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Customizing Capacitively Coupled Plasma Properties with Triple-Frequency Power Sources[1] CHENHUI QU, PENG TIAN, SHUO HUANG, MARK J. KUSHNER, University of Michigan — As features sizes continue to shrink, control of reactive fluxes to wafers in capacitively coupled plasmas (CCPs) for semiconductor fabrication must become more precise. To achieve this control, additional frequencies having larger dynamic range are being investigated. In this paper, control of plasma properties in triple-frequency (TF) CCPs is computationally investigated, and compared to dual-frequency (DF) systems. The range of frequencies investigated are a few MHz to 100 MHz, with a standard configuration being two lower frequencies on the bottom electrode, and the high frequency on the top electrode. Electron energy distributions (EEDs) and reactant fluxes to the substrate in process relevant gas mixtures such as $Ar/C_4F_8/O_2$, will be discussed while individually varying the power at different frequencies. The influence of the geometry (e.g., gap spacing and where power is applied) and the consequences of phase off-sets between frequencies in DF and TF systems on EEDs will also be discussed.

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