

Abstract Submitted
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Fe₃O₄ nanoparticles: superparamagnetic behavior MATEA TREVINO, KARINE CHESNEL, BYU, Physics Dept, BETSY OLSEN, JULIE BOERIO-GOATES, BYU, Chemistry Dept — Magnetite (Fe₃O₄) nanoparticles exhibit a superparamagnetic behavior when small, 1-50 nm in diameter. When cooling the sample, we reach a point called the blocking temperature (T_b), below which the magnetic moments are frozen. Each particle carries a super macrospin and aligns with other macrospins in the presence of a magnetic field. We will show results obtained on the nanoparticles of two batches: 5-15nm and 40-50nm in diameter. We studied these particles with Vibrating Sample Magnetometry (VSM). We will show magnetization curves taken at different temperatures and Field Cooling versus Zero Field Cooling measurements, to determine T_b. We will show Atomic Force Microscopy (AFM) images of nanoparticles deposited on a substrate. The AFM images provide information about the structure and morphology of the nanoparticles assembly. We will include Magnetic Force Microscopy (MFM) images to show the local magnetic profile of individual particles. By comparing VSM data and AFM/MFM images, our goal is to understand the superparamagnetic behavior of nanoparticles.

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