Contribution ID: **428** Type: **Poster Presentation**

Influence of solvent casting and weight ratios on the morphology and optical properties of inorganic-organic hybrid structures

Wednesday, 9 July 2014 17:10 (1h 50m)

Abstract content
   (Max 300 words)
Formatting &
Special chars

Organic photovoltaic (OPV) solar cells have been spotlighted as harnessing clean energies because of their advantages of simple processing, low cost, semi-transparency, high-mechanical flexibility, and light weight. The potential applications of OPV solar cells using heterojunction (BHJ) structures have driven extensive and successful efforts to enhance their power conversion efficiency (PCE). It has been demonstrated that nanoscale morphology in the active layer of poly (3-hexylthiophene) (P3HT) and (6,6)-phenyl C61 butyric acid methyl ester (PCBM) is essential for improved transport of charge carriers in the OPV cell and for enhancing its efficiency. Several experimental methods have been proposed to control this morphology in order to improve the current power conversion efficiency. To offset low efficiencies, inorganic semiconductors have been incorporated into the BHJ structures due to their high carrier mobilities. Among inorganic semiconductors, Zinc oxide (ZnO) is one of the most promising inorganic semiconductor materials because it is inexpensive and ZnO-nanorod arrays offer an excellent controllable transport path with high electron mobility.

In this contribution the effect of solvent to control the degree of mixing of the polymer, fullerene and ZnO nanoparticles components into a hybrid inorganic-organic structure, is investigated in detail. Evolution of the domain size, structure and optical properties of the blends induced by ZnO:P3HT:PCBM spin-coated from different weight ratios in order to improve the charge transport pathways is studied, using X-ray diffraction, UV-vis, photoluminescence and spectroscopic ellipsometry.

Apply to be
 considered for a student
   award (Yes / No)?

No

Level for award
 (Hons, MSc,
   PhD)?

No

Main supervisor (name and email)
and his / her institution

TFG Muller,
tmuller@uwc.ac.za
Department of Physics, University of the Western Cape

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Dr MULLER, Theo (University of the Western Cape)

Co-authors: Mr RAMASHIA, Albert Thinavhuyo (University of the Western Cape); Prof. ARENDSE, Christopher (University of the Western Cape); Dr MOTAUNG, David (CSIR); Dr CUMMINGS, Franscious (University of the Western Cape); Dr MALGAS, Gerald (University of the Western Cape)

Presenter: Dr MULLER, Theo (University of the Western Cape)

Session Classification: Poster2

Track Classification: Track A - Division for Physics of Condensed Matter and Materials