Abstract Submitted
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Size control and large scale synthesis of Fe3O4 nanoparticles via step by step reaction[1] SHIRIN POURMIRI, FRANK ABEL, Univ of Delaware, VASILEIOS TZITZIOS, Institute of Nanoscience and Nanotechnology, NCSR Demokritos, Greece, GEORGE HADJIPANAYIS, Univ of Delaware — This work focuses on the synthesis and characterization of Fe3O4 nanoparticles by a simple chemical approach. The synthesis takes place in a oleylamine-oleic acid mixture using Fe(acac)3 as iron precursor under air atmosphere. The particle size was controlled following a step by step thermolytic approach; at each step the particles were investigated by TEM, XRD and magnetic measurements. The synthesized particles at 310 oC have an average size of 9.3 nm (1st step), 11.5 nm (2nd step), 13.6 nm (3rd step) and 16.5 nm (4th step) depending on the time and concentration at which the nanoparticles were synthesized. Magnetic measurements at room temperature show that the saturation magnetization of the particles increases with particle size from 54.0 emu/g in nanoparticles with 9.3 nm to 82.9 emu/g in the 16.5 nm particles. The smallest size particles show a higher slope in the high field M(H) data indicating surface spin canting.

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