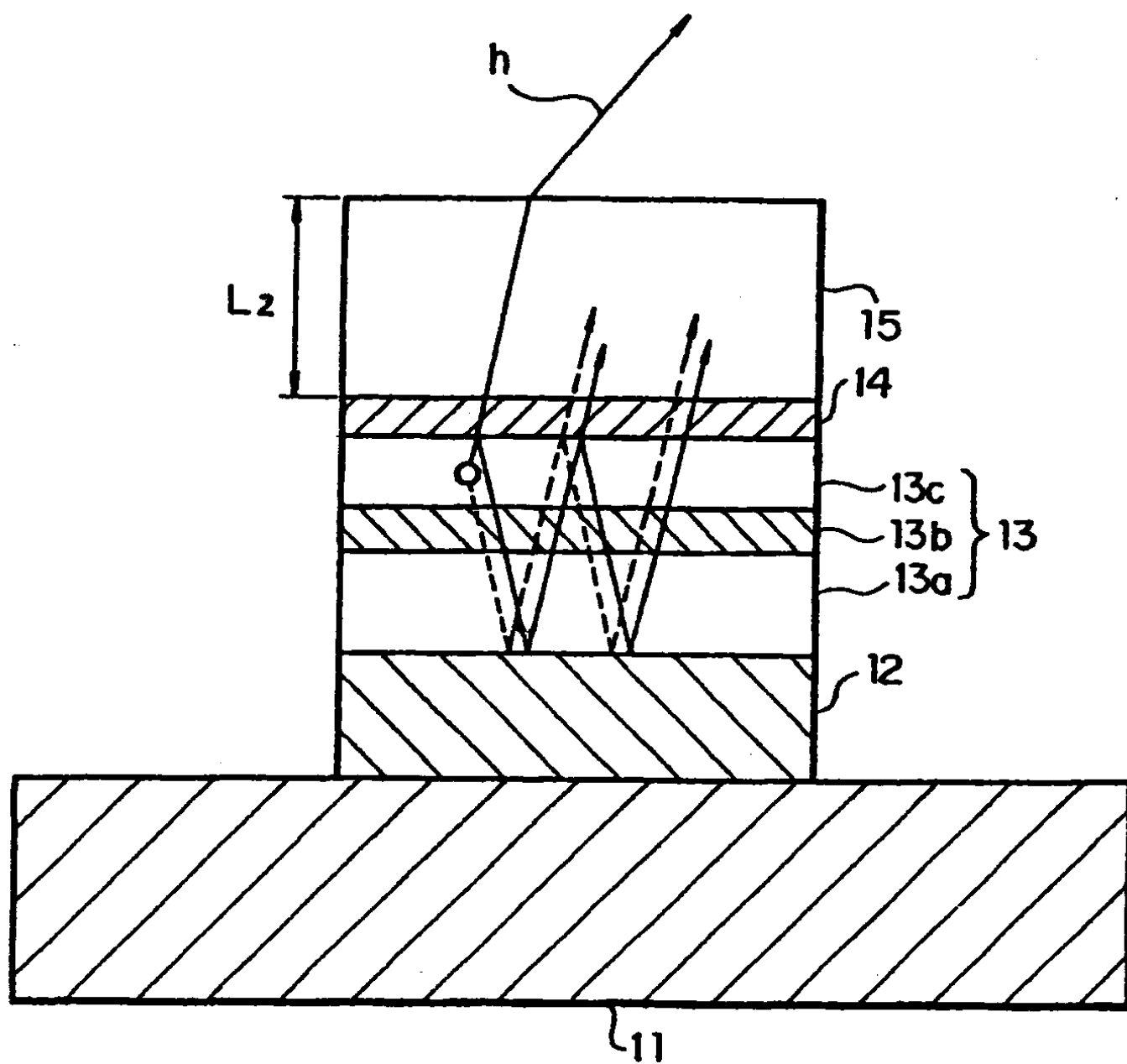
11



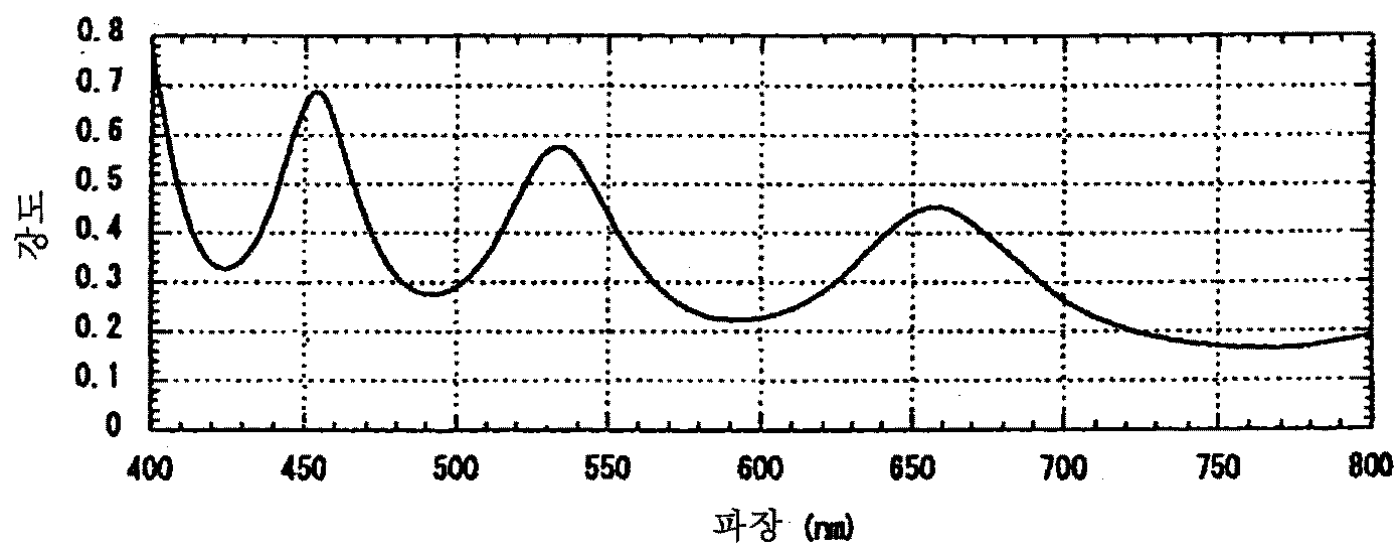
12

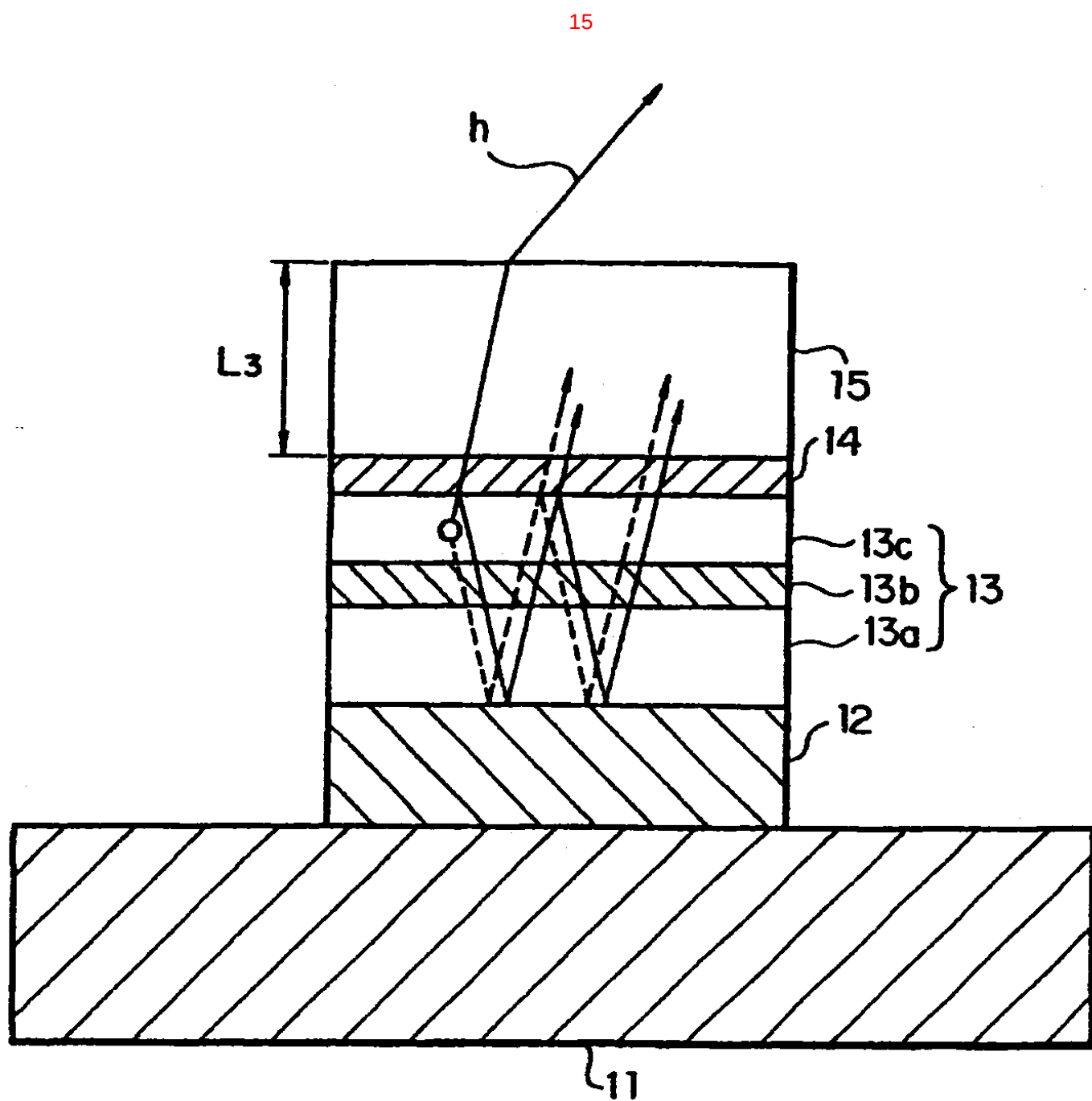


13

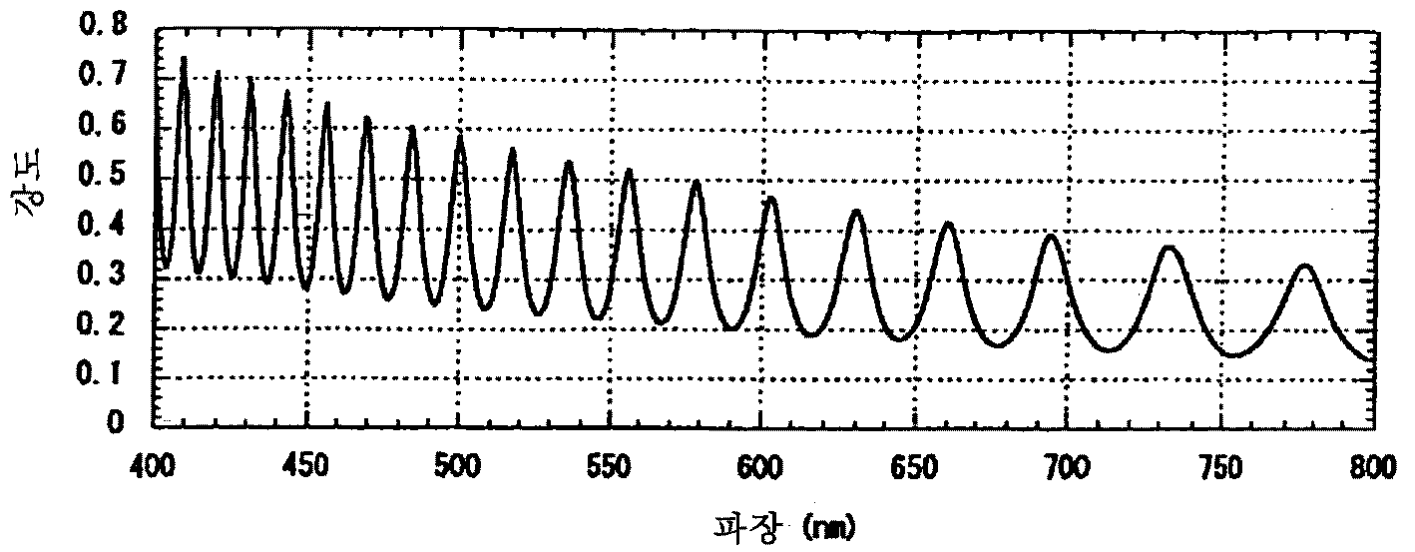


14

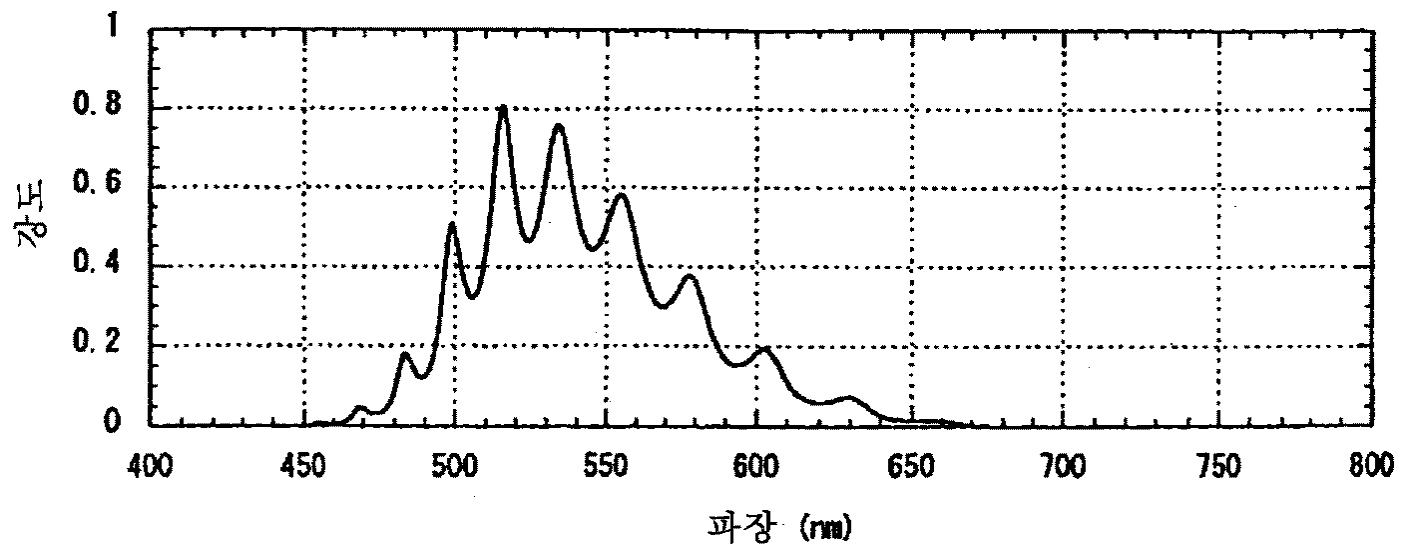


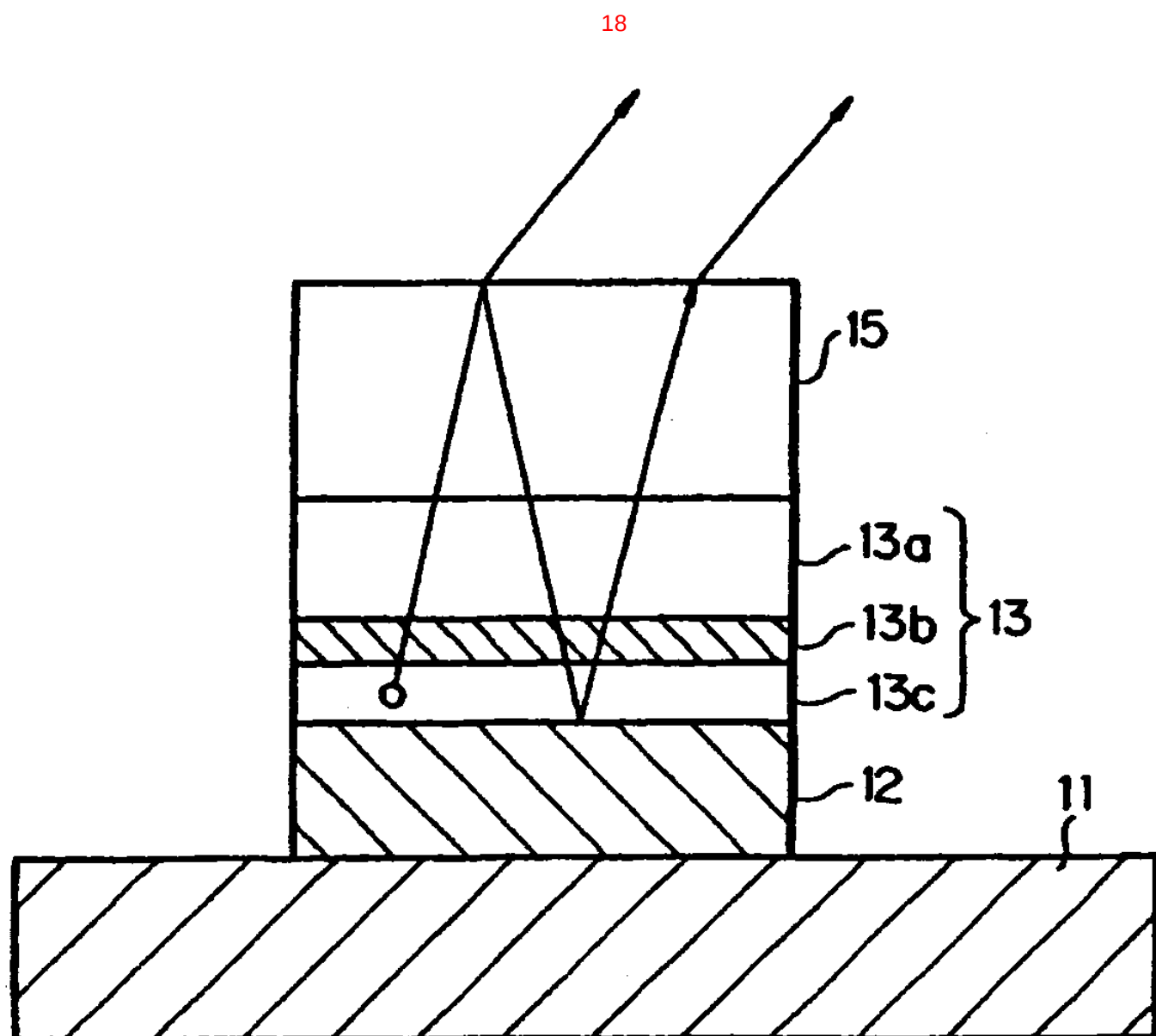


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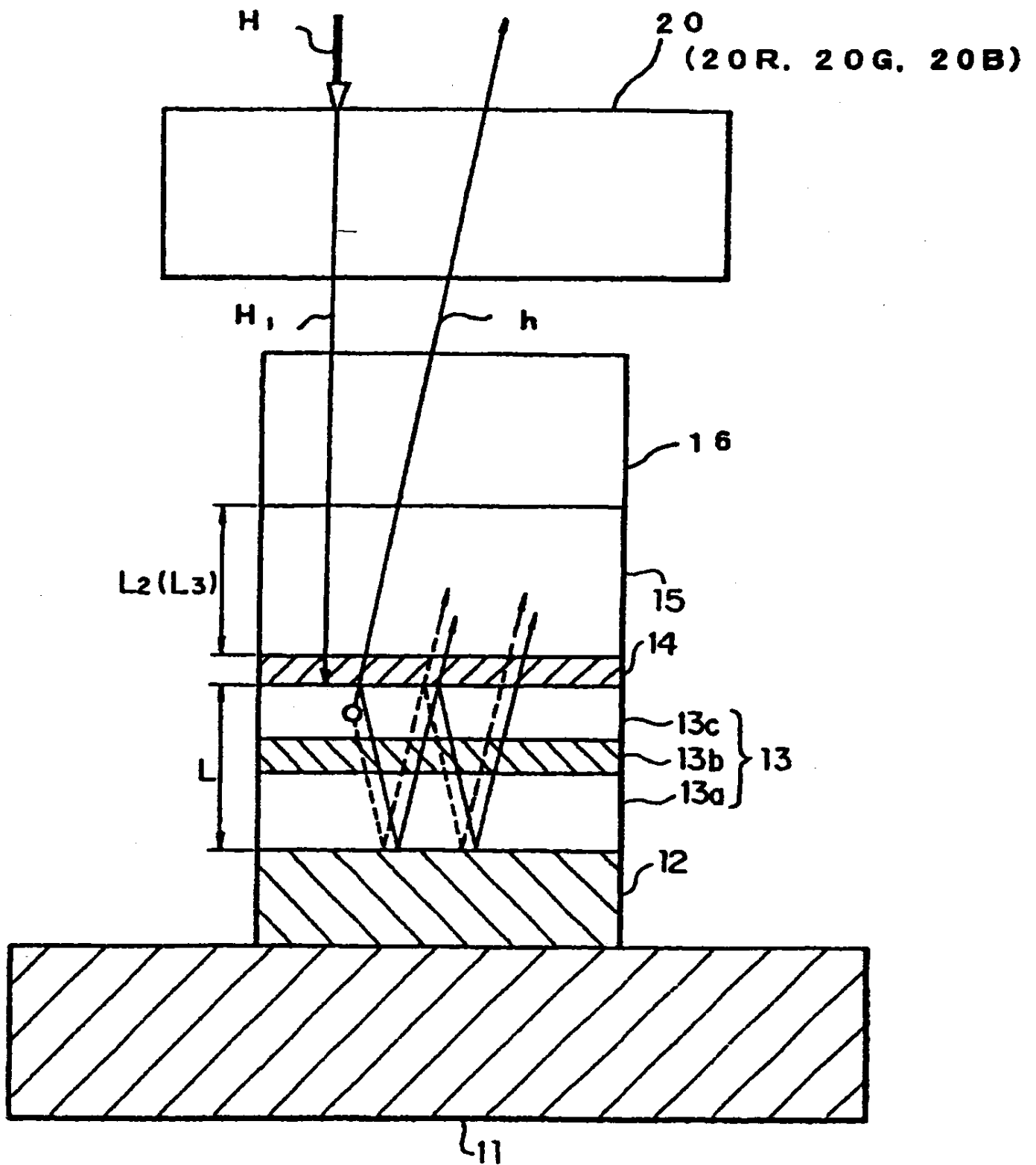


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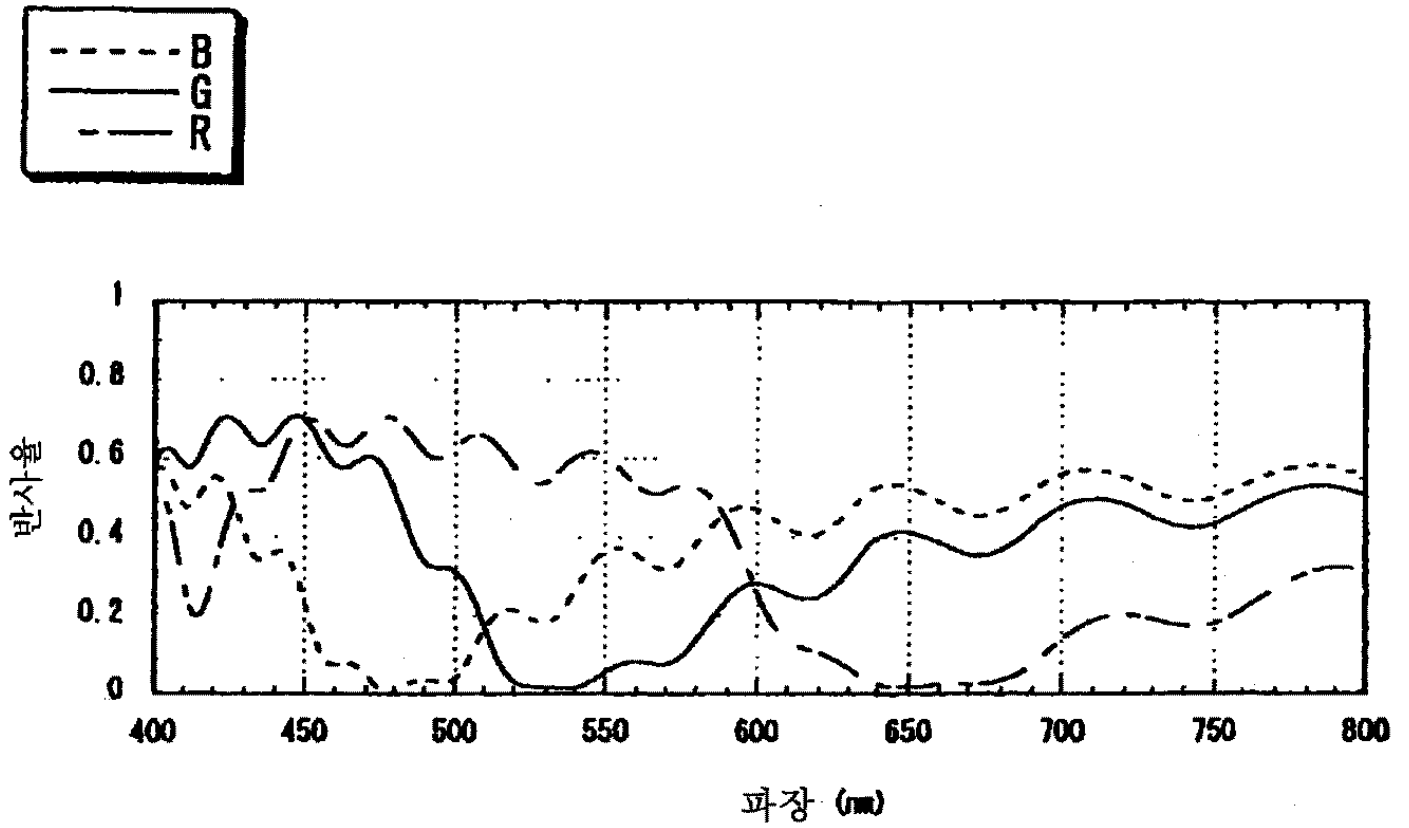




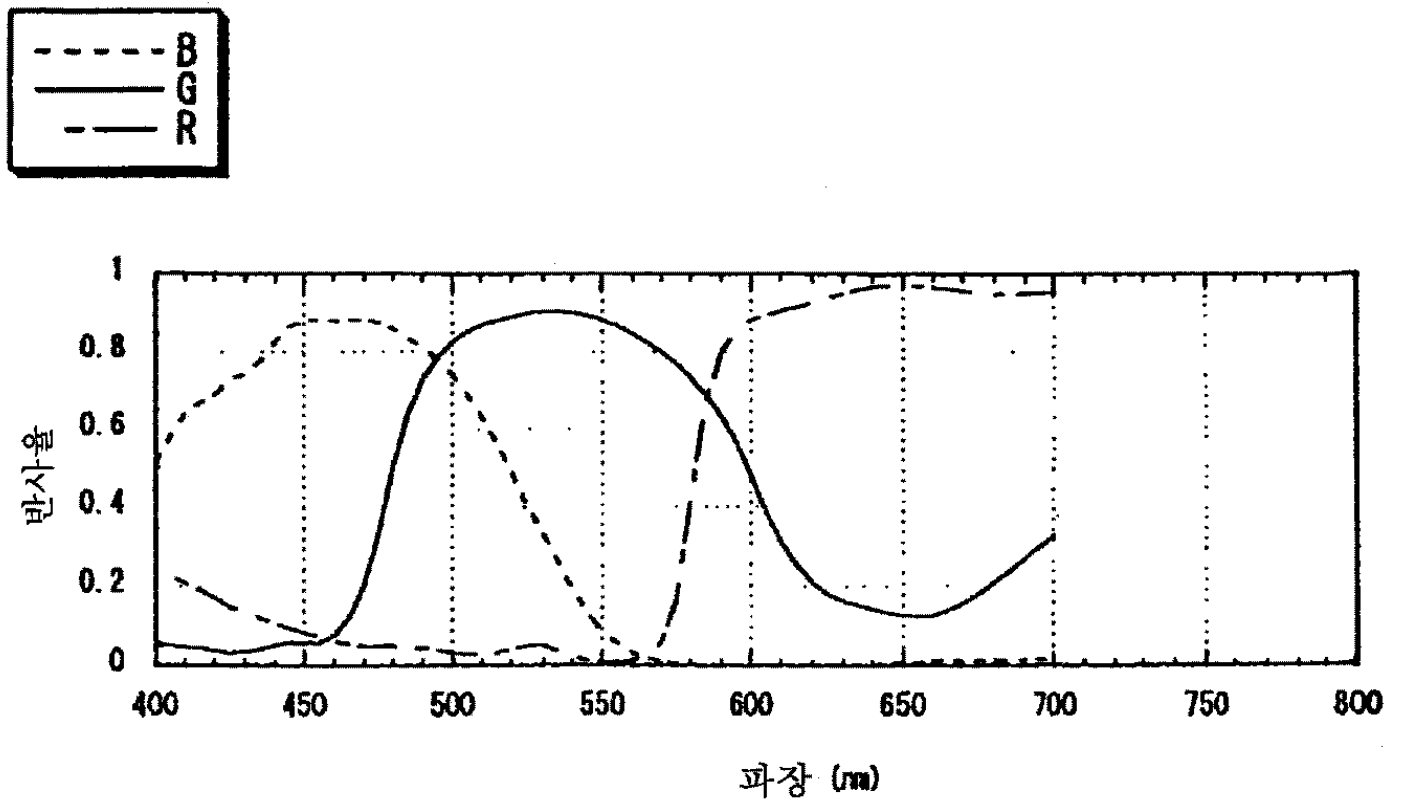
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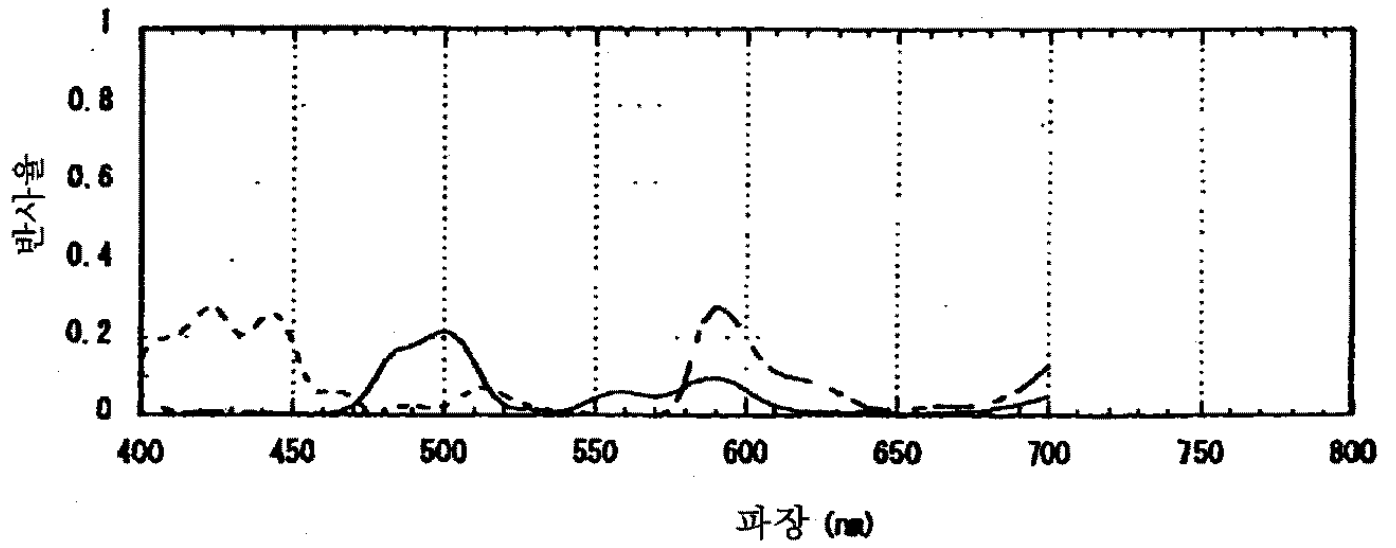


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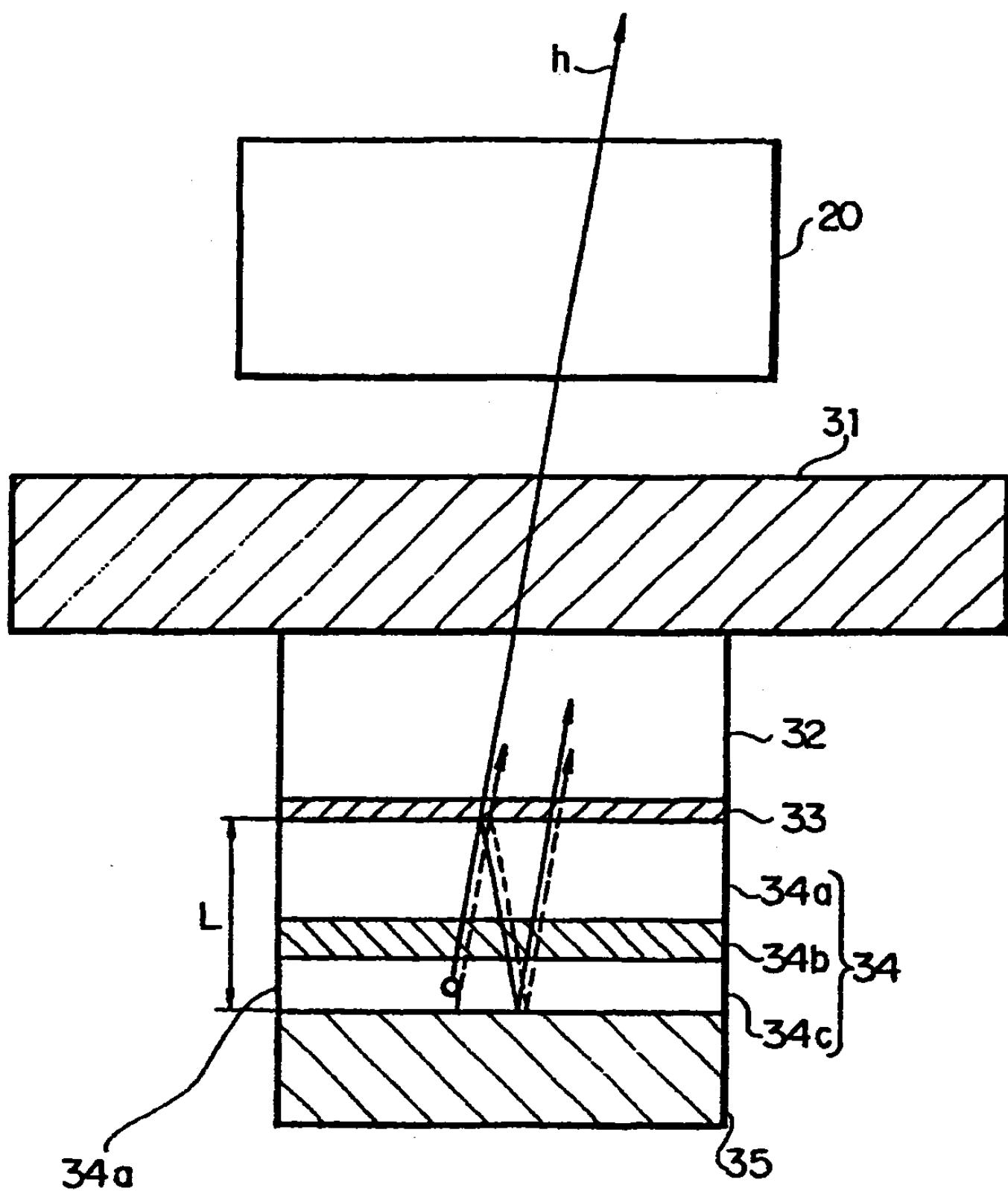


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专利名称(译)	显示元素		
公开(公告)号	KR1020010101640A	公开(公告)日	2001-11-14
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[标]申请(专利权)人(译)	索尼公司		
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摘要(译)

由光反射材料制成的第一电极，具有有机发光层的有机层，半透明反射层，当在有机发光层中产生的光在谐振部分的两端反射时发生的相移由 ϕ 弧度表示，谐振部分的光学距离由 L 表示，当要提取的光谱的峰值波长是 λ 时，光学距离 L 被设定在满足 $(2L)/\alpha + \lambda/2\pi = M$ 的范围内的最小值。（波长 λ ）与波长的光谱宽度共振？4 指数方面 有机发光层，半透明反射层，

