

Peptoids as Promising Azobenzene Support for the Chemical Storage of Solar Energy

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Azobenzene (**AB**) derivatives are among the most studied photoswitches in the context of solar thermal fuels and numerous strategies to improve their properties have been considered in literature. Among them, anchoring the chromophores along a template, *i.e.* carbon nanotubes¹ or polymer backbones², appears promising though challenging.

We propose here peptoids as a programmable scaffold to improve the AB storage properties. These peptidomimetic compounds consist of sequence-defined synthetic polyamides with an achiral backbone which can be decorated with diverse side chains at specific positions. Peptoids belong to the foldamer family, implying that they can adopt specific stable secondary structures in solution depending on the nature of the side chains. We will illustrate in this contribution that the position of the AB anchoring site on a three-unit peptoid backbone, *i.e.* external (N and C terminus) vs internal positions, has a huge impact on the MOST properties, in particular on the metastable isomer half lifetime $t_{1/2}$ ranging from 0 min to 14 days at 20 °C.³ These promising results were obtained via a Liquid Chromatography-Mass Spectrometry (LC-MS) method that allows for the determination of the back-isomerisation kinetics of each photoisomer independently. This peptoid site selectivity will certainly prove to be of prime interest for the design of specific architectures to meet the requirements of the targeted applications. Finally, we will present preliminary results on the influence of azobenzene interactions in peptoids containing at least two AB moieties at different positions, as monitored by combining LC-MS and circular dichroism experiments.

¹A. M. Kolpak, J. C. Grossman, *J. Chem. Phys.* **2013**, *138*, 034303.

²D. Zhitomirsky, E. Cho, J. C. Grossman, *Adv. Energy Mater.* **2016**, *6*, 1.

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