

Preparation of functionalized Super paramagnetic Particles by Co-precipitation Method for Bio-Kit

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This paper describes an improved approach for the coating of super paramagnetic particles with shells of amorphous silica. Magnetite (Fe₃O₄) nanoparticles are prepared by co-precipitation method.

The silica coating is controlled by CMRE(Continuous Micro Reaction System) with a dilute silicate solution. Transmission electron microscopy, SEM, FT-IR, XRD, VSM, Silanol group and particle size analysis results show that the attractions between the super paramagnetic particles are screened by the silica coating. With enough polymerization of sodium silicate, the stable core-shell particle was obtained. Vibrating sample magnetometer characterization shows that magnetization can be affected by the magnetic core-shell structure.

Magnetic nanoparticles have been applied to immobilizing proteins, enzymes and other bioactive agents in analytical biochemistry, medicine and biotechnology.

Pure magnetic particles may not be very useful in practical applications due to easy aggregation, less stabilization of their structures and magnetic properties, and rapid bio-degradation.

Key Words: Magnetic Particle, Silica core-shell, Bio-Kit, Functional group