Exchange-spring magnetic behavior in Sr-hexaferrite/MnZn-ferrite composites for permanent magnet applications

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Since the proposal of exchange-spring magnet in 1991 by Kneller and Hawig [ref], powder and layered films have mostly received attention for its applications. However, the exchange coupling effect in bulk permanent magnets has never been reported. In this study, the exchange-spring magnetic behavior in bulk hard/soft magnetic composite was investigated. The hard/soft composite magnets were composed of strontium hexaferrite/manganese zinc ferrite, which were synthesized via conventional solid-state reaction. Raw materials were $SrCO_3$, Fe_2O_3 for strontium hexaferrite, and Mn_2O_3, ZnO, Fe_2O_3 for manganese zinc ferrite. They were ball-milled and uniaxially pressed into precursor pellets. The strontium hexaferrite precursor was calcined at 1150℃ for 12 h in air, and manganese zinc ferrite at 1200℃ for 8 h in air. The calcined pellets were crushed and sintered at 1300℃ for 2 h in air. The samples were characterized by X-ray diffraction (XRD), vibrating sample magnetometer (VSM), and scanning electron microscope (SEM). Further results will be presented for a discussion.

Keywords : Exchange-spring magnet, magnetic composite, strontium ferrite, manganese zinc ferrite

Reference

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