

Synthesis and Characterization of Cationic Iridium Complexes for the Fabrication of Green and Blue-green Light-emitting Electrochemical Cells

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The ionic iridium complexes, [Ir(ppy)₂(EP-Imid)]PF₆ (Complex 1) and [Ir(dfppy)₂(EP-Imid)]PF₆ (Complex 2) are used as the light-emitting material for the fabrication of light-emitting electrochemical cells (LECs). These complexes have been synthesized, employing 2-(4-ethyl-2-pyridyl)-1H-imidazole (EP-Imid) as the ancillary ligand, 2-phenylpyridine (ppy) and 2-(2,4-difluorophenyl)pyridine (dfppy) as the cyclometalated ligands, which were characterized by various spectroscopic, photophysical and electrochemical methods. The photoluminescence (PL) emission spectra in acetonitrile show blue-green and blue light emission for Complex 1 and 2 respectively. However, LECs incorporating these complexes resulted in green (522 nm) light emission for Complex 1 with the CIE coordinates of (0.33, 0.56) and blue-green (500 nm) emission for Complex 2 with the CIE coordinates of (0.24, 0.44). Using Complex 1, a maximum luminance of 1191 cd m⁻² and current efficiency of 1.0 cd A⁻¹ are obtained while that of Complex 2 are 741 cd m⁻² and 0.88 cd A⁻¹ respectively.