Abstract Submitted
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Permanent-Magnetic Fe-Pt Nanosparticles[1] RALPH SKOMSKI, D.J. SELLMYER, Department of Physics and Astronomy and NCMN, University of Nebraska — Recently, it has become possible to produce magnetically stable small-scale single-phase [1] and hard-soft [2] Fe-Pt nanoparticles with potential applications in permanent magnetism. The coercivity is largely determined by the degree of $L1_0$ ordering and the presence of the soft phase, respectively, and affected by surface anisotropy. We model the coercivity of the particles as a function of composition, structure, and particle diameter. The smallest particles reverse coherently, with renormalized anisotropy constants, but with increasing size, micromagnetic corrections become important. The reversal modes in the two-phase particles are reminiscent of p-state wave functions in atomic physics [2] and well described by second-order perturbation theory. We also discuss extensions involving semihard phases, which may be created by substitutions or coatings using heavy transition metals, such as Pt and W. One example is hexagonal $Co_{1-x}Pt_x$, which exhibits a huge anisotropy per Pt atom and a substantial net anisotropy. - [1] C. B. Rong *etal.*, Adv. Mater. 18, 2984 (2006); R. Skomski *etal.*, JAP 103, in press (2008). - [2] J. E. Shield *etal.*, JAP 99, 08B508 (2006). - [3] R. Skomski, $SimpleModelsofMagnetism$, University Press, Oxford 2008.

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