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Entropy and magnetic properties of Ni-Mn-In magnetocaloric materials JING-HAN CHEN, Department of Physics and Astronomy, Texas A&M University, College Station, Texas, NICKOLAUS BRUNO, Department of Mechanical Engineering, Texas A&M University, College Station, Texas, IBRAHIM KARAMAN, Department of Materials Science and Engineering, Texas A&M University, College Station, Texas, YUJIN HUANG, JIANGUO LI, School of Materials Science and Engineering, Shanghai Jiaotong University, Shanghai, 200240, China, JOSEPH ROSS, Department of Physics and Astronomy, Texas A&M University, College Station, Texas — Materials showing the magnetocaloric effect (MCE) have been a source of growing interest because of their potential for an environmentally friendly and energy efficient refrigeration technology. Recently, alloys based on Ni-Mn-Z (Z=In, Sb, Sn) have been reported to show a large MCE across the martensitic transformation where a first order structural transition is coupled to a magnetic transition. In this study, Ni-Mn-In materials with compositions NiMnIn, NiMnInand NiMnInwere analyzed both through magnetization and field-dependent calorimetry. For measurements across the first-order transformation region, we designed a modified method for relaxation calorimetry. Based on these measurements we identified individual contributions to the entropy change, including an antiferromagnetic state at low temperatures and a large change at the first order transition. The NiMnInresults also include a large anomalous nonmagnetic contribution.We will conclude by discussing the relative cooling power, and the prospects of these materials for practical applications. We gratefully acknowledge the support by the National Science Foundation under Grant No. DMR-1108396, and by the Robert A. Welch Foundation (Grant No. A-1526).

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