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He bombardment of WEST tungsten grades: surface morphology changes and flux dependence[1] H. HIJAZI, C. MARTIN, PIIM, F. W. MEYER, M. E. BANNISTER, ORNL, M. CABIE, A. CAMPOS, CP2M, J-L. GARDAREIN, IUSTI, Y. CORRE, M. RICHOU, CEA, Y. ADDAB, P. ROUBIN, PIIM — We report measurements of the surface morphology changes induced by He ion bombardment of WEST grades polycrystalline tungsten at conditions relevant for the WEST He campaign (T=400-1000 C and flux range 0.3-5.10^{20} $m^{-2}s^{-1}$). 218 eV He impact energy bombardments were carried out at the ORNL MIRF, using a high-flux deceleration module and beam flux monitor. Surface analyses were performed at the PIIM laboratory using electron microscopy techniques (FIB-SEM and EBSD). At fluxes below 2.10^{20} $m^{-2}s^{-1}$, nano-wavy structures and pinholes are observed on individual grains, together with sub-surface bubbles. Interestingly, the wavy structures and pinholes were found preferentially on grains with surface orientations near 101 and 001, respectively. At fluxes above 2.10^{20} $m^{-2}s^{-1}$, the individual grain-to-grain variability disappears and the entire surface is covered by nano-fuzz structures. These results suggest that, at around 2.10^{20} $m^{-2}s^{-1}$, ion beam bombardment produces significant sub-surface damages with a high bubble density due to He saturation leading to a possible scenario that bubbles burst to form pinholes and then nanofuzz. Detailed analyses of the correlation between the grain orientation and the wavy structure as well as of the surface erosion, roughness and emissivity are underway.

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