

Self-Assembly of Monodisperse Oleic Acid-Capped Superparamagnetic Iron Oxide Nanoparticles

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Abstract : Oleic acid (OA) capped superparamagnetic iron oxide nanoparticles (SPION) were synthesized by a thermal decomposition method. The composition of nanoparticles was confirmed by X-ray powder diffraction, and the morphology of particles was investigated by Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), and Transmission electron microscopy (TEM). The crystalline and particle size distribution of SPIONS capped with OA were investigated with a mean size of 6.99 nm and 8.9 nm, respectively. It was found that SPIONS have superparamagnetic characteristics with a saturation magnetization value of 64 emu/g. The thin film form of self-assembled SPIONS was fabricated by coating techniques of spin coating and dip coating. SQUID-VSM magnetometer and FMR techniques were performed in order to evaluate the magnetic properties of thin films, especially the existence of magnetic anisotropy. The thin films with magnetic anisotropy were obtained by self-assembled monolayers of SPION.

Keywords : magnetic materials, nanostructures, self-assembly, FMR

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