

Abstract Submitted
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Profile Control Using Pulsed Power During Plasma Etching in Capacitively Coupled Plasmas¹ SANG-HEON SONG², MARK J. KUSHNER, University of Michigan — Profile control during plasma etching is becoming more challenging as feature sizes decrease. Pulse power in capacitively coupled plasmas (CCPs) is being developed as a means to provide more flexibility in reactive fluxes and ion energy and angular distributions (IEADs) to achieve this profile control. In this talk, we discuss results for profile control in etching of dielectrics from modeling studies of pulsed 2-frequency CCPs sustained in Ar/CF₄/O₂ mixtures. The simulators include a 2-d plasma hydrodynamics model to produce reactive fluxes and IEADs, and a 2-d Monte Carlo based profile model. IEADs are produced in three formats in pulsed CCPs – when both the low frequency (LF) and high frequency (HF) are on, when only the LF or HF are on, and when both the LF and HF are off. The resulting IEADs are further modified by duty cycle and the size of the blocking capacitor. We found that the side-wall slope of high-aspect-ratio (HAR) features can be controlled by combinations of pulsing the LF and/or HF, and duty cycle. In addition to the feature receiving different IEADs, the ratio of polymerizing to ion fluxes which contributes to control of sidewall slope is also sensitive to these process variables.

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²Now with: Tokyo Electron Ltd., Albany, NY.

Mark Kushner
University of Michigan

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