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Magnetic and magnetocaloric properties of $Mn_{5-x}Co_xGe_3$ compounds MIRANDA CAUDLE, BARRETT FITZGERALD, Co-Presenter, BRIAN KNAUF, ELI SHLONSKY, PATRICK CARROLL, LINDSAY DARKINS, ADAM EATON, MATTHEW RURKA, AMBER WILLIAMS, PAUL WILSON, None, JEFFREY BROCK, TA, MAHMUH KHAN, Professor — Mn_5Ge_3 exhibits a Curie temperature of 296 K and has been reported to have a magnetic entropy change comparable to that of pure Gd, which makes it a potential candidate for near room temperature magnetic refrigeration applications. In this study we have synthesized and characterized a series of $Mn_{5-x}Co_xGe_3$ compounds where x=0, 0.05, 0.1, and 0.15. The goal is to determine the effect of Co substitution for Mn on the magnetic and magnetocaloric properties of the materials. X-ray diffraction measurements revealed that all samples exhibit the D8 hexagonal structure at room temperature. Magnetization measurements show that all compounds exhibit ferromagnetism, with a decrease of Curie temperature with increasing Co concentration. Although, the magnetic entropy changes stays nearly constant across all values of x, Co substitution significantly enhances the refrigeration capacity of the materials. The largest magnetocaloric effect is observed in the $Mn_{4.95}Co_{0.15}Ge_3$ compound with a peak magnetic entropy change of 7.75 J/kg K and a peak refrigeration capacity of 380.32 J/kg for a magnetic field change of 5T. The results provide further understanding of potential magnetocaloric applications for this series of compounds.

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