Title: Annealing effect on the structural and magnetic properties of the $CuAl_{0.6}Cr_{0.2}Fe_{1.2}O_4$ nano-ferrites

Author: M.A. Amer T.M. Meaz A.G. Mostafa H.F. El-Ghazally

PII: S0025-5408(15)00187-7
DOI: http://dx.doi.org/doi:10.1016/j.materresbull.2015.03.031
Reference: MRB 8102

To appear in: *MRB*

Received date: 11-12-2014
Revised date: 3-3-2015
Accepted date: 11-3-2015

Please cite this article as: M.A.Amer, T.M.Meaz, A.G.Mostafa, H.F.El-Ghazally, Annealing effect on the structural and magnetic properties of the CuAl0.6Cr0.2Fe1.2O4 nano-ferrites, Materials Research Bulletin http://dx.doi.org/10.1016/j.materresbull.2015.03.031

Annealing effect on the structural and magnetic properties of the $CuAl_{0.6}Cr_{0.2}Fe_{1.2}O_4$ nano-ferrites

By

M.A. Amer[1,*], T.M. Meaz[1], A.G. Mostafa[2] and H.F. El-Ghazally[1].

[1]Physics department, faculty of science, Tanta university, Tanta, Egypt

[2]ME. Lab., physics department, faculty of science, Al-Azhar university, Cairo, Egypt.

Graphical abstract

fx1

Mössbauer spectra of the as-prepared (AP) and annealed $CuAl_{0.6}Cr_{0.2}Fe_{1.2}O_4$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 ^oC.
- 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 abstractMössbauer spectra of the as-prepared (AP) and annealed $CuAl_{0.6}Cr_{0.2}Fe_{1.2}O_4$ samples.

Abstract

Amounts of the as-synthesized $CuAl_{0.6}Cr_{0.2}Fe_{1.2}O_4$ 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 ^oC for each. The techniques used for characterizing the samples were X-ray diffractions, infrared (IR) and Mössbauer spectroscopy and vibrating