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Surfactant Effects on the Growth of Magnetic Nanocrystals ANNA C.S. SAMIA, Chemistry Division, Argonne National Lab, JOHN A. SCHLUETER, J. SAMUEL JIANG, SAMUEL D. BADER, Materials Science Division, Argonne National Lab, XIAO-MIN LIN, Materials Science Division, Chemistry Division, Argonne National Lab — Understanding the role of surface ligands in regulating nanocrystal growth is an important step towards developing synthetic routes for the fabrication of novel nanomagnets. Here we report the surfactant effects on the particle size and growth of FePt and Co nanocrystals. Different concentrations of oleic acid (OA) ligand present during the cobalt carbonyl decomposition result in either the formation of large ferromagnetic nanocrystals or small cluster complexes. More dramatically, by adding or removing free oleic acid ligand from the final product of the carbonyl decomposition, we can turn a large nanocrystal colloid into a cluster complex solution and vice versa. The use of oleic acid as capping material in the organometallic synthesis of FePt leads to the formation of monodispersed 5 nm nanocrystals. On the other hand, changing the surfactant to TOPO results to a bimodal size distribution of large (14 nm) and small (2 nm) FePt nanocrystals. The blocking temperature of the TOPO-capped sample has three times higher blocking temperature than the OA-capped nanocrystals.

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