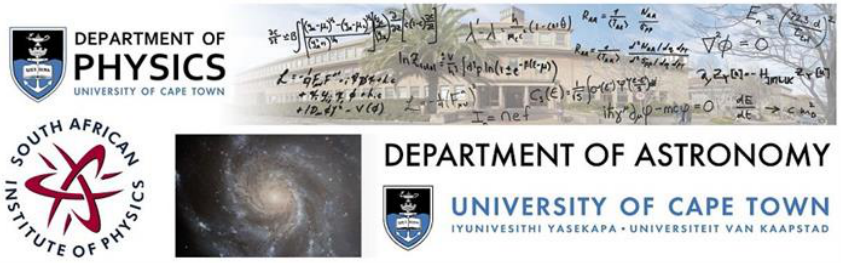

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The study of organic photovoltaics with Illumination intensity

Wednesday, 6 July 2016 15:00 (20 minutes)

Abstract content
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Photon harvesting in an organic photovoltaic (OPV) solar cells is a promising technology for future energy requirements [1]. The daily current and voltage outputs of a solar cell highly depend on the solar light intensity. The present study focuses on the illumination intensity dependent device characteristics to evaluate the OPV and understand the physics attributed to performance. The illumination intensities were controlled by neutral density filters with 1.7%, 5.4%, 15%, 30%, 100% (1 sun) of illuminated intensity. An OPV with ITO/ PEDOT:PSS/PCBM:P3HT/Al architecture has been used as a reference device to evaluate the open circuit voltage (Voc) and short circuit current characteristics (Jsc) [2]. The J-V characteristics show an exponential and linear increase in Voc and Jsc with illumination intensity, respectively. It is found that, all illuminated J-V characteristic curves intersect with the dark current at a single point which correlates with the built in voltage Vbi [2]. These characteristic parameters were compared with the modified hole transport layer (HTL) device ITO/Ag-GO-PEDOT:PSS/PCBM:P3HT/Al. The Ag/ GO modified PEDOT:PSS serves as an efficient hole extraction layer to improve photo conversion efficiency (PCE) by 126%. The characteristic parameters were compared and the enhancement in solar cell performance is discussed with supporting results from UV-Vis, Raman, TEM and cyclic voltammetry.

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