

GRK 2516 Soft Matter Seminar

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None

Research seminar of the DFG Research Training Group GRK 2516 (<https://grk2516.uni-mainz.de>).

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Controlling Stability and Particle Aggregation in Salted Gold Nanoparticle Suspension by Ion Type, Concentration, and Aging

The fabrication of composite materials from inorganic nanoparticles (NPs) and an organic matrix significantly enriched the field of nanotechnology as components facilitate each other or cover a significant drawback. Thereby, the blending of components enables various novel application, e.g. for catalysis, nano-sensors, and medical engineering.

Despite the numerous improvements over the last years, the assembly of small NPs within a polymer matrix is still not well understood. To overcome the resulting limit of accessible structures, we pursue a more controlled approach of NP formation inside a polymer matrix, utilising gold NPs as model system. During NP self-assembly, specific stimuli (represented by five Na salts of varying concentration) assert control over the NP structure by guiding the system through a series of kinetically trapped states.

Prior to investigation of NP assemblies in a polymer matrix, the response of gold NPs suspensions needs to be well characterised. Therefore, suspensions of gold NPs (~10nm) with two capping agents are mixed with different Na-salts along the Hofmeister series (anion: F, Cl, Br, I, SCN), and optically monitored by a camera and a spectrometer. The aggregation and sedimentation behaviour reveals non-systematic ion- specific effects, which further depend on the NP size and capping agent.