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(43)

10-2004-0000630
2004 01 07

(21) 10-2002-0035137
(22) 2002 06 22

(71)

575

(72)

1630-5

410 906

4 504-90

650

411 1805

9

909 1504

(74)

:

(54)

5.8eV 60% 1 ; 2 ; 2 , 가 4.5 eV ;

(ohmic contact)

3a

1a-b ,

2 (a)-(c) 1a ,

2 (d)-(g) 1b ,

3a-b ,

4a-4c 3a ,

4d-4f 3b ,

5a-b 1 - - , -

, ,

6a-b 2 - - , -

, ,

7a-b 1 1 - - (IVL)

.

< >

100, 200,308... 101, 201, 301... 1

102, 202, 302... 2 302'..... 3

103, 203, 303...

104, 204, 304... 105, 205, 305...

106, 206, 306... 107, 207, 307...

309... 310...

311... 312...

313... 313a...

314... 315...

316... 317...

308...

M) , 가 (A
 , 가 가 , ,
 , 가 , 가 , 가
 , 가 , 5,796,509 가 .
 , ,
 6,016,033 , 2 , 2 , 1 , 1 ,
 2 , 1 ,
 5,714,838 , 가 ,
 가 , 가 ,
 , ZnS, GaN, ITO, ZnSe , ITO, Al
 가 , Al ,
 가 .

(Top-emitting) (SID Digest pp 384-386, : A 13.0-inch AMOLED display with top emitting structure adaptive current mode programmed pixel circuit').

가 , 가 , 가 ,
 , , 60% .

가 .

60% 1 ;
 , 가 4.5 eV 5.8eV 2
 ;
 2 ;
 .
 가 1 가 4.5 eV 5.8eV 3
 1 (Al), , (Ag), , 60% 가 2 3
 ITO(indium tin oxide),IZO(indium zink oxide) (Ni), (Pt), (Au), (Ir), 가 4.5 eV 3
 5.8 eV 가
 .
 1 가 (Al) , 2 가 (Ni) 3 가 (Ni)
 1 가 (Al) , 2 가 (Ni)
 1 (Ag) , 2 3 ITO IZO
 .
 Li, Ca, LiF/Ca, LiF/Al, Al, Mg, Mg , ITO(Indium Tin Oxide), IZO(Indium Zinc Oxide)
 .
 ;
 ;
 / 60% 1 ;
 1 , 가 4.5 eV 5.8eV 2
 ;
 2 ;
 .
 , ;
 ;
 / 가 4.5 eV 5.8eV
 3 ;
 3 60% 1 ;
 1 가 4.5 eV 5.8eV 2
 ;

2 ;

1 ()/ 2 () 2 3 ()
)/ 1 ()/ 2 () 3 가
 4.5 eV 5.8eV 60% , 60 99.9% , 2 3 가
 Al/Ni 2 Ni/Al/Ni 3
 가 / /
 60% , 85% , 60 99.9%

1a

1a (101) , 4.5 eV (100) 5.8eV , 1 (101) 60 99.9% (102)가 , Al, Al , Ag,
 Ag

1 (101) 50 300nm

2 (102) 4.5 eV 5.8eV , ITO, IZO, (Ni), (Pt), (Au), (Ir)

2 2 (102) 3 30nm 2 (102) 가 30nm
 1 가 , 3nm

2 (102) (103) (103) (104),
 (105), (106) (107)가

1 (107) (encapsulation layer) ()

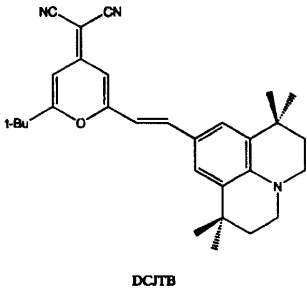
(207)

O₂ 가 Y₂O₃, SiO₂, Si₃N₄, SiN_xO_y

(103) N,N'- (-1-)-N,N'- - {N,N'-di(napht
 halene-1-yl)-N,N'-diphenyl-benzidine: - NPB}, N,N'- (3-)-N,N'- - [1,1'-]-4,4'-

가 (TPD) (103) 10 50nm (103)

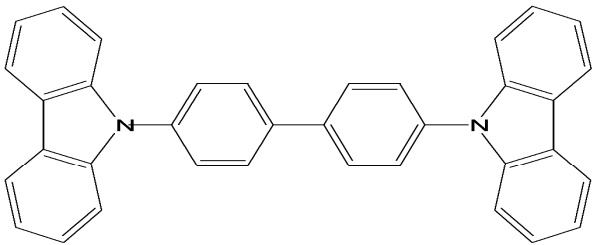
(103) 가
 4-()-2- -6-(1,1,7,7-)-9-)-4H
 - (4-(dicyanomethylene)-2-t-butyl-6-(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran: DCJTБ),
 6(Coumarin 6), (Rubrene), DCM, DCJTБ, (Perylene), (Quinacridone),
 0.1 5 %
 가 , 가 ,



(103) 2 (102)
 , 2 (102) (104) , ()

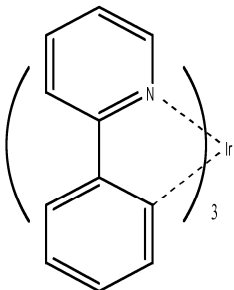
(starbust) , 30 100nm 가

(104) , CBP(4,4'-bis(carbazol-9-yl)-biph
 enyl)



CBP

(104) (103) 가 -
 IrPPy3{tris(phenylpyridine)Iridium}



IrPPy3

(104) 10 40 nm

(105)
inolinolate)-aluminium: Alq₃),

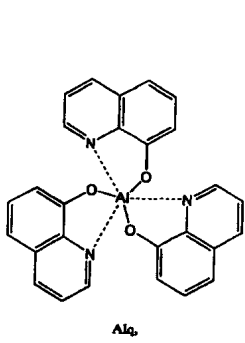
Almq₃

(8-)- (tris(8-qu

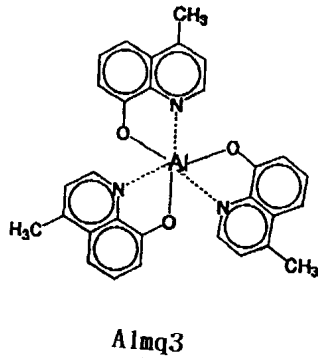
(105) 30 100nm

(105)

가



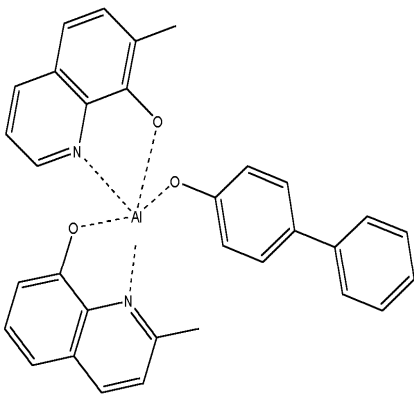
(104)



(105)

(HBL)

BAIq



BAIq

10nm (105) (106) LiF 가 0.1 (106)

(106) (107) 가 , Li, Ca, LiF/ ITO, IZO(Indium Zinc O
Ca, LiF/Al, Al, Mg, Mg xide) 가 가
ITO, IZO(Indium Zinc Oxide) 가 5nm
5 30nm 가 30nm
10 400nm
가

(10)

(10) 0.3 1.1 mm

1b

1b , 1a 1 (101) (100) 3 (102')가
 , 2 (102) 3 (102')

1 4.5 eV 5.8eV , 2 (102) 3 (102') 가
 ITO, IZO, Ni, Pt, Au, Ir

2 (102') Ni 1 3 (101) Al Ag , 2 (102) Ni
 1 (101) Al Ag 3 (102) 3

Al/Ni 2 Ni/Al/Ni 3 ,

-cm Al 가 Al (3.65×10⁵ / -cm) 2.5 가 Ni 1.43×10⁵ /
 가 50-100

2 (a)-(c) 1a 2 , (200) 1 (201) 2 1 (201) (2 (a)).
 , 1 (201) 2 (202)

0.1-20 Pa , , , , 0.1-4 W/cm² , 가 가 가
 , 가

(203), (204), (106) (205) (206) , 2 (a)-(c) , ,
 (203), (204), (205), (206)

(207)

(207) (encapsulation layer) () .

(207) , E-

2 (d)-(g) 1b 3 , (200) 3 (202') (2 (d)).
 , 2 (202) 3 (202') 1 (201) (2 (e)). ,
 (2 (f)).

, 2 (c) 가 1b (2 (g)).

3a-b (20) (40)

3a (20) (308) (309), (311), (312) (316)

(316) () (303), (304), (305), (306) (302)가 (307)가 (303), (304), (304), (305), (306) (307) 3a (40)

(40) 가 (308) (309)

(310) (310) (315) (315) (312) (310) (313), (314) (313a)

1 (313) (314) (316) (20) (301) (318) 1 (314) 2 (318) 2 (301) (302)

3b 3a 1 (301) 3 (302')가 (314) (318) (20) 3 (102') (40)

3a-b 1 (301) 2 (302) 3 (202') (318) 3

/ 가 /

4a-4c 3a (318) 가 (316) 2 (301) 2 (302) (4a). (301) 2 (302)

1 (301) 2 (302) 2 0.1-4 W/cm² 가 가 가 0.1-20 Pa 가 가

2 (302) (317) 가 (4b). (317)

(304), (305), (306) (4c). (302), (307)

, 2 (301) (302)

2

3

TFT

4d-4f 3b

301) 2 (318) (302) 3 (302'), 1 (4a-4c)

3b

1

Ni RF- 0.7KW, 2mmtorr 가 75 3
 Al DC 4KW, 4mmtorr 가 1800 1
 2, 1 Ni RF- 0.7KW, 2mmtorr 가 75

Al 40

2mm×2mm , UV/O₃

2 NPB IDE 406(Idemitsu) 50nm
 0.1nm/sec 15nm

100:5 CBP IrPPy3 25nm

Alq3 BAlq 10nm (HBL)

40nm

10:1 ITO (Mg) (Ag) 10 nm
 0.2nm/sec , 1×10⁻⁵ Pa

가 , UV , 70 1

2

3 가 100 , 2 가 1800 , 1 가 100

3

Al DC 4KW, 4mmtorr 가 1800 1
 2, 1 RF- 0.7KW, 2mmtorr 가 75

2 2 1

1

가 Ca 10nm 3 가
 , 1
 DC 4KW, 4mmtorr Al 가 180nm Al
 , SiO₂ 100nm , SiO₂ (ashing) Al
 , SiO₂ ITO ITO SiO₂
 1 - - (IVL) -
 5a-b 1 .

[1]

| | (cd/A) | (nit) | (V) |
|---------------------------|--------|-------|-----|
| Ni(75)/Al(1800)/Ni(75) | 15 | 100 | 7 |
| | 20 | 500 | 7.9 |
| | 21 | 1000 | 9.0 |

1 5a-b , 3 가
 3 - - (IVL) -
 6a-b 2 .

[2]

| | (cd/A) | (nit) | (V) |
|-------------------|--------|-------|-----|
| Al(1800)/Ni(75) | 13 | 100 | 7 |
| | 19 | 500 | 8.2 |
| | 20 | 1000 | 9.1 |

2 6a-b , 2 , 3
 2
 , 1 1 , - - (IVL)
 , 7a-b 3 .

[3]

| | (cd/A) | (nit) | (V) |
|--|--------|-------|-----|
| | 6.8 | 100 | 6.7 |

| | | | |
|---|------|------|-----|
| 1 | 11.0 | 500 | 7.6 |
| | 12.9 | 1000 | 8.1 |
| 1 | 1.6 | 100 | 7.1 |
| | 4.8 | 500 | 8.0 |
| | 8.1 | 1000 | 8.4 |

3 7a-b , 가

(ohmic contact)

(57)

1. 60% 1 ;
 가 4.5 eV 5.8eV 2
 ;
 2 ;

2. 1 , 1 가 4.5 eV 5.8eV
 3 가

3. 2 , 1 가 (Al), (Ag), 60%

4. 1 (Pt), 2 (Au), , 2 3 가 ITO(indium tin oxide), IZO(indium zinc oxide) (N
 i), 가 4.5 eV 5.8eV

5. 2 , 1 가 (Al) , 2 3 가 (Ni)

6. 1 , 1 가 (Al) , 2 가 (Ni)

7. 1 2 , 가 Li, Ca, LiF/Ca, LiF/Al, Al, Mg, Mg , ITO(Indium Tin Oxide), IZO(Indium Zinc Oxide)

8. 1 2 , , , , , .

9. ; ; / 60% 1 ; 1 , 4.5 5.8eV 2 ; 2 ;

10. 9 , 1 가 (Al), (Ag), 60%

11. 9 , 2 가 ITO(indium tin oxide), (Ni), (Pt), (Au), (Ir), 가 4.5 eV 5.8eV

12. 9 , 1 가 (Al) , 2 가 (Ni)

13. 9 , 가 Li, Ca, LiF/Ca, LiF/Al, Al, Mg, Mg , ITO(Indium Tin Oxide), IZO(Indium Zinc Oxide)

14. 9 , , , , , .

15. ; ; / 4.5 5.8eV 3 ; 3 60% 1 ; 1 4.5 5.8 eV 2 ; 2 ;

15 **16.** , 1 가 (Al), , (Ag), , 60%

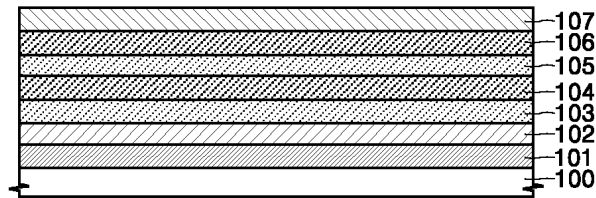
15 **17.** , 2 3 가 ITO(indium tin oxide), (Ni), (Pt), (Au), (Ir),
 가 4.5 eV 5.8eV

15 **18.** , 1 가 (Al) , 2 3 가 (Ni)

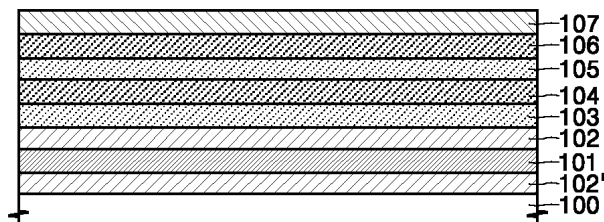
15 **19.** , 가 Li, Ca, LiF/Ca, LiF/Al, Al, Mg, Mg , ITO(Indium Tin Oxide), IZO(Indium Zinc Oxide)

15 **20.** , , , , , ,

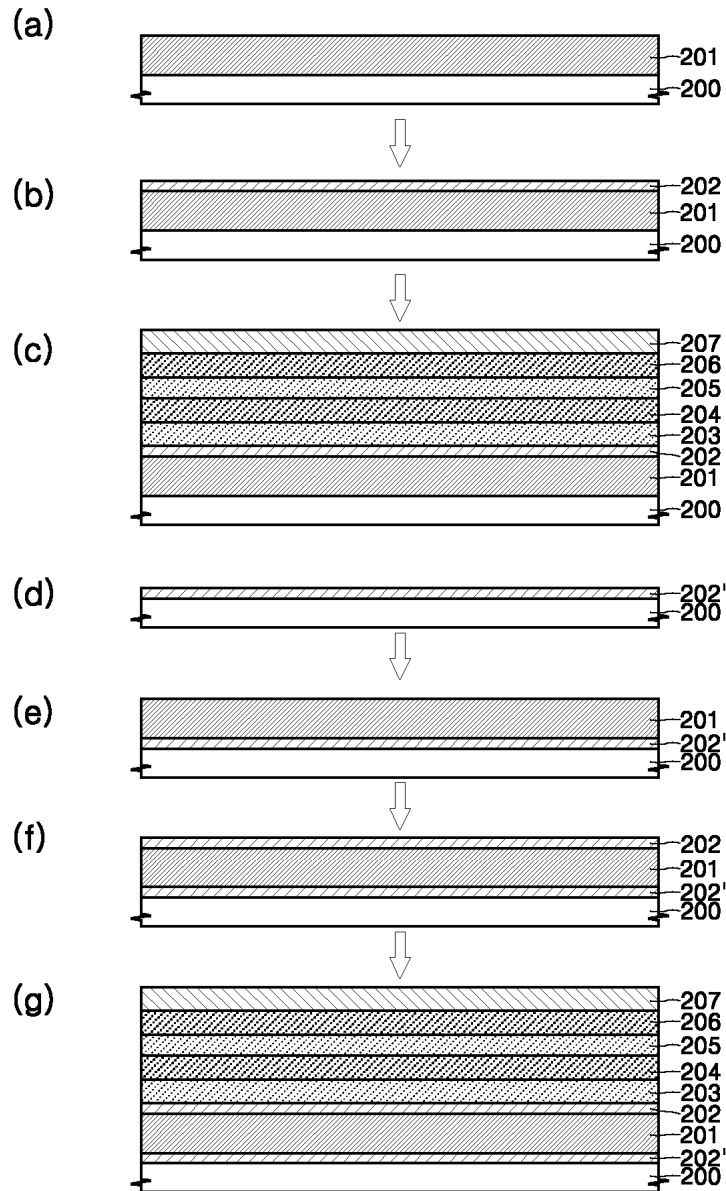
1a



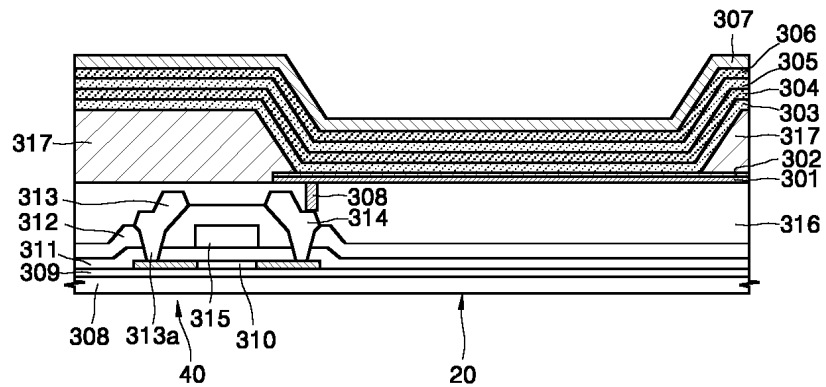
1b



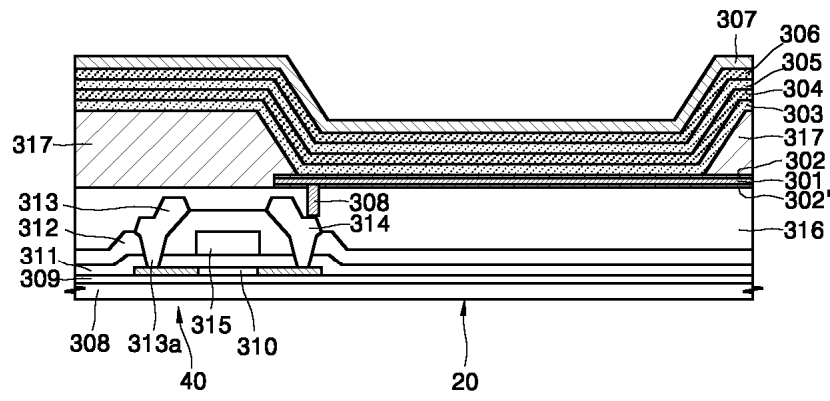
2



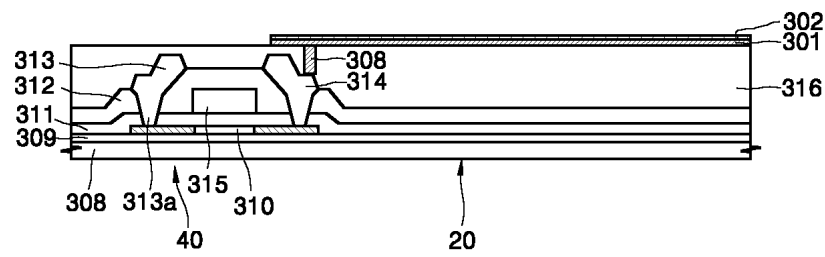
3a



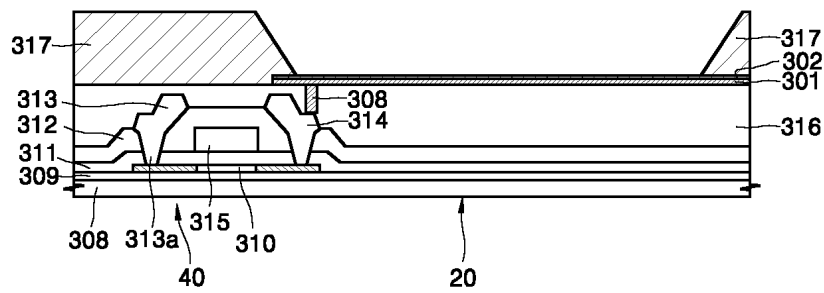
3b



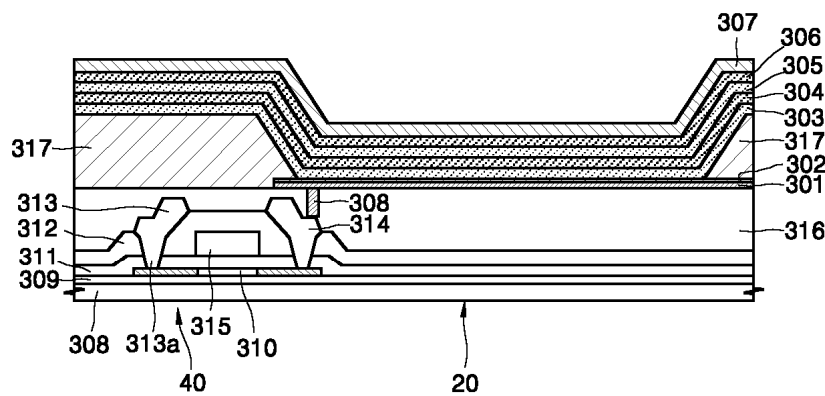
4a



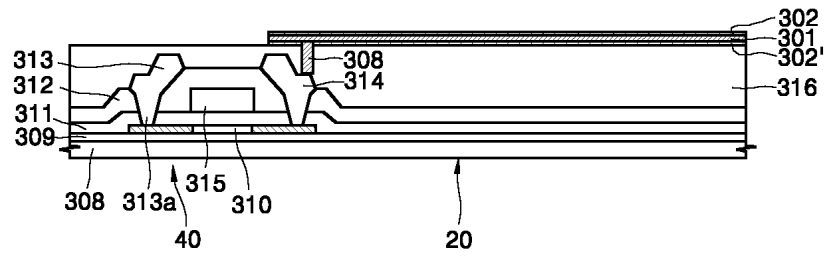
4b



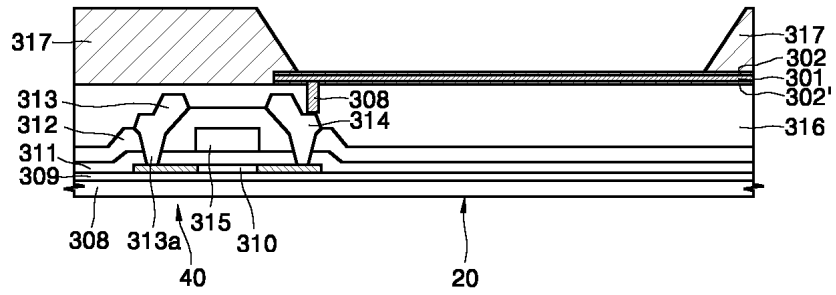
4c



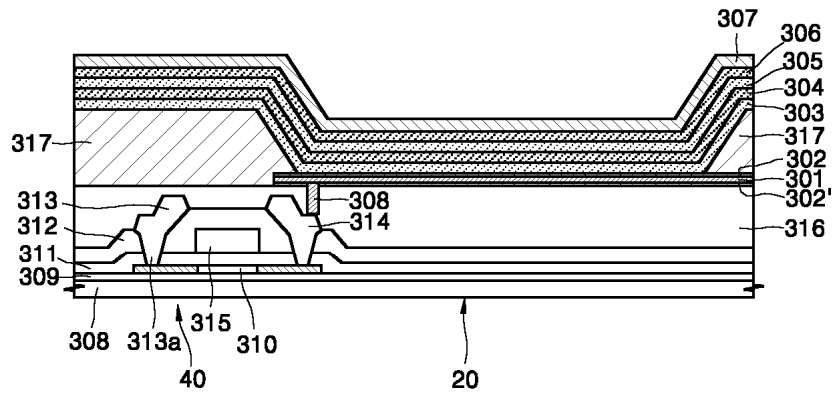
4d



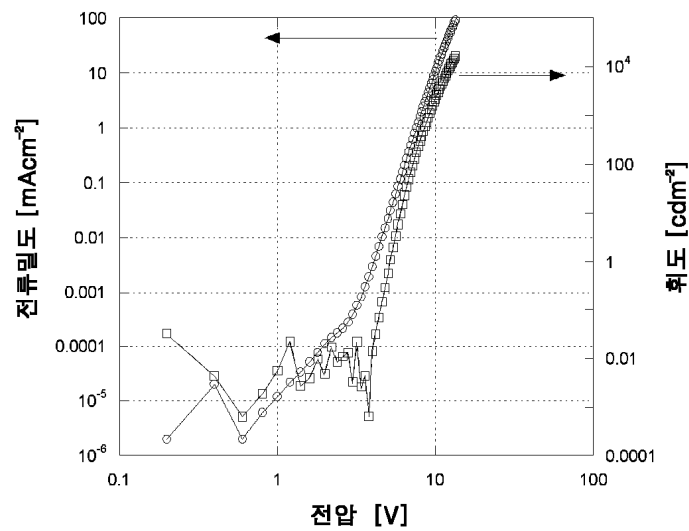
4e



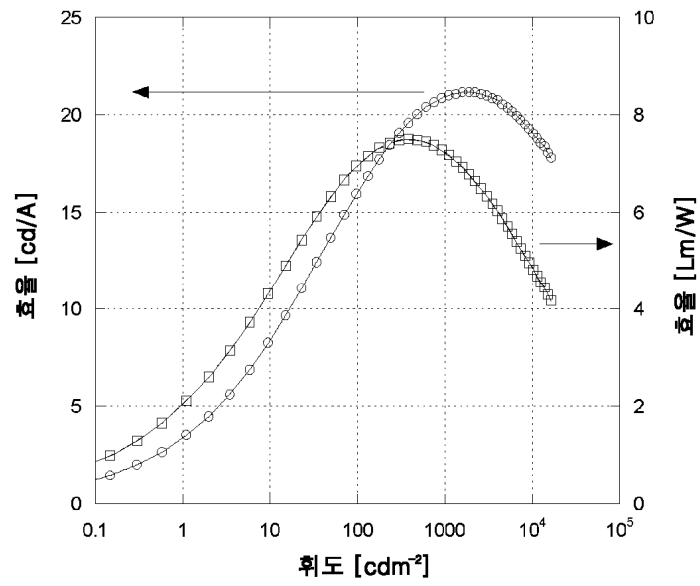
4f



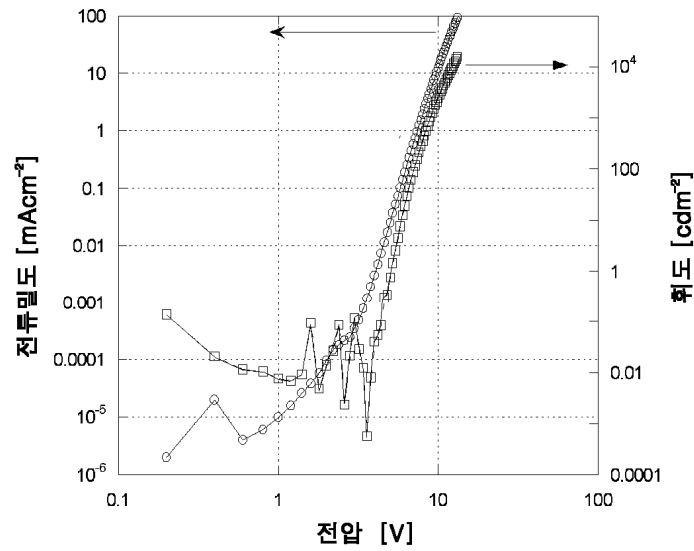
5a



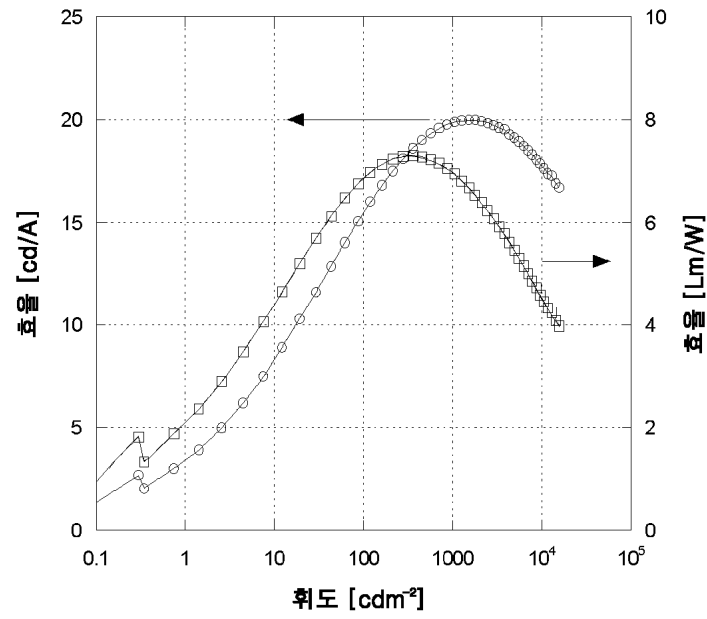
5b



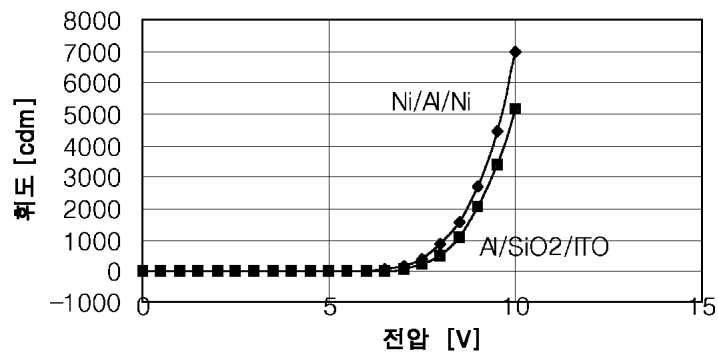
6a



6b



7a



7b

