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Feature Profile Evolution in Chlorine Etching of Polysilicon PAUL MOROZ, Tokyo Electron US Holdings — Chlorine-based plasma etching has been used in the semiconductor industry in integrated-circuit fabrication processes, and has been extensively studied both experimentally (including specially designed beam experiments) and theoretically. Interaction of plasma with material surfaces results in competing mechanisms of etching and deposition, sometimes strongly depending on energy and angular distribution of incoming fluxes of species. We present results of feature profile simulations with a new Monte Carlo simulator written in a C++ environment that has a number of advantages. The case of chlorine etching of polysilicon is convenient for tuning the simulator. All plasma fluxes are modeled as incoming super-particles with energy and angle varied by a random number generator in correspondence with actual fluxes. The code runs in real time with iterations at specified time-step, allows consideration of arbitrary number of solid materials and gas species, convenient input of arbitrary initial geometry of the features, and convenient specification of chemistry models.

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