

Synthesis of monodisperse magnetite nanoparticles using a high pressure homogenizer

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High pressure homogenization in a solution during the chemical reaction may accelerate the rate of the reaction and the crystallization may be possible at low temperature. Magnetite nanoparticles were synthesized from Fe(OH)₂ using a high pressure homogenizer without any dispersing agents and oxidant. The X-ray diffraction patterns showed that all the samples had the inverse spinel structure of magnetite nanoparticles. The average size of the magnetite particles could be controlled by the number of passes. The average particle size ranged from 17 to 22 nm. Magnetic hysteresis measurements were performed using a vibrating sample magnetometer (VSM) to investigate the magnetic properties of the magnetite nanoparticles at room temperature. The VSM measurements revealed superparamagnetism of the nanoparticles for 1 and 3 passes at 1500 bar.