NANOPARTICLE CONSTRUCTS OF METALLIC AND CORE-SHELL NANOPARTICLES BASED ON DNA-HYBRIDIZATION

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Nanoparticles represent versatile building blocks for nanotechnology and material science. Therefore, the defined assembly of nanostructures is of significant importance. Short DNA sequences bound to the nanoparticles' surface enable highly specific DNA hybridization-driven events that direct the formation of nanoparticle constructs. The well-established system based on thiolated DNA was thereby complemented with amino-functionalized DNA.
Examples for the defined formation of gold and gold/silver nanoparticle constructs are demonstrated. Further, gold-silver core-shell nanoparticles are introduced as further building blocks for the hybridization-controlled formation of nanoparticle constructs. The resulting plasmonic properties of the particles are studied using ensemble as well as single particle spectroscopic characterization, even during the process of metal shell growth. The optical properties are determined by the outermost layer when a certain shell thickness is reached. In addition, the formation of constructs of gold and silica nanoparticles is demonstrated including core-shell structures of gold and silica.
The results demonstrate the potential of the combination of different particle sizes, compositions as well as coupling chemistry in order to realize controlled nanoparticle constructs.

References:

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