

Abstract Submitted
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Characterization of boronized graphite in NSTX-U and its effect on plasma performance¹ FELIPE BEDOYA, JEAN PAUL ALLAIN, Univ of Illinois - Urbana, ROBERT KAITA, CHARLES SKINNER, Princeton Plasma Physics Laboratory, UNIVERSITY OF ILLINOIS TEAM, PRINCETON PLASMA PHYSICS LABORATORY COLLABORATION — Plasma Facing Components (PFC) conditioning can have a crucial influence in plasma performance in tokamak machines. The National Spherical Torus Experiment (NSTX-U) used boronization as the main wall conditioning technique during the FY16 experimental campaign. The Materials Analysis Particle Probe (MAPP), a characterization facility, was used to investigate the surface of ATJ graphite exposed to boronization and plasma in the tokamak using X-ray Photoelectron Spectroscopy (XPS). The measurements showed that plasma induced oxidation plays a critical role in the chemical evolution of the surfaces and as a consequence in plasma performance. Additionally, ex-vessel in-situ laboratory experiments and post-mortem studies of extracted NSTX-U tiles were performed to complement the observations made with MAPP, including controlled D irradiations and XPS depth profiles. These three methodologies show congruent results where D exposures increase the oxygen concentration between 20-30%, highlighting the influence of these two species on the chemistry of the samples.

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Felipe Bedoya
Univ of Illinois - Urbana

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