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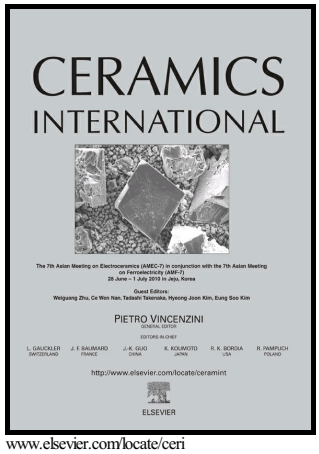

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Structure and magnetic properties of multi-morphological $CoFe_2O_4$/CoFe nanocomposites by one-step hydrothermal synthesis

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Abstract

Multi-morphological $CoFe_2O_4$/CoFe nanocomposites have been synthesized using a facile hydrothermal process. The effects of hydrazine hydrate amount during hydrothermal reaction on the structure and magnetic property of the specimens were studied. With increasing hydrazine hydrate amount, the $CoFe_2O_4$ transformed to CoFe and the morphology of the specimen changed from granular particles to faceted particles. The saturation magnetization monotonically increased and the coercivity monotonically decreased with increasing hydrazine hydrate amount. The magnetic interactions, determining the magnetic properties of the composites, result from the dominant dipole coupling and relative weak exchange coupling between $CoFe_2O_4$ and CoFe nanoparticles. The $CoFe_2O_4$/CoFe nanocomposite prepared with 2 mL hydrazine hydrate exhibited the optimal magnetic properties, with the saturation magnetization of 81 emu/g and coercivity of 636 Oe.

Keywords: A. Powders: chemical preparation; B. Composites; C. Magnetic properties; D. Ferrites

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