Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Photothermal heating and mechanical properties of Au/PEO and Ag/PEO nanocomposites[1] MERVE SEYHAN, Yeditepe University, KATHERINE RICKARD[2], Rensselaer Polytechnic Institute, U. ECEM YARAR, Yeditepe University, DENIZ RENDE, NIHAT BAYSAL, RAHMI OZISIK, Rensselaer Polytechnic Institute, SEYDA BUCAK, Yeditepe University — In the current study, the photothermal effect of gold (Au) and silver (Ag) nanoparticles in poly(ethylene oxide) is investigated. Both Au and Ag nanoparticles were synthesized in-house and were characterized by dynamic light scattering, UV-Visible spectroscopy and transmission electron microscopy experiments. The average size of the Au and Ag nanoparticles was found to be on average 8.9 and 8.4 nm, respectively. The Au/PEO and Ag/PEO nanocomposites containing 0.01–2% nanoparticles (by weight) were prepared via solution mixing. Mechanical and thermo-mechanical properties were investigated by static and dynamic tests. The results indicate that the Young's modulus increases with increasing nanoparticle concentration, however, the modulus values reached a plateau at high concentrations. Both nanocomposites were heated via laser radiation at appropriate wavelengths and via traditional heating (using a heating stage). The temperature variations were measured through Raman spectroscopy experiments and by correlating Raman and traditional heating experiments.

[1]The material is partially based upon work supported by NSF under Grant Nos. 1200270 and 1003574, and TUBITAK 113M265.
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Date submitted: 15 Nov 2013 Electronic form version 1.4