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Modeling of low-recycling divertor with lithium coating in NSTX R.D. SMIRNOV, A.YU. PIGAROV, S.I. KRASHENINNIKOV, UCSD, C.H. SKINNER, D.P. STOTLER, R.E. BELL, H.W. KUGEL, PPPL, V.A. SOUKHANOVSKII, T.D. ROGNLIEN, M.E. RENSINK, LLNL, R. MAINGI, ORNL — We have modeled D-Li-C edge-plasma transport with UEDGE code in support of lithium coating experiments on NSTX. The transition from the usual high-recycling regime (HRR) to low-recycling regimes (LRR) was simulated by varying hydrogen pumping by the Li coated divertor plates. The LRR modeling demonstrates the onset of sheath-limited divertor plasma conditions, flat parallel profile of electron temperature in SOL, and plate thermal loading dominated by parallel heat conduction. The results also show that Li impurities (mainly originating from the coated divertor plates) are well retained in the divertor volume. The modeled core contamination level for Li+3 ions is 0.1% that is consistent with recent experimental NSTX data. At the same time, the simulated and experimental levels of wall-originated C+6 (modeled with anomalous inward pinch in core) can be as high as ∼10% (maximal Zeff∼4). High surface temperatures (>800K) are predicted to result in a divertor transition from LRR to HRR due to excessive evaporation and recycling of Li. The work is supported by DoE Grant DE-FG02-08ER54989 (UCSD) and Contracts DE-AC02-09CH11466 (PPPL), DE-AC52-07NA27344 (LLNL), DE-AC05-00OR22725 (ORNL).

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