Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Effect of surface coating and solvent interactions on magnetization of iron oxide nanoparticles[1] DENIZ RENDE, DANNAH LAGUITAN[2], Rensselaer Polytechnic Institute, RICHARD A. HARRIS, Nanotechnology Innovation Centre, Mintek, NIHAT BAYSAL, Rensselaer Polytechnic Institute, SEYDA BUCAK, Yeditepe University, DIANA-ANDRA BORCA-TASCIUC, RAHMI OZISIK, Rensselaer Polytechnic Institute — Magnetic iron oxide nanoparticles (MIONPs) are being widely used in various biological applications, and they are surface modified with surfactants to increase their biocompatibility or to prevent their agglomeration in various solvents. However, the surfactants interact with the surface atoms of the nanoparticles leading to the formation of a magnetically disordered layer, which in turn reduces the effective magnetic phase. The magnetic phase reduction can also be attributed to the interaction between the surfactant and the solvent. In the current study, the interactions between the surfactants and the suspension media were investigated to understand their effect on magnetization of MIONPs. The surfactant–suspension media interactions were altered by gradually changing the quality of the solvent ranging from good to poor. The saturation magnetization was used to determine the effective concentration of magnetic phase as a function of solvent quality. The difference between the VSM and actual iron oxide concentration indicates the reduction of magnetic phase of the magnetic core as a function of solvent quality.

[1]The material is partially based upon work supported by NSF under Grant Nos. 1200270 and 1003574, NSF-CAREER Award No. 0846433, and TUBITAK 113M265.
[2]Undergraduate student

Deniz Rende
Rensselaer Polytechnic Institute

Date submitted: 15 Nov 2013 Electronic form version 1.4