Abstract Submitted
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Synthesis and Magnetic Characterization of Maghemite Nanoparticles Designed for Targeted Cancer Therapy[1] K. PISANE, E. DESPEAUX, P.M. GANNETT, M.S. SEEHRA, Departments of Physics and Basic Pharmaceutical Sciences, West Virginia University — Adopting the procedure described by Hyeon et al [1], oleic acid coated maghemite nanoparticles of 7 nm average size as determined by TEM were synthesized for use in targeted cancer therapy. Here we report their magnetic properties. Using a PPMS magnetometer, magnetization (M) vs. temperature (2 K - 350 K) and magnetic field (up to ± 90 kOe) was measured under the zero-field-cooled (ZFC) and field-cooled (FC) conditions. The results for H = 100 Oe show a blocking temperature $T_B = 35K$ which shifts to lower temperatures with increase in H. For$T > T_B$, isotherms of M vs. H were measured at several temperatures and, following the procedures reported recently [2], data were fitted to a modified Langevin function: $M = M_0 L(\mu_p H/k_B T) + \chi_a H$ with $\mu_p \simeq 7500\mu_B$ per particle. Using this magnitude of μ_p, particle diameter D = 6.9 nm is determined which agrees with the TEM data. Procedures for *in vitro* studies include coating with biocompatible polymer and functionalization with therapeutic and targeting ligands. Toxicity testing and determination of *in vivo* activity are in progress.

[1] T. Hyeon et al, J. Am. Chem. Soc. 123, 12798 (2001)
[2] M. S. Seehra et al, J. Phys. Chem. Solids 71, 1362 (2010)

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