Preparation and Characterization of Magnetite Nanoparticle

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The synthesis of Fe3O4 nanoparticle has been focused on the recent research interest because of their diverse potential applications as new materials. The synthesis of monodisperse nanocrystal is the most important because the properties of these nanoparticles are strongly dependent on their dimensions. We have design and prepared monodisperse, size-controllable, shape-controllable and highly crystalline nanocrystal. Metal-oleate complex consisting of metal precursors and sodium oleated is dissolved in water-ethanol-toluene solution, and we inject the oleic acid passivating the metal precursors and hydrazine decomposing the metal-oleic acid complex. Unfortunately most synthetic methods produced few grams of nanoparticles. However we report the large scale synthetic method. We were able to synthesize about 20g of magnetite nanocrystals with low reaction temperature using hydrazine. Moreover, we control the particle size by varying the experimental conditions without size sorting process.