Directing the Self-Assembly of Hybrid (Bio)Nanoparticles

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This presentation deals with the use of different interfaces guiding the self-assembly of various soft colloidal particles [1]. First, we describe classical oil/water emulsion systems, the so-called Pickering emulsions. Here, the controlled assembly of protein-polymer conjugate nanoparticles (Ferritin-PNIPAAm) followed by crosslinking the polymer matrix leads to permeable, yet highly flexible and stable membranes and capsules [2].

![Fig. 1](image)

**Fig. 1** A) Fluorescence microscopy (overlay) images of an emulsion of 10 µL water+Fluorescein (0.01mM) with ~400 mg/ml Ferritin-NIPAAm-DMIAAm, in 1000 µL toluene+Nile Red (0.01 mM), cross-linked. B) Capsules of A, collected and re-dispersed in pure water. The inset shows the bright field image of the w/w capsules. Measurements were performed at room temperature, scale bars represent 100 µm.

Moreover, we demonstrate that nanostructured substrates produced from wrinkling instabilities with wavelengths on the order of only a few hundred nanometers, effectively guide the self-assembly of various well-defined organic nanoparticles (e.g. proteins or microgels) [3]. This process allows the creation of anisotropic large scale particle arrays and supramolecular constructs like composite particulate nanoscale fibres.

