Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

In-vacuo studies of Boronization and Lithiumization in NSTX-U and relationship to plasma performance*[1] CARLOS BEDOYA, JEAN PAUL ALLAIN, UIUC, ROBERT KAITA, CHARLES SKINNER, PPPL, SCOTTI FILIPPO, LLNL, BRUCE KOEL, Princeton U, UIUC TEAM, PPPL COLLABORATION, PRINCETON U COLLABORATION, PRINCETON U COLLABORATION
— A new plasma facing component (PFC) diagnostic, the MAPP probe, was installed on NSTX-U in the beginning of the 2015 campaign. MAPP was used to find qualitative correlations between PFC conditions and plasma performance. XPS data collected with MAPP suggests the formation of B_4C following boron deposition (boronization). The depositions of these thin films seem to temporarily improve the plasma performance. The data shows how the atomic concentration of oxygen in the coatings rises from ˜5% to almost 30% after exposures to tens of plasma discharges. This oxidation coincides with the decrease in plasma performance. Increments in the content of oxygen (OII line) in the plasma were also observed with visible light spectroscopy over the same time range. MAPP is also able to measure the chemical state of graphite as a result of lithium evaporation onto PFCs (lithiumization). This work will report on the effect on the surface chemistry of ATJ graphite of lithium deposition and plasma exposure in NSTX-U. As it was the case with boronization, the relationship between plasma performance and PFC conditioning with lithium is investigated.

[1]Work supported by USDOE Contract DE-AC02-09CH11466, COLCIENCIAS Francisco Jose de Caldas Fellowship Program, USDOE Contract DE-SC0010717 and Award Number DE-SC0012890.

Carlos Bedoya
UIUC

Date submitted: 15 Jul 2016 Electronic form version 1.4