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**Nonaqueous Synthesis of Gadolinium and Neodymium Nanoparticles**[1] R. FUKUDA, M. CASTRO, P.-C. HO, Physics, California State University Fresno, S. ATTAR, M. GOLDEN, Chemistry, California State University Fresno, D. MARGOSAN, USDA-ARS — Nanoparticles are of great interest due to their magnetic properties, such as superparamagnetism, that are not exhibited by their bulk counterparts. Gd and Nd are being tested by applying the reverse micelle method. The reverse micelle method consists of using a surfactant with a large nonpolar solvent to polar solvent ratio to form spherical cages that control the size of the products. Many studies involving the reverse micelle method employ water as the polar solvent. Since Gd and Nd are highly reactive to water, methanol is used as a replacement with hexane or heptane as the nonpolar solvent. Gadolinium chloride or neodymium nitrate are reduced using sodium borohydride after the reverse micelles encapsulate the rare earth compound. Scanning electron microscopy (SEM) and light microscopy show small, spherical clusters with diameters in the micron range. Higher magnification of the SEM melted the clusters, even after cooling the sample to 87 K. The sample was coated with Pt to prevent melting. Energy dispersive x-ray measurements were conducted to find the chemical composition of the clusters, but the sample signals were too small to make a conclusion. Future growths will use the surfactant DDAB instead of AOT since DDAB is more stable when examined with SEM.

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