Magnetocaloric properties of Ni$_2$Mn$_{0.55}$Cr$_{1-x}$Co$_x$Ga Heusler alloys

JEFFREY BROCK, RAMAKANTA CHAPAI, MAHMUD KHAN, Miami Univ — Since the discovery of the giant magnetocaloric effect in Gd5(Si1-xGex)4 near room temperature [V. K. Pecharsky, et al., Phys. Rev. Lett. 78, 4494 (1997)], the research activities in search for materials exhibiting similar effects have been continuously accelerating. Although many materials exhibiting large magnetocaloric effects have been discovered [K. A. Gschneidner, Jr., et al., Rep. Prog. Phys. 68, 1479 (2005)], only a few have been reported to exhibit such effects in the vicinity of room temperature [O. Tegus, et al., Nature (London) 415, 150 (2002)][M. Khan, et al., J. Appl. Phys. 101, 053919 (2007)]. Here, we present an experimental study on the magnetic properties of Ni2Mn0.55Cr1-xCoxGa Heusler alloys. The alloys have been investigated by magnetization. It is shown that by partial substitution of Cr by Co the ferromagnetic ordering temperature of Ni$_2$Mn$_{0.55}$Cr$_{1-x}$Co$_x$Ga can be tuned over a wide range of temperatures, that is from 265 K (x = 0) to 306 K (x = 0.2). Over the entire temperature range the alloy system exhibits large magnetocaloric effect.

Jeffrey Brock
Miami Univ

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