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Charge-up effects with respect to flux ratios of electrons to ions in 3D charge-up simulations SUNG JIN KIM, Pohang University of Science and Technology, HAE JUNE LEE, Pusan National University, JAE KOO LEE, Pohang University of Science and Technology — Charge-up damage is one of plasma process induced damages and comes from different motions of ions (anisotropic motion) and electrons (isotropic motion). We have performed a three-dimensional charge-up simulation [1] to examine charge-up effects. Kinetic results of particles obtained from 1D particle-in-cell Monte Carlo collision (PIC-MCC) simulations [2] are used as input parameters of the 3D charge-up simulation. Charge-up potentials and etching rates are calculated in trenches hundreds of nanometers wide. The role of charge-up effects in etching profile evolution is investigated. In 3D charge-up simulation, reflection between sidewall and ions is considered using reflection coefficients calculated by a TRIM code. Since ion reflection creates undesirable etching profiles such as bowing, trenching, and notching, the gradient of etching profile created by reflected particle is studied. Charge-up effects by inequality of ion and electron fluxes injected in electrode are investigated with respect to an electron temperature and a trench width. We optimize flux rates of electrons to ions to produce good anisotropic etching profiles. *This work is supported by Tera-level nanodevices in Korea Ministry of Science and Technology. [1] H.S. Park, S.J. Kim, J.K. Lee, IEEE Trans. Plasma Science, 31 (2003) 703 [2] H.C. Kim, J.K. Lee, Phys. Rev. Lett., 93 (2004) 085003

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