

74a Nanoparticle Assemblies with Molecular Springs

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Nanoparticle (NP) superstructures are an important pathway to creation of smart materials with new functionalities. Most of the current examples of complex NP systems, such as bioconjugates or hybrid nanocolloids and their lattices are typically static, i.e. have limited response to the environmental parameters and do not exhibit smooth reversible transitions of their 3D organization/geometry in response to external stimuli. Dynamic NP superstructures with gradual structural adaptation to common physical parameters may reveal interesting analogies with biological entities similar in scale. Additionally, such systems can also find technological applications as novel optical devices. One example of them – reversible nano-thermometer built from two types of NPs connected by a polymer molecule acting as a molecular spring – is described in this paper. The underlying microscopic mechanism of the nano-thermometer involves the plasmon resonance and exciton-plasmon interaction.