SFB TRR 102

Polymers under Multiple Constraints

Polymer- & Soft-Matter-Seminar

Tuesday,
19th November
2019

at: **5.15pm**

VDP 4 1.27,
Von-Danckelmann-Platz 4
06120 Halle

Multidomain Peptide Assemblies for the Design of Thermoresponsive Supramolecular Materials

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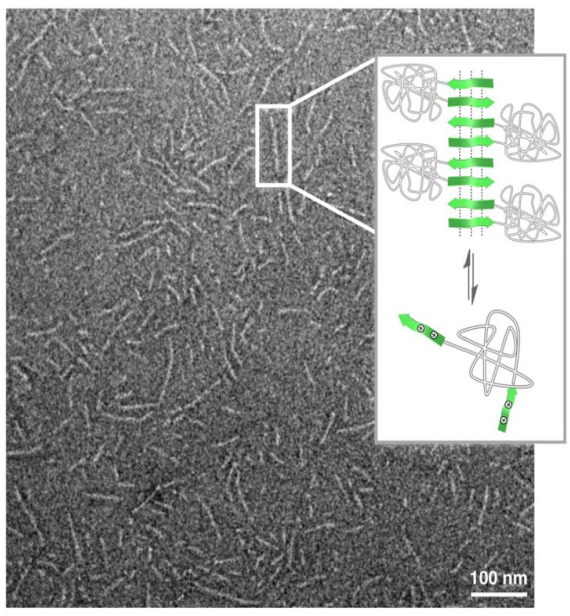
Spatial and temporal control are critical properties to advance and optimize functional macromolecular materials in order to mimic key features of living systems.[1] In my lecture, I will discuss our methodology in developing non-equilibrium states in thermoresponsive hydrogels using peptide-polymer conjugates. We have expanded our concept of charge regulated ß–sheet self-assembly of alternating hydrophilic and hydrophobic amino acids in order to introduce redox-switchable properties.[2] An interplay of pH- and oxidation-stimuli, promoted by the production of reactive oxygen species (ROS) leads to transient supramolecular assemblies of either methionine containing dendritic peptide amphiphiles or amphiphilic ABA and ABA' triblock peptide-polymer conjugates, with tuneable lifetimes and stabilities of the hydrogels.[3] The incorporation of triethylene glycol chains introduces thermoresponsive properties to the supramolecular hydrogels, which operate in a biomedically relevant temperature range of 30 - 40 °C. Repair enzymes are able to reverse the oxidative damage in the methionine-based thioether side chains and thus reinitiate supramolecular polymerization. Reactive oxygen species play an important role in signal transduction cascades, and our strategy therefore offers potential for applications in dynamic biomaterials that operate in redox microenvironments.



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