Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Synthesis and Structure of Fully Conjugated Block Copolymers Utilized in Organic Photovoltaics YOUNGMIN LEE, MELISSA APLAN, QING WANG, ENRIQUE D. GOMEZ, Pennsylvania State Univ — Fully conjugated block copolymers have the potential to overcome many of the limitations of mixtures and blends as photoactive layers in solar cells; furthermore, they may serve as model systems to study fundamental questions regarding optoelectric properties and charge transfer. However, the synthesis of fully conjugated block copolymers remains a challenging issue in the fieldchallenge. We have optimized the two-step synthesis of P3HT-b-PFTBT, which is composed comprised of Grignard metathesis for polymerization of P3HT followed by chain extension through a Suzuki-Miyaura polycondenstation. We find that the concentration of the Grignard reagent is critical for end-group control such that P3HT is terminated by H at one end and Br at the other. Furthermore, we can utilize an asymmetric feed ratio of monomers for the Suzuki-Miyaura reaction to minimize the amount of uncoupled homopolymers and to control the molecular weight of the second block. We investigated the chemical composition, structure and electrical characteristics of the polymers prepared by the different synthetic methods, and demonstrate that we can utilize these strategies for the synthesis of block copolymers beyond P3HT-b-PFTBT.

Youngmin Lee
Pennsylvania State Univ

Date submitted: 13 Nov 2014 Electronic form version 1.4