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The role of graphene concentration on PEDOT: PSS thin films for organic photovoltaic applications

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Poly (3,4-Ethylenedioythiopheme) polystyrene sulfonate (PEDOT: PSS) is a single component polymer with two ionomers. The first component (PEDOT) is a polythiophene polymer carrying positive charge while the other component (PSS) is a sodium polystyrene sulfonate polymer carrying negative charge. It is used in organic electronics due to its hole conducting properties. It was used earlier as an active layer in transistors, buffers or electrode material between dielectric material and the gate electrode. It has several advantages such as good thermal stability, high transparency, and mechanical flexibility. In addition to PEDOT: PSS, graphene, since its founding in 2004, has attracted remarkable attention due to its beneficial properties, including high charge mobility, transparency, mechanical strength and flexibility. In this work, we are focusing on the fabrication and characterization of pure and doped PEDOT: PSS with different concentrations (0.1,0.2 and 0.4%) of Graphene. The pure and doped PEDOT: PSS thin films were prepared using spin coating technique on clean glass substrate. The morphology, optical and electrical properties of the thin films were investigated and compared. The thickness of all fabricated thin films was measured using a Profilometer. The morphology of the prepared thin films were characterized using atomic force microscope (AFM). The optical properties of the thin films were examined using Uv-Vis spectrophotometer. The thickness of PEDOT: PSS was found to increase with increasing the concentrations of graphene. The results showed that the graphene has effected the optical and electrical properties of PEDOT: PSS thin film. The energy gap and roughness of the prepared films can be controlled with increasing Graphene concentration. The results will feed into the use of PEDOT: PSS as hole transport layer for organic photovoltaics (OPVS).

Speaker Biography

Fahad Naif A Almutairi is a PhD student at the School of Electronic Engineering, Bangor University, UK. He is in his second year of the PhD in the field of organic photovoltaics. His bachelor(B.S.) and master degree(MSc) were in pure physics and physics of Laser respectively. He has published four papers in international journals.

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