

Abstract Submitted
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Low temperature glassy relaxation in rare earth doped Fe₃O₄ nanoparticles SUVRA LAHA, GAVIN LAWES, Wayne State University — Magnetic nanoparticles typically exhibit glassy relaxation at low temperature, which can be affected by doping. Gadolinium and Lanthanum doped Fe₃O₄ nanoparticles were synthesized using a chemical co-precipitation method. The structural and optical properties of these nanoparticles were characterized by using Transmission Electron Microscope (TEM) and the Raman spectroscopy. The TEM images show the formation of nanoparticles of size ranging between 12-14 nm and Raman spectra are consistent with the formation of Fe₃O₄. AC magnetic measurements were also conducted on these nanoparticles. From the ac out-of-phase susceptibility (χ'') vs temperature (T) graphs, it is observed that the doped nanoparticles show larger amplitude relaxation peaks at low temperature as compared to the undoped particles. These magnetic relaxation features develop roughly between 25K to 35K and show frequency dependence. The increased magnetic relaxation at low temperatures can be attributed to structural defects which may arise due to the doping of lanthanides in Fe₃O₄ nanoparticles.

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