Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

ToF-SIMS Characterization of Biocompatible Silk/Polypyrrole Electromechanical Actuators NATHAN BRADSHAW, SEAN SEVERT, Western Washington Univ, ZHAOYING WANG, Pacific Northwest National Laboratory, CARLY KLEMKE, JESSE LARSON, Western Washington Univ, ZIHUA ZHU, Pacific Northwest National Laboratory, AMANDA MURPHY, JANELLE LEGER, Western Washington Univ — Materials capable of controlled movements that can also interface with biological environments are highly sought after for biomedical devices such as valves, blood vessel sutures, cochlear implants and controlled drug release devices. Recently we have reported the synthesis of films composed of a conductive interpenetrating network of the biopolymer silk fibroin and poly(pyrrole). These silk-PPy composites function as bilayer electromechanical actuators in a biologically-relevant environment, can be actuated repeatedly, and are able to generate forces comparable with natural muscle (>0.1 MPa), making them an ideal candidate for interfacing with biological tissues. Here, time of flight secondary ion mass spectrometry was used to investigate the migration of ions in the devices during actuation. These findings will be discussed in the context of the actuation mechanism and opportunities for further improvements in device stability and performance.

Nathan Bradshaw
Western Washington Univ

Date submitted: 14 Nov 2014 Electronic form version 1.4