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RF Hollow Cathode Discharge Simulation using Electron Monte Carlo - Fluid Plasma Model KALLOL BERA, SHAHID RAUF, Applied Materials, Inc. — Radio-frequency (RF) hollow cathode discharges (HCD) have been used for thin film deposition in the semiconductor industry. Hollow cathode systems typically consist of small hollow cylindrical electrodes electrically connected through a power generator to a larger grounded electrode. The hollow cathode geometry allows hollow cathode effect (HCE) depending on operating condition. In this study, we investigate rf hollow cathode discharge using our plasma model. The plasma model consists of species continuity equations along with electron energy equation. Drift-diffusion approximation is used for charged species fluxes. Electric field is calculated using Poisson equation. The secondary electron emission due to ion impact has been included. Electron Monte Carlo model is used to track the emitted electrons until electron energy becomes lower than threshold value when the electrons become part of fluid electrons. We have explored the effect of gas pressures on plasma density in RF HCD of different hole diameters using our model. We compared the simulation results with experimental data of RF HCD.

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