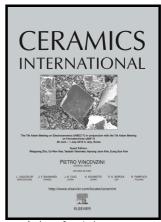
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Structure and magnetic properties of multi-morphological CoFe₂O₄/CoFe

nanocomposites by one-step hydrothermal synthesis

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Abstract

Multi-morphological CoFe₂O₄/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 CoFe₂O₄ 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 CoFe₂O₄ and CoFe nanoparticles.

The CoFe₂O₄/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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