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Imagining of rotating surfactant-coated barium hexaferrite particles in high viscosity fluids[1] AUSTIN ROUTT, KATHRIN SPENDIER, MEGHAN SMITH, PHILIPPE JONES, WILL THOMPSON, Univ Colorado - Colorado Springs — Magnetically anisotropic barium hexaferrite ($BaFe_{12}O_{19}$) nanoparticles were coated through various techniques and with various substances. Primary coatings used were dextran sulfate (DXS), as used on iron oxide, and carboxymethyldextran (CMD). Coatings were done on particles ranging from ˜50nm to ˜500nm. The coated $BaFe_{12}O_{19}$ particles were tested for their ability to penetrate high viscosity hydroxyethylcellulose (HEC) gels when subject to an oscillating magnetic field, with and without the influence of a static magnetic field superimposed onto the oscillating field. The oscillating magnetic field amplitudes ranged from 1.0 - 4.0 mT and frequencies ranged from 0 - 100 Hz. The data were analyzed to identify an ideal frequency and field strength for particle penetration time through about 1.0 cm of HEC in a cuvette. Using the frequency and field strength selected, two pairs of Helmholtz coils were designed to fit in an inverted light microscope to image rotating magnetic particles at a high spatial and temporal resolution of 300 nm and 5 ms, respectively. In this presentation, we will show our preliminary data on the imaging of rotating ($BaFe_{12}O_{19}$) nanoparticles in 1-10% HEC gels and water.

[1]UCCS BioFrontiers Institute

Austin Routt
Univ Colorado - Colorado Springs

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