

Abstract Submitted  
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**Structure and Magnetic Properties of Sm-Co Particles Synthesized From Nanostructured Precursor Oxides**<sup>1</sup> BRIAN KELLY, KARL UNRUH, University of Delaware — Sm-Co particles have been synthesized by a calciothermic reduction/diffusion reaction from a Sm-Co-O precursor. The precursor oxide was prepared by an autocombustion reaction and was subsequently milled with CaO, which served as a grain-growth inhibitor and thermal ballast. The effects of varying the amount of Ca metal between 2 and 6 times the amount needed for complete reduction of the available Sm-Co-O precursor, the reaction temperature between 850 and 1000 C, and reaction time between 15 minutes and 24 hours were studied. The structural and magnetic properties of the Sm-Co reaction products were studied by x-ray diffraction, scanning electron microscopy, and vibrating sample magnetometry measurements. The results of these measurements indicated that magnetically hard SmCo<sub>5</sub> was preferentially formed in samples synthesized with high Ca amounts and short diffusion times, or low Ca amounts and long diffusion times. Particle sizes were also observed to increase with both increasing diffusion time and increasing Ca amount. The influence of changes in both reaction temperature and size of the CaO additive on the final product were also studied.

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