

(19)  
(12)

(KR)  
(B1)

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G03F 7/32

(45)  
(11)  
(24)

2002 12 05  
10 - 0363271  
2002 11 20

(21) 10 - 2000 - 0032225  
(22) 2000 06 12

(65) 2001 - 0111605  
(43) 2001 12 19

(73) 가 3 472 2

(72) 613 - 4  
770 4/6  
122 323 1305  
625 - 3  
625 - 3

(74)  
:

(54)

10 ~ 45 %, 2 3 , 2 ~ 20 %, 5 ~ 15 %, 4 ~ 15 %, 30 ~ 55 %  
가  
64 가 DRAM

3

1	(1),	(2),	(TEOS : Tetraethyl or
thosilicate) (3),	(FOX : Flowable Oxide) (4),		(TEOS : Tetraethyl orthosilicate)
(5)가		(6)	(Via Hole)

2	1	(6)	1
	65		

3	1	(6)	3
	65		

(LSI), (VLSI)

가

가

가

(MEA)

가

, a) (MEA), 2 - (2 - ) (AEE) , b) N,N -  
 (DMAc), N,N - (DMF), N - (NMP), (DMSO),  
 2 ( 4,617,  
 251 ); a) (MEA), , b) N -  
 (MAc), N,N - (DMAc), N,N - (DMF), N,N - (D  
 EAc), N,N - (DPAc), N,N - , N,N - , N - - N  
 - ( 4,770,713 )  
 ; a) (MEA) , b) 1,3 - -2 - (DMI), 1,3 - -  
 2 ( 3,828,513 ); a) (MEA), (DEA), (TEA)  
 , b) , c) ,  
 ( 62 - 49355 ); a) (MEA), (DEA) , b) 1,3 - -  
 2 - ( 63 - 208043 ); a) (M  
 EA), , b) DMAc, NMP, DMSO , c)  
 ( 63 - 231343 ); a) (MEA)  
 , b) - 1,3 -  
 -2 - , c) DMSO  
 ( 64 - 42653 ); a) (MEA) , b)  
 , DMAc, NMP, DMSO , c)  
 ( 4 - 124668 ); a) 1,3 - -2 - (DMI), b)  
 (DMSO), c) (MEA) ( )  
 4 - 350660 ); a) (MEA), b) DMSO, c) (catechol)  
 ( 5 - 281753 ) ,

, a) , b) , c)  
 ( 4 - 289866 ); a) , b) , c) , d)  
 ( 6 - 266119 ); a) GBL, DMF, DMAc, NMP  
 , b) 2 - , c) ( )  
 7 - 69618 ); a) (MEA) , b) , c) ( )  
 8 - 123043 ); a) , b) , c) , d) 4  
 , e) ( 8 - 262746 ); a)  
 (MEA) AEE , b) , c) , d)  
 ( ) , e) ( 9 - 152721 ); a) , b) , c)  
 (pKa)가 7.5 13 , d) , e) ( )  
 9 - 96911 ) ,

200 (popping) 가 가 가

가

가

가 [Fujimura, 1P - 13, p 가

574, 1989] 2 2

4 가 DRAM

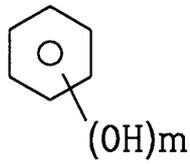
6

5 ~ 15 %, (ㄷ) 10 ~ 45 %, (ㄹ) (ㄱ) 2 3 2 ~ 20 %, (ㄴ) 4 ~ 15 %, (ㅇ)

50 % 2 ~ 20 %가 ( 2 , 20 %

5 ~ 15 %가 , 5 %  
 , 15 %  
 가  
 , 18 가 (MΩ)  
 , 10 45 %가 , 10 45  
 %  
 %  
 , 10 45 % 가 가  
 , 2 3 1

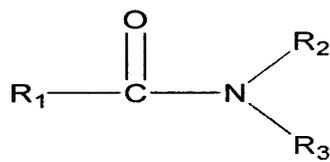
1



, m 2 3

, 2 3  
 , 2 3  
 가  
 , 2 3  
 , 4 15 %가 , 4  
 %  
 15 %  
 , 2 ,

2



, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>

가 1 2

30 ~ 55 %가  
 , 55 %  
 가

가

가

가

(1)

A

800 150 8

TEOS FOX  
 ( , TEOS CVD  
 : DPR - i900)  
 110 90

가 1.2 μm가  
 (pre - bake)

2.38 %

(TMAH) 21 60

120

100

: M318) SF<sub>6</sub>/ Cl<sub>2</sub> 가

35

O<sub>2</sub>

A 65

5 , 10 , 20  
 가

가  
 가

(SEM)

2

:

: 80 %

x :

(2)

B

A

B 65

5 , 10 , 20  
가

가 3

:

:

× :

1 ~ 5 1 ~ 3

(ㄱ) ~ (ㄴ) 1 1 ~ 5 1 ~ 3 (1)  
, (2) 2 ~ 3

[ 1 ]

		( % )											
		(ㄱ)		(ㄴ)		(ㄷ)		(ㄹ)		(ㅁ)			
	1	HDA	2	B - Oxime	15	24	PG	8	DMAc	51			
	2	HDA	5	P - Oxime	15	25	PC	8	DMAc	47			
	3	HDA	10	B - Oxime	10	38	PC	5	DMAc	37			
	4	HDA	10	B - Oxime	10	30	PC	4	N - MAc	46			
	5	HDA	6	P - Oxime	5	31	PG	5	N - MAc	53			
	1	HDA	20	-	-	20	PC	5	-	-	AEE	55	
	2	HDA	19			19	GA	2			AEE	60	
	3	HDA	20	-	-	20	GA	5	-	-	MEA	55	

HDA : (Hydroxylamine)

B - Oxime : (Butanon oxime)

P - Oxime : (Propanon oxime)

PG : (Pyrogallol)

PC : (Pyrocatechol)

GA : Gallic acid)

DMAc : (N,N' - Dimethylacetamide)

N - MAc : - (N - Methylacetamide)

MEA :

AEE : 2 - (2 - ) (2 - (2 - Aminoethoxy)ethanol)

[ 2 ]

		5	10	20
	1			
	2			
	3			
	4			
	5			
	1	x		
	2	x	x	x
	3	x	x	

1 ~ 3 3

( ; S - 4100)  
65

1  
1 ~ 3 A

1 , (1), (2), (TEOS : Tetraethyl orthosilicate)(3), (FOX : Flowable Oxide)(4), (6) (TEOS : Tetraethyl orthosilicate)(5)가 가 (Via Hole)

2 1

65

3 3

65

[ 3 ]

		5	10	20
	1			
	2			
	3			
	4			
	5			
	1			x
	2			
	3			x

(57)

1.

(ㄱ) 2 3 2 ~ 20 %, (ㄴ) 4 ~ 15 % 5 ~ 15 %, (ㄷ) 10 ~ 45 %, (ㄹ) 30 ~ 55 %

2.

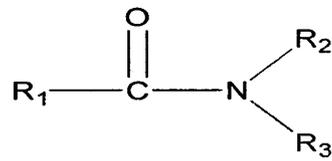
1 ,

3.

1 ,

2

2



R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>

가 1 2

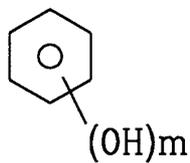
4.

1 ,

2 3

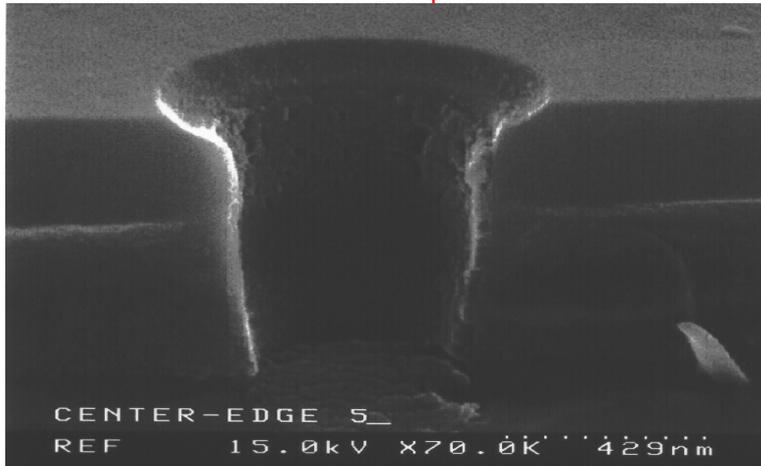
1

1

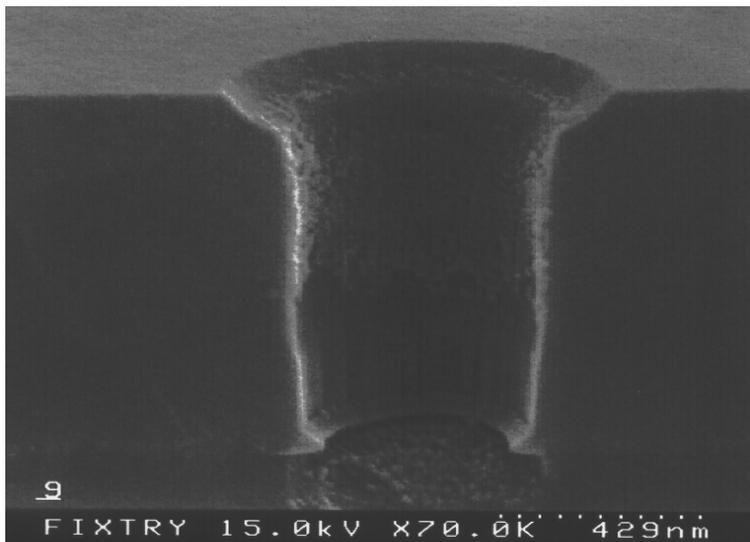


, m 2 3 .

1



2



3

