

Synthesis and size control of superparamagnetic magnetite nanoparticles by controlling microenvironment through the piezoelectric nozzle

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We report the synthesis and characterization of the Fe₃O₄ nanoparticles by a chemical coprecipitation technique through the pipette drop (pipette diameter: 2000 μm) and the piezoelectric nozzle method (nozzle size: 50 μm). A molar ratio of Fe(II)/Fe(III) = 0.5 was dissolved in distilled water with sonicator. The result solution was poured with piezoelectric nozzle method into alkali solution and black precipitates were formed immediately. X-ray diffraction was measured for the estimation of average particle size of synthesized magnetite and all the results were compared with TEM image. Raman spectroscopy measurements were performed for the confirmation of magnetite phase. For the estimation as MRI contrast agent, the magnetic property of synthesized magnetite was finally measured by Vibrating Sample Magnetometer.