

Abstract Submitted
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Analysis of surface chemistry of boronized TZM samples in NSTX-U between plasma exposures¹ HANNA SCHAMIS, FELIPE BEDOYA, JEAN PAUL ALLAIN, UIUC, ROBERT KAITA, PPPL, BRUCE KOEL, Princeton University — In the National Spherical Torus Experiment Upgrade (NSTX-U) a new 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 TZM (99% Mo, 0.5% Ti, 0.08% Zr) samples. XPS gives information about the chemical composition of up to about 5 nm of the surface, and can be conducted on a day-to-day basis or at higher temporal resolutions e.g. close to in-between plasma shots. MAPP characterization gives insight on boron deposition and fuel retention by following the evolution of atomic concentrations and oxidation states. The data shows that the boron deposited layer was thicker than 5 nm. Additionally, the data shows evidence of sputtering of the boron layers following tens of plasma shots. The data also shows an increase in the oxygen concentration with plasma exposure. The next NSTX-U experimental campaign will feature TZM tiles in the lower divertor region, while the rest of the first wall will continue to be ATJ graphite. Our data provides the basis to analyze how the surface chemistry of the new set of tiles will be influenced by plasma operations, boron conditioning and carbon migration.

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