

Solvent- and Light-gated Fluorescence of a DCM Derivative

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Dicyanomethylene-p-dimethylaminostyryl-pyran, commonly referred as *DCM*, is a well known red fluorescent dye widely applied in chemistry, biology and physics.¹ However, only little studies have focused on the possible photoisomerization of its central double bond.² We present herewith a new DCM derivative that can exist in two configurational isomers (*E* and *Z*) and two rotational conformers (*s-trans* and *s-cis*), on account of the reciprocal position of the substituents. Among these four isomers, the *s-trans-E* isomer is the most stable and the only fluorescent form. Irradiation with visible light can produce the non-emitting *Z* isomers, whereas UV light can restore the *E* ones, reversibly and with a high fatigue resistance. We also investigated the emission-photochromism balance in different solvents: the fluorescence is more efficient in polar solvents, whereas the photoisomerization follows an opposite trend. Therefore, this intriguing case of solvent- and light-gated fluorescence³ can pave the way to a fine tuning of the optical properties in more complex multichromophoric architectures.

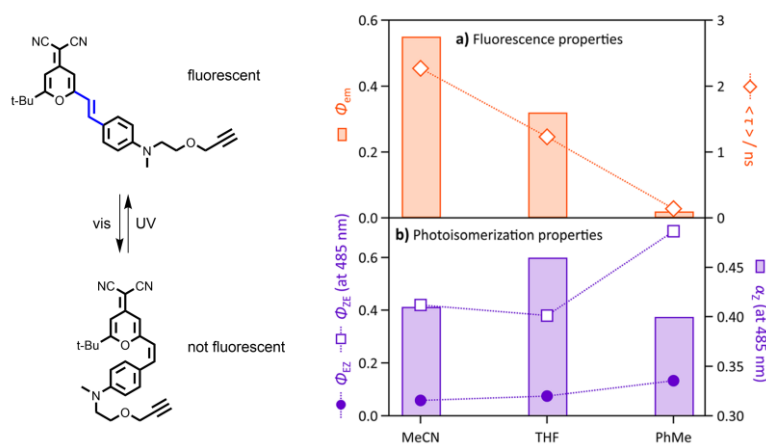


Figure 1. Left: structure and isomerization of the studied compound; right: emission quantum yield and lifetime (top) and photochromic quantum yield and conversion (bottom) in different solvents.

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