Contribution ID: **538** Type: **Poster**

Impact of Helium Ion Energy Modulation on Tungsten Surface Morphology and Nano-Tendril Growth

Thursday, 20 October 2016 08:30 (4 hours)

Helium (He) ion energy modulation is demonstrated, for the first time, to affect the development of the tungsten (W) nano-tendril morphology that results from He irradiation. Dramatically isolated nano-tendril bundles (NTBs) grow from the surface instead of a uniform nano-tendril layer, or so called fuzz, leaving ˜90% of the surface without nano-tendril growth at all. The growth parameters for NTBs are the same as for fuzz except for the radiofrequency modulation of the ion energy. Analyses of the newly discovered NTB growth regime strongly support models of nano-tendril growth that take adatom kinetics as their basis. Additional modeling of the ion energy distribution function of the ITER divertor must take place in order to assess the scope of nano-tendril growth that might occur, and of what type. Through mass loss measurements and electron microscopy, the minimally supported NTBs are shown to be a greater threat to plasma-facing component erosion and dust production than previously observed for uniform fuzz.

Paper Number

MPT/P5-26

Country or International Organization

United States of America

Primary author: Mr WOLLER, Kevin (Massachusetts Institute of Technology)

Co-authors: Prof. WHYTE, Dennis (MIT Plasma Science Fusion Center); WRIGHT, Graham (Massachusetts Institute of Technology)

Presenter: Mr WOLLER, Kevin (Massachusetts Institute of Technology)

Session Classification: Poster 5

Track Classification: MPT - Materials Physics and Technology