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Dynamics of Hydrogenic Retention, Diffusion, and Trapping in Molybdenum G.M. WRIGHT, D.G. WHYTE, J.G. KULPIN, University of Wisconsin-Madison, R. DOERNER, University of California-San Diego, A.J. NOSEK, J.M. SHEA, University of Wisconsin-Madison — Hydrogenic retention, diffusion and trapping in plasma-facing components (PFC) are of great importance when examining wall fuelling and tritium retention issues for ITER. The Alcator C-Mod tokamak uses molybdenum for their PFC material, covered with boron films from regular boronizations. After cleaning the interior of the machine, Alcator C-Mod had purely Mo tiles. In the following shots, over 50% of the injected deuterium was not recovered and thought to be lost in the walls. Repeated shots showed no signs of this "wall pumping" becoming saturated. This unexpected behaviour could have severe consequences for tritium retention in ITER, which is considering refractory metal tungsten PFC. The dynamics of D retention and diffusion must be resolved to understand these issues in pulsed tokamaks. The C-Mod tiles, deuterium-implanted Mo samples provided by the PISCES experiment at University of California-San Diego, and pure Mo samples will be studied using the DIONISOS experiment at the University of Wisconsin-Madison. Ion beam analysis will be used to investigate the dynamics of plasma-driven implantation and diffusion of deuterium in molybdenum as a function of plasma density, sample bias, surface temperature, and time.

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