

Abstract Submitted
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A comparison of methods for the determination of the magnetocrystalline anisotropy constant in an Fe_3O_4 -based ferrofluid RONALD TACKETT, MEGAN ALLYN, Kettering University, VIJAYENDRA GARG, ADERBAL DE OLIVEIRA, University of Brasilia, PREM VAISHNAVA, Kettering University — The dynamics of the relaxation behavior of superparamagnetic nanoparticles is governed by many factors such as the anisotropy constant, composition, size and nature of coating of the nanoparticles particles. We report values of the anisotropy constant (K) for magnetite nanoparticle (size ~ 12 nm) coated with dextran and suspended in water by dc and ac magnetization measurements, MOssbauer spectroscopy and the temperature dependent specific absorption rate (SAR) measurement. The magnetite nanoparticles were synthesized by co-precipitation and characterized by X-ray diffraction (XRD) and Transmission electron microscopy (TEM). The K values from dc magnetic susceptibility, MOssbauer spectroscopy, ac magnetic susceptibility, and that obtained by temperature dependent SAR measurements are all within the range of the accepted values in the literature. Merits and demerits of the four methods of determining K values will be discussed. We will also report on the temperature dependence of the anisotropy constant and the NEel relaxation constant.

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