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10 : 12 :
14 : 16 : 1
18 : 20 :
22 : 24 :
26 : 2 28 :

30 : 32 : 3
 34 :

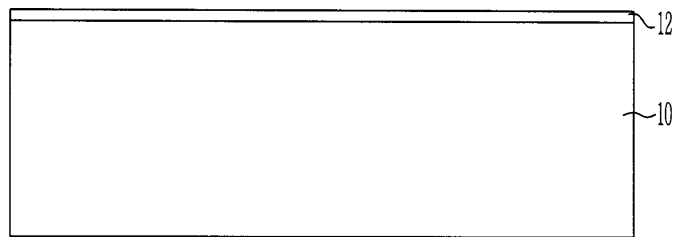
(Self align)
 ned floating gate)
 (Flash memory cell)
 (Mask patterning)
 (Critical Dimension; CD) (Variation)
 (Fail) 가
 0.15 μ m
 (Space)
 가
 (Over erase) 가
 , 0.13 μ m
 (Technology)
 SACrificial; SAC) STI (Side wall oxidaion) (Wall) (Corner)
 (Gate thinning) 가
 STI (Lithography) 가 가 가 (CD) 가
 , STI 가 가 가
 (Capacitance) 가 가 가
 가
 ; 1 ;
 ; ; 2 ;
 1a 1i
 1a (10) (SACrificial; SAC; 12) ;
 (12) (10) 750 800
 , (10) 70 100
 (12)
 (10) DHF(Diluted HF; 50:1 H₂O HF) BOE(Buffer Oxide Etchant; HF
 NH₄F가 100:1 300:1)가 DI(Deionized) (Water)
 , (10) (Paticle) (10) SC-1(NH₄OH/H

$2O_2/H_2O$ (10) DI (1)
 (12) (VT)
 1b STI () ()
 (14) (14) 750 800 (12)
 30 (10) 900 910 N_2 20
 DI DHF BOE가
 DI (10) SC-1
 1 (16) 가
 PH₃가 580 620 0.1 3Torr SiH_4 Si_2H_6
 LP-CVD LP-CVD (P)
 , P) 250 500 1.5E20 3.0E20atoms/cc (18)
 900 2000
 1c (ISO) STI (18), 1
 (16) (12) (10) (10) 가
 (20)가 (20) 65 85° () 가 ,
 (18) (Profile) (10) (20)
 (, 가)
 1d (20) (A)
 RTP(Rapid Thermal Process) FTP(Fast Thermal Process)
 (Hydrogen; H₂) (Flow rate) 100 2000sccm 600 1050
 250 380Torr 5 10 (,)
 (14) (14) (B)가
 (20)
 BOE가 DI DHF
 -1 DI (10) (10) SC
 1e LP-CVD Si_3N_4 가 100 650 770 0.1 1Torr
 (Liner) (22)
 1f (20) HDP(High Density Plasma) (24)
 4000 10000 (24)
 (20) (Void)가 (Gap filling)
 (CMP; Chemical mechanical polishing) (18)
 1g 1 (16) H_3PO_4 () (Dip out)
 (18) 가 (24)
 (10) 가 () 1
) 가
 DHF 1 (16)
 1 400 1000 2 (26) , 2 (2)
 6) 2 (26) 2 (26) (24) 가
 (28) (28) (Spacing) (28)가
 (10) DI DHF BOE가
 DI (10) (10) SC-1
 1i ONO(Oxide/Nitride/Oxide) (30) ()
 30) down) (Oxide) TDDDB(Time Dependent Dielectric Break
 DCS(SiH_2Cl_2) N_2O 가 HTO 35 60
 , 600 700 0.1 3Torr 810 850
 LP-CVD (30) (Nitride)
 가 NH₃ DCS 가 50 65 , 650 800 1 3To

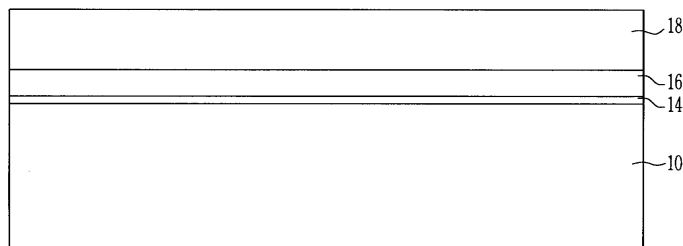
- 1 , ;
- 2 3. , 750 800 70 100
- 1 4. , 750 800 900 910 N₂
- 20 30 5. , SiH₄ Si₂H₆ PH₃가 580 620 0.1 3Tor LP-CVD
- 1 6. ,
- 1 7. , 600 1050 5 10 RTP FTP
- 1 8. ,
- 100 2000sccm 9. ()
- 1 10. , 650 770 0.1 1Torr LP-CVD 1
- 00 500 11. ()
- 1 12. , DHF SC-1 , BOE SC-1
- 1 13. , 4000 10000
- 1 14. ,
- 1 15. , H₃PO₄
- 1 16. , 가
- 16 17. , 400 1000
- 18. ,

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23.
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- 1 2
DCS(SiH₂Cl₂) N₂O 가 HTO 35 60 1
가 NH₃ DCS 가 1 3Torr 650 8
LP-CVD 50 65
DCS(SiH₂Cl₂) N₂O 가 HTO 35 60
2 LP-CVD
1:2 6:1 가 500 1000
510 550 0.1 3Torr
MS(SiH₄) DCS WF₆ 300 500 2.

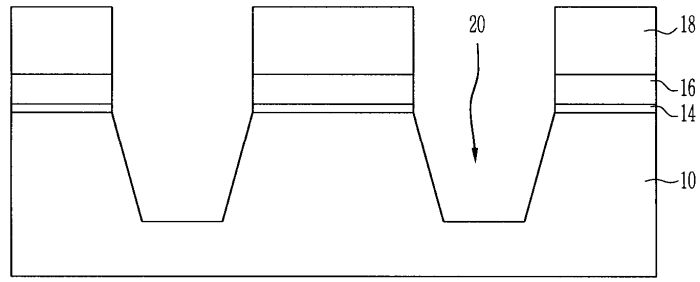
1a



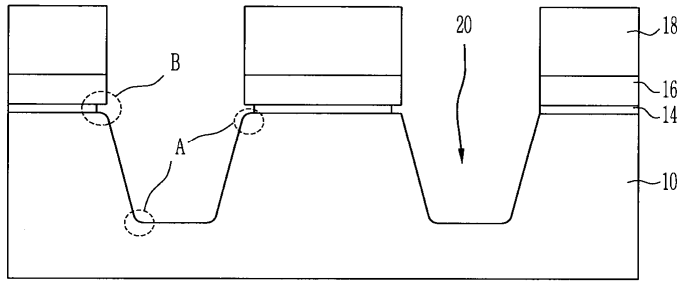
1b



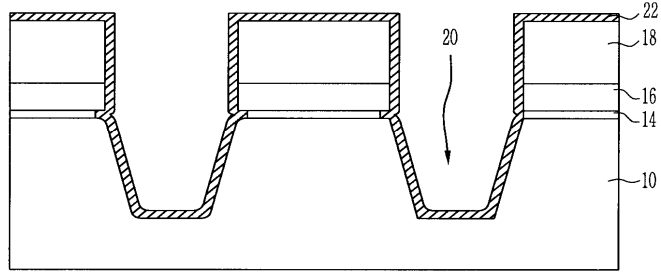
1c



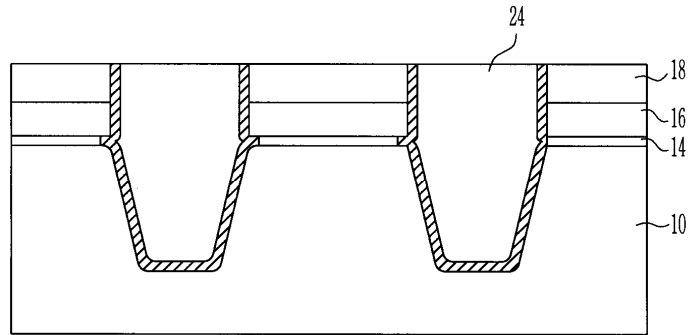
1d



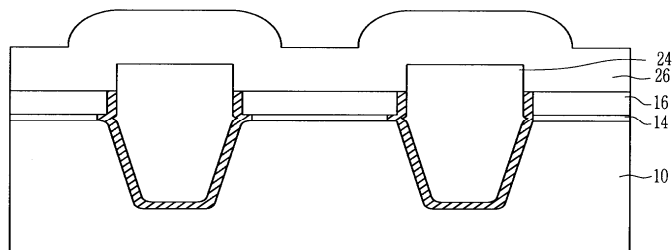
1e



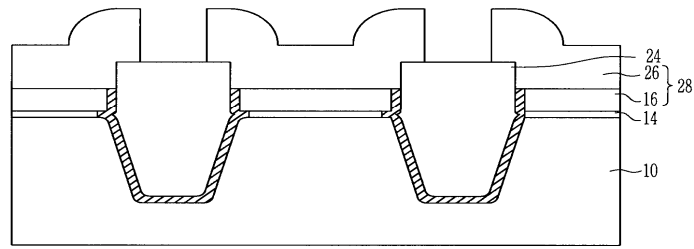
1f



1g



1h



1i

