Direct Chemical synthesis of L1₀ FePt Nanoparticles with High Coercivity¹ XIAOCAO HU, RYAN GALLAGHER, GEORGE HADJIPANAYIS, University of Delaware — FePt particles with tetragonal L1₀ structure have been of great interest as one of the most promising candidate for ultra-high density recording media. Chemical synthesis is one of the two major methods to fabricate FePt nanoparticles because it can lead to high uniformity and patterned assembly. However, traditional approaches require post annealing above 500° to transform the FePt nanoparticles from the disordered face-centered cubic (fcc) to the ordered L1₀ phase which introduces undesirable agglomeration and sintering. In this study, we have fabricated ordered L1₀ FePt nanoparticles using one-step chemical synthesis without post annealing. The traditional synthesis method of reduction of Pt(acac)₂ and Fe(CO)₅ was used at higher temperatures in the range of 300 to 400°. Monodispersed Au nanoparticles with average size of 10 nm were used as catalysts. X-ray diffraction (XRD) spectra and selected area electron diffraction (SAED) patterns revealed that the FePt nanoparticles are in L1₀ phase. The highest coercivity obtained was 8 kOe at room temperature and 11 kOe at 50 K and is achieved at the reaction temperature of 400°. Transmission electron microscopy (TEM) images showed that FePt nanoparticles are partially agglomerated which needs further improvement.

¹Work supported by DOE DE-FG02-04ER4612