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Plasma performance dependence on lithium surface conditions for the Lithium Tokamak eXperiment-β[1] A. MAAN, D.P. BOYLE, R. KAITA, PPPL, E.T. OSTROWSKI, PrincetonU, D.C. DONOVAN, UTenn, R. MAJESKI, PPPL, B.E. KOEL, PrincetonU, T.M. BIEWER, ORNL, P.E. HUGHES, PPPL, C. HANSEN, UWash, V. SOUKHANOVSKII, LLNL — The characteristics of lithium-coated plasma-facing components (PFCs) have been correlated with plasma performance on the Lithium Tokamak eXperiment-β (LTX-β). Previous experiments on LTX showed that the application of lithium to PFCs was needed to achieve higher performance discharges with flat electron temperature profiles and high edge temperatures. Samples that match the LTX-β PFCs were exposed to plasmas before and after PFCs were coated with lithium and transferred under vacuum to a surface analysis station. Measurements using X-ray photoelectron spectroscopy (XPS) revealed that the primary surface constituent was lithium oxide. Earlier XPS analysis of lithium-coated PFCs on LTX was only able to show the presence of surface oxygen. The new XPS data from LTX-β have sufficient resolution to clearly identify lithium compounds for the first time, and enable them to be correlated with how lithium-coated PFCs can reduce impurities and retain hydrogen to reduce recycling. Measurements from the Lyman-α detector array, newly installed to view the high field side limiting surface, are presented to illustrate progress made towards recycling measurements for LTX-β.

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