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Magnetic and exchange bias properties of Ni1.4Mn2Ga0.6 intermetallic alloy ABDULLAH ALBAGAMI, MAHMUD KHAN, Miami University — The understanding of magnetic exchange interactions in magnetic materials is important for new innovations in science and technology. This is because magnetic materials have many multifunctional properties that are utilized in numerous technologies. Exchange bias is one such property that results from competing magnetic interactions in certain materials. Here we present an experimental study on the magnetic and exchange bias properties of Polycrystalline Ni1.4Mn2Ga0.6 alloy. The material exhibit a ferromagnetic Curie temperature of 299.58 K. The magnetization versus field data obtained at 5 K under zero field condition exhibits a double shifted hysteresis loop that disappears at higher temperatures. When the sample is cooled from room temperature to 5 K in applied magnetic fields, exchange bias is observed, whose magnitude is strongly dependent on the cooling field. A maximum exchange bias field of 730 Oe is observed under field cooling condition at 5 K. Interestingly, a negative magnetization is observed in the magnetization versus field data obtained at magnetic fields smaller than 75 Oe. The experimental results are explained in terms of the competing ferromagnetic and antiferrromangnetic exchange interaction that exist in the materials due to the Mn atoms occupying multiple crystalline sites resulting in a spin glass type frustrated ground state.

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