Growth of gold nanorods in pNIPAM microgels

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In order to assemble a multiresponsive composite material, gold nanoparticles of different sizes and shapes were grown in the presence of pNIPAM microgels. The microgels provide a temperature responsive matrix with a characteristic transition temperature at 32°C. Above this temperature, the previously swollen network expels water from its internal structure which may be seen as a collapse event. Due to the shrinkage, the refractive index of the microgel changes. This change can be monitored by the internally captured gold nanoparticles since their optical absorption spectrum strongly depends on the surrounding media’s properties.

![Evolution of UV-VIS spectrum with temperature](image)

The evolution of the spectrum is fully reversible which was shown by repeated heating and cooling cycles. The shape of the curve is adjusted by the nanoparticles size and shape and can span a wide range of wavelength in the optical spectral region. No leakage of the nanoparticles was observed.

![Plasmon positions while cycling between 15°C (blue symbols) and 50°C (red symbols)](image)