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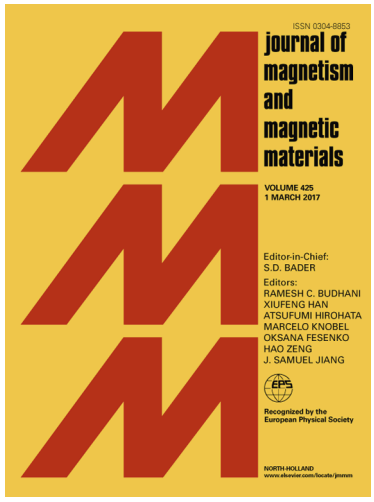

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Mohammad Ansari, Ashkan Bigham, S.A. Hassanzadeh-Tabrizi, H. Abbastabar Ahangar

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Synthesis and Characterization of $Cu_{0.3}Zn_{0.5}Mg_{0.2}Fe_2O_4$ Nanoparticles as a Magnetic Drug Delivery System

Mohammad Ansari[a], Ashkan Bigham[a], S.A. Hassanzadeh-Tabrizi[a], H. Abbastabar Ahangar[b*]

[a] Advanced Materials Research Center, Department of Materials Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran

[b] Department of Chemistry, Najafabad Branch, Islamic Azad University, Najafabad, Iran

Abstract

Mixed spinel ferrite nanoparticles are being applied in biomedical applications due to their biocompatibility, antibacterial activity, particular magnetic and electronic properties with chemical and thermal stabilities. The $Cu_{0.3}Zn_{0.5}Mg_{0.2}Fe_2O_4$ nanoparticles are synthesized through the thermal treatment method. Polyvinyl alcohol (PVA) is used as the capping agent to stabilize the particles and prevent their agglomeration. The synthesized nanoparticles are characterized through X-ray diffractometer (XRD), Fourier transform infrared spectroscopy (FTIR), N_2 adsorption-desorption, field emission scanning electron microscopy (FESEM), and transmission electron microscope (TEM). The magnetic characterization is made on a vibrating sample magnetometer (VSM), which displayed super-paramagnetic behavior of the synthesized sample. Potential application of the $Cu_{0.3}Zn_{0.5}Mg_{0.2}Fe_2O_4$ nanoparticles as a drug delivery agent is assessed *in vitro* by estimating their release properties. The obtained results indicate that the amount of ibuprofen (IBU) adsorbed into the nanocarrier of $Cu_{0.3}Zn_{0.5}Mg_{0.2}Fe_2O_4$ is 104 mg/g and the drug release is sustained up to 72 h.

* Corresponding author. Tel.: +983142292868; fax: +983142291016
E-mail address:, abbastabar@pmt.iaun.ac.ir (H.A. Ahangar)

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