PEPTIDE SELF ASSEMBLY CONFERENCE 2026

MAINZ. GERMANY FROM DYNAMIC STRUCTURES TO FUNCTIONAL MATERIALS

Abstract: Expanding the Functional Scope of NVOC Photocages for Light-Controlled Peptide Self-Assembly

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Stimulus responsive peptide materials are an interesting class of materials due to their capability to undergo chemical transformation upon exposure to an external stimulus. Photocages are especially interesting as light yields spatial and temporal control for chemical transformations with the potential of releasing proassembling peptides[1] and manipulating supramolecular strucutures[2]. Building on the findings of the photolytic redox activity of the Nvoc photocage[3] the photolytic oxidative conversion of hydroxylamine containing peptide assemblies to nitroxide containg peptide assemblies has been realized. Furthermore, the Nvoc scaffold was engineered into a bifunctional photocage platform that enables the incorporation of an additional stimulus-responsive trigger, providing a strategy for sequential control over peptide self-assembly.[4]

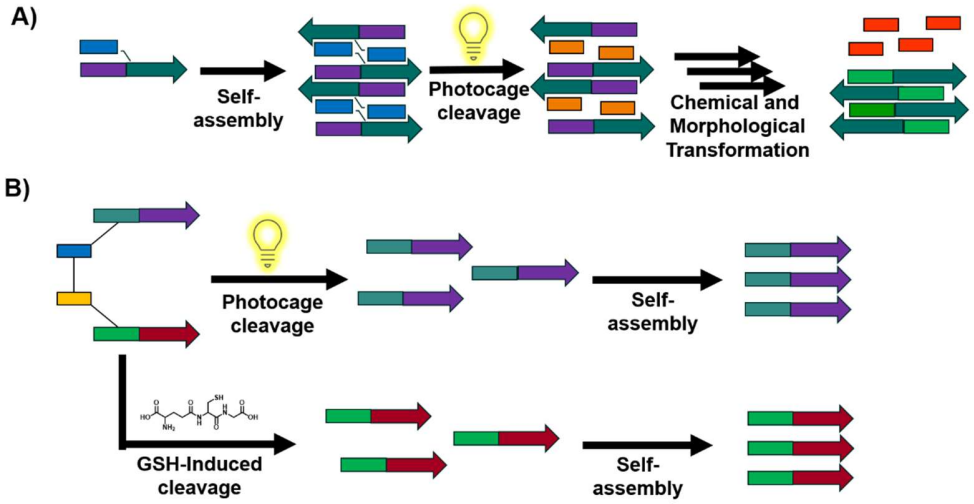

Figure 1: A) Schematic representation of the UV-light-induced oxidation of peptide assemblies. Photolysis of the NVOC photocage generates a nitroso species that converts hydroxylamine into nitroxide, accompanied by formation of the amine cage by-product. **B)** Schematic representation of a bifunctional NVOC photocage enabling orthogonal control over peptide self-assembly. Light-induced photocleavage and glutathione-mediated disulfide reduction independently release two pro-assembling isopeptides, triggering self-assembly of the respective peptide building blocks.

1. Ren, Y. *et al. Nature Synthesis* **4**, 673 (2025).
2. Measey, T. J. & Gai, F *Langmuir* **28**, 12588 (2012).
3. Roth, P. *et al.*. *Nature Synthesis* **2**, 980 (2023).
4. Schuler, M. *et al. Nat. Rev. Chem.* **10**, 365 (2026).

Poster will be presented together with Patrick Kral.