

DTE-based Cyclometalated (N[^]C[^]N) Platinum(II) Complexes Efficient Optical Photo-Switches

Julien Boixel,¹ Véronique Guerchais,¹ Dominique Roberto,² Denis Jacquemin³

¹ Université de Rennes, CNRS, ISCR – UMR6226, F-35000, Rennes

² Università degli Studi di Milano, Italy

³ Université de Nantes, CNRS, CEISAM – UMR6230, F-44000, Nantes

E-mail : julien.boixel@univ-rennes1.fr

Organometallic systems with commutable optical responses (e.g. nonlinear optics (NLO) and luminescence) are of growing interest due to their potential application in photonics technologies. In the course of finding new strategies for quadratic NLO metallo-switches, our group has been investigating dithienylethene-based cyclometalated platinum complexes with the aim of combining the optical properties of cyclometalated Pt(II) complexes[1] with the photochromic performances of dithienylethene (DTE)[2]. [3] We disclose a new family of photochromic cyclometalated platinum(II) complexes **1** and **2** (Figure 1), where a DTE unit is connected at the *para*-position of the central phenyl ring of (N[^]C[^]N) cyclometalated ligand, through a different linkage. The DTE moiety is directly connected to the central benzene ring of the terdentate ligand in **1** whereas, in complex **2**, it is separated by a non-conjugated and flexible ethylene glycol bridge.

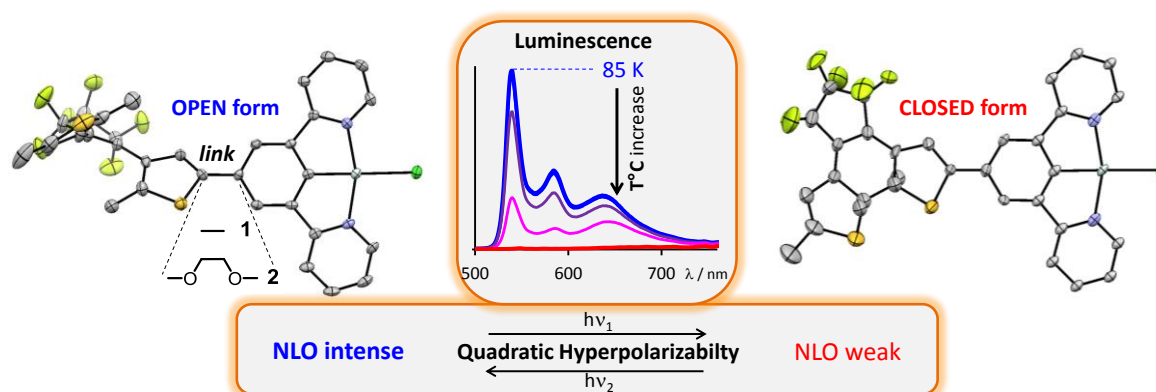


Figure 1.

This strategy leads to a quantitative photo-isomerization for both **1** and **2**, whatever the nature of the connecting mode between the DTE unit and the platinum(II) moiety. The efficient photochromism allows a significant NLO photo-modulation, both in solution and in thin films. In addition, the photoluminescence of the **1** and **2** has been controlled by the *open/closed* isomerization of the DTE unit. A better insight on the electronic and optical properties have been obtained thanks to X-ray crystal structures of both, *open* and *closed* forms, and theoretical calculations.

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