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Magnetic Properties and Chemical Synthesis of FePt and CoPt Nanoclusters YAO ZHAO, YUCHENG SUI, DAVID SELLMYER, Department of Physics and Astronomy and Nebraska Center for Materials and Nanoscience, University of Nebraska, Lincoln, NE, 68588-0111, USA — Much interest has been paid to self-assembled $L1_0$ FePt and CoPt nanoclusters for basic science and potential applications in ultra-high density magnetic recording media. In this study, thermal decompostion of a Fe and Pt acetylacetonates mixture in trioctylamine was employed to produce FePt nanoclusters with average size about 4 nm and a narrow size distribution. The atomic ratio of Fe and Pt for the as-synthesized FePt clusters is 50:50. Using the same procedure, CoPt nanoclusters were obtained with the atomic ratio of 40:60. With the addition of oleic acid into the reaction solution the atomic ratios were adjusted to 50:50. As-synthesized FePt and CoPt nanoclusters have fcc structures, but after rapid thermal annealing in forming gas the nanoclusters transform into hard magnetic $L1_0$ ordered structures. The nanostructures of the clusters were characterized by TEM and XRD. The magnetic properties were measured by a SQUID magnetometer. The coercivity of FePt and CoPt clusters reached the maximum value of 23 kOe and 17kOe respectively after annealing at 750 ^{o}C for 5mins. Beyond 750 ^{o}C, the coercivity decreased slightly because of the sintering effect and a different magnetic reversal mechanism. This work is supported by NSF-MRSEC, DOE, INSIC, NRI and NCMN.

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