

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Low-energy He-ion-induced surface-morphology changes of a hot W target¹ HUSSEIN HIJAZI, CHAD PARISH, HARRY MEYER III, JANE HOWE, FRED MEYER, Oak Ridge National Laboratory — We report on measurements of interactions of low-energy (50 – 200 eV) He ions with polished tungsten surfaces heated to $\sim 1250\text{K}$ performed at the ORNL Multi-charged Ion Research Facility (MIRF). Goal of the measurements was to investigate the initial phases of nano-fuzz formation recently reported by M.J. Baldwin and R.P. Doerner [Nucl. Fusion 48, 035001 (2008)]. For accumulated fluences of $\sim 10^{19}\text{ cm}^{-2}$, small surface-grain features were observed, which extend to He-ion-energy-dependent depths of 100 to 200 nm, as determined by FIB/SEM cross section scans. We have recently installed a deceleration module capable of using the full He ion intensity extracted from our ECR ion source, which is expected to increase achievable fluences by at least an order of magnitude. XPS, SEM, and FIB/SEM/TEM analyses of He-ion exposed hot tungsten samples irradiated at the larger fluences will be presented at the conference. The samples to be studied include both virgin W, and W that has been damaged by 30 keV self-ion irradiation to damage doses in excess of 100 dpa prior to the He-ion exposure, in order to assess the effects of high radiation damage on the initial phases of nano-fuzz formation.

¹Research supported by the ORNL LDRD program, by the Office of Fusion Energy Sciences of the USDOE, and by ORNL's Shared Research Equipment (ShaRE) User Program, sponsored by the USDOE Office of Basic Energy Sciences.

Hussein Hijazi
Oak Ridge National Laboratory

Date submitted: 23 Jul 2012

Electronic form version 1.4