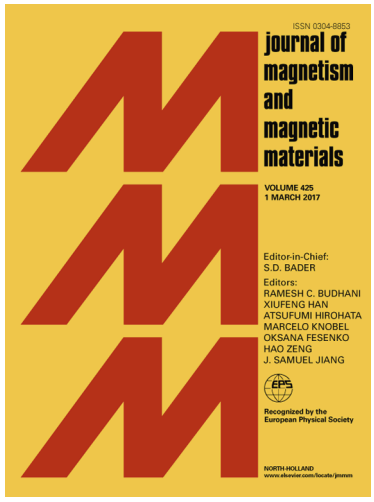

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Structure and magnetic properties of Heusler alloy Co_2RuSi melt-spun ribbons

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Abstract

Heusler alloy Co_2RuSi has been synthesized by melt-spinning technology successfully. Co_2RuSi bulk sample after annealing is composed of an HCP Co-rich phase and a BCC Ru-Si phase, but melt-spinning can suppress the precipitation of the HCP phase and produce a single Co_2RuSi Heusler phase. In the XRD pattern, it is found that Ru has a strong preference for the (A, C) sites, though it has fewer valence electrons compared with Co. This site preference is different from the case in Heusler alloys containing only 3d elements and is supported further by first-principles calculations. Melt-spun Co_2RuSi has a Ms of 2.67μ_B/f.u. at 5K and a Tc of 491K. An exothermic peak is observed at 871K in the DTA curve, corresponding to the decomposition of the Heusler phase. Finally, the site preference and magnetic properties of Co_2RuSi were discussed based on electronic structure calculation and charge density difference.