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Progress toward Synthesis and Characterization of Rare-Earth Nanoparticles[1] DULCE G. ROMERO, PEI-CHUN HO, Department of Physics, Cal. State U., Fresno, SAEED ATTAR, Department of Chemistry, Cal. State U., Fresno, DENNIS MARGOSAN, USDA-ARS — Magnetic nanoparticles exhibit interesting phenomena, such as enhanced magnetization and reduced magnetic ordering temperature (i.e. superparamagnetism), which has technical applications in industry, including magnetic storage, magnetic imaging, and magnetic refrigeration. We used the inverse micelle technique to synthesize Gd and Nd nanoparticles given its potential to control the cluster size, amount of aggregation, and prevent oxidation of the rare-earth elements. Gd and Nd were reduced by $NaBH_4$ from the chloride salt. The produced clusters were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), and energy dispersive X-ray spectroscopy (EDX). The results from the XRD show that the majority of the peaks match those of the surfactant, DDAB. No peaks of Gd were observed due to excess surfactant or amorphous clusters. However, the results from the SEM and EDX indicate the presence of Gd and Nd in our clusters microscopically, and current synthesized samples contain impurities. We are using liquid-liquid extraction method to purify the sample, and the results will be discussed.

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