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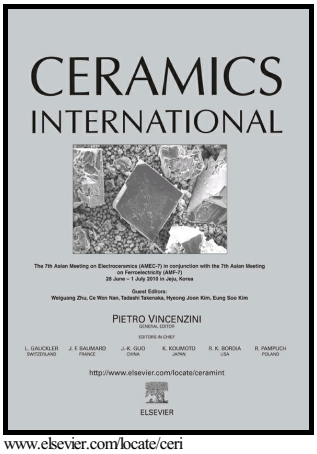

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Abstract

$CoFe_2O_4$/FeCo hard/soft core-shell system with different shell thickness was obtained by precise control of surface treatment conditions of the $CoFe_2O_4$ nanoparticles under reduced condition. $CoFe_2O_4$ nanoparticles were subjected to surface reduction treatment for various period of times (10, 15, 20, 25, and 30 min) at 550 ˚C in order to optimize the thickness of FeCo soft shell. The phase evolution, morphology, coercivity and magnetization of the nanocomposites were examined by X-ray diffraction, electron diffraction pattern, transmission electron microscope, and vibrating sample magnetometer. The single-phase-like hysteresis loops and Henkel plot reflect the existence of the exchange coupling phenomenon in the core-shell nanocomposite. The enhancement of maximum energy product, $(BH)_{max}$, by 50% with respect to the pure $CoFe_2O_4$ nanoparticles is obtained for a sample treated at 20 min.

Key words: nanocomposite, Core-shell, maximum energy product, exchange coupling