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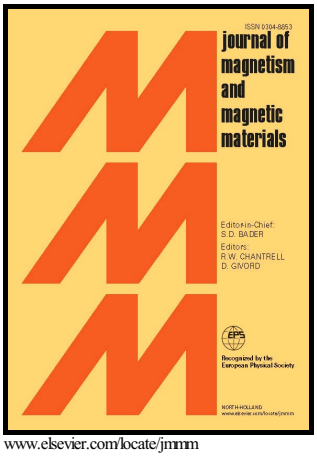

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Water dispersible Superparamagnetic cobalt iron oxide nanoparticles for magnetic fluid hyperthermia

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Abstract

Superparamagnetic nanoparticles of Cobalt iron oxide ($CoFe_2O_4$) are synthesized chemically, and dispersed in an aqueous suspension for hyperthermia therapy application. Different parameters such as magnetic field intensity, particle concentration which regulates the competence of $CoFe_2O_4$ nanoparticle as a heating agents in hyperthermia are investigated. Specific absorption rate (SAR) decreases with increase in the particle concentration and increases with increase in applied magnetic field intensity. Highest value of SAR is found to be 91.84 W g^{-1} for 5 mg. mL^{-1} concentration. OA-PEG coated $CoFe_2O_4$ nanoparticles have shown superior cyto-compatibility over uncoated nanoparticles to L929 mice fibroblast cell lines for concentrations below 2mg/mL. Present work provides the underpinning for the use of $CoFe_2O_4$ nanoparticles as a potential heating mediator for magnetic fluid hyperthermia.

Keywords: Magnetic nanoparticles; OA-PEG coating; Contact angle measurements; Induction heating; Biocompatibility

1. INTRODUCTION

Uprising research in the field of nanotechnology has put forth various modern tools which cover up technical and biological applications. Magnetic nanoparticles (MNPs) is one of the such new tools. MNPs with ultrafine size, biocompatibility and superior magnetic properties are favoured in human applications. Among various MNPs, manghemite and magnetite are already used for biomedical