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Magnetic and Magnetocaloric Properties of $\text{MnFe}_4\text{Si}_{3-x}\text{In}_x$ CODY

DAWSON, ZACHARY SPENCE, P. HILL, Southeast Missouri State University Department of Physics and Engineering Physics, IGOR DUBENKO, ABDIEL QUETZ, NAUSHAD ALI, Southern Illinois University - Carbondale Department of Physics — The magnetocaloric effect has attracted pressing curiosity for its application in magnetic refrigeration because it presents an alternative to current refrigeration technology that is more efficient and environmentally friendly. Previous research on the $\text{Mn}_{5-x}\text{Fe}_x\text{Si}_3$ system has shown that magnetic entropy changes are enhanced in the MnFe_4Si_3 compound [1]. We have prepared samples of $\text{MnFe}_4\text{Si}_{3-x}\text{In}_x$ in order to investigate how In substitution for Si affects the properties of this system. Samples were prepared by arc melting and annealed for 5 days at 900°C and the crystal structure of each sample was systematically studied through X-ray diffraction techniques to determine phase purity. Then the system was investigated by measuring magnetization as a function of temperature and magnetic field. Here we report on the magnetic and magnetocaloric properties of the pseudo ternary $\text{MnFe}_4\text{Si}_{3-x}\text{In}_x$ system for $x = 0, 0.5, 1, \text{ and } 1.5$, and discuss its applicability in magnetic refrigeration.

[1] Songlin, Dagula, O. Tegus, E. Brück, J.C.P. Klaasse, F.R. de Boer, K.H.J. Buschow, *J. Alloys Compd.* 334 (2002) 249.

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