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Probing Brownian relaxation in water-glycerol mixtures using magnetic hyperthermia HUMESHKAR NEMALA, Department of Physics and Astronomy, Wayne State University, Detroit, Michigan, MICHAEL MILGIE, Department of Natural Sciences,University of Michigan, Dearborn, Michigan, ANSHU WADEHRA, JAGDISH THAKUR, Department of Physics and Astronomy, Wayne State University, Detroit, Michigan, VAMAN NAIK, Department of Natural Sciences,University of Michigan, Dearborn, Michigan, RATNA NAIK, Department of Physics and Astronomy, Wayne State University, Detroit, Michigan — Generation of heat by magnetic nanoparticles in the presence of an external oscillating magnetic field is known as magnetic hyperthermia (MHT). This heat is generated by two mechanisms: the Neel relaxation and Brownian relaxation. While the internal spin relaxation of the nanoparticles known as Neel relaxation is largely dependent on the magnetic properties of the nanoparticles, the physical motion of the particle or the Brownian relaxation is largely dependent on the viscous properties of the carrier liquid. The MHT properties of dextran coated iron oxide nanoparticles have been investigated at a frequency of 400KHz. To understand the influence of Brownian relaxation on heating, we probe the MHT properties of these ferrofluids in water-glycerol mixtures of varying viscosities. The heat generation is quantified using the specific absorption rate (SAR) and its maximum at a particular temperature is discussed with reference to the viscosity.

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