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(12) (B1)

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(24) 2001 03 20

(21) 10 - 1998 - 0032106 (65) 2000 - 0013319
(22) 1998 08 07 (43) 2000 03 06

(73) ()

49

(72) 87 121 401

(74)

:

(54)

, , , ,

가

가

가

(adhesion)

가

(turn around time)

(no - time delay)

(allocation)

(idle time)

fer to wafer uniformity)

(wa

가

가

; TaCl₅, Ta[N(CH₃)₂]₅, Ta(OC₂H₅)_{5-n}(OCH₂CH₂OCH₃)_n, Ta[N(C₂H₅)₂]₅ Ta(OC₂H₅)₅
300 700

1 mTorr 100 Torr

, , n 1 n 4

,

,

,

,

,

,

,

,

,

가 $TaCl_5$

TaCl₅

가 $Ta[N(CH_3)_2]_5$

$$\text{Ta}[\text{N}(\text{C}_2\text{H}_5)_2]_5$$

$$\text{Ta}[\text{N}(\text{CH}_3)_2]_5$$

$$\text{Ta}[\text{N}(\text{C}_2\text{H}_5)_2]_5$$

가

가

(in-situ),

가

(Ar)

가

, , , , 가 , , H_2 , SiH_4 , Si_2H_6 , BH_3 , AsH_3 , PH_3 , GeH_4 , SiH_2Cl_2 , NH_3 가 .

(noble)

가

(near - noble)
 IrO_2 가
 PH_3)

1

BH₃ · AsH₃ 가

TPE($\text{Ta}(\text{OC}_2\text{H}_5)_5$), PDMAT($\text{Ta}[\text{N}(\text{CH}_3)_2]_5$), PDEAT($\text{Ta}[\text{N}(\text{C}_2\text{H}_5)_2]_5$),
 $(\text{Ta}(\text{OC}_2\text{H}_5)_{5-n}(\text{OCH}_2\text{CH}_2\text{OCH}_3)_n)$, TaCl_5

, - 2 - (, Ta(OEt)_{5-n} (OR)_n , OEt:OC₂H₅, OR:OCH₂CH₂
 OCH₃) Ta(OEt)₅ (HOCH₂CH₂OCH₃) n 가 , n
 n="1,2" Ta(OEt)₄ (OR) Ta(OEt)₃ (OR)₂ 가
 , Ta(OEt)₅ Ta(OEt)₅ - 20 (21)
 , Ta(OEt)₅ 가

TPE 가 TPE , 가
 TPE , TPE 0.01sccm 1slm ,
 1sccm 10slm , 1 mTorr 100 Torr
 , 300 700 ,

, 0.01sccm 1slm
 H₂, SiH₄, Si₂H₆, BH₃, AsH₃, PH₃, GeH₄, SiH₂Cl₂ NH₃ 가

, (plasma power) 10W 3kW,
 10sccm 10slm, 300 700 , 1mTorr 100Torr

, 가 PDMAT PDEAT , 가 PDMAT PDEAT
 PDEAT , PDMAT PDEAT 0.01sccm 1slm
 1sccm 10slm, 1mTorr 100Torr, 300 700
 , 0.01sccm 1slm
 , H₂, SiH₄, Si₂H₆, BH₃, AsH₃, PH₃, GeH₄, SiH₂Cl₂ NH₃
 가 , 10W 3kW,
 10sccm 10slm, 300 700 , 1mTorr 100Torr

, 가 TaCl₅ , 가 TaCl₄
 , TaCl₅ 0.01sccm 1slm,
 1sccm 10slm, 1mTorr 100Torr, 300 700
 , 0.01sccm 1slm
 , H₂, SiH₄, Si₂H₆, BH₃, AsH₃, PH₃, GeH₄, SiH₂Cl₂ NH₃ 가
 , 10W 3kW,
 10sccm 10slm, 300 700 , 1mTorr 100Torr

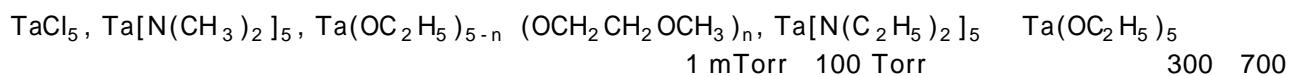
RuO₂ IrO₂ 가

가

(57)

1.

가



, , n 1 n 4

2.

1

3.

2

4.

2

5.

2

6.

1

7.

1 , ,

,

8.

1 , ,

,

9.

8 , ,

,

10.

1 , ,

, , , , ,

11.

1 , ,

가 TaCl₅TaCl₅

12.

1 , ,
[N(C₂H₅)₂]₅가 Ta[N(CH₃)₂]₅Ta[N(C₂H₅)₂]₅Ta[N(CH₃)₂]₅

Ta

13.

1 , ,

,

14.

1 , ,