

Abstract Submitted
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The Magnetocaloric Effect in Single Crystal and Processed Polycrystalline MnP¹ RYAN A. BOOTH, SARA A. MAJETICH, Carnegie Mellon University — Manganese Phosphide (MnP) is a promising magnetocaloric effect (MCE) material for use in room temperature-magnetic refrigeration because it exhibits a first-order ferromagnetic to paramagnetic phase transition at a Curie temperature of 290 K, possesses no measurable magnetic hysteresis, and has a saturation field of lower than 7.5 kOe along the c-axis. The magnetic entropy change (ΔS) was measured in single crystals along the c-axis to be 2.2, 3.3, and 6.0 J / kg K in applied fields of 10 kOe, 20 kOe, and 50 kOe respectively. Cold-rolling followed by a short annealing of polycrystalline MnP was shown to create preferential crystallographic alignment that mimics the favorable properties of single crystals without the expenses associated with their growth. A comparison of the magnetocaloric effect between single crystals and rolled polycrystalline MnP is presented.

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