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(12)

(KR)
(B1)

(45)
(11)
(24)

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(30) 11/559,486 2006 11 14 (US)

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KR1020030084110 A*
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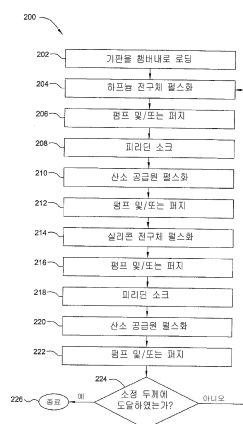
: 20

(54)

(57)

-k

- 2



1

- k :
- (a) ;
- (b) ;
- (c) 1 ;
- (d) 1 ;
- (e) ;
- (f) 2 ;
- (g) 2 ;

-k .

2

3

1 , - -

-k .

4

1 ,

-k .

5

1 ,
TDMH TEMAH TDEAH HCl₄

-k .

6

1 ,
(b) (g)

-k .

7

1 ,
1 2 H₂ O₂ O₂

-k

8

9

1 ,

-k

10

1 ,

-k

11

-k

(a)

(b)

(c)

(d)

(e)

-k

12

13

11 ,

-k

14

11 ,

-k

15

11 ,
-k TDMH TEMH TDEAH HCl₄

-k .

16

11 ,
(b) (e)

-k .

17

11 ,
1 2 H₂O Q₃ Q₂

-k .

18

13 ,

-k .

19

13 ,

-k .

20

:

;

;

,

;

;

,

;

21

1 ,

-k

22

1

50

-k

23

11

-k

[0001]

(ALD)

[0002]

(aggressi ve)

(features)

(conformal)

[0003]

(CMD) 0.15

ALD

ALD

(reactant)

1

(pul sed)

2

1

(purge)

[0004]

ALD

(precursor)

ALD

(oxi di zi ng source)

(hi gh) - k

[0005]

ALD

-k

[0006]

-k

ALD

flowed)

(soaki ng)

(co-

[0007]

1 1 (soak) 2
2

[0008]

1 1
1 1
2 2 2
2 2

[0009]

[0010]

[0011]

[0012]

-k ALD (co-
flowed)

[0013]

1 (100) (100) (102)
(batch) (100) (104) (susceptors; 106)
(100) (104)
(wafer boat)
(104)

[0014]

(108) (100) (108) (110)
(114) (114) (116) (122)
(102) (120) (114)
(108) (102) (108) (112)
(118a- 118d) (108)

[0015]

(100) (124) (126) (130)
(132) (126) (128) (136) (124)

[0016] (134) (124) (124)
 (102)
 (throttle valve; 138) (102)

[0017] ALD -k , -k (100)

HCl₄, HI₄, HBr₄
 (RR N₄H , R R
 (Et₂N)₄H (TDEAH), (M₂N)₄H (TDMAH), (M¹Et N)₄H (TEMAH),
 (^tBuC₅H)₂HCl₂, (C₅H)₂HCl₂, (EtC₅H)₂HCl₂, (M₅C₅)₂HCl₂, (M₅C₅)HCl₃, (ⁱPrC₅H)₂HCl₂, (ⁱPrC₅H)HCl₃,
 (^tBuC₅H)₂H M₂, (acac)₄H, (hfac)₄H, (tfac)₄H, (thd)₄H, (NO)₄H, (^tBuO)₄H, (ⁱPrO)₄H, (EtO)₄H,
 (MO)₄H

[0018] , Al, Zr, La, Sr
 -k -k
 2006/0019033

[0019] (100)
 (M₂N)₄Si, (M₂N)₃Si H (M₂N)₂Si H₂, (M₂N)Si H₃, (Et₂N)₄Si, (Et₂N)₃Si H (M¹Et N)₄Si, (M¹Et N)₃Si H
 Si (NCO)₄, M¹Si (NCO)₃, Si H₄, Si₂H₆, Si Cl₄, Si₂Cl₆, M¹Si Cl₃, HSi Cl₃, M₂Si Cl₂, H₃Si Cl₂, M¹Si (CH₃), M₂Si (CH₃)₂,
 (MO)₄Si, (EtO)₄Si,
 (RR N_{4-r}Si H_r , R R , n=0-3
 (RO)_{4-r}Si L_n (generic chemical formula) , R
 , L H CH F, Cl, Br I
 (higher)

2004/0224089
 () ((M₂N)₃Si H -DMS), () ((M₂N)₄Si
 TDMS) (Si H)
 (HDS)
 (TEOS)

[0020] ALD (O), (O), - (O),
 (H₂O), (N₂O), (NO), (N₂O),
 (NO), (H₂O), (H₂O)

[0021] , ALD

ALD (rate)

[0022] (injector plenums) 1b
 (108a- c) 1b (118a- 118d)
 (108a- 108d)

[0023] HDS TECS TDMH TEMH TDEAH HCl₄

[0024] (soak) 10

100 300
150 200

[0025]
[0026] 2 (202) (200) 10
204)

[0027] / (206)

[0028] / (208) 1
(210)

[0029] 212) / (214)
(pul sed)

216). , / (

[0030] , (218). , H₂O
(220).

H₂O , /
(222).

[0031] / , ()
(224).

[0032] 3 (300) ,
(302).

10 (304).

[0033] / , (306).
(308). /
(310).

[0034] 312). / , ()
(314).

316). , / (

[0035] , (318). , H₂O
(320). H₂O , /
(322).

[0036] / , (324). ,
(326).

[0037] 4 (400) , (404).
(402).

[0038] / , (406).
(408).

[0039] , /
(410). , (412).

[0040] , H₂O (414).
(416).

H₂O

(418).

[0041]

(420).

(422).

[0042]

5

(500)

(502).

(504).

[0043]

(506).

(508).

[0044]

(510).

(512).

(514).

[0045]

, H₂O

(516).

H₂O

(518).

[0046]

(520).

(522).

[0047]

25

50

100

2

1

90

1

20

30

60

20

40

1

40

[0048]

H₂O

H₂O

ALD

150

200

150

200

ALD

[0049]

[0050]

1a

(100)

[0051]

1b

(108a-c)

[0052]

2

(200)

[0053]

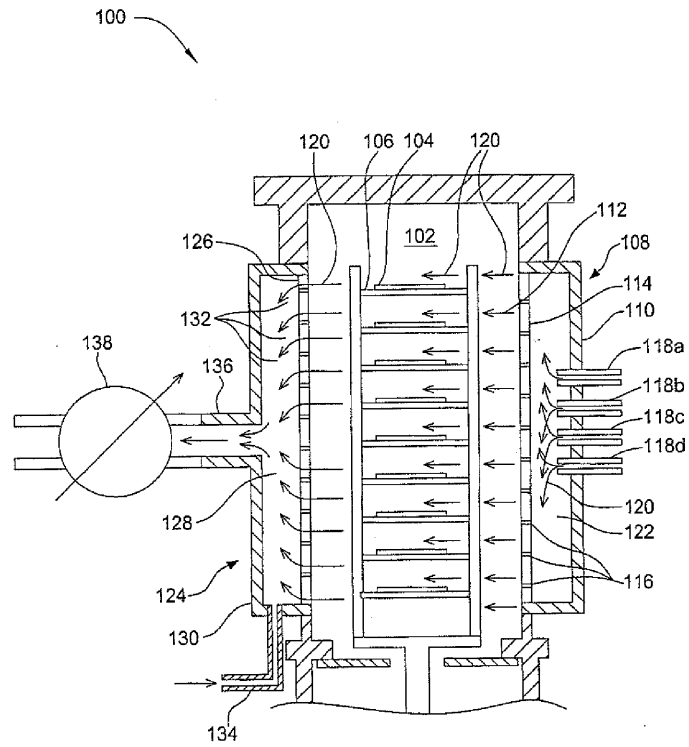
3

(300)

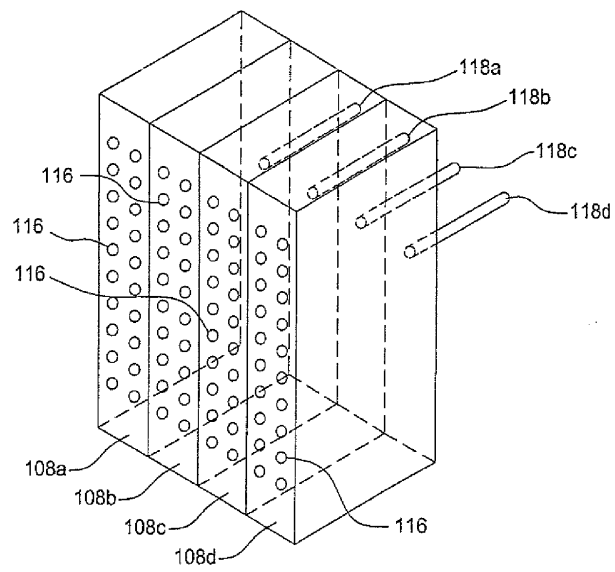
[0054] 4 (400)

[0055] 5 (500)

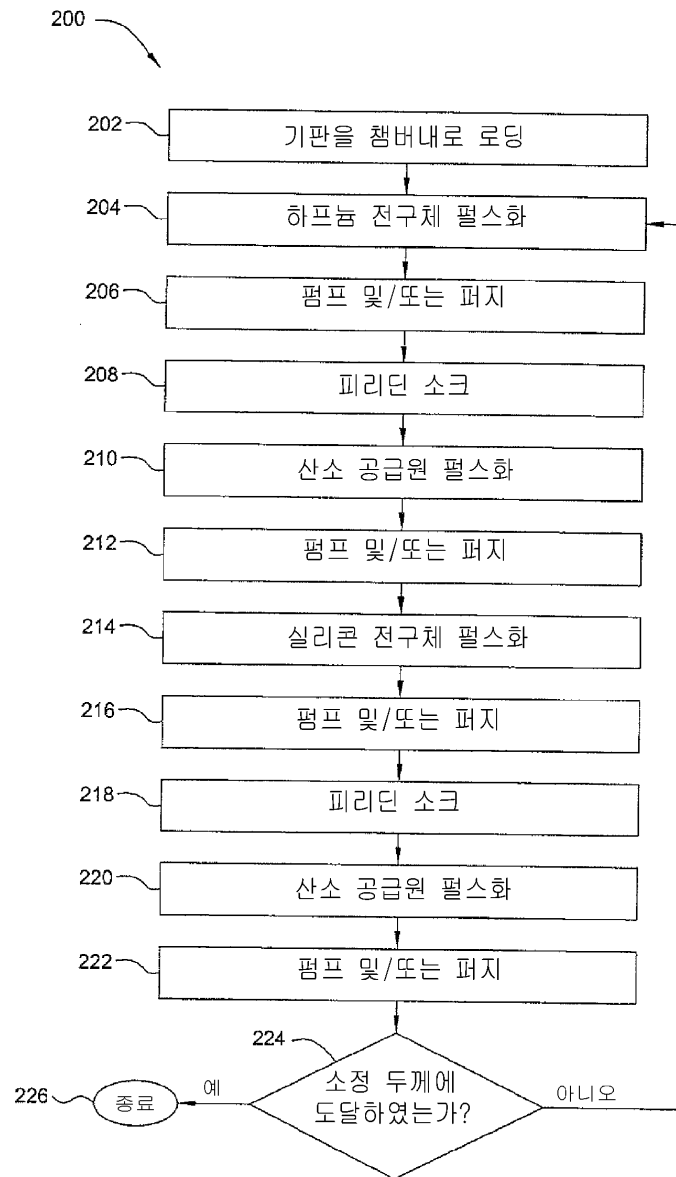
1a



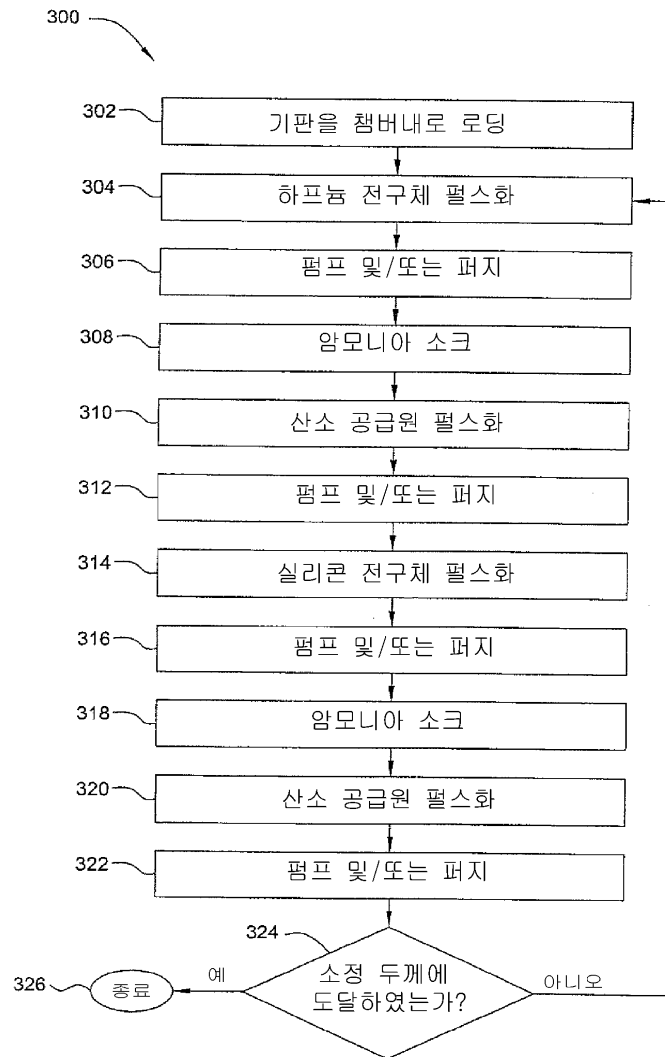
1b



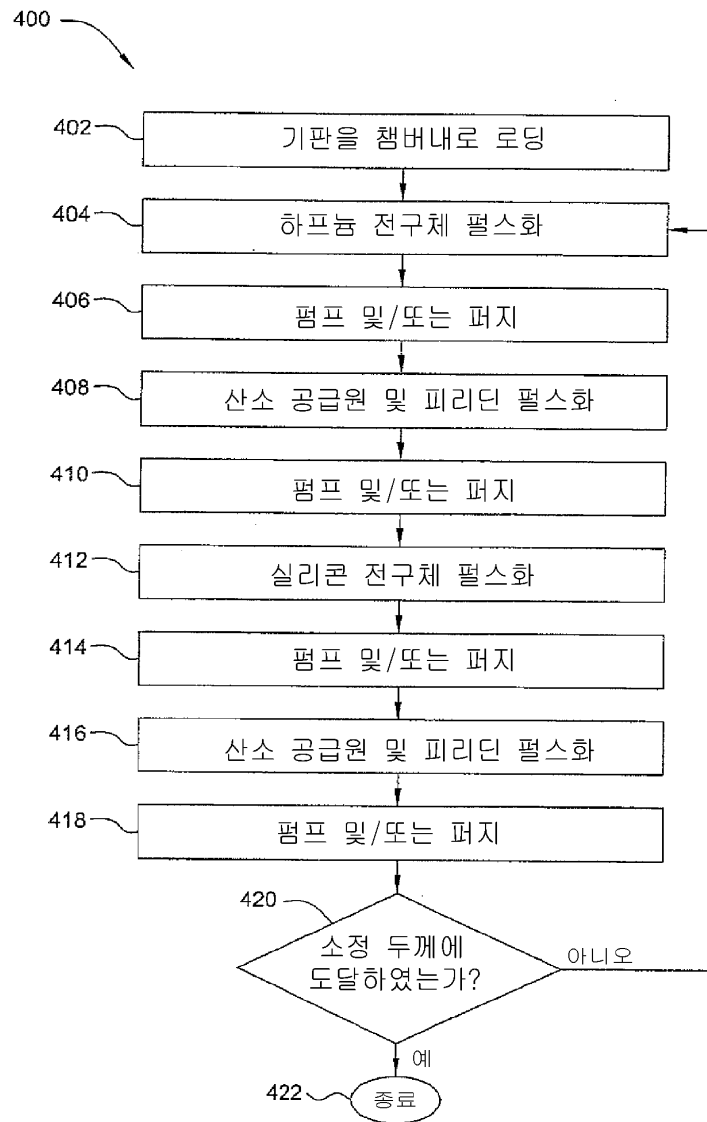
2



3



4



5

