Abstract Submitted
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Global mixed-material migration modeling of NSTX-U and a parameterized Li-C-O surface model[1] J.H. NICHOLS, M.A. JAWORSKI, R. KAITA, 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/O 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 C/Li/O mixed-material erosion model has been generated by parameterizing dynamic sputter and reflection yield calculations from SDTrimSP. The sensitivity of global lithium migration rates to various surface model parameters will be examined.

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