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Phosphorescent Palladium Complexes with Long-Lived Excited State

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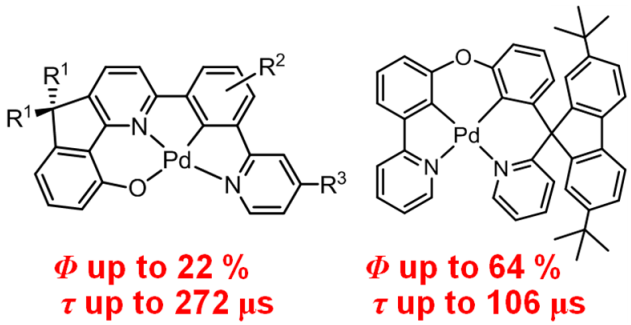
Phosphorescent metal complexes have demonstrated tremendous applications in diverse areas such as in solar catalysis, luminescent cellular imaging, and photo-active functional materials. All these applications heavily rely on the lifetime and emission quantum yield of the electronic excited states. In literature, examples of electronic excited states of metal complexes with lifetimes over 100 μs, high emission quantum yields and/or with open coordination sites are sparse. As metal ions would facilitate radiative decay via spin-orbit coupling, excited states having significant metal parentage such as metal-to-ligand charge transfer ones observed in platinum(II) and iridium(III) complexes usually undergo fast radiative decay than intraligand excited states. In this lecture, the photophysics, photochemistry and applications of a series of palladium(II) complexes supported by tetradentate [N^C^C^N] and [O^N^C^N] ligand systems will be discussed. These complexes display sky blue to red phosphorescence with emission quantum yields and lifetimes of up to 0.64 and 272 μs, respectively. The use of rigid tetradentate ligands can greatly suppress non-radiative decay arising from excited structural distortion. Some of these metal complexes demonstrate promising applications in materials science and photocatalysis.



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