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Core impurity reduction using divertor D_2 injection in lithium-conditioned H-mode discharges in NSTX F. SCOTTI, PPPL, V.A. SOUKHANOVSKII, LLNL, R.E. BELL, S. GERHARDT, M. JAWORSKI, R. KAITA, J. KALLMAN, H.W. KUGEL, B.P. LEBLANC, R. MAQUEDA, S.F. PAUL, M. PODESTA', A.L. ROQUEMORE, PPPL, D.J. BATTAGLIA, ORNL, R. RAMAN, U. Washington — The application of lithium evaporative coatings in NSTX resulted in improved confinement and MHD stability. However, the routine achievement of ELM-free regimes caused core impurity accumulation with Z_{eff} (due to carbon) increasing up to 3-4 and core P_{rad} (due to metals) ramping up to several MW. Strategies for impurity reduction are thus essential for NSTX ELM-free discharges. In a dedicated experiment, small divertor D_2 injections (3-7 Torr-l) were used in high triangularity, NBI heated, H-mode discharges resulting in the reduction in core n_C and Z_{eff} by up to 30% without confinement degradation. The purpose of this analysis is to identify the contributions from underlying effects such as the reduction of divertor carbon and metal sputtering, changes in the SOL transport, improved impurity compression, or neoclassical edge convection due to increased neutral pressure. Supported by the U.S. DOE under Contracts DE-AC52-07NA27344, DE-AC02-09CH11466, DE-AC05-00OR22725, DE-FG02-08ER54989, and W-7405-ENG-36.

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