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Dependence of LTX plasma performance on surface conditions as investigated by the Materials Analysis and Particle Probe[1] M. LUCIA, R. KAITA, R. MAJESKI, D.P. BOYLE, M.A. JAWORSKI, J.C. SCHMITT, D.A. ST. ONGE, PPPL, F. BEDOYA, J.P. ALLAIN, UIUC — The Lithium Tokamak Experiment (LTX) is a spherical torus magnetic confinement device designed to accommodate solid or liquid 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's *in situ* analysis techniques of x-ray photoelectron spectroscopy (XPS) and thermal desorption spectroscopy (TDS), evolution of the PFC surface chemistry in LTX is studied as a function of varied hydrogen plasma exposure, surface temperature, and lithium coating. Performance of LTX plasma discharges depends on the composition and temperature of the PFCs in a strong and complex fashion. This work attempts to relate LTX plasma performance to the surface conditions as determined by XPS and TDS with MAPP. As proxies for the LTX PFCs, MAPP samples are exposed to both lithium evaporations and plasma discharges inside LTX. Metrics of LTX plasma performance include energy confinement time, plasma temperature and density profiles, and state of impurity species. Single Langmuir probes on MAPP and triple Langmuir probes throughout LTX are also used to relate LTX edge plasma parameters to MAPP results.

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