

Synthesis and characterization of cobalt ferrite nanoparticles by hydrothermal method for biomedical applications

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Cobalt ferrite nanoparticles have attracted considerable attention for their high application potential in biomedicine such as drug delivery, cancer therapy, bio-imaging, biosensors, and photoablation therapy. The special interest is their magnetic properties which are mainly determined by the type of materials, crystallinity of structures, and particle size. The water affinity of magnetic nanoparticles (MNPs) is necessary for medical applications and their aggregation caused by the large specific surface area and magnetic interactions must be removed. It is thus essential to adopt methods to stabilize the MNPs, either by using surfactants or by changing their surface potential. In this study, single-phase cobalt ferrite nanoparticles of controlled size (~10 nm) have been synthesized by hydrothermal method using oleic acid as a surfactant. The oleic acid-coated cobalt ferrite nanoparticles are dispersed well in nonpolar organic media. The role of oleic acid was clarified and the formation mechanism of nanoparticles was also investigated by altering the precursors concentration, oleic acid concentration, heating time, and reaction temperature.