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Phase transitions and associated magnetic and transport properties in $Ni_2Mn_{0.70}Cu_{0.25}Cr_{0.05}Ga$. SUNDAY AGBO, KHAN MAHMUD, Department of Physics, Miami University, Oxford, Ohio 45056, USA — The need to improve the energy efficiency of temperature and climate control systems has generated a considerable research interest in magnetic refrigeration technologies. A magnetic refrigerator utilizes a particular type of magnetic materials (magnetocaloric material) as the refrigerant. Therefore, advancements in mangetic cooling technology is crucially dependent on the discovery of new materials with large tunable MCEs near room temperature. Materials that exhibit coupled magnetic and structural phase transitions with negligible thermal hysteresis, are promising in this regard. Keeping this discussion in mind, we have investigated the structural, magnetic and magnetocaloric properties $Ni_2Mn_{0.70}Cu_{0.25}Cr_{0.05}Ga$ alloy using x-ray diffraction, magnetic, resistivity, and calorimetric measurements. A first order coupled magnetostructural phase transformation with a thermal hysteresis of 1 K was observed in the material near room temperature. The first-order nature of the transition was confirmed by Arrot plots. The magnetic entropy changes for a field change of 1 T to 5 T were evaluated.

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