Abstract Submitted
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Surface chemistry analysis of NSTX private flux region and upper vessel tiles[1] C.N. TAYLOR, K.E. LUITJOHAN, B. HEIM, J.P. ALLAIN, Purdue University, C.H. SKINNER, H.W. KUGEL, R. KAITA, PPPL, PURDUE TEAM, PPPL COLLABORATION — Lithium wall conditioning in NSTX reduces plasma impurities and deuterium recycling, thus resulting in enhanced plasma performance. X-ray photoelectron spectroscopy (XPS) is used to investigate the mechanisms of deuterium retention and has identified Li-O-D and Li-C-D functionalities on lithium conditioned NSTX graphite tiles. Methods to remove the passivation layer that develops during transport to Purdue University and recover the underlying surface will be presented. XPS analysis has revealed distinct surface chemistry for different regions in the vessel. Lower center stack and inner divertor tiles show unusual XPS spectra that strongly coincide with the campaign-averaged private flux region. XPS spectra from upper vessel tiles, that experience a wide range of lithium deposition, motivate laboratory tests to identify the minimum lithium threshold capable of sustaining lithium aided deuterium retention. A minimum lithium threshold is highly sensitive to surface morphology and is found between 50-500 nm.

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