Abstract Submitted
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Advances in global mixed-material surface evolution modeling for NSTX-U[1] J.H. NICHOLS, M.A. JAWORSKI, R. KAITA, T. ABRAMS, D.P. STOTLER, PPPL, K. SCHMID, IPP Garching — NSTX-U will initially operate with graphite walls, periodically coated with thin lithium films to improve plasma performance. Prior experiments with Li evaporation on NSTX suggest that poloidally inhomogenous mixed-material C/Li surfaces will evolve over the course of the campaign due to wall material migration during plasma operation. Understanding the depletion and accumulation of Li in different parts of the machine is a key component of optimizing the Li conditioning process. To that end, the WallDYN global mixed-material surface evolution model [K. Schmid et al., J. Nucl. Mater. 415, S284-S288 (2011)] has been applied to the NSTX-U geometry. The WallDYN model couples local erosion and deposition processes with plasma impurity transport in a non-iterative, self-consistent manner that maintains overall material balance. For this work, a simplified C/Li mixed-material erosion model is generated by parameterizing sputter and reflection yield calculations from TRIM-like codes. The sensitivity of global lithium migration rates to various model parameters will be examined. A qualitative comparison will be made between the WallDYN model and post-campaign Li coverage measurements from NSTX.

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