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 SrCO₃, Fe₂O₃ for 
strontium hexaferrite, and Mn₂O₃, ZnO, Fe₂O₃ for manganese zinc ferrite. They were ball-milled and uniaxially 
pressed into precursor pellets. The strontium hexaferrite precursor was calcined at 1150°C for 12 h in air, and 
manganese zinc ferrite at 1200°C for 8 h in air. The calcined pellets were crushed and sintered at 1300°C 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