Single-Step Si Etch (not Bosch Process!) using DRIE

**Tool:** Si DRIE Etcher (Recipe Name: *cao_n_01*)

**Chuck Temperature:** 10 °C

**Recipe:** 19mT, 15/825W, SF₆/C₄F₈/Ar Flow-rate=26/54/20SCCM.

Note: Before etching a Si sample, running an oxygen plasma clean of DRIE chamber, with 30mT, 0/825W, O₂/Ar flow-rate=20/10sccm, for 30 minutes.

**Figure 1.** Si etch profile, using DRIE at 10 °C chuck temperature, with 19mT, 15/825W, SF₆/C₄F₈/Ar flow-rate=26/54/20SCCM, and etch time of 5 minutes. (a) Trench width~0.9μm; (b) Trench width~0.5μm.
**Result:** a vertical side-wall etching profile. Etch Rate is \(0.2 \, \mu \text{m/min}\), and the PR mask seems not to be etched at all [Etch selectivity (Si/PR) is very large!].

**Figure 2.** Si nanowire etch profile using DRIE at 10 °C chuck temperature with 19mT, 15/825W, SF\(_6\)/C\(_4\)F\(_8\)/Ar flow-rate=26/54/20SCCM. (a)-(b) 130 s; (c)-(d) 180 s; (e)-(f) 240 s; (g)-(h) 300 s.