

(19) (KR)
(12) (B1)

(51) 。 Int. Cl. ⁶
H01L 29/78 (45) 2003 01 29
(11) 10 - 0351009
(24) 2002 08 20

(21) 10 - 1995 - 0049121 (65) 1996 - 0026961
(22) 1995 12 09 (43) 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 , 20 > 10⁵ /) 10⁻⁸ 10⁻⁹ S/cm) (16)
< 5x10⁻⁸ S/cm, . .
- (- 6T) . .

1		TFT	.	.
2	3		TFT	.
4	5		가	TFT
6	7		- 6T	- 6T X -
8		- 6T		
9		TFT		

15 :

16 ·

20 ·

31

31

(organic active layer) (TFT)

TFT (amorpho)

us silicon-based TFT)

TFT . , F.Garnier 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 Sththetic Metals, Vol. 41 - 43, pp. 1127 - 1130. .

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

TFT

" 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) (polypyrole) ()
 FET 10⁵ / / FET
 가 TFT / /
 TFT (2 × 10⁻⁴ cm²/V · s) 가

TFT /
 가 가

" " (20) 10⁻³ cm²/V · s
 TFT 20 1S/cm

" P " (" n ") 가
 () ()
 () " (holes) " (" ")

TFT (article) (, /) 가

TFT 1 2 (, 1
) , 2 3
 2
 - (quaterthiylene) (- 4T), - (hexathiylene) (- 6T), -
 (octathiylene) (- 8T), - (pentathiylene) (- 5T), - (heptathiene)
 lene) (- 7T), - (nonathiylene) (- 9T)
 4 5 (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

TFT - 6T / / 가

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

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

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

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

, - 6T 가 TFT TFT
 TFT (, 10² 20) 20 10⁶ / P .

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

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

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

, 12 μ m 250 μ m MIS - FET TFT
 Si 300nm
 (gold ohmic contact) Si , , (evaporation)
 50nm , ,
 4 (- 6T) TFT
 20 (off - current) (0 - 100v) 10 $^{-11}$ A / 10 6
 20 - 6T 10 $^{-8}$ S/cm (10 $^{-9}$ S/cm) 0 60 가 , P (,),
 5 TFT
 / (1.4 \times 10 $^{-8}$ S/cm) - 6T 10 6 1 2 \times 10 $^{-2}$ cm 2 /V · s
 20 20V - 80V TFT , , /
 TFT (material preparation) TFT
 20 5 \times 10 $^{-8}$ S/cm , , / - 8T - 4T
 - (- terthienyl) 3
 10 가 (4.5g) (magnetic stir bar)
 400ml < - 70 (THF) 가 ()
 7.3ml 2.5M n - 10
 - 70 20 , 5 가 , , 5 -
 (lithio) -
 (ferric) 150ml THF 2
 (cannula) 가 가 , , 6.4g
 5 20 - 6T
 100ml , 100ml , 100ml , 300ml 1% HCl, 300ml (DI) , 0.1
 % Na₂CO₃ , , , , , 3.5g ,
 가 100ml , , , , , ,
 > 120
 800 ml (mesitylene) , ,
 (,) 가 , ,
 (supernatant) 1.5g 가 , ,
 0mg 5cm, 가 6 12cm 300 10 $^{-4}$ torr 200 30
 > 1cm 가

$-6T$
 $-6T($, $-6T$
 $-6T$, $-6T$
 $-6T$ / $-6T$

- 6T - 6T - 6T
 (evaporated films) 100 200nm (pl
 (atelet)) (grain)
 , 50nm - 6T (B. Servet
 Chemistry of Materials. Vol.6, (1994), P 1809
 - 6T $10^{-2} \text{ cm}^2 / \text{V} \cdot \text{s}$ 가
 $-3 \text{ cm}^2 / \text{V} \cdot \text{s}$, , 2×10
 , / /
 0.1 % (0.05 %) ,

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

- nT (morphology) 가
 , - 6T TFT (RTA)
 가

(, 295 315) () 5 (10 , 1)
 - 6T N_2 100 μm , 2 μm ,
 (strip)) - nT (morphology) 가 R
 TA

, p - 6T RTA /
 RTA(1 206) , - 6T 10^{-6} S/cm
 0.7 $\times 10^{-8}$ S/cm - nT N_2

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

가

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

(57)

1.

a) (16),

b) 1 2 (12, 13) ;

c) 1 2 , 3 가 ,
 1 2 3 (14) , (20)

d) 4 - 5 - - nT 4 - 5 -
 - nT , n 4 9 ,

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

2.

1 ,

- 6T - 8T , ,

3.

2 ,

0.1 , ,

4.

1 ,

10 5 / / , ,

5.

1 ,

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

6.

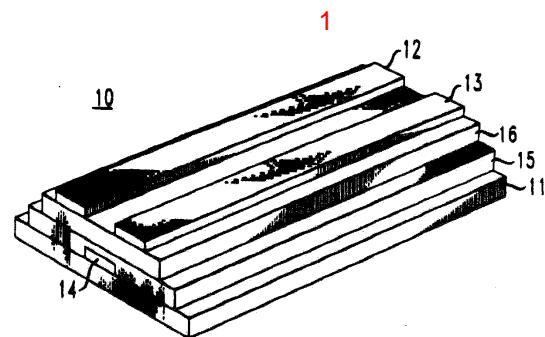
4 - 5 - - mT (m=4, 6, 8) , ,

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

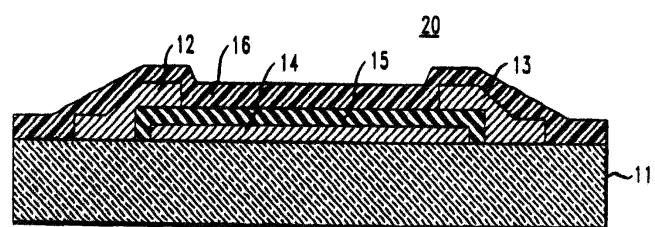
b) - mT , ,

c) - mT 가 , , 가 - (m/2) ;

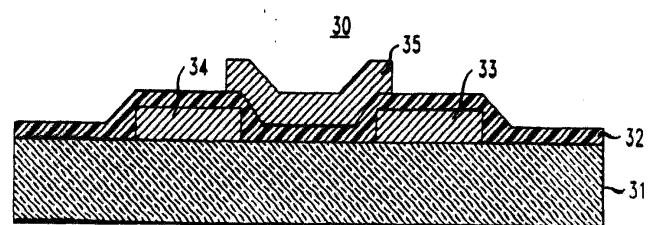
d) - mT , ,



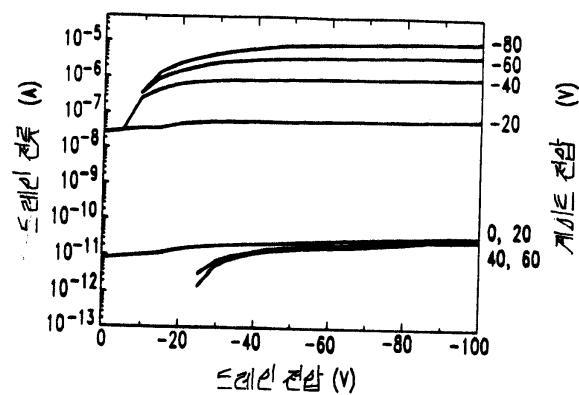
2



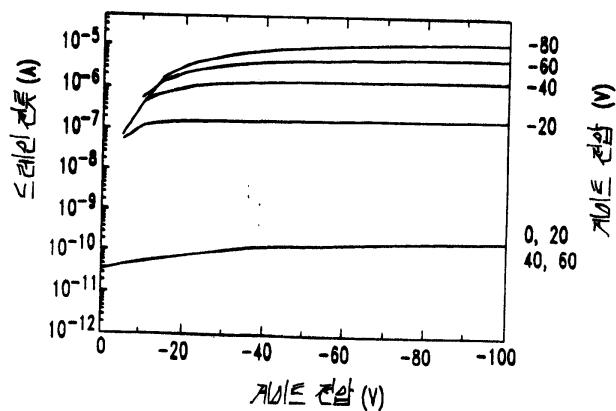
3



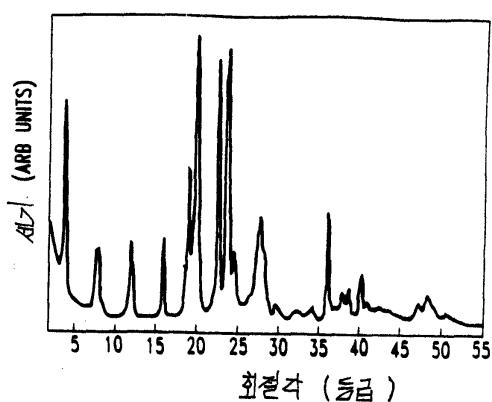
4



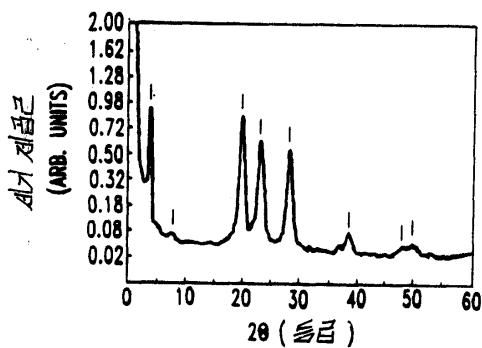
5



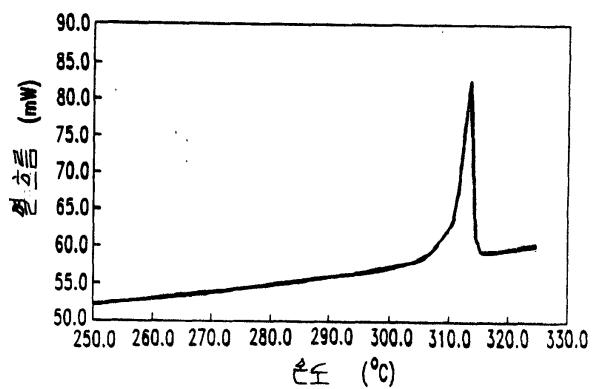
6



7



8



9

