Hughes, Kubota, Maan, and Zhang

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Investigation of lithium PFC surface characteristics and low recycling at LTX/LTX-Beta[1] ANURAG MAAN, Univ of Tennessee, ROBERT KAITA, PPPL, DREW ELLIOTT, ORNL, DENNIS BOYLE, RICHARD MAJESKI, PPPL, DAVID DONOVAN, Univ of Tennessee, LUXHERTA BUZI, BRUCE E KOEL, Princeton University, THEODORE M BIEWER, ORNL — Lithium coatings on high-Z PFCs at LTX have led to improved plasma performance. The initial hypothesis was that lithium retains hydrogen by forming lithium hydride and thereby enabling low recycling in LTX. However, recent in-vacuo measurements indicate the presence of lithium oxide in deposited lithium coatings. Improved plasma performance continued to be observed in the presence of lithium oxide. These observations raise questions like what is the nature of the lithium oxide surface, whether the PFC is an amorphous mixture of lithium and lithium oxide or something more ordered like a lithium oxide layer growing on top of lithium, and whether lithium oxide is responsible for any retention of hydrogen from the plasma. To investigate the mechanism by which the LTX PFC might be responsible for low recycling, we discuss the results of deuterium retention measurements using NRA/RBS and sample characterization using high resolution XPS (HR-XPS) in bulk lithium samples. Baseline HR-XPS scans indicate the presence of Lithium Oxide on sputtered lithium samples. Status of related planned experiments at LTX-β will also be discussed.

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