PHOTORESPONSIVE COVALENTLY LINKED DEXTRAN NETWORKS – TOWARDS FUNCTIONAL HYDROGELS

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Functional materials that can take up and release guest molecules upon stimulation with light can find applications in the area of targeted drug release. [1] Such systems are often based on azobenzene, a molecular photoswitch that can be photoisomerized between its *cis* and *trans* isomers. [2] The bacterial polysaccharide dextran and its modifications have been used in a wide variety of drug delivery systems. [3]

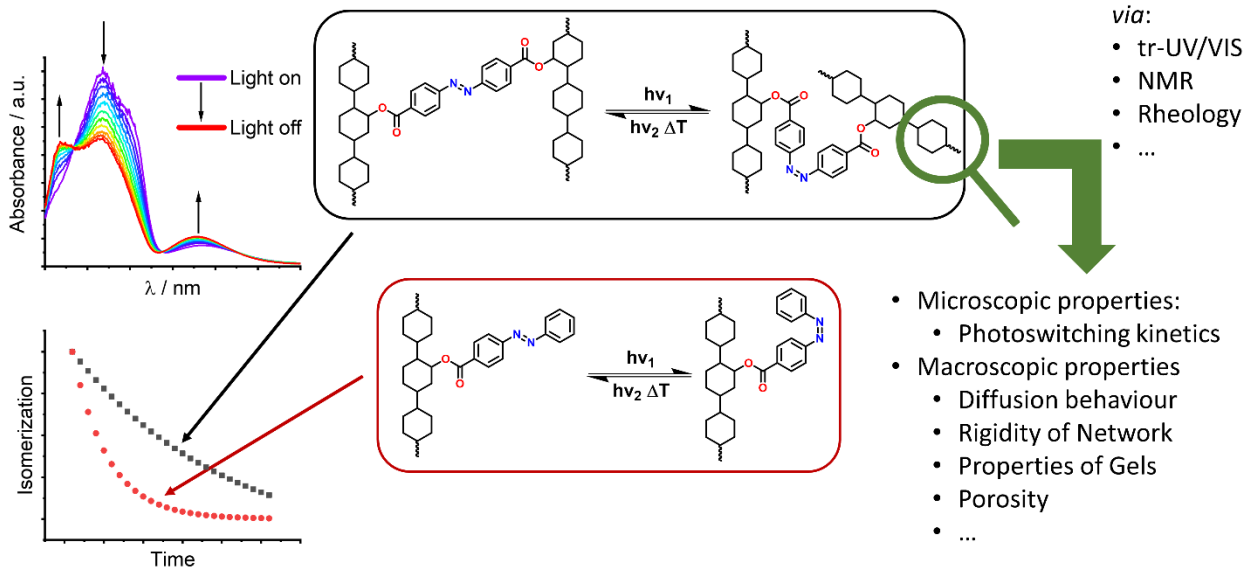

Figure 1: Azobenzene-crosslinked dextran molecules show photoswitching activity, paving the way towards photo-triggered catch-and-release devices.

Here a previously unreported doubly-covalent ester link by azobenzene moieties opens the way for a photo-triggered porous device for the release and capture of small molecules. We have been exploring the potential of such materials by varying the degree and fashion of crosslinking. The preparation of gels with photoswitchable mechanical properties *via* this procedure has been demonstrated.

Control experiments indicate remarkably different material properties when the azobenzene linker is attached by one or two covalent bonds. We have been following the kinetics of *trans*↔*cis* isomerizations of the azo-moiety and the micro- and macroscopic properties of the crosslinked dextran network using a wide variety of analytical techniques, including time-resolved UV/VIS spectroscopy, NMR spectroscopy and, in the case of gels, Rheological measurements.

References

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