

Fluorescence photoswitching of diarylethene dyads: characterization of the energy transfer and microscopy

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Photochromic/fluorescent dyad leads to photoswitchable emissive systems through energy transfer processes.¹ The profile of the response between the fluorescence signal and the conversion yield of the photochromic moiety depends on the environment. When the dyads are gathered in nanoparticles states, giant amplification effect leading to a nonlinear profile can be observed.² Design and synthesis of new diarylethene/perylene diimide architectures will be presented.² Steady-state spectroscopy in solution and nanoparticles revealed uncommon properties depending on the ratio of diarylethene in the compound. Time-resolved spectroscopy was carried out to investigate and characterize the energy transfer processes. Moreover, fluorescence photoswitching was performed on individual nanoparticles, allowing us to observe an interesting fluorescence recovery profile. To explain such an uncommon behavior, a mathematical modeling was proposed, allowing the determination of the number of perylene diimides quenched per photochromic molecule. Preliminary experiments of super-resolution imaging will be presented.

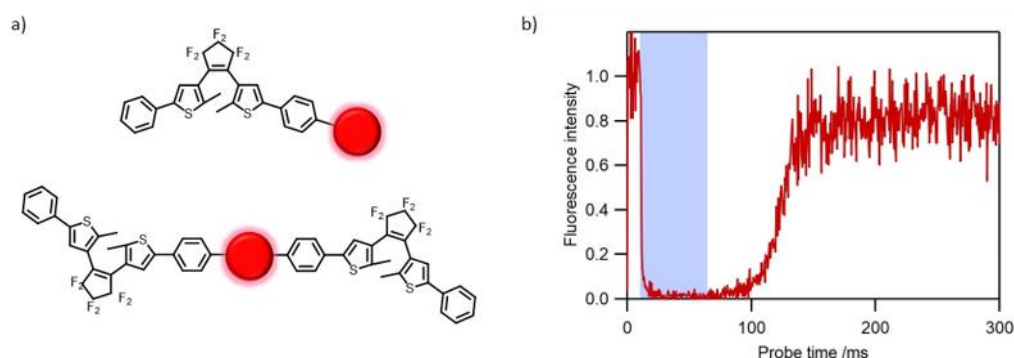


Figure 1. a) Schemes of diarylethene derivatives linked to fluorophores (red circles), b) fluorescence photoswitching profile of a single nanoparticle (the blue area corresponds to UV irradiation).

[1] T. Fukaminato, S. Ishida, R. Métivier, *NPG Asia Mater.* **2018**, 10, 859-881

[2] I. Ikariko, S. Deguchi, N. Fabre, S. Ishida, S. Kim, S. Kurihara, R. Métivier, T. Fukaminato, *Dyes and Pigments* **2020**, 180, 108490