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Deuterium and helium behaviour and morphology effects in porous tungsten/liquid lithium plasma facing component system[1] AVEEK KAPAT, University of Illinois at Urbana-Champaign, FELIPE BEDOYA, KEVIN WOLLER, Massachusetts Institute of Technology-Plasma Science and Fusion Center, JEAN PAUL ALLAIN, Pennsylvania State University — The focus of this work is to develop a material system that has the favourable bulk properties of W while changing the interface material between the impinging plasma and the structural tungsten. A porous W-liquid metal hybrid system is manufactured and tested for bulk thermomechanical properties as well as plasma surface interactions such as He-induced morphology, vapor shielding and H isotope inventory. Porous W-substrates have been fabricated via SPS and subjected to He and D plasma exposures in both Magnum-PSI and DIONISOS. D inventory in porous W substrates with 1μm Li deposited and melted is quantified with *in-operando* NRA during 60eV D^+ plasma exposure to a fluence of 2E24 m^{-2} with the retention behaviour relative to Li percolation quantified with *in-operando* He ERD as well as *post-mortem* SIMS. Morphology resistance is tested by SEM examination of porous W samples exposed in Magnum-PSI to 1E26m^{-2}D, 5E26m^{-2} He, and 5E26m^{-2} He with 1ms pulses between 0.1-0.5 GW m^{-2} @ 0.1 Hz, all biased to 33eV and heated to 1000C. The effects of porous structure on the implantation and retention of He/D are studied on Magnum-PSI exposed samples with *post-mortem* SIMS.

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