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A self-consistent modeling of feature profile evolution under competition between etching and deposition TAKASHI SHIMADA, TAKASHI YAGISAWA, TOSHIAKI MAKABE, Keio University, KEIO UNIVERSITY TEAM — Radical deposition is one of the important issues for SiO_2 etching as the radicals contribute to the protection of side wall as well as the acceleration of etching by the formation of a mixing layer on the bottom. We investigate the relationship among local wall charging, etching and deposition in a SiO_2 trench etching, by considering the transport of electrons, positive ions, and neutral radicals in the two-dimensional sheath structure in a two frequency-capacitively coupled plasma in CF_4/Ar. Emphasis is given on the influence of both charging and neutral radical accumulation inside the SiO_2 trench during plasma etching. Feature profiles of the SiO_2 trench are estimated by the Level Set method under conditions with/without charging and neutral deposition. In particular, the effect of the bias amplitude on the profile evolution is discussed under the competition between etching and deposition.

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