

Abstract Submitted
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Investigation of charge-up and ion reflection effects in SiO₂ etching using a three-dimensional charge-up simulation SUNG JIN KIM, Pohang University of Science and Technology, HAE JUNE LEE, Pusan National University, JAE KOO LEE, Pohang University of Science and Technology — A charge-up damage is one of plasma process induced damages and comes from different motions of ions and electrons. 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 simulations [2] are used as input parameters of the 3D charge-up simulation. Charge-up potential and etching rates are calculated according to ion energy distributions, aspect ratios of trenches, and secondary electron emission coefficients. In ion physical etching with etching rate less than 1 $\mu\text{m}/\text{min}$, since a charge-up potential saturated time is shorter than a one-atomic layer etched time, charge-up potential plays an important role in etching profile evolution. Ion reflection coefficients calculated by trim code and inequality of ion and electron fluxes on wafers are considered to investigate ion reflection, which creates undesirable 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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