

Abstract Submitted  
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**Surface chemistry analysis of boronized TZM and ATJ graphite samples during and after plasma irradiation** HANNA SCHAMIS, FELIPE BEDOYA, JEAN PAUL ALLAIN, University of Illinois at Urbana-Champaign, ROBERT KAITA, Princeton Plasma Physics Laboratory — In the National Spherical Torus Experiment Upgrade (NSTX-U) a plasma facing component diagnostic, the Material Analysis and Particle Probe (MAPP), was installed. MAPP has the capability of conducting XPS studies on materials without exposing them to atmospheric conditions. MAPP was used to conduct XPS studies of ATJ graphite (current first-wall material) and TZM alloy (99% Mo, 0.5% Ti, 0.08% Zr) samples exposed to plasma operations during the 2015-2016 experimental campaign. The data shows evidence of sputtering of the boron layers following tens of plasma shots, as well as an increase in the oxygen concentration with plasma exposure. Offline depth-profile XPS analysis was performed on the TZM samples at UIUC. These studies showed layers of deposited material on the surface of the sample, including boron layers that showed significant oxygen retention, which correlates with the MAPP data. Post-mortem depth-profile XPS analysis was also performed on ATJ graphite samples from the tiles in the divertors. Additionally, deuterium irradiation studies were also conducted on the boronized TZM samples. The effects of D+ irradiation were observed in the IGNIS (Ion-Gas-Neutral Interactions with Surfaces) facility at UIUC.

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