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Combinatorial thin film deposition and infrared emission characterization of hydrogen storage materials LEONID BENDERSKY, Materials Science and Engineering Laboratory, NIST, HIROYUKI OGUCHI, University of Maryland, EDWARD HEILWEIL, Physics Laboratory, NIST, DANIEL JOSELL, Materials Science and Engineering Laboratory, NIST — Optimal hydrogen sorption/desorption behavior (temperature, pressure, kinetics) depends on a composition and a microstructural state. Combinatorial thin films provide a wide range of continuously changing compositions and microstructures (amorphous, nanocrystalline, single crystal, multiphases) on a single substrate. In this paper we report preparation and characterization of two systems, Fe_2Ti-$FeTi_2$ and MgNi-Mg on silicon wafers with Pd overlayers. The specimens were prepared by a shutter-controlled multilayer e-beam deposition. After-deposition annealing can create a variety of microstructural states. Both as-deposited and annealed films were fully characterized by SEM, x-ray, and selectively by TEM. Hydrogenation of the films was monitored with an infrared (IR) camera. Changes in the IR emissivity in response to the film hydrogenation and phase transition behavior will be discussed.

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