

Abstract Submitted
for the TSF05 Meeting of
The American Physical Society

Elastic properties, Mossbauer spectra and phonon density of states in $\text{Fe}_x\text{Cr}_{1-x}$ alloys TOMAS HERNANDEZ, University of Texas at El Paso, MATTHEW S. LUCAS, BRENT FULTZ, California Institute of Technology — The binary alloy of iron and chromium is known to have three magnetic transitions observable at temperatures below 300 K. Our research group has performed inelastic neutron scattering on the samples of $\text{Fe}_x\text{Cr}_{1-x}$ for $x = 1, 3, 10, 20, 30$ at percent across the magnetic phase transitions to obtain the phonon energy density of states. From these measurements elastic properties and vibrational entropy can be determined. Direct measurements of the elastic constants, i.e. shear and bulk moduli, were done using an ultrasonic technique by measuring sound speeds in the alloys at room temperature. The results are to be compared with the data obtained from the inelastic neutron scattering experiment. Mossbauer spectroscopy, a technique that detects the change in nuclear energy levels caused by electronic interactions was used to detect the magnetic transitions and measure the isomer shift of the alloys in the paramagnetic phase of the different alloy concentrations.

Tomas Hernandez
University of Texas at El Paso

Date submitted: 16 Sep 2005

Electronic form version 1.4