

Cyclometallated Platinum(II) complexes with tunable luminescence and nonlinear optical properties

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Organometallic compounds that show both luminescent and second-order nonlinear optical (NLO) properties are of great interest as building blocks for the preparation of molecular multifunctional materials. Platinum(II) complexes with a cyclometallated 1,3-di(2-pyridyl)benzene (dpyb) ligand have been widely investigated for their remarkable luminescence properties in solution at room temperature^[1] and demonstrated high second order nonlinear optical activity.^[2] Both properties are tunable by ligand modification. Here we present two series of mononuclear 5- π -delocalized-donor-(dpyb) Pt(II) complexes (Fig. 1) where the aromatic group (Ar) is connected to the N[^]C[^]N moiety either through a double bond or a more rigid thiophene linker, and we will show how this influences their luminescence and NLO properties.

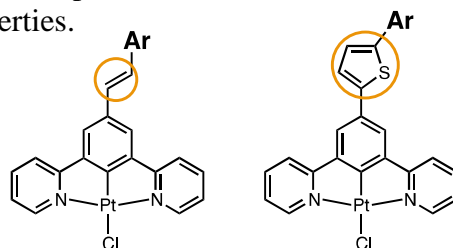


Figure 1. Schematic representation of the studied mononuclear complexes.

Furthermore, through facile functionalisation on the position 5 of the phenyl ring, we have designed and synthesised a binuclear complex where the two Pt(dpyb)Cl moieties are bridged by a tetra(oxyethylene) chain, long enough to allow a folding (Fig. 2). We studied the parameters, as solvent, temperature and metal-ion coordination, that would allow controlling the enhancement and red-shift of the phosphorescence, associated with the switching between the extended and the face-to-face forms.

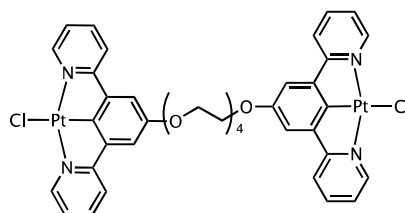


Figure 2. The flexibly-linked dinuclear platinum complex.

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References:

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 [2] F. Nisic, E. Cariati, A. Colombo, C. Dragonetti, S. Fantacci, E. Garoni, E. Lucenti, S. Righetto, D. Roberto, J. A. G. Williams, *Dalton Trans.*, **2017**, 46, 1179