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Fluence Resolved Growth of Nanostructured Tungsten "Fuzz"
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— Growth of nanostructures on the surface of tungsten plasma facing components is anticipated in the next generation of experimental fusion reactors. Determining the mechanisms underlying tungsten fuzz growth is an important step towards mitigation of fuzz formation. Nanostructured tungsten was produced on ohmically heated tungsten wires in a helicon plasma source (maximum flux of 2.5e21 $m^{-2}s^{-1}$), asymmetry in the setup allows for investigation of temperature and flux effects in a single sample. An effort at elucidating the mechanism of formation was made by inspecting SEM micrographs of the nanostructured tungsten at successive fluence steps of helium ions up to 1e27 m^{-2}. To create these micrographs a single tungsten sample was exposed to the plasma, removed and inspected with an SEM, and replaced into the plasma. The tungsten surface was marked in several locations so that each micrograph is centered within 200 nm of each previous micrograph. Pitting of the surface (dia. 20 $\pm$ 10 nm, fl. 5+/-2e25 m^{-2}) followed by surface roughening (9+/-2e25 m^{-2}) and finally tendril formation (30+/-10 nm, 2+/-1e26 m^{-2}) is observed.

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