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2. Dry Etching of SiO₂, SiN_x, and Si using 80plus Reactive Ion Etcher

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Keywords

Etch rate, Dry Etching, SiO₂, SiN_x, Si, 80plus

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2. Dry Etching of SiO₂, SiN_x, and Si using 80plus Reactive Ion Etcher (Graduate Student Fellow Program)

Prepare by Meet Vora (10/29/2014)

SiO₂ etch

- Ar = 38 sccm
- CHF₃ = 12 sccm
- Pressure = 30 mTorr
- Power = 200 W
- T = 17.5 °C
- Etching rate: 41.7 nm/min

Note: Etch rate also depends on the sample size and percentage of the open area, which is not covered by resist film.

Si₃N₄ etch

- O₂ = 5 sccm
- CHF₃ = 50 sccm
- Pressure = 20 mTorr
- Power = 150 W
- T = 17.5 °C
- Etching rate: 73 nm/min

Note: Etch rate also depends on the sample size and percentage of the open area, which is not covered by resist film.

Shallow Si etch

- Pressure: 10 mTorr
- CHF₃: 35 sccm
- SF₆: 14 sccm
- RF power: 100 W
- T = 17.5 °C.
- Etch rate in the brochure of Oxford = 35 nm/min

Note: Etch rate also depends on the sample size and percentage of the open area, which is not covered by resist film.

- 10/29/2014
- The sample size: ~10 x 10 mm²
- Percentage of the open area: ~80%
- Etch rate: 123 nm/min

Deep Si etch

- SF6 = 50 sccm
- O2 = 10 sccm
- Pressure = 150 mTorr
- RF power = 100 W
- T = 20 °C
- Etch rate 500-700 nm/min (in the brochure)
- Selectivity to SiO2 mask: >50:1

Note: Etch rate also depends on the sample size and percentage of the open area, which is not covered by resist film.

- Time dependence of etch depth (8/25/2014)
- The mask was thick S1813 resist film pasted on Si.
- Etch rate: 515 nm/min