

Abstract Submitted  
for the GEC09 Meeting of  
The American Physical Society

**Initial Studies of Deep Silicon Etch** IQBAL SARAF, MATTHEW GOECKNER, LAWRENCE OVERZET, University of Texas at Dallas — The kinetic behaviors of time-multiplexed deep silicon etch processes are being studied in an Oerlikon DSE II using SF<sub>6</sub>, C<sub>4</sub>F<sub>8</sub> and Ar gas flows. We have formed a model for the reactor that fits the overall pressure in time and provides insight into gas mixing during the cycle transitions. It allows one to predict cycle conditions that isolate the deposition and etch steps. Also the effect of the gas-line fill time and its correlation with residence time is studied. In addition, we have measured plasma characteristics using a diagnostic tool called a “Wise probe”. Preliminary measurements of the ion current density (ICD) to the probe surface for SF<sub>6</sub> and C<sub>4</sub>F<sub>8</sub> plasmas as a function of pressure, flow rates, power and bias power are presented and discussed. For both C<sub>4</sub>F<sub>8</sub> and SF<sub>6</sub> plasmas the ion current density strongly depends upon the gas pressure in the range of 10 to 45 mTorr. However, the ion current density depends weakly on the ICP power at higher pressure (45mTorr) for both C<sub>4</sub>F<sub>8</sub> and SF<sub>6</sub> plasmas. These kinetic dependencies are related to the time averaged silicon etch rate/profile, aspect ratio dependence, and photoresist selectivity in order to gain initial insights into the fundamental plasma-surface interactions controlling the etch.

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Date submitted: 15 Jun 2009

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