HYDROGELS WITH PHOTO-SWITCHABLE STIFFNESS: A TOOL TO MIMIC EXTRA CELLULAR MATRIX

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Cells in tissues interact continuously with their microenvironment influencing their behaviors, such as proliferation or cell differentiation. Mechanical stimuli can also lead to pathologies. It is thus to understand the relationship between cell response and mechanical stress. For this, *smart* materials controllable by external stimuli and capable of inducing a mechanical stress into the cell are needed.

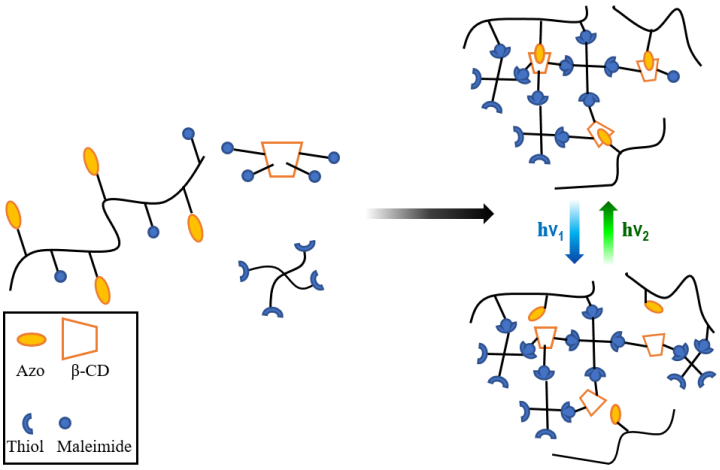

Figure : light responsive supramolecular hydrogel

Azobenzene@cyclodextrin are well-known light-responsive host-guest complexes which have been used to create smart hydrogels [1]. Depending on its isomerization state, azobenzene (azo) and its derivatives can form complexes with β-cyclodextrin (β-CD). Light can thus trigger the formation or the breakage of the supramolecular complexes.

In this work, visible-light responsive azo derivatives and their complexation in β-CD were studied. From azo@β-CD complexes, we designed hydrogels composed of a supramolecular photo-controllable polymer network [2]. The gels were furthermore crosslinked by thiol-maleimide reaction. In the end, controlling the composition of these hydrogels makes it possible to tune their stiffness and to change it in a controllable, light-assisted way. These hydrogels are promising tools to study the influence of matrix stiffness on the cellular and tissue behaviors.

[1] A. Harada, Y. Takashima, M. Nakahata, *Acc. Chem. Res.*, 47, 2128, **2014**

[2] J. Royes Mir, C. Coudret, C. Roux, F. Benoit-Marquié, M. Cazalès, C. Séverac, C. Lorenzo, A.-F. Mingotaud, *ChemPhotoChem*, 1, 311-316, **2017**