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Magnetocaloric Effect of NiFeCoCrPdx High Entropy Alloys<sup>1</sup> DUSTIN BELYEA, University of South Florida, C. BAUER, USF, M. LUCAS, Air Force Research Laboratory, J. HORWATH, AFRL; Wright State University, E. MICHEL, AFRL; UTC inc., CASEY W. MILLER, USF — FeCoCrNi is one of many "high entropy alloys" (HEAs), which are multicomponent alloys with high entropy of mixing. These materials often have high hardness, and resistance to wear and corrosion, making them attractive for applications. Here, we report on the magnetic entropy change and magnetocaloric effect of the FeCoCrNiPdx system. The addition of Pd to FeCoCrNi has been shown to enable the critical temperature to be tuned from 130 K for x=0 to 500 K for x=2. Isothermal magnetization measurements were made on samples with x ranging from 0 to 0.50 as functions of temperature. The magnetic entropy change ( $\Delta S$ ) was calculated using the thermodynamic Maxwell Relation. We find that Pd additions tune the peak  $\Delta S$  temperature from 130 to 300K, while modestly increasing the peak  $\Delta S$  magnitude. Interestingly, the addition of Pd leads to an almost doubling of the relative cooling power (RCP), as well as a notable change in the critical behavior of the material. The RCP of  $\sim 35$ J/kg for a 1T field change puts the Pd-containing HEAs in competition with other magnetocaloric materials in the 100-200 K operating range. This alloy system's combination of durability and a tunable Curie temperature without appreciable change in cooling power may make this system interesting for magnetocaloric applications.

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