

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Surface chemistry of conditioned plasma facing components in the National Spherical Torus Experiment Upgrade (NSTX-U) HEATHER SANDEFUR, HANNA SCHAMIS, JEAN PAUL ALLAIN, University of Illinois at Urbana-Champaign — The National Spherical Torus Experiment Upgrade (NSTX-U) has been used to investigate the effect of wall tile surface conditioning on plasma performance during operation. Previous campaigns have demonstrated the enhanced suppression of edge-localized modes (ELMs) and reduced divertor recycling when reactor walls were conditioned with lithium. Performance was also improved when wall tile conditioning via boronization was performed, and high confinement (H-mode) operating conditions were routinely achieved during operation after conditioning. In order to better understand the impact of surface conditioning and subsequent plasma exposure on wall materials, cored sample of the exposed NSTX-U wall tiles were obtained and their surface chemistry was analyzed. The Ion-Gas-Neutral Interactions with Surfaces (IGNIS) system was used to analyze boronized NSTX-U samples using x-ray photoelectron spectroscopy (XPS) and low energy ion scattering spectroscopy (LEISS). The near-surface chemical composition of the samples was determined using time of flight secondary ion mass spectrometry (TOF-SIMS) and Rutherford backscattering spectrometry (RBS). In addition, variations in surface morphology in each tile were observed using atomic force microscopy and Keyence profilometry.

Heather Sandefur
University of Illinois at Urbana-Champaign

Date submitted: 10 Jul 2019

Electronic form version 1.4