Supramolecular Ruthenium-based Gels Responsive to Visible/NIR Light

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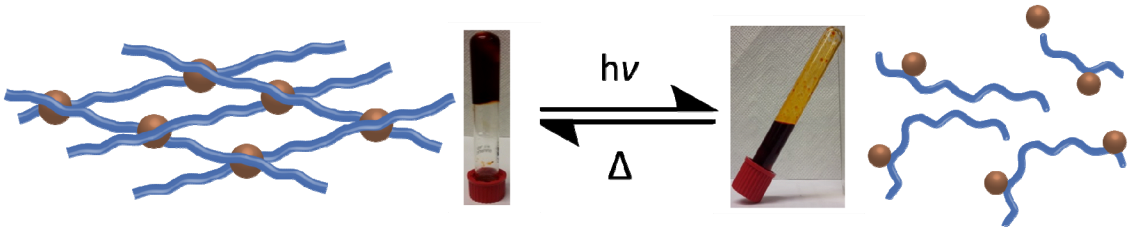
Functional polymers which can be photochemically manipulated by exogenous light have immense promise in materials science due to the possibility for spatiotemporal control, with applications ranging from drug delivery to photolithography. For many applications, for example patterning of cellular microenvironments, materials are required which are sensitive to longer wavelength, i.e. visible and near-infrared (NIR) irradiation, owing to its deeper penetration and lower risk of damage to biological tissue compared to UV irradiation. To meet these requirements, Ru-based polymeric materials containing the complex $[(bpy)_2RuL_2]^{2+}$ (with byp = 2,2'-bipyridine, L = pyridine-type ligand) were developed. The ruthenium complexes function as cross-linker forming organo- and hydrogels. Upon visible or near-infrared irradiation (in a two-photon process), the pyridine ligand is photo-cleaved which leads to a liquefaction of the gel [1]. When poly(4-vinylpyridine) is used as photo-cleavable ligand, the process is thermally reversible, hence self-healing gels are obtained [2].



[1] S. Theis, A. Iturmendi, C. Gorsche, M. Orthofer, M. Lunzer, S. Baudis, A. Ovsianikov, R. Liska, U. Monkowius, I. Teasdale, *Angew. Chem. Int. Ed.* **2017**, *56*, 15857-15860.

[2] I. Teasdale, S. Theis, A. Iturmendi, M. Strobel, S. Hild, J. Jacak, P. Mayrhofer, U. Monkowius, **2019**, *submitted*.