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Time dependent chemical interactions of lithium, deuterium, and oxygen on lithium-coated graphite surfaces[1] C.N. TAYLOR, J.P. ALLAIN, B. HEIM, Purdue University, C.H. SKINNER, H.W. KUGEL, R. KAITA, A.L. ROQUEMORE, Princeton Plasma Physics Laboratory, PURDUE UNIVERSITY TEAM, PRINCETON PLASMA PHYSICS LABORATORY COLLABORATION
— Lithium conditioning of plasma facing components has been used for particle control in fusion devices such as TFTR, CDX-U, FTU, T-11M, TJ-II and NSTX and has yielded improved plasma performance. A PMI probe has been installed on NSTX to provide an in-situ diagnostic for surface chemistry and deuterium retention measurements. Recent controlled laboratory experiments at Purdue University are investigating the chemical functionalities in lithiated graphite and the mechanism by which D is retained. XPS results show that Li reacts readily with residual oxygen in ATJ graphite, and immediately begins to intercalate into the substrate. Additionally, it has been found that Li-O and Li-C react to D proportional to the lithium thickness, suggesting a D saturation threshold. This work investigates the transient nature of the lithium and oxygen functionalities, their response to time varying D flux, and the implications to NSTX.

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C.N. Taylor
Purdue University

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