

Abstract Submitted  
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**Charged species' densities and fluxes in a dual-frequency capacitive plasma** GARRETT CURLEY, JEAN-PAUL BOOTH, CORMAC CORR, JEAN GUILLON, SEBASTIEN DINE, LPTP, Ecole Polytechnique, 91128 Palaiseau, France — Dual-frequency capacitively-coupled plasmas in fluorocarbon-based gases are widely used for etching holes in SiO<sub>2</sub>- based dielectric films in integrated circuit manufacture. We are studying a customized 2 + 27 MHz industrial etch reactor, running in Ar/C<sub>4</sub>F<sub>8</sub>/O<sub>2</sub> gas mixtures at 50 mTorr. We have used an RF planar probe [1] to measure the positive ion flux and a microwave resonator probe [2] to measure the electron density. The ratio of the (central) electron density to the ion flux was observed to vary significantly with the feedstock composition, sometimes reaching values three times higher than that predicted by simple electropositive theories. We believe this indicates the presence of significant densities of F<sup>-</sup> negative ions. We are currently attempting to measure the F<sup>-</sup> density directly by high-sensitivity optical absorption techniques.

[1] Braithwaite et al, PSST, 5 (1996), 677-684

[2] Piejak et al, J. Appl. Phys. 95 (2004), 3785-3791

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