Molecular photoswitches as solar energy storage devices

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In recent years, the use of molecular switches to control diverse properties has become increasingly popular. Among the different types of reported switches, photoswitches have received considerable attention due to practical advantages such as high temporal and spatial resolution and lack of wastage products. The use of these photoswitches has led to a number of amazing applications on the photocontrol of different properties from polymers to liquid crystals or peptide conformations.[1] Most of these applications rely on the use of light to interconvert the system between two different states. Additionally, the switch could be used also to provide a potential use in its own as energy storage. Specifically, the energy of a photon could be absorbed and stored in a molecular photoswitch and the difference in energy between the two states could be released once an energy barrier for the back-reaction is surmounted. If the absorbed light is solar energy, the switch turns into a solar energy storage. This concept is called Molecular Solar Thermal system (MOST) and it has gained some attention in the last years as an alternative to other energy conversion systems due to its functioning as a closed cycle and lack of emissions. Herein we report how a well-known type of molecular switch could be tuned to act as a part of a MOST system.[2]

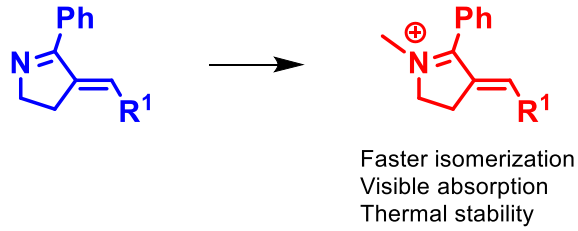

Figure. Tuning of the properties of Rhodopsin-based molecular switches.

References.

1.- Garcia-Iriepa, C.; Marazzi, M.; Frutos, L. M.; Sampedro, D. *RSC Advances* **2013**, *3*, 6241-6266.
2.- Blanco-Lomas, M.; Martínez-López, D.; Campos, P. J.; Sampedro D. *Tetrahedron Lett*. **2014**, *55*, 3361-3364.