

# DIARYLETHENE-FUNCTIONALIZED SACCHARIDES FOR EFFICIENT AND NON-LINEAR FLUORESCENCE QUENCHING

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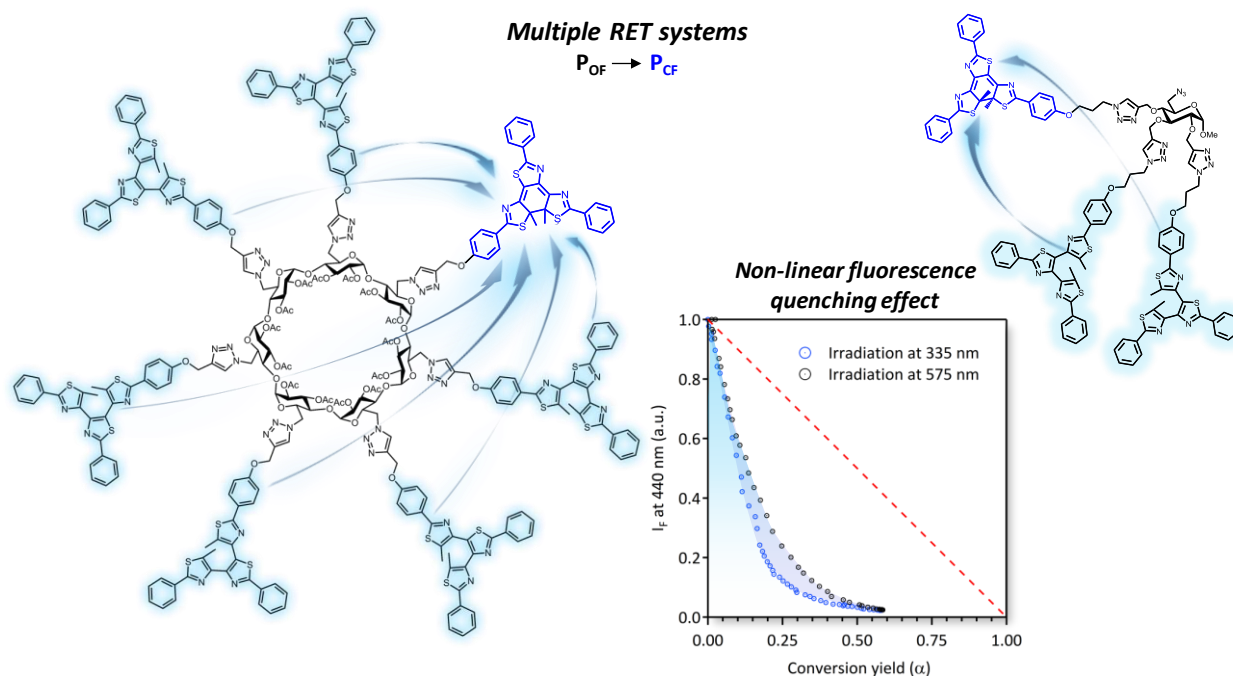
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The development of novel optical devices, such as light-driven optical memories or biocompatible nanophotostwitches for super-resolution imaging, attracts considerable interest in the growing field of photoresponsive nanotechnologies.<sup>[1]</sup>

As a continuing program on the development of fluorescent photoswitchable biomolecules for optical applications, we have designed and synthesized several multichromophoric architectures using the Cu(I)-catalyzed azide-alkyne cycloaddition reaction on saccharides derivatives.<sup>[2],[3]</sup> Saccharides are polyfunctional molecules with well-defined stereogenic centers in one molecular unit, and constitute platforms of interest on which multiple chromophoric units can be attached. Furthermore, such platforms offer an important degree of freedom, such as the multivalent effect and the chirality, to tune the photochemical and photophysical properties. To optimize the system performances (contrast and brightness), the number of diarylethene DAE units was modulated using different saccharidic platforms (glucopyranoside and  $\beta$ -cyclodextrin derivatives).

The fluorescence photoswitching of these systems is based on the intramolecular Resonance Energy Transfer (RET) processes between the DAE units, and an efficient non-linear fluorescence quenching effect was observed. To explain and quantify this phenomenon, a statistical approach supported by molecular modeling was developed. Synthesis of these photoswitchable multichromophoric saccharides as well as their photochemical and photophysical properties (steady-state absorption & fluorescence under light irradiation) will be presented.



**Figure 1.** Molecular photoswitches and the non-linear fluorescence quenching effect of the  $\beta$ -CD derivative.

[1] B. L. Feringa, W. R. Brown, *Molecular Switches*, 2<sup>nd</sup> ed., Wiley-VCH, Weinheim, **2011**.

[2] K. Ouhenia-Ouadahi, R. Métivier, S. Maisonneuve, A. Jacquart, J. Xie, A. Léaustic, P. Yu, K. Nakatani, *Photochem. Photobiol. Sci.*, **2012**, *11*, 1705.

[3] S. Maisonneuve, R. Métivier, P. Yu, K. Nakatani, J. Xie, *Beilstein J. Org. chem.* **2014**, *10*, 1471.