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HIDRA-MAT Development for HIDRA Plasma Exposure and *In-situ* Material Characterization[1] ANDREW SHONE, University of Illinois Urbana Champaign, ZAK KOYN, Energy Driven Technologies LLC, AVEEK KAPAT, RABEL RIZKALLAH, University of Illinois Urbana Champaign, J.P. ALLAIN, Pennsylvania State University, DANIEL ANDRUCZYK, University of Illinois Urbana Champaign — The Hybrid Illinois Device for Research and Applications (HIDRA) at the University of Illinois Urbana Champaign (UIUC) is a hybrid fusion device that enables PMI testing for both stellarator and tokamak plasmas. HIDRA's long-pulse stellarator plasmas provide a platform for long exposures of PFCs. HIDRA-MAT is a material characterization module attached to HIDRA that is being designed and fabricated to include TDS and Raman systems for *in-situ* characterization of materials that liquid metals have been introduced to. A specialized rotatable sample holder positions the sample for liquid metal droplet application from a lithium droplet injector on HIDRA-MAT. Early experiments look to investigate the effect of liquid lithium on porous tungsten samples regarding the retention of H, D, and He after plasma exposure. Preliminary results from RGA calibrations show the ability to differentiate D and He with TDS characterization of W samples after glow discharges to soon follow. Lastly, a systematic study of Li-H and Li-D bonds is being carried out to create a Raman spectra database to explore the effectiveness of Raman spectroscopy in references to liquid metal PFCs.

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