Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Direct Fabrication and Magnetic Characterization of Highly Ordered $L1_0$ FePt Nanoparticles JIAO-MING QIU, JIAN-PING WANG, MINT & Department of Electrical and Computer Engineering,University of Minnesota — Future advanced magnetic recording media require the grains to be small and uniform with sufficient anisotropy to sustain thermal fluctuation. $L1_0$ phase FePt nanoparticles fit these requirements but their fabrication turns out to be difficult. Conventional methods were reported to be able to make monodispersed FePt nanoparticles with disordered structure[1]. The inevitable phase transformation process is believed to be kinetically limited[2] and such issues as agglomeration and twinning are to be addressed. Here we report a novel technique that can fabricate monodispersed highly ordered FePt nanoparticles with no need for phase transformation process. In this technique, particle nucleation and growth processes happened in the gas phase and they were separated in space. Modified sputtering plasma made the ordering and particle growth processes proceed simultaneously. Uniform $L1_0$ FePt nanoparticles with room temperature coercivity of 8.25 kOe were achieved for particle randomly assembled film. HRTEM analysis shows that these particles have perfect octahedron shape with only {111} surfaces exposed. Ref: 1. Sun, S, et al, Science, 287, 1989, 2000 2. Ding, Y. et al, Appl. Phys. Lett. 87, 022508, 2005

Jiao-Ming Qiu
MINT & Department of Electrical and Computer Engineering, University of Minnesota

Date submitted: 06 Dec 2005 Electronic form version 1.4