Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Ordering, Texture and Magnetism in Ultrathin FePt Films TOM GEORGE, XINGZHONG LI, RALPH SKOMSKI, DAVID J. SELLMYER, Nebraska Center for Materials and Nanoscience, University of Nebraska — Non-epitaxially grown $L1_0$ FePt ultrathin films have been fabricated and investigated. All films were magnetron sputtered onto SiO_2 substrates in the form $[Fe/Pt]_n$, with individual layer thicknesses from about 0.1 to 0.4 nm. The films' nominal total thickness ranged from 5 to 20 nm and was controlled by varying the number of bi-layer repetitions. The $L1_0$ phase and (001) texture were obtained by post-deposition annealing for 300 seconds at 600 $^\circ$C. Transmission electron microscopy showed all as-deposited films as continuous; but after annealing, all films except the thickest ones showed agglomeration into a connected island-like morphology. $L1_0$-ordering and texture were confirmed by x-ray and electron diffraction, and the degree of order tended to decrease with increasing nominal film thickness. The (001) texture was greatest when the nominal film thickness was 12.5 nm, coinciding with an island thickness of the same value. SQUID magnetometry shows a relatively unusual trend of coercivity increasing with island thickness, with the highest value corresponding to the most ordered sample. The process of film agglomeration and the effects of bi-layer thickness and annealing temperature and time are also discussed. – This research is supported by NSF-MRSEC (RS), INSIC, DOE (DJS), and NCMN.

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Date submitted: 21 Nov 2008 Electronic form version 1.4