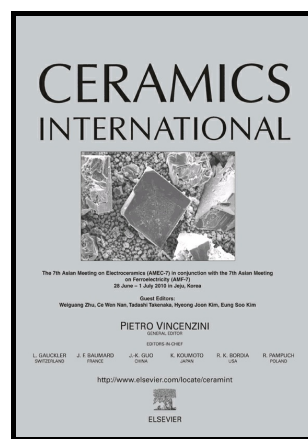


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Synthesis and Magnetic properties of nano-sized $\text{Cu}_{0.5}\text{Ni}_{0.5}\text{Fe}_2\text{O}_4$ via citrate and aloe vera A comparative study

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Abstract:

In this report, $\text{Cu}_{0.5}\text{Ni}_{0.5}\text{Fe}_2\text{O}_4$ nanoparticles were synthesized by solgel using eco-friendly aloe vera extract and citric acid separately and their properties were discussed. Structural, Functional, morphological, magnetic properties of the samples were characterized using X-ray diffraction (XRD), Fourier transform infrared (FT-IR), Transmission electron microscopy (TEM), Vibrating sample magnetometer (VSM). XRD exhibited the samples have single phase cubic spinel with average size of 46.4nm and 35.45nm. Two characteristics bands of ferrite were confirmed by FTIR. TEM indicated different morphology of the samples with some regularity. VSM data showed that higher coercivity for the sample prepared by aloe vera extract.

Key words

Ni-Cu ferrite; Citrate; Aloe vera; Ferromagnetism

Introduction :

In recent times, spinel ferrites precisely have fascinating magnetic properties, and making them a noticeable group in magnetic materials because their subsequent applications are used in many interdisciplinary areas [1].

In inverse spinel copper ferrite (CuFe_2O_4) structure , Cu^{2+} ions and half of the Fe^{3+} ions occupy octahedral sites and the surplus Fe^{3+} ions reside in tetrahedral sites. Morphology, particle size, defects in surface, and temperature affect the magnetic properties of ferrite nano particles. Hence it is essential to mention that the design of magnetic nanoparticles for different applications involves careful estimation of size modification, on its magnetic properties [2].

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