

# PHOTOCLEAVABLE SUPRAMOLECULAR RUTHENIUM-HYDROGELS

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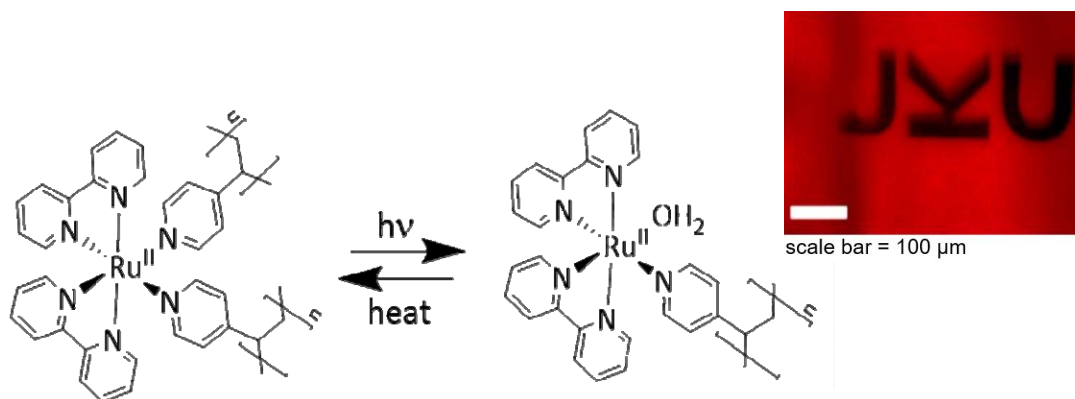
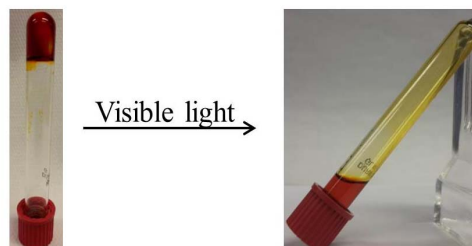
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The application of  $cis\text{-}[\text{Ru}^{\text{II}}(\text{bpy})_2(\text{L1})(\text{L2})]^{2+}$  for the phototriggered release of the molecules L1/L2 is well known in the literature. The photoactive MLCT band of these complexes lies in the visible region. Consequently, the ligands can be released by using light with a wavelength of 400 nm and above [1].

This strategy was transferred to polymeric structures in order to design novel materials which are degradable via visible and NIR light. In one material, the ruthenium complex  $cis\text{-}[\text{Ru}^{\text{II}}(\text{bpy})_2(4\text{AMP})_2]^{2+}$  (with 4AMP = 4-aminomethylpyridine) was incorporated into polyureas to form hydrogels [2]. In another material,  $cis\text{-}[\text{Ru}^{\text{II}}(\text{bpy})_2\text{Cl}_2]^{2+}$  was used to cross-link commercially available poly(4-vinylpyridine) also yielding a gel [3]. In both cases, upon irradiation with visible light the pyridine moiety dissociates rapidly due to a cleavage of the Ru–N bond which leads to degradation of the gels. The photocleavage only occurs in directly irradiated regions and enables a spatial control of the degradation. This allows for micro-patterning in multi-photon processes in the NIR. For the gels obtained from poly(4-vinylpyridine) the degradation is reversible as was demonstrated by writing, erasing, re-writing cycles.



[1] L. Zayat, C. Calero, P. Alborés, L. Baraldo, R. Etchenique, *J. Am. Chem. Soc.* **2003**, *125*, 882.

[2] S. Theis, A. Iturmendi, C. Gorsche, M. Orthofer, M. Lunzer, S. Baudis, A. Ovsianikov, R. Liska, U. Monkowius, I. Teasdale, *Angew. Chem.* **2017**, *129*, 16071.

[3] I. Teasdale, S. Theis, A. Iturmendi, M. Strobel, S. Hild, J. Jacak, P. Mayrhofer, U. Monkowius, *Chem. – Eur. J.* **2019**, *25*, 9851.