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Chemical Synthesis of Iron-Nickel Nanoparticles[1] FRANK ABEL, University of Delaware, VASILIAS TZITZIOS, Institute of Materials science, demokritos, Greece, GEORGE HADJIPANAYIS, University of Delaware — Equiatomic FeNi alloys undergo a phase transformation, like FePt, from a disordered fcc structure to an ordered fct structure. However, unlike FePt in Fe-Ni this transformation is very sluggish and has been only observed in heavily irradiated thin films and in meteorite samples as was recently reported.[1,2] In this study, we used a high temperature chemical synthesis route to investigate the possibility of fabricating fct FeNi nanoparticles. The Iron Nickel Boron nanoparticles were made using anhydrous Iron (II) Chloride and Nickel (II) Chloride using Sodium borohydrite as a reducing agent in tetraglyme under a nitrogen hydrogen atmosphere. The high temperature of the reaction allowed for the formation of as made crystalline Iron Nickel nanoparticles without additional annealing. By changing the concentration of sodium borohydrite we were able to prepare nanoparticles either in the pure fcc phase, or in a new mixed phase. The magnetic properties were improved by increasing the concentration of Iron precursor. We obtained FeNi nanoparticles with saturation magnetization of (56 emu/g) and coercivity of (190 Oe). The particle size distribution of the FeNi particles ranged from several hundred nanometers to a half micron. **References: 1.** L Neel, et al., *Journal of Applied Physics*, Volume **35**, No. 3 (1964) **2.** M Kotsugi, et al., *Journal of Physics: Condensed Matter* **, 26 064206** (2014)

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Frank Abel
University of Delaware

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