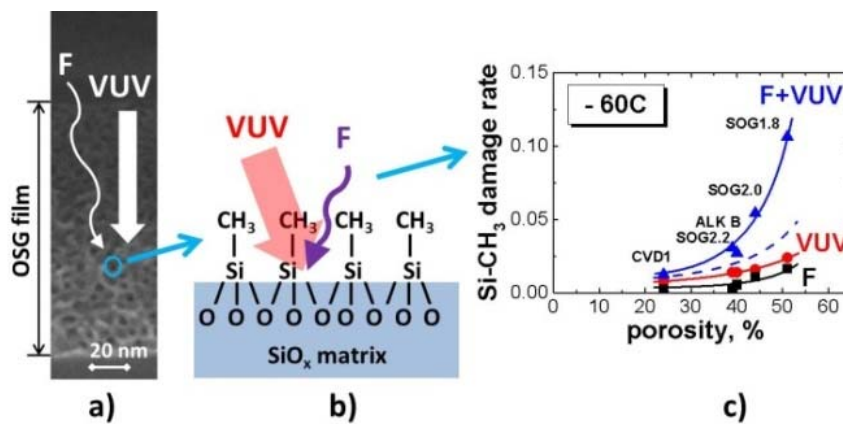


Synergistic effects of VUV photons and F atoms on damage and etching of porous organosilicate films

Abstract

Synergistic effects were investigated between VUV photons and F atoms in both damage and etching of nanoporous organosilicate (OSG) low-k films. It was shown that both the OSG damage and etching rates by F atoms notably drop with decreasing temperature due to the existence of activation energy while the rate of the VUV-induced damage practically does not change. The simultaneous exposure can significantly exceed the sum of the separate effects of VUV photons and F atoms. The reason is that the absorbed photon energy allows F atoms to overcome the activation barrier especially under lowered temperature. A possible mechanism of F atom surface reactions assisted by VUV photons is analyzed.



Biography

Dmitry Lopaev (1962) graduated with honor from the Physics Faculty of Lomonosov Moscow State University (MSU) in 1985. He has obtained his PhD (1993) on "Plasma Physics and Plasma Chemistry" for work on production and loss of singlet delta oxygen in plasma and the role of electronically and vibrationally excited ozone in those processes. Since 1988 he is in the Plasma Physics Dept. of Skobeltsyn Institute of Nuclear Physics (Lomonosov MSU). At present he is a leading researcher in the Microelectronics Dept. of Skobeltsyn Institute of Nuclear Physics. He was a supervisor of twenty masters and several PhD projects. His experience is on experimental work with different types of gas discharges as well as plasma, optical, and laser diagnostics. His current interests cover different topics from fundamental plasma physics and plasma chemistry to applied plasma technologies, mainly on processing for microelectronics and nanotechnology.