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## Effects of Varying Sufactant Chain Lenghts on the Magnetic, Optical and Hyperthermia Properties of Ferrofluids

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# NASA/ADS

## Effects of varying surfactant chain lengths on the magnetic, optical and hyperthermia properties of ferrofluids

**Rablau, Corneliu; Vaishnava, Prem; Regmi, Rajesh; Sudakar, Chandran; Black, Correy; Lawes, Gavin; Naik, Ratna; Lavoie, Melissa; Kahn, David**

We report studies of the structural, magnetic, magneto-thermal and magneto-optic properties of dextran, oleic acid, lauric acid and myristic acid surfacted  $\text{Fe}_3\text{O}_4$  nanoparticles of hydrodynamic sizes ranging from 32 nm to 92 nm. All the samples showed saturation magnetization of 50 emu/g, significantly smaller than the bulk value for  $\text{Fe}_3\text{O}_4$ , together with superparamagnetic behavior. The ac magnetization measurements on the dextran coated nanoparticles showed frequency dependent blocking temperature, consistent with superparamagnetic blocking. The ferrofluid heating rates in a 250 Gauss, 100 kHz ac magnetic field varied with the chain lengths of the surfactants, with higher heating rates for longer chains. DC-magnetic-field-induced light scattering patterns produced by two orthogonal He-Ne laser beams passing through the ferrofluid sample revealed different optical signatures for different surfactants.

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