Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Thermo-reversible morphology and conductivity of a conjugated polymer network embedded in polymeric self-assembly.[1] YOUNGKYU HAN, JAN-MICHAEL Y. CARRILLO, ZHE ZHANG, YUNCHAO LI, KUNLUN HONG, BOBBY G. SUMPTER, Oak Ridge National Laboratory, MICHAEL OHL, Jlich Center for Neutron Science, MARIAPPAN PARANS PARANTHAMAN, GREGORY S. SMITH, CHANGWOO DO, Oak Ridge National Laboratory — Self-assembly of block copolymers provides opportunities to create nano hybrid materials, utilizing self-assembled micro-domains with a variety of morphology and periodic architectures as templates for functional nano-fillers. Here we report new progress towards the fabrication of a thermally responsive conducting polymer self-assembly made from a water-soluble poly(thiophene) derivative with short PEO side chains and Pluronic L62 solution in water. The structural and electrical properties of conjugated polymer-embedded nanostructures were investigated by combining SANS, SAXS, CGMD simulations, and impedance spectroscopy. The L62 solution template organizes the conjugated polymers by stably incorporating them into the hydrophilic domains thus inhibiting aggregation. The changing morphology of L62 during the micellar-to-lamellar phase transition defines the embedded conjugated polymer network. The conductivity is strongly coupled to the structural change of the templating L62 phase and exhibits thermally reversible behavior with no signs of quenching of the conductivity at high temperature.

[1]The research was sponsored by the Scientific User Facilities Division, Office of BES, U.S. DOE and Laboratory Directed Research and Development Program of ORNL, managed by UT-Battelle, LLC.

Youngkyu Han
Oak Ridge National Laboratory

Date submitted: 06 Nov 2015 Electronic form version 1.4