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Isotope Exchange Experiments in Divertor and First Wall Materials in PISCES JOSEPH BARTON, University of California, San Diego, THOMAS SCHWARZ-SELINGER, Institut fur Plasmaphysik, Garching, Germany, YONGQIANG WANG, Los Alamos National Laboratory, RUSSELL DOERNER, GEORGE TYNAN, University of California, San Diego — D and H isotope exchange experiments in W and Be samples were conducted in the PISCES linear plasma devices to simulate Tritium retention in first wall and divertor materials in toroidal confinement devices. The one inch diameter samples were first exposed to D plasma in typical tokamak divertor conditions to a fluence of 10^{22} ions/cm^2 while maintaining a sample temperature around 300 K. The samples were subsequently exposed to H plasma at varying fluences (10^{20} to 10^{22} ions/cm^2) and sample temperatures. Intensities of D-alpha and H-alpha optical emission spectrum (OES) signals from the plasma track the isotope exchange in front of the metal samples in situ, while thermal desorption spectroscopy (TDS) after exposure show what amount of D remains in the bulk sample relative to H. It is shown that W and Be tend to exchange isotopes at the same rate and retain similar fractional amounts of D after exposure. Retention decreases with higher sample temperatures during H plasma exposure, as expected. Nuclear reaction analysis (NRA) with He-3 ions will be conducted to obtain D depth profiles in exposed W to understand how this exchange process varies the bulk D concentration profile.

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