

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Charged Particle Dynamics in a Dual-Frequency Capacitively Coupled Fluorocarbon Plasma¹ DRAGANA MARIĆ, GARRETT CURLEY, JEAN-PAUL BOOTH, PASCAL CHABERT, JEAN GUILLON, LPTP, Ecole Polytechnique, Palaiseau, France — We are studying a customized 2 + 27.12 MHz industrial etch reactor, running in Ar/O₂ with c-C₄F₈ or CF₄ gas mixtures at pressures in the region of 50 mTorr. Independent control of ion flux and ion energy is an advantage of DFC plasmas, but little experimental data exists regarding the charged particle dynamics in complex industrial gas mixtures. Negative ions could play an important role in this type of plasma. The presence of negative ions will modify the positive ion flux arriving at a surface, and may even reach the surface and participate in etching. We measure the electron density using a microwave hairpin resonator and the positive ion flux with an ion flux probe: the ratio of these two quantities varies strongly with gas chemistry and gives evidence for the presence of negative ions. We have measured high electronegativity for high c-C₄F₈ flowrates. We have also examined the effect of varying the 2 MHz and 27.12 MHz powers on both the electron density and positive ion flux. This allows us to estimate the effect of varying power on the negative ion density. In addition CRDS was used to measure the F⁻ density[1]. This optical measurement will be compared to the probe technique.

[1] Booth et al, Appl. Phys. Lett. 88 (2006) 151502

¹We acknowledge financial assistance from Lam Research Corporation.

Dragana Maric
LPTP, Ecole Polytechnique, Palaiseau, France

Date submitted: 16 Jun 2006

Electronic form version 1.4