

Abstract Submitted
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The Material Analysis Particle Probe (MAPP) as an in-situ plasma-material interaction diagnostic in NSTX¹ BRYAN HEIM, CHASE TAYLOR, SAMI ORTOLEVA, MIGUEL GONZALEZ, JEAN PAUL ALLAIN, HENRY KUGEL, ROBERT KAITA, CHARLES SKINNER, LANE ROQUEMORE, PURDUE UNIVERSITY TEAM, PRINCETON PLASMA PHYSICS LABORATORY COLLABORATION — The National Spherical Torus Experiment uses lithium as a plasma-facing surface to enhance plasma performance. Control of hydrogen recycling is dependent on surface chemistry of lithium depositions on graphite and metallic substrates. To characterize the surface chemistry evolution of the in-vessel surface during plasma irradiation a new Material Analysis Particle Probe (MAPP) has been designed that exposes in-situ samples to dedicated NSTX plasma shots. After exposure the samples are retracted in-vacuo to an analysis chamber and examined by a suite of surface analysis tools such as: XPS, LEISS and TDS. The data interpretation is aided by lab experiments that measure the properties of lithiated graphite and lithium coatings on porous Mo surfaces (i.e. in the liquid lithium divertor) identical to those used in NSTX. Results from MAPP design and testing as well as lab experiments on D- irradiated lithium-based surfaces will be presented.

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