

Performance of Light-emitting Electrochemical Cells using Cationic Iridium Complex and the Effect of an Ionic Conductor in the Active Layer

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A new cationic heteroleptic iridium(III) complex with phenanthroline based-ancillary ligand, namely, $[\text{Ir}(\text{ppy})_2(\text{dpphen})]\text{PF}_6$ (ppy is 2-phenylpyridine, dpphen is 2,9-diphenyl-1,10-phenanthroline and PF_6 is hexafluorophosphate) have been synthesized and characterized. Light-emitting electrochemical cells (LECs) incorporating the complex were fabricated by spin-coating on ITO glass substrates. The device structure consists of poly(3,4-ethylenedioxythiophene)-poly(styrenesulfonate) (PEDOT:PSS) as buffer layer and emitting layer composed of the iridium complex blended with an ionic conductor tetrabutylammonium trifluoromethanesulfonate (TBAOTf), which accelerates the charge injection into the emitting layer and hence improve the performance of the devices. The investigation of electroluminescence properties of the devices showed that the addition of ionic conductor to the active layer resulted in enhanced luminance of the device at shorter turn-on voltage compared to pristine device.