Giant amplification effect of fluorescence photoswitching in organic nanoparticles investigated by spectroscopy and microscopy

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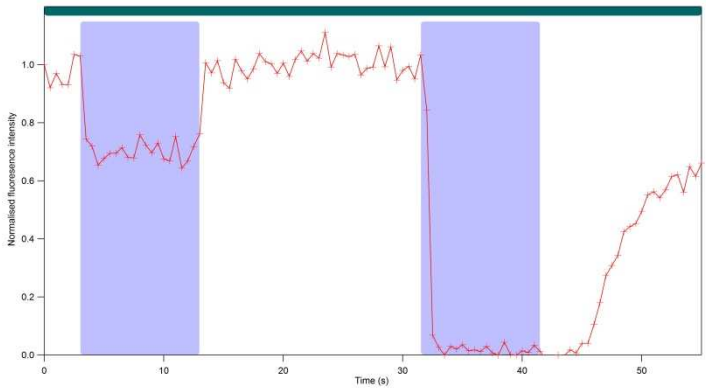
Fluorescence modulation of emissive system can be achieved by attaching a photochromic unit to a fluorophore. In this context, we studied covalently-linked diarylethene/perylenediimide architectures, with different ratio of each building block.[1] Molecular dyads in solution present a linear correlation profile between the fluorescence signal and the conversion yield of the photochromic molecule whereas a giant amplification effect appears when the dyads are gathered in organic nanoparticles.[2] This energy transfer in solution and in nanoparticles was characterized by fluorescence anisotropy and fluorescence decay. Microscopy studies at the level of single nano-objects will be presented, allowing us to follow, in real time, the fluorescence modulation of the nanoparticles (cf. Figure 1).



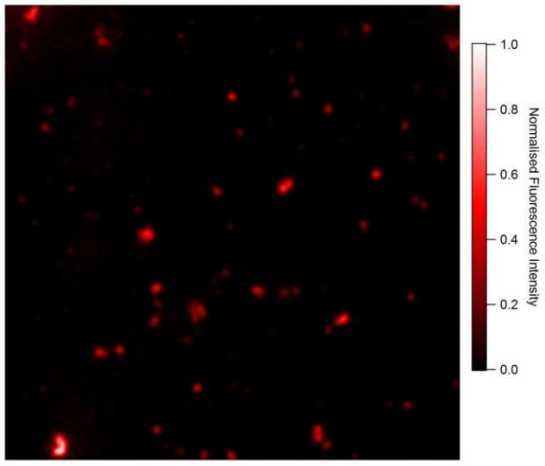


Figure 1. Fluorescence microsocopy image and intensity timetrace showing fluorescence photoswitching (under UV light) with different irradiation powers.

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

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