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ENHANCED PERFORMANCE OF ORGANIC LIGHT EMITTING DEVICES USING NANOCOMPOSITE SiO_2:PHF AS AN EMITTING LAYER

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ABSTRACT

Polymer light-emitting diode with ITO/PHF/Al and ITO/SiO_2:PHF/Al structure has been fabricated, where PHF is poly (4, 4'-diphenylene diphenylvinylene). ITO/PHF/Al has turn-on voltage at 23.0 V.The nanocomposites layer consisting of PHF and SiO_2 nanoparticles as an emitting layer in a single structured ITO/PHF/Al polymer light emitting diode. The nanocomposites SiO_2: PHF solution was prepared by mixing 1.0 ml of PHF with 0.05 ml of SiO_2 colloidal solution. It was found that the spin-coated nanocomposites emitting layer has reduced the OLED turn-on voltage to 18.0 V. The calculated quantum efficiency for the ITO/SiO_2:PHF/Al device is sixth time higher compared to the ITO/PHF/Al device. The investigated nanocomposites SiO_2:PHF emitting layer shown to have a good adhesion and uniform surface with the anode and the cathode compare to the PHF emitting layer.

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