

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Influence of Surface Coating of Magnetic Nanoparticles on Mechanical Properties of Polymer Nanocomposites¹ ECEM YARAR, GIZEM KARAKAS, Yeditepe University, DENIZ RENDE, RAHMI OZISIK, Rensselaer Polytechnic Institute, SEYDA MALTA, Yeditepe University — Polymer nanocomposites have emerged as promising materials due to improved properties when compared with conventional bulk polymers. Nanofillers are natural or synthetic organic/inorganic particles that are less than 100 nm in at least one dimension. Even the addition of trace amounts of nanofillers to polymers may lead to unique combinations of properties. Among variety of inorganic nanofillers, iron oxide magnetic nanoparticles are of great interest due to their unique physical and chemical properties, such as low toxicity, biocompatibility, large magnetization and conductivity, owing to their extremely small size and large specific surface area. In this study, approximately 8-10 nm magnetic nanoparticles coated with either citric acid or oleic acid are synthesized and blended with poly(methyl methacrylate) (PMMA) or poly(ethylene oxide) (PEO). The hydrophobicity/hydrophilicity of the polymer and the surface coating on the iron oxide nanoparticles are exploited to control the dispersion state of nanoparticles, and the effect of dispersion on mechanical and thermal properties of the nanocomposite are investigated via experimental methods such as dynamic mechanical analysis and differential scanning calorimetry.

¹This material is based upon work partially supported by the National Science Foundation under Grant No. CMMI-1538730 and TUBITAK 112M666

Deniz Rende
Rensselaer Polytechnic Institute

Date submitted: 06 Nov 2015

Electronic form version 1.4