Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Thermodynamics and Magnetocaloric properties of Fe/Cr Superlattices[1] T. MUKHERJEE, S. MICHALSKI, R. SKOMSKI, D.J. SELLMYER, CH. BINEK, Department of Physics & Astronomy and the Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, NE, 68588-0111 —
We explore MC properties of tailored Fe/Cr superlattices involving simple 3d metals. Our multilayers are fabricated by pulsed laser deposition with emphasis on maximizing magnetic entropy changes near room temperature. We use nanostructuring[2] to tailor magnetic interaction and exploit geometrical confinement in order to fit the FM to paramagnetic transition temperature of the FM constituent films. In concert this leads to an optimized global metamagnetic transition maximizing the isothermal entropy change. Thermodynamic and MC properties of such Fe/Cr superlattices are studied with the help of SQUID magnetometry. Entropy changes are deduced via the Maxwell relation in single phase regions and via the Clausis-Clapeyron relations at first order metamagnetic transitions, X-ray diffraction and X-ray reflectivity are used to correlate structural data with the magnetic properties.

[1]Financial support by NRI, and NSF through EPSCoR, Career DMR-0547887, and MRSEC Grant No. 0820521.
[2]Phys. Rev. B **79**, 144406 (2009).

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Date submitted: 03 Jan 2011 Electronic form version 1.4