

A comparative study of Carbazole based polymer and Polyfluorene derivatives as emissive layer for blue emitting flexible PLED devices

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Electrically conductive polymers have proved to be very interesting materials in the development of various electronic and optical devices, such as solution processed Polymer Light-Emitting Diodes (PLEDs). Tremendous advances in the field of solution processed PLEDs have been achieved mainly through the synthesis of novel emitting materials. Blue light emission has been the most challenging notably due to the difficulty to inject charges in wide energy gap materials [1]. In this study, we compared promising lab scale blue emitting polymer bearing Carbazole moiety with commercially available Polyfluorene derivatives in terms of film forming ability, emission characteristics and color purity. The spin coating technique was implemented to produce functional layers, including the hole transport layer and emitting layer. The optical and photophysical properties of the solution processable thin films were thoroughly studied via NIR– Vis– far UV Spectroscopic Ellipsometry (SE) and Photoluminescence (PL) respectively, whereas the structural characteristics were examined by Atomic Force Microscopy (AFM). Subsequently, blue light PLED devices were fabricated, and they were evaluated using Electroluminescence (EL). From the analysis of the electrical data, valuable information was obtained for different current density characteristics under different bias voltage regimes. Emission bandwidths, color coordinates and the luminance were also derived in order to evaluate the devices' stability. Finally the printability of the polymer films to flexible substrates was investigated using slot die coating processes.

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References

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