Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Improving the Electrical Conductivity of Polyaniline Through Molecular Control JOUNG EUN YOO, WILLIAM KREKELBERG, TRACY BUCHOLZ, THOMAS TRUSKETT, YUEH-LIN LOO, PRINCETON UNIVERSITY TEAM, UNIVERSITY OF TEXAS AT AUSTIN COLLABORATION — We have investigated the electrical conductivity of polyaniline (PANI) that is template synthesized with a polymer acid of poly(2-acrylamido-2-methyl-1-propanesulfonic acid), PAAMPSA. The conductivity of PANI-PAAMPSA is determined by the particle density when PANI-PAAMPSA is cast as films. The PANI-PAAMPSA particle density can in turn be tuned by manipulating the molecular characteristics of PAAMPSA. Specifically, templating aniline polymerization with a higher molecular weight PAAMPSA results in bigger PANI-PAAMPSA particles; templating aniline polymerization with a broader molecular weight distribution PAAMPSA results in particles with a larger size distribution. The conductivity of drop-cast films of PANI-PAAMPSA therefore depends on how the particles pack in the solid state. In particular, we find the conductivity of PANI-PAAMPSA to increase with particle density. Additionally, PANI is preferentially segregated to the surface of these particles. The conductivity of PANI-PAAMPSA thus scales superlinearly with the surface area per unit volume of the cast film.

Joung Eun Yoo

Date submitted: 14 Nov 2008 Electronic form version 1.4