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Article

Phosphorescent Iridium(III) Cyclometalates Supported by 2Ãƒ Â¢Ã‚Â€Ã‚Â•(1,2Ãƒ Â¢Ã‚Â€Ã‚Â•DihydronaphthalenÃƒ Â¢Ã‚Â€Ã‚Â•4Ãƒ Â¢Ã‚Â€Ã‚Â•yl)pyridine Ligand

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Abstract

Novel Ir(III) cyclometalates, (dnpy) $_2$Ir(acac) (**2**) and *fac*Ã*ƒ*Â¢Ã‚Â€Ã‚Â•Ir(dnpy)$_3$ (**3**), supported by 2Ã*ƒ*Â¢Ã‚Â€Ã‚Â•(1,2Ã*ƒ*Â¢Ã‚Â€Ã‚Â•dihydronaphthalenÃ*ƒ*Â¢Ã‚Â€Ã‚Â•4Ã*ƒ*Â¢Ã‚Â€Ã‚Â•yl)pyridyl ligand (dnpy) were synthesized and characterized. XÃ*ƒ*Â¢Ã‚Â€Ã‚Â•ray diffraction study on **3** revealed facial arrangement of three dnpy ligands around the Ir center. Photoluminescence (PL) spectra of **2** exhibited orange emission centered at 590Ã*ƒ*Â¢Ã‚Â€Ã‚Â‰nm, which is almost similar to that

observed for 2Ãƒ Â¢Ã‚Â€Ã‚Â•naphthylpyridine complex, (napy) $_2$Ir(acac) (**III**). In contrast, compound **3** displayed blueÃƒ Â¢Ã‚Â€Ã‚Â•shifted, yellow emission at 550Ãƒ Â¢Ã‚Â€Ã‚Â‰nm. TrisÃƒ Â¢Ã‚Â€Ã‚Â•complex **3** showed higher quantum efficiencies than **2** in both the solution and film states. Cyclic voltammetry measurements indicated that replacing naphthyl with 1,2Ãƒ Â¢Ã‚Â€Ã‚Â•dihydronaphthyl ring raises both the metalÃƒ Â¢Ã‚Â€Ã‚Â•centered HOMO level and ligandÃƒ Â¢Ã‚Â€Ã‚Â•centered LUMO level in **2** and **3**. It was suggested that 1,2Ãƒ Â¢Ã‚Â€Ã‚Â•dihydronaphthyl ring has a stronger electronÃƒ Â¢Ã‚Â€Ã‚Â•donating effect than naphthyl ring, while the Ãƒ Â•Ã‚Â€* orbital of dnpy ligand is less stabilized due to partial conjugation of the dihydronaphthyl ring.

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Volume38, Issue5

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Pages 544-549

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