

## MICROPATTERNING OF HYDROGELS BY SENSITIZED TWO-PHOTON CLEAVAGE OF *o*-NITROBENZYL CROSSLINKAGES

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Photodegradable hydrogels, highly hydrated polymer networks with photolabile junctions, have been developed in recent years as useful platforms for research on cell function, tissue engineering and cell delivery. Their physical and chemical properties can be dynamically altered by the non-invasive use of light. For this purpose frequently photocleavable *o*-nitrobenzyl (oNB) derivatives are integrated into the networks. Degradation of such hydrogel systems can be either induced by one-photon irradiation using UV light or by a two-photon process applying pulsed IR-laser light. As the two-photon absorption cross-sections  $\delta_a$  of these functionalities are usually rather low,[1] relatively high laser intensities and long irradiation times are required for photoscission. However, such parameters can lead to damage of living cells encapsulated into the material. In order to promote the two-photon induced process, we present a modular system permitting the sensitization of the oNB photoscission by addition of a small molecule exhibiting large two-photon absorption. We show that the efficiency of the oNB photoscission can be effectively promoted in a concentration dependent manner and demonstrate the efficacy of this process in the presence of cells. The biomaterials used in this study are based on hyaluronic acid (HA) and poly(ethylene glycol) (PEG) that are assembled by a cytocompatible Michael-type thiol-ene click reaction.

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[1] I. Aujard, C. Benbrahim, M. Gouget, O. Ruel, J.-B. Baudin, P. Neveu, L. Jullien, *Chem. – Eur. J.* **2006**, *12*, 6865-6879.