

Abstract Submitted
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Effect of Bi Substitution on the FCC to L1₀ Phase Transformation in CoPt(Bi) Nanoparticles FRANK ABEL, Physics and Astronomy, University of Delaware, VASILIS TZITZIOS, Institute of Nanoscience and Nanotechnology, NCSR, DAVID SELLMYER, Physics and Astronomy and NCMN, University of Nebraska, GEORGE HADJIPANAYIS, Physics and Astronomy, University of Delaware — The transformation from the fcc to fct structure L1₀ in CoPt requires annealing at temperatures over 600⁰ C, as compared to FePt which can occur at 550⁰ C. In the past, similar attempts to lower the transformation temperature in CoPt have been unsuccessful. In this work, we report for the first time a decrease in the phase transformation temperature of chemically synthesized CoPt nanoparticles by the addition of a small amount of bismuth. Our studies have shown that the phase transformation occurs in as-made CoPt(Bi) nanoparticles at refluxing temperatures as low as 330⁰C, which is significantly lower than previously reported values in CoPt nanoparticles and thin films. The as-made CoPt nanoparticles with 5% atomic weight Bi show partial L1₀ ordering with an average size of 11.7 nm, as shown by TEM imaging, and have a coercivity of 1 kOe and saturation magnetization of 32 emu/g. Annealing of the CoPt(Bi) nanoparticles produced maximum coercivities of 12.4 kOe when annealed at 700⁰C for 1 hour. The effect of amount of Bi addition on the formation and ordering of L1₀ structure will be discussed.

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