

The crystal structures and chiral luminescence of three Iridium(III) complexes with the maximum EQE of 10.7% at 5000 cd/m²

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Abstract

In this paper, three Iridium(III) complexes, Ir(dnfppy)₂(Cl/Pyrrole), Ir(dfppy)₂(dpp) and Ir(tfmqz)₂(sdpp), have been designed and synthesized. They emitted deep-blue, blue or red photoluminescence with high quantum yields, for ((Ir(dnfppy)₂(Cl/Pyrrole): $\lambda_{\text{max}} = 447$ nm, F = 62.4%; Ir(dfppy)₂(dpp): $\lambda_{\text{max}} = 467$ nm, F = 25%; Ir(tfmqz)₂(sdpp): $\lambda_{\text{max}} = 609$ nm, F = 73.7%), respectively. Two pairs of enantiomers of Ir(dfppy)₂(dpp) and Ir(tfmqz)₂(sdpp) have been separated by column chromatography. The maximum external quantum efficiency (EQE_{max}) of OLEDs based on Ir(tfmqz)₂(sdpp) was 13.8%, showing a relatively low efficiency roll-off with the EQE of 10.7% at 5000 cd/m².

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