

Abstract Submitted  
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**Synthesis and Analysis of Rare-Earth Nanoparticles Gd and Nd** JOSE AMARAL, CARMIN LIANG, DULCE ROMERO, PEI-CHUN HO, Physics/California State Univ, Fresno, SAEED ATTAR, Chemistry/California State Univ, Fresno, DENNIS MARGOSAN, USDA/Agriculture Research Service — We have synthesized sub-micron gadolinium particles using sodium borohydride reduction of gadolinium chloride in an inverse micelle solution of the surfactant didodecyldimethylammonium bromide (DDAB) and toluene. Gadolinium and neodymium are paramagnetic rare earth metals at room temperature and become ferromagnetic and anti-ferromagnetic below 293K and 19K, respectively. A liquid-liquid extraction using two immiscible solvents can separate the magnetic nanoparticles from unwanted by-products of the reduction. SEM images show spherical Gadolinium clusters less than one micrometer were produced. Nd nanoparticles do not synthesize using toluene and water and results using methanol and hexane are on-going. Magnetic nanoparticles can have enhanced magnetization and increased density in a finite region compared to their bulk material. Possible applications include high-density magnetic storage, high-density recording media, contrast agents to improve medical magnetic resonance imaging, and magnetic refrigeration.

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