Abstract Submitted
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Studying the Magnetic Resonance properties of Superparamagnetic Iron Oxide (Fe_2O_3) Nanoparticles SO JIN PARK, University of Maryland Eastern Shore, BEHROUZ KHODADADI, THOMAS MACHER, TIM MEWES, YUPING BAO, MINT Center, University of Alabama — Ferromagnetic Resonance (FMR), which measures the resonance field by detecting the precessional motion in response to a microwave field, is used to analyze the effects of the polymer matrix concentration of polyacrylic acid (PAA) and presence of bias field on the magnetic properties of citrate coated iron oxide nanoparticles. The nanoparticles were dispersed into three different levels of PAA concentration: citrate coated iron oxide nanoparticles in water (0 mg PAA matrix), nanoparticles in low PAA (1mg), and high PAA (5mg) matrix. The polymer matrix aided in fixing the nanoparticles into place, which restricted mechanical movement. In addition, a bias field created by two permanent magnets was used to harden samples of nanoparticles with PAA while subject to a magnetic field. Our results indicated that nanoparticles in solution (not fixed) had the overall highest linewidth compared to the nanoparticles dispersed in polymer matrix, in both samples with and without a bias field. The larger linewidth could be due to the large inhomogenity in the dipole-dipole interaction found in the freely moving nanoparticles. It was also observed that the arrangement of the bias field relative to the external field during measurements had an effect on the magnetic properties.

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