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In-situ elemental and chemical state characterization of lithiated surfaces under energetic particle bombardment.[1] JEAN-PAUL ALLAIN, S. HARILAL, M. NIETO, M.R. HENDRICKS, AHMED HASSANEIN, Argonne National Laboratory, PPPL COLLABORATION[2], SNLL COLLABORATION[3] — Lithium has been considered a potentially viable plasma-facing surface enhancing the operational performance of fusion devices such as: TFTR and NSTX. Solid and liquid lithium has been studied extensively both in its erosion and hydrogen-retaining properties. However, questions still remain on the role of lithiated surfaces and multi-material interactions at the plasma edge. Lithiated surfaces include: liquid Li on metal substrates, Li alloys and Li coatings. The main processes studied here (e.g. erosion, H-retention) consist of spatial scales from a few monolayers at the vacuum/film interface to 100's nm deep. Techniques used include: low-energy ion scattering spectroscopy (LEISS), direct recoil spectroscopy, X-ray photoelectron spectroscopy and in-situ erosion diagnosis. LEISS diagnoses the first 2-3 monolayers. XPS gives chemical state data 10-nm into the lithiated surface. Three cases are presented in this paper: liquid Li, alloyed Li and Li coatings under D irradiation.

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[2]C. Skinner, H. Kugel, R. Majeski, R. Kaita
[3]R. Bastasz and J.A. Whaley

Jean-Paul Allain
Argonne National Laboratory

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