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# Investigations of structural, magnetic and induction heating properties of surface functionalized zinc ferrite nanoparticles for hyperthermia applications

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In the present work, investigations of structural, magnetic and induction heating properties of surface functionalized zinc ferrite nanoparticles were carried out successfully. The zinc ferrite nanoparticles were prepared by co-precipitation route and further functionalized with oleic acid. The room temperature X-ray diffraction pattern confirmed the typical cubic spinel structure of the prepared nanoparticles. The average crystallite size calculated from Scherrer's formula was found to be 12.30 nm confirming the nanocrystalline nature of zinc ferrite nanoparticles. The characteristic peaks observed in FT-IR spectrum confirmed the formation of cubic spinel structure and oleic acid coating over zinc ferrite nanoparticles. The room temperature magnetization behaviour revealed the superparamagnetic nature of the prepared nanoparticles. The induction heating behaviour shows a desirable amount (6 mg/mL) of zinc ferrite nanoparticles can able to achieve 42°C temperature for 600 s at 4.0 kA/m. This indicates that the resulting zinc ferrite nanoparticles are promising materials in magnetic hyperthermia treatments.

Topics

Electromagnetic induction, Electrodynamics, Nanomaterials, Nanoparticle, Fourier transform spectroscopy, Inorganic

Nanoparticle, Fourier transform spectroscopy, Inorganic compounds, Co-precipitation, X-ray diffraction, Thermoregulation, Fatty acids

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