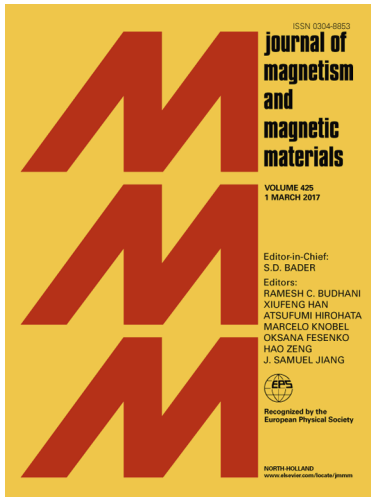

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ABSTRACT

Recently, MnNiGe and MnCoGe intermetallic compounds have received a considerable attention due to the coupled tunable martensitic and magnetic transitions as well as giant magnetocaloric effect (MCE) they exhibit. In this work, by doping with Cr and varying of the annealing regime, a merged magnetostructural transition between a ferromagnetic orthorhombic and a paramagnetic hexagonal structure was received near room temperature in $Mn_{1-x}Cr_xCoGe$ melt-spun ribbons with x = 0.04 and 0.11. Structural and magnetic characterizations have been performed by X-ray diffraction, differential scanning calorimetry and magnetization measurements. It is found that, in ribbons with x = 0.04 (0.11) annealed at 1148 K, the peak value of the magnetic entropy change and the refrigerant capacity through the orthorhombic to hexagonal transition strongly increase with the annealing time from 7.3 (9.4) $Jkg^{-1}K^{-1}$ to 10.6 (13.7) $Jkg^{-1}K^{-1}$ and from 182 (235) Jkg^{-1} to 214 (267) Jkg^{-1}, respectively, at 5 T for the time increase from 4 h to 8 h. Compared to bulk alloys of similar composition, the fabricated melt-spun ribbons show much broader working temperature range and a higher cooling efficiency.

Keywords: MnCrCoGe melt-spun ribbons; martensitic transformation; magnetostructural transition; magnetocaloric effect.

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