

Abstract Submitted  
for the NWS07 Meeting of  
The American Physical Society

**Impedance studies of mixed ionic-electronic conjugated polymers**

YONGJUN WANG, FUDING LIN, MARK LONERGAN, Department of Chemistry, The Materials Science and Institute, Oregon Nanoscience and Microtechnologies Institute, University of Oregon — A polymer fabricated by sandwiching an ionically functionalized polyacetylene between two metal electrodes, is investigated with impedance analysis at temperatures ranging from 308K to 398K. Three processes—namely geometric capacitance charging, ion hopping and interfacial polarization—can be identified in the frequency region of 0.01 Hz to 1MHz. The temperature dependence of the conductivity and the hopping frequencies shows Arrhenius behavior with activation energies of 0.97 eV and 0.98 eV respectively. The similarity of these activation energies implies that the concentration of mobile charge carriers is independent of temperature and the conductivity is determined primarily by the charge carrier mobility. Ionic conductivity is found in the range  $10^{-12}$  to  $10^{-10}$  S/cm in the temperature span studied. These experiments lay the foundation for further investigations of charge transport at conjugated polymer interfaces with ionic functionality.

Yongjun Wang  
Department of Chemistry, The Materials Science and Institute  
Oregon Nanoscience and Microtechnologies Institute, University of Oregon

Date submitted: 20 Apr 2007

Electronic form version 1.4