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Nanostructured Mn2Ga Alloys with High Magnetization and Coercivity AHMED A. ELGENDY, GEORGE HADJIPANAYIS, University of Delaware — Mn-based alloys have attracted much interest lately for the development of rare earth free magnets because of their high magnetocrystalline anisotropy. [1]. In this study, we have prepared nanostructured Mn2Ga alloys with the pure D022 phase by subjecting ball milled powders with micron size grains to the supercritical conditions of fluids at high pressure of 850 psi and temperature of 250 oC. The use of supercritical fluids was found to lead to a homogeneous microstructure with an average grain size of 35 nm. The magnetic properties show an enhancement of magnetization and coercivity from M(3T)= 30 emu/g and HC =3 kOe in the micron size powders to M(3T) and HC of 48 emu/g and 4.7 kOe, respectively in the nanosize powders. This new method of grain size reduction to nanoscale with the subsequent increase in coercivity via the high pressure cell opens new routes for rare earth-free permanent magnet development. The work was funded by NSF-G8. References: Cui, B. Z.; Marinescu, M.; Liu, J. F. Ferromagnetic Tetragonal L10-type MnGa Isotropic Nanocrystalline Microparticles. IEEE Trans. Mag. 2013, 49(7), 3322-3325.

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