Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Effects of varying surfactant chain lengths on the magnetic, optical and hyperthermia properties of ferrofluids CORNELIU RABLAU, PREM VAISHNAVA, Kettering University, Flint, MI, RAJESH REGMI, CHANDRAN SUDAKAR, CORREY BLACK, GAVIN LAWES, RATNA NAIK, Wayne State University, Detroit, MI, MELISSA LAVOIE, Yale University, New Haven, CT, DAVID KAHN, Oakland University, Auburn Hills, MI — We report studies of the structural, magnetic, magneto-thermal and magneto-optic properties of dextran, oleic acid, lauric acid and myristic acid surfacted Fe_3O_4 nanoparticles of hydrodynamic sizes ranging from 32 nm to 92 nm. All the samples showed saturation magnetization of $\sim$50 emu/g, significantly smaller than the bulk value for Fe_3O_4, together with superparamagnetic behavior. The ac magnetization measurements on the dextran coated nanoparticles showed frequency dependent blocking temperature, consistent with superparamgnetic 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.

Corneliu Rablau
Kettering University, Flint, MI

Date submitted: 21 Nov 2008 Electronic form version 1.4