

Abstract Submitted  
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**Influence of Ion Flux, Ion Energy, Fluorine Availability, and Surface Temperatures on SiO<sub>2</sub> Etch Rates in FC Plasmas** CALEB NELSON, SANKET SANT, LAWRENCE OVERZET, MATTHEW GOECKNER, University of Texas at Dallas — A long residence time (4.9 s) plasma was employed to examine plasma surface interactions. Gas and surface reactions were correlated for different F:C ratio feedgas. *In situ* measurements of CF<sub>x</sub> densities and process rates were made using an FTIR multipass system and an ellipsometer, respectively. Absolute fluorine densities were measured using actinometry. It was observed that etch and deposition rates varied as a function of ion flux, ion energy, fluorine availability, and surface temperature. These parameters were varied by changing source to chuck gap, increasing chuck bias power, different feedgas, and plasma induced surface temperature changes, respectively. Etch rates were found to increase with ion flux in a limited regime. Increasing ion energy was correlated to an increase in the overall etch rate. At low bias powers, a fluorine rich environment (CF<sub>4</sub>) produced high etch rates, while a fluorine deficient plasma (C<sub>4</sub>F<sub>8</sub>) transitioned to lower etch rates and deposition. Finally, increasing surface temperature was found to change the net surface mechanism from etch to deposition.

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