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The influence of He plasma pretreatment on O and H atom interaction with low-k nanoporous materials[1] O.V. BRAGINSKY, A.S. KOVALEV, D.V. LOPAEV, E.M. MALYKHIN, YU. A. MANKELEVICH, T.V. RAKHIMOVA, A.T. RAKHIMOV, A.N. VASILIEVA, S.M. ZYRYANOV, Nuclear Physics Institute, Moscow State University, Moscow, Russia, M.R. BAKLANOV, IMEC, Leuven, Belgium — The low-k film damage during resist plasma processing is mainly caused by O and H atoms. Low-k surface modification via plasma pretreatment is capable to reduce the atom influence and therefore to minimize the damage. The effect of He plasma pretreatment both on low-k surface modification and interaction with O and H atoms was studied for 3 types of low-k SiOCH films: BDIIx, ELK 2.5, ELK 2.3 (porosity: 24, 24, 33%, pore radius: 0.8, 0.8, 1 nm). The influence of ions, VUV radiation and metastables in He low-pressure (20 mTorr) SWD 81 MHz discharge was separately investigated. The O and H surface loss probabilities were measured in the far afterglow of the high-pressure (10 Torr) 13.56 MHz discharge. All changes occurring with low-k surface after treatment in both discharges were analyzed by FTIR spectroscopy. The phenomenological model, including recombination and reactions of O and H atoms on low-k surface, was used to analyze the obtained results.

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