

Effect of particle magnetic moment distribution on magnetic properties of maghemite nanoparticles

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Magnetic properties of nanoparticles depend on several factors. These factors include their size, morphology, distribution in size and many more. Effect of particle size distribution has been studied by many authors in detail, but the effect of particle magnetic moment distribution on magnetic properties of maghemite nanoparticles has never been studied. Nanoparticles of maghemite, with ferrimagnetic ordering, are stable oxides of iron. Pure phase of this material is synthesized by following the procedure described elsewhere [1]. Structural characterization of this sample is done with x-ray diffraction and transmission electron microscopy. Magnetization of samples as function of temperature and applied magnetic field are measured using a SQUID magnetometer. We study the effect of particle magnetic moment distribution on maghemite nanoparticles using modified Langevin function, first without considering the distribution and then with considering the distribution. It is found that this distribution plays an important role in magnetic nanoparticles.

References:

- [1] T. Hyeon, S.S. Le, J. Park, Y. Chung, H.B. Na, J. Am. Chem. Soc. **127**98, 123 (2001)