

Wafer cleaning by using Supercritical Carbon dioxide.

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가 ULSI (Ultra Large Scale Integrated Circuits)가

[1].

(SCF) (Supercritical Fluid : SCF) [4,5]

가 0.1µm Cluster 가

(cyclohexanone)

가 cluster 가 contact hole geometry 가

가

(photoresist) Clariant 社 AZ1512 2MØ (500rpm, 5sec ~ 4000rpm, 35sec) 1.29µm (2cm*2cm) (ISRC LAB)

fig.1
 booster Vessel Liquid pump for circulating
 Liquid pump for Co-solvent Metering valve,
 P-pressure gauge, T-thermocouple)
 10 bar
 (Gas booster)

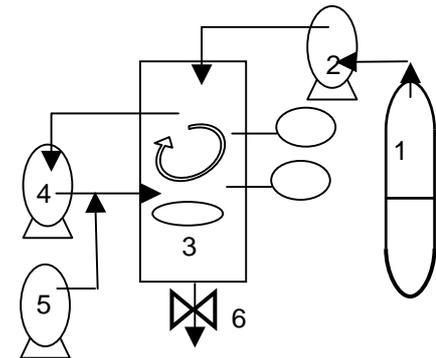


fig 1. apparatus of wafer cleaning

가

가

2 가

가

가 (Heating jacket)

1

2

2

wafer

가

3

(rinsing)

AFM Semiconductor

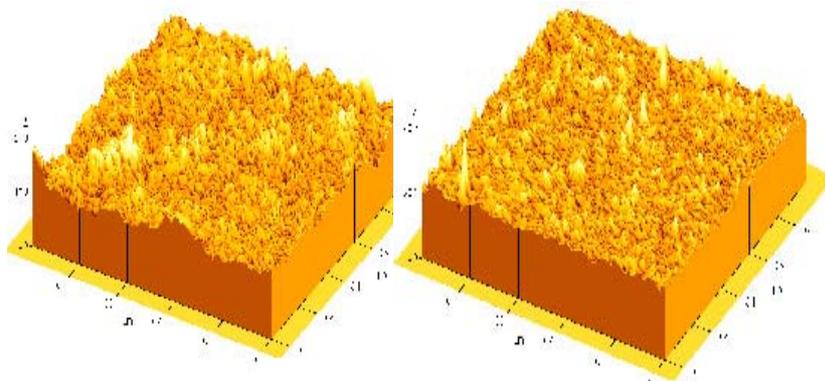
inspection microscope MX50(Olympus)

AFM
 1.5M μ)

가

(cyclohexanon)

(2.0M μ)



a. Average roughness = 0.87 (2.0M μ) b. Average roughness = 0.79 (1.5M μ)

fig2. Roughness of wafer surface

PR removal stage : T - 50 , P - 150atm, Time - 30min

Rinsing stage : T - 25 , P - 100atm, Time - 10min/3

fig 2.

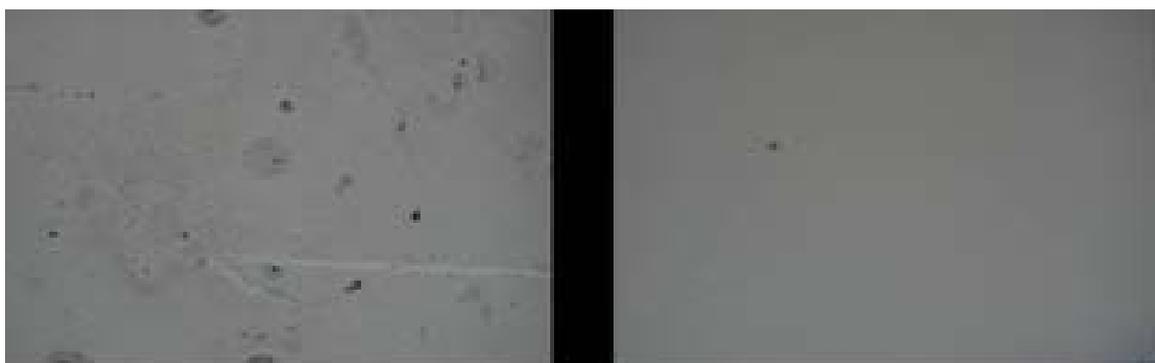
가 가 가 가 가
 가 (Photoresist) dydaork 가
 가
 Semiconductor inspection microscope MX50(Olympus)



a. before wafer cleaning

b. after wafer cleaning

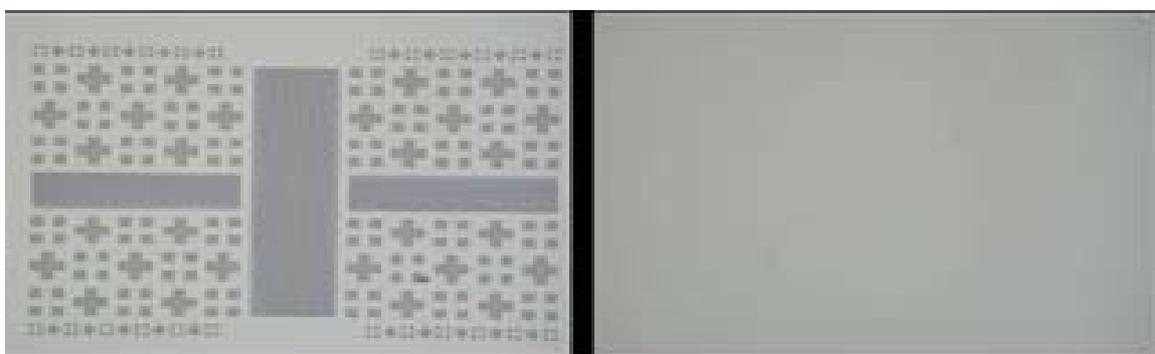
fig 3. Photoresist residue cleaning on the wafer with SCCO₂



a. before wafer cleaning

b. after wafer cleaning

fig 4. Photoresist residue cleaning on the wafer with SCCO₂ and co-solvent



a. before wafer cleaning

b. after wafer cleaning

fig 5. Doped photoresist cleaning on the wafer with SCCO₂ and co-solvent

99.99%

bare wafer(fig 3)

cyclohexanone

가

(fig 4)

50 , 150bar

1.5 Vol. %

cyclohexanone

microscope

MX50(Olympus)

. Polysilicon

PR

strip

wafer

cyclohexanone

(fig 5)

PR

가

, PR

PR

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2. , , 7, 2 (1994).

3. Kern, W.: "Handbook of Semiconductor Wafer Cleaning Technology: Science, Technology, and Applications", Noyes Publication, New Jersey (1993).

4. Bok, E., Kelch, D., Schumacher, K. S.: *Solid State Technology*, 117-120, June (1992).

5. McHardy, J., Sawan, S. P.: "Supercritical Fluid Cleaning: Fundamental, Technology and Applications", Noyes Publication, New Jersey (1998).