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Direct Chemical synthesis of $L1_0$ FePt Nanoparticles with High Coercivity[1] XIAOCAO HU, RYAN GALLAGHER, GEORGE HADJIPANAYIS, University of Delaware — FePt particles with tetragonal $L1_0$ 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 $L1_0$ phase which introduces undesirable agglomeration and sintering. In this study, we have fabricated ordered $L1_0$ 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 $L1_0$ 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.

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George Hadjipanayis
University of Delaware

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