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Temperature and magnetic field dependent magnetization of nanoparticulate ZnFe2O4 produced by maechanocamical synthesis

ZnFe2O4 is basically a non-inverted ferrite which is enormously used as ferrofluids, magnetoelectric refrigeration and contrast agent for magnetic resonance imaging. A series of nanoparticulate ZnFe2O4 of average sizes Φ ˜ 9 nm to 90 nm with a range of inversion 0.008 to 0.35 has been produced by mechnochemical synthesis. The blocking temperature of the investigated samples has increased with increasing crystallite size and accordingly behaved as Curie-Weiss paramagnetic materials [1, 2]. The temperature dependent magnetic behavior of these nanoparticulates has been investigated over the temperature range from 5 K to 300 K at a magnetic field of 100 oe. DC magnetization over a magnetic field range of 0 oe to 10000 oe at 5 K, 150 K and 200 K has been observed which interpreted that the samples are superparamagnetic materials [3]. All the samples showed the normal magnetic hysteresis below blocking temperature which also shows that the coercively increases with decreasing inversion [1]. The frequency dependent magnetic behavior of nanoparticulate ZnFe2O4 of 90 nm crystallite size has also been studied over a frequency range of 10 Hz to 10000 Hz which interpreted that with the increase of frequency the magnetization of this sample increased to saturation magnetization for all samples are approximately at 100 K temperature [4].

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