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The effects of intraparticle and interparticle interactions on the magnetic hysteresis loop of frozen suspensions of bionized nanoferrite particles ZOE BOEKELHEIDE, Lafayette College, CORDULA GRUETTNER, micromod Partikeltechnologie GmbH, CINDI DENNIS, National Institute of Standards and Technology — Bionized nano-ferrite (iron oxide/dextran) nanoparticles have been shown to have a large heating response in an alternating magnetic field, making them very promising for applications in magnetic nanoparticle hyperthermia cancer treatment. Magnetic hysteresis loop measurements of these particles provide insight into the magnetic reversal behavior of these particles, and thus their heating response. Measurements have been performed on frozen suspensions of nanoparticles dispersed in H_2O, which have been frozen in a range of applied fields in order to tune the interparticle dipolar interactions through formation of linear chains. These experimental results are compared with micromagnetic models of both monolithic (single-domain) and internally structured (multi-grain) particles. It is found that the internal structure of the nanoparticles, which are made up of parallelepiped-shaped grains, is important for describing the magnetic reversal behavior of the particles and the resulting shape of the hysteresis loops. In addition to this, interparticle interactions between particles in a linear chain modify the reversal behavior and thus the shape of the hysteresis loop.

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