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Formation of a Magnetically Hard FePt Alloy by Diffusional Mixing of Fe and Pt Nanoparticles* BRIAN PATTERSON, United States Air Force Academy, THOMAS EKIERT, KARL UNRUH, University of Delaware — The formation of a bulk FePt alloy by diffusional mixing of nanometer-sized particles of elemental Fe and Pt has been studied by differential scanning calorimetry, x-ray diffraction, and vibrating sample/DC extraction magnetometry. A strong exothermic signal and a rapid increase in the magnetization at a temperature of about 475 $^\circ$C (both at a heating rate of 10 $^\circ$C/min) indicate the formation of a new magnetic phase from the as-prepared dispersion. The coercivity of the resulting alloy was found to be in excess of 10 kOe at room temperature and about 12.5 kOe at 5 K. X-ray diffraction measurements confirmed the presence of a face centered tetragonal (FCT) phase with an a lattice parameter similar to, and a c lattice parameter somewhat smaller than, the corresponding values in bulk FePt. * This work has been supported by AFRL DARPA METAMATERIALS contract no. F33615-01-2-2166.

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