Abstract Submitted
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In situ mass spectrometry measurements of erosion and hydrogen scattering from lithium surfaces during irradiation with ultralow-energy ion beams[1] SHOTA ABE, BRUCE E. KOEL, Princeton University — We have conducted experimental in situ measurements of the sputtered and reflected species from thin Li film targets during irradiation by a mass-selected deuterium ion beam to study erosion and hydrogen retention behavior. The experiments include ions incident at ultralow energies (<100 eV), which is relevant to tokamak divertor environments. A quadrupole mass spectrometer (QMS) is used to detect positive and negative ions and neutral species, and is calibrated by referencing available sputtering and secondary ion yield data. Identifying and quantifying both the neutral and ion species produced by sputtering and reflection is necessary to advance our understanding of plasma and materials physics in tokamaks that employ Li-coated first wall concepts such as in LTX-β and NSTX-U at PPPL. In preliminary results, we measured Li species from Li films irradiated by D^+ or D_2^+ beams with a flux of $\sim 10^9$ $cm^{-2}s^{-1}$ for incident ion energies of 5-400 eV/D while keeping the chamber background pressure low so that volumetric reactions do not occur.

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