Abstract Submitted
for the DNP17 Meeting of
The American Physical Society

Actinide Sputtering Induced by Fission with Ultra-cold Neutrons[1] TAN SHI, Univ of Michigan - Ann Arbor, MICHAEL VENUTI, Colorado School of Mines, DEION FELLERS, Los Alamos National Laboratory, SEAN MARTIN, U.S. Naval Academy, CHRIS MORRIS, MARK MAKELA, Los Alamos National Laboratory — Understanding the effects of actinide sputtering due to nuclear fission is important for a wide range of applications, including nuclear fuel storage, space science, and national defense. A new program at the Los Alamos Neutron Science Center uses ultracold neutrons (UCN) to induce fission in actinides such as uranium and plutonium. By controlling the UCN energy, it is possible to induce fission at the sample surface within a well-defined depth. It is therefore an ideal tool for studying the effects of fission-induced sputtering as a function of interaction depth. Since the mechanism for fission-induced surface damage is not well understood, this work has the potential to deconvolve the various damage mechanisms. During the irradiation with UCN, NaI detectors are used to monitor the fission events and were calibrated by monitoring fission fragments with an organic scintillator. Alpha spectroscopy of the ejected actinide material is performed in an ion chamber to determine the amount of sputtered material. Actinide samples with various sample properties and surface conditions are irradiated and analyzed. In this talk, I will discuss our experimental setup and present the preliminary results from the testing of multiple samples.

[1]This work has been supported by Los Alamos National Laboratory and Seaborg Summer Research Fellowship.

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Date submitted: 05 Jul 2017 Electronic form version 1.4