Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

XPS investigation of depth profiling induced chemistry[1] QUINN PRATT, University of San Diego, CHARLES SKINNER, Princeton Plasma Physics Laboratory, BRUCE KOEL, ZHU CHEN, Princeton University — Surface analysis is an important tool for understanding plasma-material interactions. Depth profiles are typically generated by etching with a monatomic argon ion beam, however this can induce unintended chemical changes in the sample. Tantalum pentoxide, a sputtering standard, and PEDOT:PSS, a polymer that was used to mimic the response of amorphous carbon-hydrogen co-deposits, were studied. We compare depth profiles generated with monatomic and gas cluster argon ion beams (GCIB) using X-ray photoelectron spectroscopy (XPS) to quantify chemical changes. In both samples, monatomic ion bombardment led to beam-induced chemical changes. Tantalum pentoxide exhibited preferential sputtering of oxygen and the polymer experienced significant bond modification. Depth profiling with clusters is shown to mitigate these effects. We present sputtering rates for Ta_2O_5 and PEDOT:PSS as a function of incident energy and flux.

[1]Support was provided through DOE Contract Number DE-AC02-09CH11466

Quinn Pratt
University of San Diego

Date submitted: 12 Jul 2017 Electronic form version 1.4