Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

A comparative study of the morphology of flow and spin coated P3HT:PCBM films[1] JOSE CHAPA, ALAMGIR KARIM, The University of Akron — Polymer solar cells are attractive due to the possibility of using cheaper materials and processing techniques for mass production of solar panels. Previous methods of fabricating polymer solar cells are suitable in laboratory conditions but are not scalable for industrial production. In this study, thin films of the photoactive blend of poly(3-hexylthiophene) (P3HT) and fullerene derivative [6,6]-phenyl-C61-butyric acid methyl ester (PCBM) were prepared by flow coating, which is suitable for industrial manufacturing of solar cells. P3HT:PCBM blends were cast from different solvents, and the morphology of flow coated and spin coated films was compared. The surface morphology and optical properties of P3HT:PCBM films were characterized with optical microscopy, AFM, and UV-vis absorption spectroscopy. The degree of P3HT order was higher in flow coated films, as compared to spin coated films. Films flow coated using chloroform solutions had a higher thermal stability and an enhanced degree of phase separation as compared to spin coated films. Flow coated films from chlorobenzene solutions had a lower thermal stability and a smaller length scale of phase separation. This study demonstrates that flow coating is a suitable alternative technique for fabricating polymer solar cells.

[1]Work supported by U.S. Department of Energy, Office of Basic Energy Sciences, under Contract DE- AC02-98CH10886

Jose Chapa
The University of Akron

Date submitted: 09 Nov 2012 Electronic form version 1.4