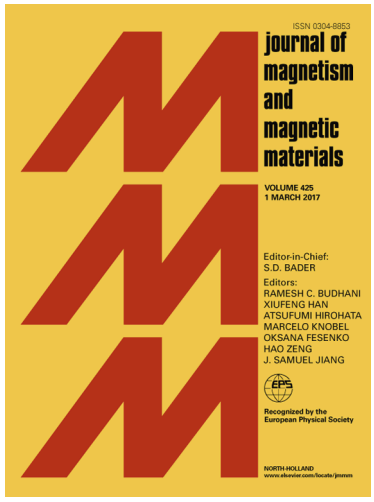

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Phase transformation in anisotropic nanocrystalline $SmCo_5$ magnets

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Abstract

$SmCo_5$ nanoflakes with excellent texture have great potential applications in high performance nanocomposite magnets, in which the phase structure of the hard magnetic phase is crucial for obtaining large coercivity. Phase transformation from 1:5 H phase to 2:17 R phase is observed in anisotropic nanocrystalline $SmCo_5$ magnets when sintering the nanoflakes at 600-650℃. The phase transformation is interesting because the 1:5 H phase is relatively stable according to the thermodynamic and kinetic analysis. The phase transformation results in much lower coercivity of the wet-milled anisotropic magnets when compared with dry-milled isotropic magnets with 1:5 H single phase. Analyses of differential scanning calorimetry, thermogravity and energy dispersive X-ray validate that the phase transformation originates from the oxidation of the nanoflakes with large specific surface area during sintering. The results suggest that controlling oxygen content