

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Phase Transitions and Magnetocaloric Effects in GdNi_2Mn_x ¹

ANIL ARYAL, ABDIEL QUETZ, SUDIP PANDEY, Southern IL Univ-Carbondale, TAPAS SAMANTA, Louisiana State University, IGOR DUBENKO, Southern IL Univ-Carbondale, SHANE STADLER, Louisiana State University, NAUSHAD ALI, Southern IL Univ-Carbondale — The structural and magnetic properties of the GdNi_2Mn_x system (for $x = 0.5, 0.6, 0.8, 1.0, 1.2, 1.4, 1.5$) have been studied by x-ray diffraction and magnetization measurements. A rhombohedral PuNi_3 -type structure was observed in the XRD data. A second order magnetic phase transition from ferromagnetic (FM) to paramagnetic (PM) was found, characterized by a long-range exchange interaction as predicted by mean field theory. A magnetic entropy change of $|\Delta S_M| = 3.1 \text{ J/kg K}$ and 2.9 J/kg K for $\Delta H = 5 \text{ T}$ was observed in the vicinity of the Curie temperature (T_C) for $\text{GdNi}_2\text{Mn}_{0.8}$ and $\text{GdNi}_2\text{Mn}_{1.4}$ respectively. In spite of the low values of ΔS_M , the relative cooling power (RCP) was found to be 176 J/Kg for the $\text{GdNi}_2\text{Mn}_{0.8}$ compound. .

¹This work was supported by the Office of Basic Energy Sciences, Material Science and Engineering Division of the U.S. Department of Energy (USDOE-DE-FG02-06ER46291 and DE-FG02-13ER46946).

Anil Aryal
Southern IL Univ-Carbondale

Date submitted: 14 Nov 2014

Electronic form version 1.4