

Thermodynamic Trends in Co-Based Alloys via Inelastic Neutron Scattering

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Abstract : Magnetic shape memory alloys (MSMAs) are promising technological materials for a range of fields, from biomaterials to energy harvesting. We have performed inelastic neutron scattering on two powder samples of cobalt-based high-entropy MSMAs across a range of temperatures in an effort to compare calculations of thermodynamic properties (entropy, specific heat, etc.) to the measured ones. The measurements were correct for multiphonon scattering and multiple scattering contributions. We present herein the neutron-weighted vibrational density of states. Future work will utilize DFT calculations of the disordered lattice to correct for the neutron weighting and retrieve the true thermodynamical properties.

Keywords : neutron scattering, vibrational dynamics, computational physics, material science

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