

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Magnetocaloric Properties of Thin Film Heterostructures¹ H.

KIRBY, C. BAUER, University of South Florida, Department of Physics, B.J. KIRBY, J. LAU, NIST, C.W. MILLER, University of South Florida, Department of Physics — In an effort to understand the impact of nanostructuring on the magnetocaloric (MC) effect, we have studied gadolinium in MgO/W(50 Å)/[Gd(400 Å)/W(50 Å)]₈ heterostructures [Miller et al., J. Appl. Phys. 107, 09A903 (2010)]. The entropy change peaks at a temperature of 284 K with a value of 3.4 J/kg K for a 0–30 kOe field change. Polarized neutron reflectometry was used to determine the depth profile of the magnetic moment per Gd atom, m_{Gd} in a Gd/W multilayer. Our results suggest that creating materials with Gd-ferromagnet interfaces may increase the m_{Gd} , leading to enhanced MC properties. Therefore SiOx/Fe(50 Å)/Gd(300 Å)/Fe(50 Å) heterostructures have been investigated.

¹This work was supported by AFOSR-YIP. Use of the Center for Nanoscale Materials was supported by the U. S. Department of Energy, Office of Science, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357.

Hillary Kirby
University of South Florida, Department of Physics

Date submitted: 06 Jan 2011

Electronic form version 1.4