ABSTRACT

Reversible Photochromism in the Cavity of a Flexible Metal-Organic Cage

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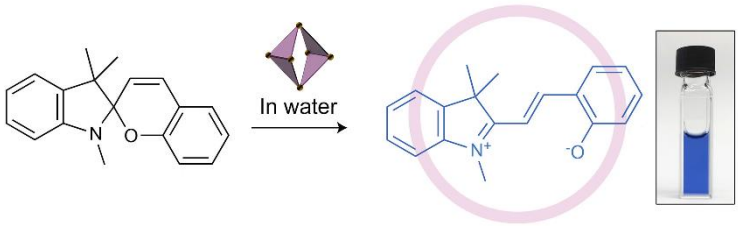

Confining molecules to volumes not larger than the molecules themselves can profoundly alter their chemical properties. Molecular switches[1] – entities, which can be toggled between two or more forms upon exposure to external stimuli – often require conformational freedom to isomerize, and placing them in confined spaces typically renders them non-switchable[2]. To preserve the switchability of these species under confinement, we encapsulated them in the cavity of a water-soluble, metal-organic cage[3] that is flexible and can adapt its shape to the conformation of the bound guest. In this talk, I will discuss how our "breathable" cage is capable of not only accommodating—and solubilizing in water—a wide range of structurally diverse guests – it also provides an environment suitable for the efficient, reversible photoisomerization of molecular switches, including spiropyrans and azobenzenes. I will also describe how we developed two novel time-sensitive information storage media: a paper, on which writing can be performed using water as the ink, and a gel, which can be reversibly patterned using light[4-6] by taking advantage of these findings. Our findings pave the way towards studying a variety of molecular switching processes in confined environments.

References

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