



Laboratoire PPSM – UMR CNRS 8531

Photochimie et Photophysique Supramoléculaires et Macromoléculaires

Séminaire PPSM

Jeudi 13 Février 2014 - 11h00

Auditorium D. Chemla - Bâtiment IDA

Docteur Louise NATRAJAN

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Angleterre

Invitée par : Fabien Miomandre

«Multiphoton and up-conversion processes in transition metal and f-element containing systems»

Materials that undergo multiphoton excitation, including two photon absorption and upconversion, are finding increasing use in many applications including 3D fluorescence microscopy, data storage, optical power limiting biological imaging and optical sensors [1]. In organic and transition metal based systems, large two photon cross sections can arise from centrosymmetric charge transfer in push-pull electron donor-acceptor (D-A) diads, in D- π -A type assemblies, and variants, where the Laporte selection rule differs from one photon excitation. In the case of the f-elements (lanthanides and actinides), both two photon absorption and upconversion processes are feasible in molecular systems. While lanthanide ions have been sensitised via two-photon excitation of organic chromophores, and investigations in the solid state are well documented, direct two-photon excitation of lanthanides and actinides in solution is unprecedented. Here, we will describe our recent work in this area with a view to harnessing and exploiting the multiphoton optical properties of metal-based compounds. We will present the multiphoton emission properties of a family of d6 transition metal-lanthanide hybrid complexes bearing one or two polar terpyridyl-stilbene derived chromophores [2] that have been optimised for multiphoton applications and present the first examples of lanthanide and actinide two photon absorption and upconversion processes in solution [3]. Our results indicate that these systems are suitable candidate molecules for multi-photon applications and these will be discussed further.

1. G. S. He, L.-S. Tan, Q. Zheng and P. N. Prasad, *Chem. Rev.* 108 (2008) 1245; H. M. Kim and B. R. Cho, *Acc. Chem. Res.* 42 (2009) 863; M. Pawlicki, H. A. Collins, R. G. Denning and H. L. Anderson, *Angew. Chem., Int. Ed.* 48 (2009) 3244.

2. L. S. Natrajan, A. Toulmin, A. Chew, S. W. Magennis, *Dalton Trans.* 39 (2010), 10837.

3. O.A. Blackburn, M. Tropicano, T.J. Sorenson, J. Thom, A. Beeby, L.M. Bushby, D. Parker, L.S. Natrajan, S. Faulkner, *Phys. Chem. Chem. Phys.* 38 (2012) 13378.

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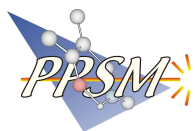
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