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Annealing effect on the structural and magnetic properties of the $\text{CuAl}_{0.6}\text{Cr}_{0.2}\text{Fe}_{1.2}\text{O}_4$ nano-ferrites

By

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Graphical abstract

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Mössbauer spectra of the as-prepared (AP) and annealed $\text{CuAl}_{0.6}\text{Cr}_{0.2}\text{Fe}_{1.2}\text{O}_4$ samples.

Highlights

- As-prepared Cu-Al-Cr nano-ferrite samples were annealed at different temperatures T_A .
- Sample structure was transformed from cubic to tetragonal by JTE at 1000 °C.
- Spontaneous and saturation magnetizations showed similar behavior against T_A .
- The deduced parameters showed dependence on T_A and proved their affect by JTE.
- Spontaneous magnetization proved dependence on crystallite size.

Graphical abstract Mössbauer spectra of the as-prepared (AP) and annealed $\text{CuAl}_{0.6}\text{Cr}_{0.2}\text{Fe}_{1.2}\text{O}_4$ samples.

Abstract

Amounts of the as-synthesized $\text{CuAl}_{0.6}\text{Cr}_{0.2}\text{Fe}_{1.2}\text{O}_4$ nanoparticles by the chemical co-precipitation method were annealed for 4 hours at one of the temperatures $T_A = 300, 500, 600, 800$ and 1000 °C for each. The techniques used for characterizing the samples were X-ray diffractions, infrared (IR) and Mössbauer spectroscopy and vibrating

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