Evaporated Lithium Surface Coatings in NSTX*

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Lithium coatings applied to plasma facing components have shown significant benefits, in NSTX high-power divertor plasma experiments. A single oven directed a collimated stream of lithium vapor toward the graphite tiles of the lower center stack and divertor, and applied depositions of a few mg to 1 g between discharges. Intermittent performance improvements compared to prior deuterium reference discharges were seen. They included *decreases* in plasma density, inductive flux consumption, and ELM frequency, and *increases* in electron temperature, ion temperature, energy confinement, and quiescent time. In addition, reductions in lower divertor D, C, and O luminosity were observed. The intermittency of improvements in performance suggests that the lithium thickness in some regions may be marginal, and a second lithium evaporator has been installed for 2008 to provide lithium deposition in regions previously shadowed by the center stack, and to increase active thickness in remote areas. Recent work in progress on the origin of the continued secular density rise, (*i.e.,* small initial decrease in n_e, followed by a secular rise), the nature and duration of the lithium coatings, the reduction in ELM frequency, increases in quiescence, and operational issues with improved confinement (*e.g.,* increasing impurity confinement and core impurity radiation with discharge duration) will be presented.

*Work supported in part by US DOE Contract DE-AC02-76CH03073.