Abstract Submitted
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Linking PFC surface characteristics and plasma performance in the Lithium Tokamak Experiment[1] M. LUCIA, R. KAITA, R. MAJESKI, D.P. BOYLE, M.A. JAWORSKI, J.C. SCHMITT, PPPL, F. BEDOYA, J.P. ALLAIN, UIUC — The Lithium Tokamak Experiment (LTX) is a spherical torus magnetic confinement device designed to accommodate lithium as the primary plasma-facing component (PFC). Results are presented from the implementation on LTX of the Materials Analysis and Particle Probe (MAPP), a compact *in vacuo* surface science diagnostic. With MAPP, *in situ* surface analysis techniques of x-ray photoelectron spectroscopy and thermal desorption spectroscopy are used to study evolution of the PFC surface chemistry in LTX as a function of varied lithium coating, hydrogen plasma exposure, and PFC surface temperature ($20-300\,°C$). Surface analysis results are then correlated with various measures of LTX plasma performance, including toroidal plasma current, line-integrated plasma density, and density-normalized impurity emission. Lithium coatings are observed to convert within hours to Li_2O by gettering oxygen from both the residual vacuum and the PFC substrate. However, plasma performance remains elevated even with discharges operating against Li_2O-coated PFCs. Hydrogen is retained by these Li_2O coatings during a discharge, but it is almost completely desorbed as outgassed H_2 in the minutes following the discharge; no persistent LiH formation is observed.

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