

Effect of the Buffer Layer on Polymer Solar Cell Performance Based on MEH-PPV+C60 Active Layers Structure



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Abstract

Aim is to investigate the influence of a buffer layer on the performance of polymer solar cells with ITO/buffer layer/MEH-PPV:C60/Al structure where indium tin oxide (ITO) was used as anode, poly[2-methoxy-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] (MEH-PPV) as donor, fullerene molecule (C60) as acceptor and aluminium (Al) as cathode. At first step, polyaniline (PANI) was prepared by an aqueous oxidative polymerization reaction. In the next step, the synthesis PANI was used as buffer layer in polymer solar cells and results were compared with fabricated device by using PEDOT:PSS. The fabricated device with polyaniline (PANI) demonstrated a significant increment in the short circuit current density (J_{sc}), open circuit voltage (V_{oc}) and fill factor (FF), as compared to fabricated device with PEDOT:PSS.

Speaker Publications:

1. "Polyfluorene copolymer /Al Schottky junction for UV-A photodetector with relatively high stability and photocurrent density"; Optics Communications/ 2019, 458.
2. "Improved performance of photoconductive gain hybrid UV detector by trap state engineering of ZnO nanoparticles"; Journal of Applied Physics / Vol 112, 2017 154501.
3. "Low driving voltage in polymer light-emitting diodes with CdS nanoparticles as an electron transport layer"; Journal of Nanophotonics / Vol 9, 2015, 093081-1-9.
4. "Flexible PET/ITO electrode array for implantable biomedical applications"; 2011, 2878-81.
5. "IBIC characterization of charge transport in CdTe:Cl"; Semiconductors/ Vol 41, 2007, 395-401.

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Biography:

Farhad A. Boroumand was born in Tehran, Iran, in 1964. He received his B.E. degree from Mashad University, Iran, in 1988 and the M.Tech. degree from Indian Institute of Technology (IIT), Delhi, India, in 1992. In 2000 he received his Ph.D. degree from King's College, London, U.K. During 2000 and 2006 he worked on four postdoctoral research projects in Sheffield and Surrey Universities concerning nano and organic devices. Currently he is working as an assistant professor in KNTU teaching courses such as Nanotechnology, Organic Electronics. He has published more than 100 journal and conference papers and his research interests are in the area of Nano-Organic Layers, Detection, Solid State Physics and Optoelectronic Devices.