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MeV Ion Beam Synthesis of Nanopore Arrays in SiO2 Films ANDREW CARLSON, ANURANJITA TEWARY, MARK BRONGERSMA, Stanford University, THOMAS FELTER, SERGEI KUCHEYEV, Lawrence-Livermore Labs
— High energy (MeV), heavy ion irradiation can be used as a tool to deform patterned SiO_2 films in a controlled fashion. We have used this technique to deform micron-sized holes in SiO_2 films generated by photolithography and focused ion beam milling. The holes were fabricated in 2 μm thick SiO_2 films in the size range from 500 nm to 2 μm and were subsequently irradiated with 4 MeV Xeions. First, a systematic study will be presented on the deformation of differently shaped holes as a function of the ion fluence. Second, we will present data on the deformation of linear and two-dimensional arrays of holes. Finally, we will test the observed deformations against currently available visco-elastic models that describe this ion irradiation-induced deformation process. This work may find application in nanoscale fashioning of SiO_2 surface features and the controlled fabrication of nanopore arrays.

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