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Structural and Magnetic Properties of $Mn_{1.5}X_{0.5}Sn$ (X = Cr, Mn, Fe, Co) Melt-spun Ribbons[1] R. FUGLSBY, P. KHAREL, Department of Physics, South Dakota State University, Brookings, SD, W. ZHANG, S. VALLOPPILLY, Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, NE, Y. HUH, Department of Physics, South Dakota State University, Brookings, SD, D.J. SELLMYER, Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, NE — $Mn_{1.5}X_{0.5}Sn$ (X = Cr, Mn, Fe, Co) nanomaterials in a hexagonal Ni_2In-type crystal structure have been prepared using arc-melting and melt spinning. All the samples show moderate saturation magnetization at 100 K with a highest value of 458 emu/cm^3 for $Mn_{1.5}Fe_{0.5}Sn$, but their Curie temperatures (Tc) are less than 300 K. The highest Tc is 206 K for the Fe containing sample. All samples except the Cr containing one show irreversibility between the zero-field-cooled and field-cooled measurements at the low temperature, showing a spin reorientation or spin-glass-like behavior. The magnetic anisotropy constants calculated at 100 K are on the order of 1 Merg/cm^3. The magnetic properties of these materials have substantially improved due to vacuum annealing, where the Tc for Mn_2Sn annealed at 450 °C has increased by about 75 K from 190 K to 265 K.

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