Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Aliphatic Polymers Bearing Pendant Radical Groups as Charge Carrying Moieties in Organic Electronic Applications BRYAN BOUDOURIS, LIZBETH ROSTRO, ADITYA BARADWAJ, School of Chemical Engineering, Purdue University — The implementation of highly conjugated polymers has led to an explosion of high-performance organic electronic devices; however, many important synthetic, physical, and mechanical properties of these macromolecules still lag behind polymers with non-conjugated backbones. In order to implement the positive aspects of both macromolecular classes, we have synthesized radical polymers (*i.e.*, where a pendant stable radical group is present on each repeat unit of the polymer) using controlled polymerization mechanisms. We demonstrate that these next-generation conducting polymers have thermal and physical properties similar to that of aliphatic polymers while still retaining charge transport properties akin to those of well-studied conjugated polymer systems. Specifically, we characterize the charge transport ability of radical polymers using a model radical polymer, poly(2,2,6,6-tetramethylpiperidinyloxymethacrylate), and propose a mechanism for charge transport in these molecules. Furthermore, because of the low optical absorption in the visible spectrum associated with non-conjugated polymers, radical polymers are utilized as anodic modifiers in organic photovoltaic devices and show promise in being more stable to environmental conditions than traditional anode-modifying materials.

Bryan Boudouris
School of Chemical Engineering, Purdue University

Date submitted: 09 Nov 2012 Electronic form version 1.4