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**In-vitro heating with Polyethylene Glycol Coated Magnetic Nanoparticles** SRINIVASAN BALAKRISHNAN, M.J. BONDER, D. GALLO, G. C. HADJIPANAYIS, Department of Physics and Astronomy, University of Delaware — Magnetic nanoparticles synthesized with a biocompatible polymer coating are under investigation for future detection and treatment of cancer. In this study we investigate the heating characteristics of Fe based nanoparticles coated with polyethylene glycol. Structural characterization indicates a variation in the composition with polymer concentration. The x-ray analyses show that samples become increasingly amorphous as evidenced by the broad amorphous-like peak superimposed on the alpha iron (110) peak. The magnetization curves indicate that all samples are soft ferromagnets with the coercivity dependent on mean particle size. When the nanoparticle suspension is subjected to a 4Oe, 500 kHz AC magnetic field there is a steep rise in temperature reaching an equilibrium temperature for all cases. Correlating the equilibrium temperature with the static magnetic properties shows that the temperature is linearly dependent on the saturation magnetization and inversely proportional to the coercivity of the particle. Work supported by NSF DMR-0302544 .

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