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Relaxation and Hyperthermia Investigation on Magnetic Nanoparticle suspensions V. BUBULAC, Department of Physics and Astronomy, Wayne State University, Detroit, MI 48201, P.P. VAISHNAVA, Kettering University, Flint, MI 48504 , R. TACKETT, C. SUDAKAR, R. NAIK, G. LAWES, Department of Physics and Astronomy, Wayne State University, Detroit, MI 48201
— We have examined the Néel and Brownian relaxation mechanisms and hyperthermia characteristics of aqueous suspension of γ- Fe_2O_3 and Fe_3O_4:Co_x ($0 \leq x \leq 0.15$) nanoparticles by ac and dc magnetization measurements and specific absorption ratio (SAR) values. The structural properties were investigated by X-ray diffraction (XRD) and Transmission Electron Microscopy (TEM). The ac susceptibility measurement showed dissipation peaks associated with Néel relaxation in γ- Fe_2O_3 and Fe_3O_4 samples but only the Fe_3O_4 sample showed a significant Brownian relaxation peak near the melting temperature of the carrier fluid. The specific absorption rate (SAR) value for the Fe_3O_4 sample is five times larger than that of the γ- Fe_2O_3 sample, which we attribute to reduced steric hindrance to rotation. Changes in the structural, magnetocrystalline, and SAR values on incorporating Co ions in Fe_3O_4 will be presented.

Chandran Sudakar
Wayne State University, MI 48201

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