Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Magnetocaloric effect (MCE) in ferrite nanoparticles[1] JAMES GASS, HARIHARAN SRIKANTH, University of South Florida — Enhancement of the magnetocaloric effect (MCE) in nanostructured materials is important for refrigeration applications particularly in potential spot cooling of MEMS and NEMS devices. We have investigated MCE in various classes of polydisperse and monodisperse soft ferrite nanoparticles with different blocking characteristics. Our observations indicate that in some systems, surface properties such as spin disorder and anisotropy lead to considerable enhancement of MCE. This is promising for potentially increasing MCE in nanoparticle systems through systematic engineering of the surfaces via core-shell or other approaches. We report on the magneto caloric effect (MCE) in several ferrite nanoparticle systems and compare them. Characterization of structural and magnetic properties was done using XRD, TEM, DC and AC magnetization, and transverse susceptibility. The change in entropy was calculated using the thermodynamic Maxwell relation from the family of M-H curves taken at different temperatures. The specific role of surface anisotropy and surface structure in ferrite nanoparticles and correlation to the MCE will be discussed.

[1]Work at USF supported by a grant from DOE-BES

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Date submitted: 26 Nov 2007 Electronic form version 1.4