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(71) 23 202

(72) 23 202

403 505

(74) :
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(54)

strate) () . (target) 가 (bias) 가 (Sub
(target) 가 (chamber)
(flux)
(Cs)
(mobility)
가 .

1
.
2
3 1 .

< >

10 : (substrate)

20 : (chamber)

210 : 220 : (target)

230 : (magnet) 240 : (reservoir)

250 : (distributor) 260 : (loadlocker)

270 : (vacuum pump)

가 , (Cs) 가 (Substrate) , (target) (bias)
.
(emission) (substrate) (deposition) , ,
(epitaxial growth), (layer) (sputtering) .
(mobility)가 가 ,
(ion beam) ,
(flux,) .
가 (momentum transfer) 가
(unbalanced magnetic sputtering)
.
(unbalanced magnetic sputtering) (unbalanced magnetic)
(chamber) ,
가 .

가 , , 가

가 , , 가

(reservoir)

(target) 가 (chamber)

(flux)

1

(20, chamber) (10, substrate) (230, magnet)가
 (210)가 (220, target) (20, chamber) (240, reservoir)가
 (20, chamber) (Cs) (20, chamber) (240, reservoir)
) (250, distributor)가

(20, chamber) (load/unload) (260, loadlock
 er) , (20, chamber) (270, vacuum pump)가

(240, reservoir) 가 가 가 (2
 40h)가 (240, reservoir) (Cs) 가 (N₂)
 240h) (Ar) 가 (He), (Kr), (Xe) 가
 (250, distributor) 가 (240h) (220) (10)
 , (doughnut) (Cs)

28.44 (Cs) 가 (Vapor) , (electroneg
 ativity) (work function)가

(Cs) (240, reservoir) 가 (Cs) (250, di
 stributor) 가 (20, chamber) (Cs vapor) (Ar)
 가

2 , 3
 1

2 (240, reservoir) 가 (targ
 et voltage) , (substrate current)

D (240) (Cs) (room temperature) , (240)
) (Cs) 80, 90, 100 C, B, A (target vol
 tage) (substrate current)가 가 .

1 , (210) (220) 가
 (bias, 30a, 30b) 가 (260, loadlocker) (210) (10, substrate)
 가 RF , (240) (250) 가 (bias) (DC)
 (DC) (DC) RF 가 가 .
 300 1200[V] , RF 300 700 [W] 가 .

3 , (250, distributor) (Cs) (220, target)
 , (Ar) (plasma density) 가 (

10, substrate) (220, target) , 가 .

(Cs) (work function)가 2 (secondary electron) 가 ,
 (Ar) 가 (flux)가 가 .

(220, target) 가 (Ar) (220, target) (220, target)
 (potential) 가 가 .

(10, substrate) 가 (10, substrate) (10, substrate)
 (potential) 가 (mobility)

(240, reservoir) . (240, reservoir)
 (Cs) (220, target) , (240, reservoir)
 가 (Cs vapor)가 (220, target)
 (Cs) 가 (Cs) 가
 (10, substrate) (220, t
 arget) (Cs) 가 (220, target)
 가 (mobility) 80 150 가 .

(Cs)
 , (mobility)
 가 .

(57)

1.

(target)

가

(chamber)

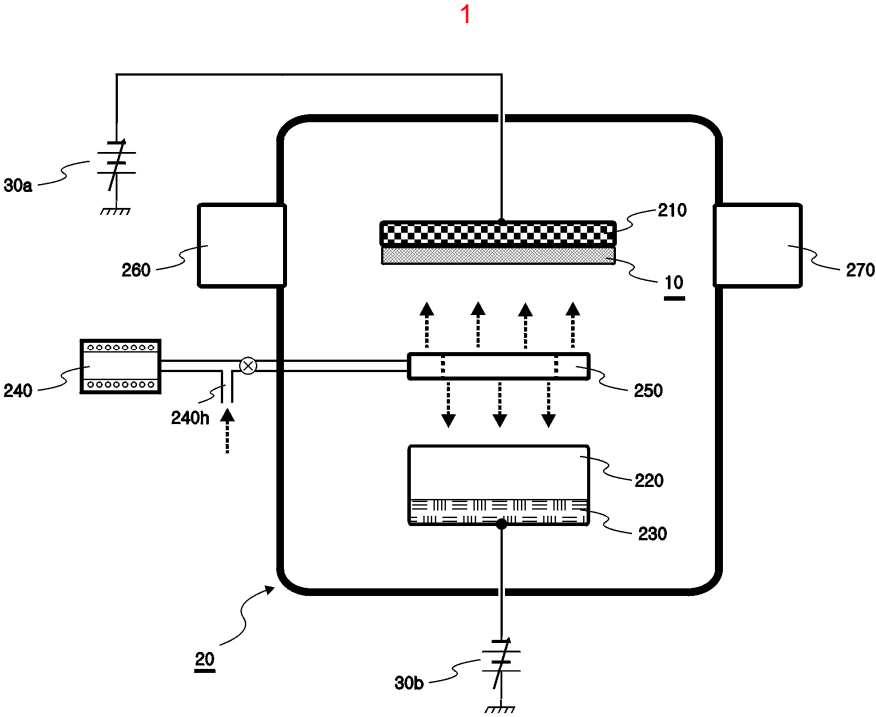
가

(flux)

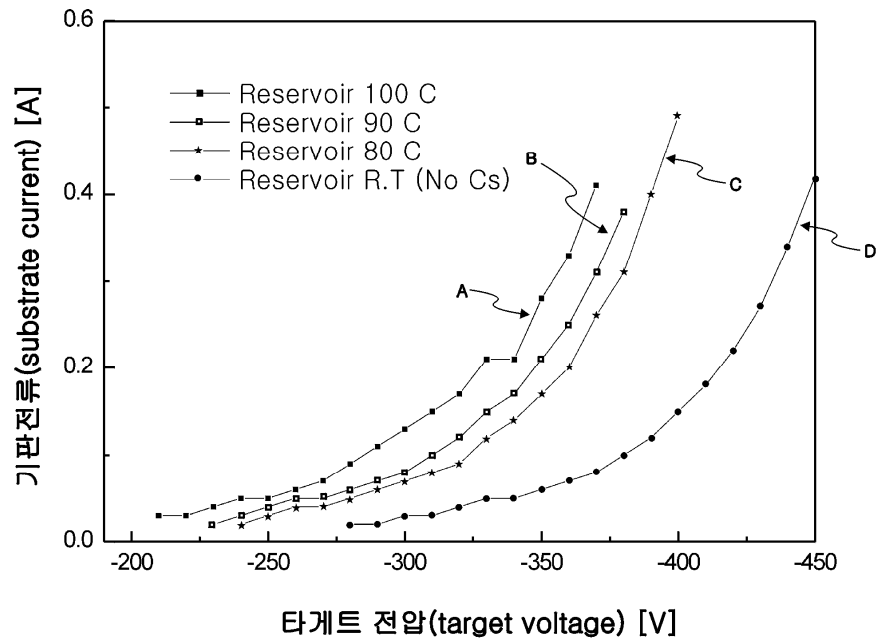
2.
1 ,
(N₂)

3.
1 ,

, 80 150



2



3

