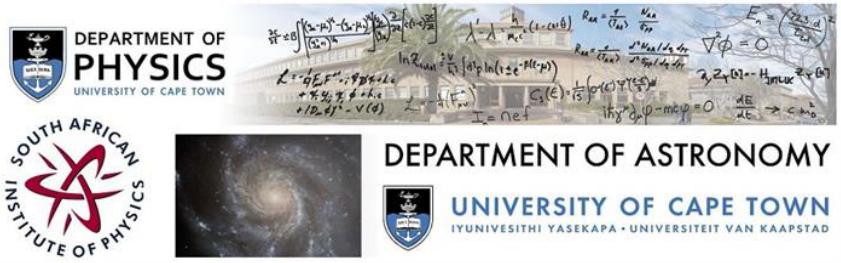

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Spectroscopic investigation of charge and energy transfer in P3HT/GO nanocomposites

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Abstract content
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As the world demand for energy continue to increase, it is vital to improve renewable energy technologies that will replace conventional fossil fuels. Carbonaceous graphene oxide (GO) is a promising environmental friendly nanomaterial, easy to prepare and scale up to commensurate with industrial requirements. The nanocomposite was prepared by blending GO nanomaterials with poly(3-hexylthiophene) (P3HT) to form hybrid heterostructures for photovoltaic applications. The X-ray diffraction (XRD) results revealed the interaction of P3HT with GO through determination of the basal spacing and unit cells dimensions. It was clearly evident from scanning electron microscopy (SEM) that presence of P3HT in GO modified flaky structure to the formation of nano-platelets. The interaction of GO with P3HT is presented by various vibrational frequencies in Fourier Transform infrared spectroscopy (FTIR). The increased percentage absorbance and clear splitting of absorption bands was observed in UV-vis spectrum for P3HT/GO due to ionic interaction between P3HT and GO. The nanocomposites were excited using tunable photoluminescence (PL) wherein the measurements showed quenching and shifting of emission spectrum when introducing P3HT. This is due to charge-transfer and energy-transfer revealed by the time correlated single photon counting (TCSPC) measurements. The obtained nanocomposites establish the formation and existence of new energy levels upon GO incorporation in P3HT which enhances charge transport. The uniqueness of this work will be presented to show conversion mechanism.

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