

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Synthesis and characterization of gold nanoparticles in a self-assembled ionic liquid polymer nanocomposite HARSHA MAGURU-DENIYA, BRYAN RINGSTRAND, Los Alamos National Laboratory, KATHERINE JUNGJOHANN, Sandia National Laboratories, MILLICENT FIRESTONE, Los Alamos National Laboratory — Incorporation of nanoparticles(NPs) into polymer matrices has attracted interest, offering a means to create multi-functional materials combining the attributes of polymers (flexibility, processability, mechanical durability) with the opto-electrical properties of NPs. Synthesis of a self-supporting, hierarchically structured Au NP-network polymer was accomplished *via* a “one-pot” reaction employing a mesophase of AuCl₃ and an imidazolium based-ionic liquid (IL) containing a acrylate group. *In-situ* generation of NPs was achieved by reduction of Au³⁺ which in turn yields concomitant initiation of the polymerization of the mesophase. FT-IR and thermal analysis confirmed acrylate cross-linking. X-ray scattering confirms preservation of the mesophase within the NP composite. TEM showed a distribution of the NPs within the composite of primarily non-spherical morphologies. The co-integration of a macromer, PEG diacrylate, served as a reducing agent for the Au and the amount incorporated into the mesophase allowed for manipulation of the swelling factor of the resultant nanocomposite in a ethanol, providing means to modulate the plasmonic resonance of the NPs. This methodology provides means for organizing NPs within the structured regions of the poly(IL) matrix. Such composites may be of interest for photonic/sensing applications.

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Date submitted: 13 Nov 2016

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