Abstract Submitted
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**Ultra low-k dielectrics damage under VUV and EUV radiation**[1] SERGEY ZYRYANOV, OLEG BRAGINSKY, ALEXANDER KOVALEV, DMITRY LOPAEV, YURY MANKELEVICH, TATYANA RAKHIMOVA, ALEXANDER RAKHIMOV, ANNA VASILIEVA, Skobeltsyn Institute of Nuclear Physics, Moscow State University, Moscow, Russia, MIKHAIL BAKLANOV, IMEC, Leuven, Belgium — Low-k dielectric films can be substantially damaged during plasma processing. High energy UV photons emitted by plasma play the key role in damaging the porous low-k films directly or indirectly by stimulating chemical reactions with radicals in plasma. The damage for ultra low-k (ULK, $k < 2.2$) films with higher porosity and increased pore radius becomes more intense because of the increased penetration depth of UV photons and radicals. Three key wavelength ranges (VUV, DUV and EUV) were studied by exposing the different ULK samples (k: 2.0–2.2, porosity: 30–50%, pore radius: 1–2 nm) to UV radiation at 13.5, 58.3 (mainly effect the Si-O-Si bonds) and 193 nm (mainly effect C-C and C-H bonds) varying the photon dose. ULK damage was studied using FTIR spectroscopy (chemical bond modification), XRF analysis (atom and radical extraction) and ellipsometry (changes in ULK film thickness and dielectric constant).

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Sergey Zyryanov
Skobeltsyn Institute of Nuclear Physics,
Moscow State University, Moscow, Russia

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