



Contribution ID: 247

Type: Oral Presentation

Characterisation of the optical properties of silver nanoparticles (Ag NPs) for enhancing organic photovoltaic (OPV) device performance.

Friday, 7 July 2017 10:00 (20 minutes)

The main aim of the study was to enhance the overall performance of the photovoltaic device through incorporation of silver nanoparticles (Ag NPs). Eight glass plates coated with indium tin oxide (ITO) on one side were used; two of them were etched by reacting hydrochloric acid with zinc powder. Silver nanoparticles of varying concentrations were then deposited on the ITO-glass substrates using radio frequency (RF) sputtering method. Poly(3,4-ethylenedioxythiophene) polystyrene sulfonate (PEDOT:PSS) was deposited onto the etched substrates using spin coating method. The optical properties were investigated using UV-Visible absorption spectroscopy where the surface plasmon peaks were recorded approximately 347 nm and 576 nm for transmittance and absorption respectively. The effect of both low and high concentrations of Ag NPs were studied; the former allowed more light to pass through whereas the latter caused the shifting of peaks to the visible region. In addition, PEDOT:PSS reduces the reflective properties of glass and generate a negative absorbance and hence more electron-hole pairs.

Key Words: surface plasmon resonance (SPR), radio frequency (RF) sputtering, Ag NPs, PEDOT:PSS, ITO

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

No

Level for award (Hons, MSc, PhD, N/A)?

N/A

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

Dr JK Kirui,
University of Venda

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

Yes

Primary author: Mr BALOYI, Kenneth (University of Venda)

Co-authors: Dr KIRUI, Joseph (University of Venda); Mr JHAMBABA, Lordwell (University of Venda)

Presenter: Dr KIRUI, Joseph (University of Venda)

Session Classification: Physics of Condensed Matter and Materials 1

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