Abstract Submitted
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Investigation of the helium effects on deuterium retention in thin film lithium coatings on tungsten substrates[1] A.L. NEFF, J.P. ALLAIN, University of Illinois, Center for Plasma Material Interactions, Micro and Nanotechnology Center, Urbana, IL 61801, T.W. MORGAN, FOM Institute DIFFER-Dutch Institute for Fundamental Energy Research, Partner in the Trilateral Euregio Cluster, the Netherlands — In a burning fusion plasma, the materials on the walls of the plasma vessel will have a significant effect on the performance of the plasma. Any amount of high Z wall material that is eroded will contaminate and cool the plasma and may lead to a disruption. Additionally, if the material retains or reflects fuel it can affect the stability of the plasma. A high recycling wall that retains minimal fuel will allow better control of the fuel inventory, especially tritium, in the walls [1]. In contrast, a low recycling wall leads to improved plasma performance by preventing instabilities in the plasma [2]. We have observed that when 5% He is added to D ions during low flux (10^{17} $m^{-2}s^{-1}$) dual ion beam irradiation the amount of D retained in the Li film diminishes [3]. This conclusion is based on the reduction of a XPS peak (at 533 eV) associated with D retention in Li films [4]. To further investigate this phenomenon, we have continued the dual beam studies in IGNIS (Ion-Gas-Neutral Interactions with Surfaces) by varying the energy and concentration of He to D. Additionally, we exposed lithiated W to sequential D and He plasmas (10^{24} $m^{-2}s^{-1}$ flux) in Magnum PSI at DIFFER. With XPS, we analyzed the chemistry of the Li films and determined changes in retention. These results will be presented. [1] G. De Temmerman, et al., Nucl. Mater. Energy (In Press). [2] H.W. Kugel, et al., J. Nucl. Mater. 390–391 (2009) 1000–1004. [3] A.L. Neff, M.S. Thesis, Purdue Univ., 2013. [4] C.N. Taylor, et al., J. Appl. Phys. 109 (2011) 053306-053306-6.

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