Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Anisotropic Sm-Co(Fe) Nanoparticles Produced by Surfactant-Assisted Ball Milling[1] NILAY GUNDUZ-AKDOGAN, GEORGE C. HADJIPANAYIS, Department of Physics and Astronomy, University of Delaware, Newark, DE, U.S.A., DAVID J. SELLMYER, Department of Physics and Astronomy, University of Nebraska, Lincoln, NE 6858 USA. — Magnetically hard $SmCo_5$ and $Sm_2(Co_{0.8}Fe_{0.2})_{17}$ nanoparticles have been produced by using surfactant assisted low- and high-energy ball milling. Surfactants prevent the re-welding of the crashed particles during the milling process and thus limit the particle growth. Oleic acid was used as the surfactant and the heptane as the milling medium. High energy ball milling experiments took place in a milling vial with carbon steel balls by using a Spex 8000M high energy ball milling machine. The coercivity was found to increase with milling time with a value of 2.9 kOe for $Sm_2(Co_{0.8}Fe_{0.2})_{17}$ and 19.5 kOe for $SmCo_5$ after 12 hrs of milling. TEM data showed that the milled powders have a narrow size distribution. The TEM grid-deposited samples showed self-assembled nanoparticles in the $Sm_2(Co_{0.8}Fe_{0.2})_{17}$alloy after 4 hours of milling, which could be further aligned when subjected to a magnetic field. The evolution of structural and microstructural properties of the particles will be monitored and compared with their magnetic properties.

[1]Work supported by DOE DE-FG02-04ER4612.

Nilay Gunduz-Akdogan
Department of Physics and Astronomy,
University of Delaware, Newark, DE, U.S.A.

Date submitted: 17 Dec 2008 Electronic form version 1.4