

(19)
(12)

(KR)
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(51) 。 Int. Cl. ⁶
H01L 29/78

(45)
(11)
(24)

2003 01 29
10 - 0351009
2002 08 20

(21)
(22)

10 - 1995 - 0049121
1995 12 09

(65)
(43)

1996 - 0026961
1996 07 22

(30)

353,032

1994 12 09

(US)

(73)

10013 - 2412

32

(72)

, 07946, , 62

, 07901, , 135

, 07974, , 1 , 48

(74)

:

(54)

(, 20 > 10⁵ /)
(20 < 5x10⁻⁸ S/cm, 10⁻⁸ 10⁻⁹ S/cm) (16)

- (-6T) .

1 TFT .

2 3 TFT .

4 5 가 TFT .

6 7 - 6T - 6T X - .

8 - 6T .

9 TFT .

* *

12, 13, 14 : 1, 2, 3

15 :

16 :

20 :

31 :

(organic active layer)

(TFT)

us silicon - based TFT) . , TFT(amorpho

TFT . , F.Garnler Science, Vol. 265, pp. 1684 - 1686; H K
oezuka Applied Physics Letters, Vol.62(15), pp 1794 - 1796 ; H.Fuchigami Applied Physics Lett
ers, Vol.63(10), PP.1372 - 1374; G.Horowitz J.Applied Physics, Vol.70(1), pp. 469 - 475, G.Horow
itz Sythetic Metals, Vol. 41 - 43, pp. 1127 - 1130. .

(FET) . TFT 가 ,
() , 가 (,) .
n P . , 5,315,129 ,
S. Miyauchi Synthetic Metals, 41 43(1991), pp. 1155 1158 , n p (polythiophene) FET 가 ,

TFT

" TFT

(switching transistor) / (on/off ratio)

TFT / , H. Fuchigami (op. cit)

(carrier mobility) 가 20 / 가

(scattering) (pu

rification) 10^{-5} 10^{-6} S/cm

H. Koezuka (op. cit) (polypyrrole) ()

10^5 / ()

FET 가 / FET

TFT 가 TFT /

TFT $(2 \times 10^{-4} \text{ cm}^2/\text{V} \cdot \text{s})$ 가

TFT 가 /

TFT 가 /

" "

(20) $10^{-3} \text{ cm}^2/\text{V} \cdot \text{s}$

TFT 20 1S/cm

" P " (" n ") 가

() 가 ()

() " (holes)" (" ")

TFT (, /) 가

TFT (article)

TFT

1 2 (,

2 가 1

3

(quaterthienylene)(- 4T), (hexathienylene)(- 6T),

(octathienylene)(- 8T), (pentathienylene)(- 5T), (heptathienylene)(- 7T),

(nonathienylene)(- 9T)

(substituents) 가 " - nT" ,

n 4 9 (deposited) (rapid therm

al anneal) , 20 5×10^{-8} S/cm (1×10^{-8} S/cm)

- 6T - 8T , - 6T 가 가

- 6T

TFT / / 가

가 , TFT (2 -) TFT /
 (2 -) TFT " Article Comprising an Organic Thin Fi
 Im Transistor" TFT 가
 , , " " (, ,
).

- mT (m=4, 6 8) TFT
 - mT - mT - mT - (m/2)
 , 5 - , - m
 T - mT 가 - (m/2)
 - mT (substeps) , " "

- 6T , - nT (members)
 / - 6T Chemical
 Abstracts, Vol.114, p.22, 186387g(1991)

가 , - 6T , - 6T , - 4T - 8T , X -
 - nT .

가 , - 6T (, 10^2) 20 TFT 10^6 / TFT
 TFT 20 가 P .

1 - - (MIS - FET) TFT(10)
 (11 16) , 1 (,), 2 (,), 3 (,),
 , .

2 MIS - FET (20) (11)(, ,
), 1 2 (12, 13), 3 (14), (15), (16)
 (20) 가 (10) TFT (, /
 /) .

3 , , 1, 2, 3 - (MES) - FET FET . (31 35)
 , , 1, 2, 3 .

12 μ m 250 μ m MIS - FET TFT
 Si (gold ohmic contact) Si 300nm
 , 10⁻⁶ torr (evaporation)
 50nm
 4 (- 6T) TFT
 - (off - current) (0 , - 100v) 10⁻¹¹ A / 10⁶
 20 - 6T 10⁻⁸ S/cm (10⁻⁹ S/cm) 가 , P (,
), 0 60
 5 TFT
 (1.4 \times 10⁻⁸ S/cm) - 6T , 1 2 \times 10⁻² cm² / V \cdot s
 / 20V - 80V 10⁶
 (material preparation) TFT
 20 5 \times 10⁻⁸ S/cm TFT , /
 TFT - - 8T - 4T
 - (- terthienyl) 3
 10 가 -
 (4.5g) (magnetic stir bar)
 400ml (THF) 가
 < - 70 ()
 7.3ml 2.5M n - 10
 , - 70 20 , 5 가 - , 5 -
 (lithio) - - , 6.4g
 (ferric) , < - 70 150ml THF 2
 (cannula) 가 가 ,
 5 20 - 6T
 , 100ml , 300ml 1% HCl, 300ml (DI) ,
 100ml , 100ml , 가 3.5g . 0.1
 % Na₂CO₃ 가 100ml ,
 800 ml (mesitylenc) 가
 (,) 가
 가 (supernatant)
 1.5g 가
 0mg 5cm, 가 6 12cm 300 10⁻⁴ torr 200 30
 > 1cm 가

- 6T
) , (0.1 1) - 6T (, - 6T
 0.1% , 0.05%) - 6T (- 6T
 - 6T
 - 6T 120 (,) 가
 - 6T , > 1cm
 - 6T 280 307 - 6T 8
 - 6T 313
 , 6 7 - 6T X - - 6T
 가
 - 6T . B. Served Advanced Materials, Vol. 5(6), p. 461(1993)
 - 6T , 20 22.5 가 (Served X -)
 - 6T (evaporated films) - 6T
 (100 200nm - 6T (pl
 atelet) , 50nm (grain) (B. Served
 Chemistry of Materials. Vol.6, (1994), P 1809)
 - 6T $10^{-2} \text{ cm}^2 / \text{V} \cdot \text{s}$ 가 , 2×10
 $^{-3} \text{ cm}^2 / \text{V} \cdot \text{s}$
 , / /
 . 0.1 % (0.05 %) ,
 - 6T 가
 (, (xylene))가 ,
 (, (sec) -)가 n - (- 6
 , (ferric) - , (III)) - 4T
 T , (, - 8T , - 6T, - 4T , - 8T -
 - 5T, - 7T, - 9T 4
 5 (, , ,
)

- 6T (, 50mg) (evaporator) 300 가 50nm - 6T
 10^{-7} torr , 100nm

- nT (morphology)가 가
 , - 6T (RTA) 가
 가 TFT (4 12 μ m)

(, 295 315) () (10 , 1)
 - 6T 5 100 μ m 2 μ m 가 .
 N₂ (strip)) - nT (morphology)가 R
 TA

, p - 6T RTA / 가
 RTA(1 206) , 0.7 $\times 10^{-8}$ S/cm - 6T 10 $^{-6}$ S/cm . N₂
 - nT

TFT MYLAR[®] - nT 가 TFT
 KAPTON[®] , Si (SiO₂) ,

가 ,

, TFT 가
 9 , J. Kanicki, editor, Art
 ech House, Boston(1991), " Amorphous and Microcrystalline Devices" p. 102
 9 - , (101) T
 FT , (102) , (103 105) ,

(57)

1.

a) (16),

b) 1 2 (12, 13) ;

c) $\frac{1}{2}$, $\frac{3}{3}$ 가, (14) (20)

d) $-nT$ 4 - 5 - $-nT$ 4 - 5 -

e) 20 $5 \times 10^{-8} \text{ S/cm}$, 20 10^{-3} cm^2
 $/V \cdot s$

2.

1, $-6T$ $-8T$,

3.

2, 0.1,

4.

1, 10^5 / / ,

5.

1, $5 \times 10^{-8} \text{ S/cm}$,

6.

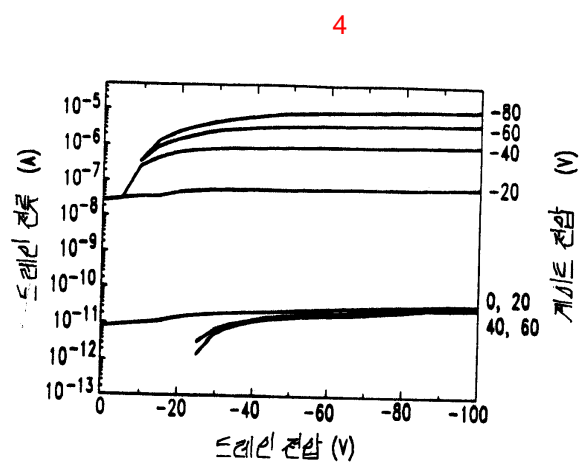
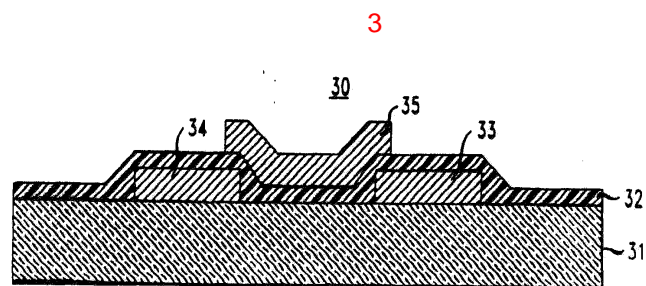
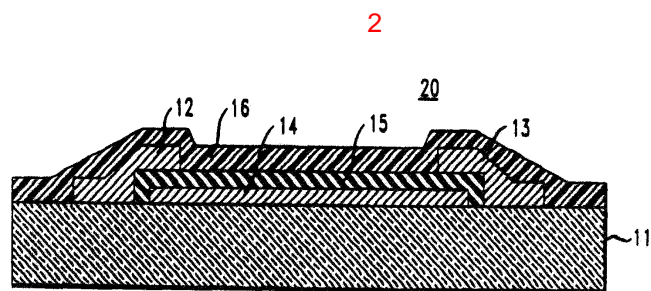
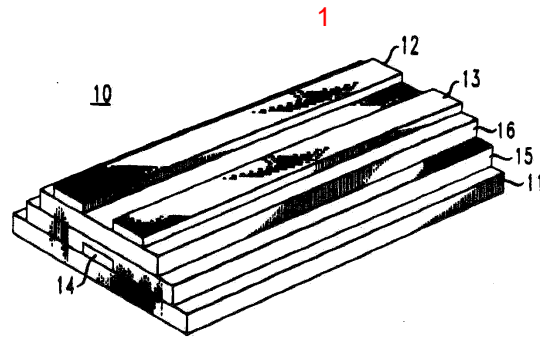
4 - 5 - $-mT$ ($m=4, 6, 8$),

a) $-mT$, $-mT$, 5 - 가 $-(m/2)$
 $-mT$;

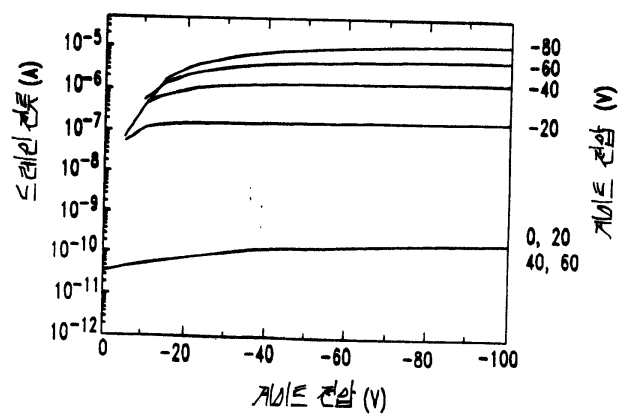
b) $-mT$,

c) $-mT$ 가 가 $-(m/2)$;

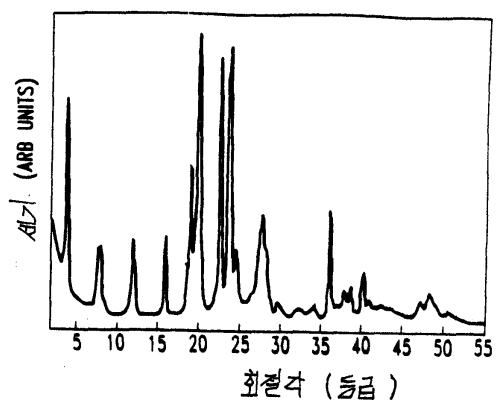
d) $-mT$.



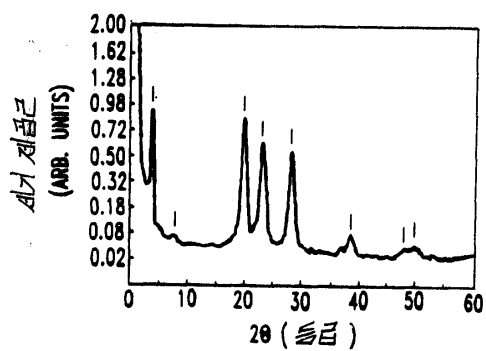
5



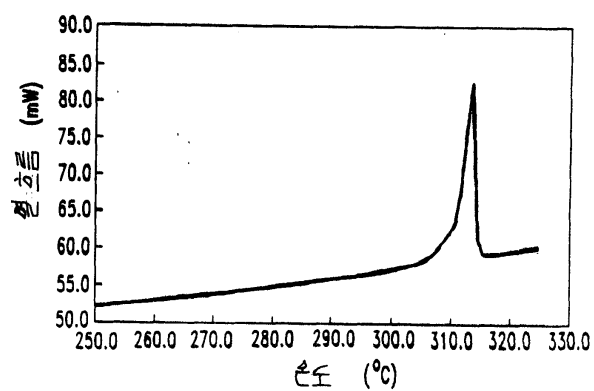
6



7



8



9

