

SEMINAIRE LIDYL

Remi METIVIER

Laboratoire PPSM, ENS Cachan, CNRS, Université Paris-Saclay

Le Vendredi 18 Janvier 2019 à 11h00
- Bâtiment 522 - Salle 138

“Photo- and Mechano-Responsive Fluorescent Molecular Nanosystems”

The field of advanced fluorescent nanomaterials, with *photo-induced* or *mechano-induced* switching capabilities, is extremely active and has been attracting ever-growing interest in recent years in many research fields for their potential applications in biological sensors, high-resolution imaging, and innovative materials science.[1] We report here on the design, fabrication, spectroscopy and microscopy of two different kinds of systems, from the ensemble level down to the single nanoparticle level, with the aim to quantify the photo- or mechano-switching efficiency.

First, photoswitchable emissive nanoparticles, based on dyad molecules combining photochromic and fluorescent moieties, were prepared and characterized. In depth photophysical study revealed that the emission signal could be successfully and reversibly switched by light by means of multiple energy transfer pathways, leading to an unprecedented giant amplification of fluorescence photoswitching (Fig. 1A-B).[2]

Second, difluoroboron- β -diketone organic materials were synthesized, showing fluorescence and morphology modifications upon mechanical and thermal treatments.[3,4] Molecular nanocrystals were obtained by the reprecipitation method, then investigated by fluorescence microscopy combined with atomic force microscopy, highlighting the specific mechanofluorochromic behaviour of this material at the nanoscale (Fig. 1C).

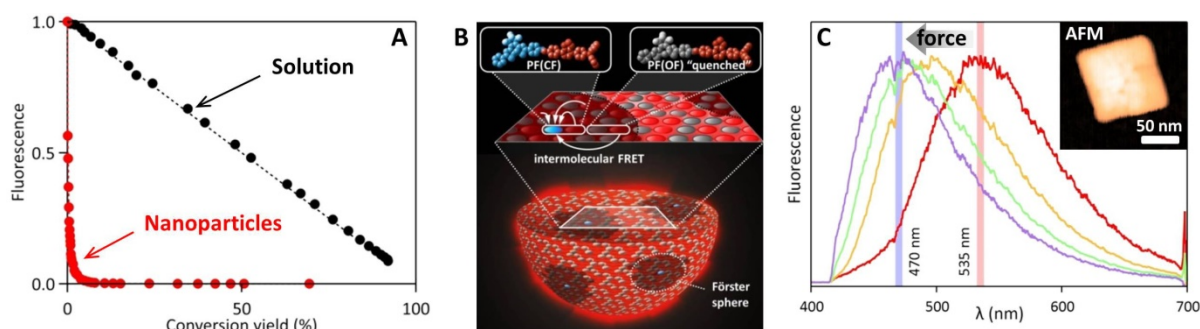


Figure 1. (A, B) Giant amplification of fluorescence photoswitching based on photochromic-fluorescent nanoparticles, and (C) mechanofluorochromic properties of difluoroboron- β -diketone nanocrystals.

Formalités d'entrée :

Visiteur U.E. : Se faire connaître au moins 48 heures à l'avance pour l'établissement de votre autorisation d'entrée sur le Centre de Saclay.

Visiteur hors U.E. : Se faire connaître au moins 4 jours à l'avance pour les formalités d'entrée et se faire accompagner par un agent CEA.

Sans autorisation, vous ne pourrez entrer sur le Centre de Saclay. Tél. : 33.1.69.08.74.09- Fax : 33.1.69.08.76.39 - email : caroline.lebe@cea.fr ou veronique.gerecny@cea.fr
Dans TOUS LES CAS, se munir d'une pièce d'identité (passeport et carte d'identité - pas de permis de conduire)

References

1. B. L. Feringa, W. R. Brown, "Molecular Switches", 2nd ed., Weinheim, Wiley-VCH (2011).
2. J. Su, T. Fukaminato, J. P. Placial, T. Onodera, R. Suzuki, H. Oikawa, A. Brosseau, F. Brisset, R. Pansu, K. Nakatani, R. Métivier, *Angew. Chem. Int. Ed.* **2016**, *55*, 3662-3666. (*inside cover*); T. Fukaminato, S. Ishida, R. Métivier, *NPG Asia Mater.* **2018**, DOI: 10.1038/s41427-018-0075-9.
3. Z. Chi, X. Zhang, B. Xu, X. Zhou, C. Ma, Y. Zhang, S. Liu, J. Xu, *Chem. Soc. Rev.*, **2012**, *41*, 3878.
4. M. Louis, A. Brosseau, R. Guillot, F. Ito, C. Allain, R. Métivier, *J. Phys. Chem. C* **2017**, *121*, 15897; L. Wilbraham, M. Louis, D. Alberga, A. Brosseau, R. Guillot, F. Ito, F. Labat, R. Métivier, C. Allain, I. Ciofini, *Adv. Mater.* **2018**, *30*, 1800817.

