

Orange Light-emitting Electrochemical Cells Utilizing Iridium Phenanthroimidazole Complexes

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LECs have attracted much more attention in the last few decades as a promising technology for low-cost lighting applications. The utilization of cationic iridium complexes in lighting devices offered a tremendous improvement over other metal complexes, because of their higher ligand-field splitting energies (LFSEs). Herein, we reported two new cationic iridium complexes using phenanthroimidazole derivatives as ancillary ligand, namely, $[\text{Ir}(\text{ppy})_2(\text{ptpphim})]\text{PF}_6$ (Complex 1) and $[\text{Ir}(\text{meppy})_2(\text{ptpphim})]\text{PF}_6$ (Complex 2). Phenanthroimidazole derivatives are well known for their amazing photophysical properties, thermal stability and balanced charge transporting capabilities. The photoluminescence (PL) emission spectra in acetonitrile show yellow light emission for Complex 1 (543 nm) and Complex 2 (558 nm). However, LECs incorporating these complexes are significantly red shifted with the CIE coordinates of (0.46, 0.52) for Complex 1 and (0.49, 0.50) for Complex 2. The use of phenanthroimidazole with bulky phenyl groups as a ancillary ligand in ionic iridium complexes can open the way towards new electroluminescent material, which reduce the intermolecular interactions between the molecules, hence are the best candidate for lighting and display application.