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Hydrogen Adsorption onto Magnesium Palladium and Magnesium Palladium Niobium Multilayer Thin Films CHRISTIAN STEINMETZ, JEFFREY HETTINGER, TABBETHA DOBBINS, Rowan University — We report on the synthesis and characterization of magnesium palladium and magnesium niobium multilayer thin films as a possible reversible hydrogen storage material. The multilayer thin films are characterized by x-ray diffraction (XRD) and x-ray reflectivity (XRR) before and after hydrogen uptake. This study examines the optimal thickness of the magnesium film which would allow the diffusion of hydrogen to form magnesium hydride (MgH2). Thin barriers of palladium and niobium permit hydrogen to permeate while acting as a diffusion barrier to oxygen. Multilayer thin films are grown with various magnesium thicknesses via magnetron sputtering on a sapphire substrate. Thicknesses of Mg, MgH2, Pd, and Nb are reported. Likewise, interfacial roughness attributable to hydrogenation and dehydrogenation cycling measured using XRR are reported.

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