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Development and Testing of Dispersion-Strengthened Tungsten Alloys via Spark Plasma Sinterin ERIC LANG, NATHAN MADDEN, CHARLES SMITH, JESSICA KROGSTAD, JEAN PAUL ALLAIN, Univ of Illinois - Urbana — Tungsten (W) is a common plasma-facing component (PFC) material in the divertor region of tokamak fusion devices due to its high melting point and high sputter threshold [1]. However, W is intrinsically brittle and is further embrittled under neutron irradiation, and the low recrystallization temperature pose complications in fusion environments [1,2]. More ductile W alloys, such as dispersion-strengthened tungsten are being developed. In this work, W samples are processed via spark plasma sintering (SPS) with TiC, ZrC, and TaC dispersoids alloyed from 0.5 to 10 weight %. SPS is a powder compaction technique that provides high pressure and heating rates via electrical current, allowing for a lower final temperature and hold time for compaction [3]. Initial testing of material properties, smicrostructure, and composition of specimens will be presented. Deuterium and helium irradiations have been performed in IGNIS, a multi-functional, *in-situ* irradiation and characterization facility at the University of Illinois. High-flux, low-energy exposures at the Magnum-PSI facility at DIFFER exposed samples to a D fluence of $1x10^{26}$ cm^{-2} and He fluence of $1x10^{25}$-$1x10^{26}$ cm^{-2} at temperatures of 300-1000 C. *In-situ* chemistry changes via XPS and *ex-situ* morphology changes via SEM will be studied. [1] D. Naujoks, et al. *Nucl. Fusion.* Vol 36, No. 6 (1996) [2] S.J. Zinkle, et al. *Annu. Rev. Mater. Res.* 2014. 44:241–67. [3] J.R. Groza, et al. *Mat. Sci. and Eng.* A287 (2000) 171-177. Work supported by US DOE Contract DE-SC0014267

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