Photophysical Properties Investigation of Solution Processed Platinum(II) Complexes

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With increasing interest from the everyday consumer, organic light-emitting diodes (OLEDs) are a rapidly evolving technology with widespread applications. Inclusion in mobile phones, large flexible displays, and flat-panel lighting has driven the need for OLEDs to be not only efficient and long lasting, but also easily manufactured. Recent reports have demonstrated OLED devices with external quantum efficiencies above the theoretical maximum due to horizontally aligned dipoles increasing the out-coupling efficiency. In particular, platinum(II) complexes are highly featured due to their square planar structure enabling close molecular packing and ordered self-assembly featuring the metal-metal-to-ligand charge transfer (MMLCT) transition. However, a significant number of these reports rely on thermal evaporation to induce the preferred orientation of the active layer – a considerable hurdle of large-scale manufacture. In this talk, the design and synthesis of simple platinum(II) complexes will be discussed, where long alkyl chains were incorporated to improve material solubility for thin-film solution deposition. Investigation of the emissive species by ultra-fast transient absorption spectroscopy and x-ray crystal structure will be presented, to provide a comprehensive analysis of the phosphorescent properties.

References
4. K. Li et al., Chem. Sci., 2013, 4, 2630-2644