Polymer-linked planet–satellite-type supracolloids: a versatile form of responsive soft matter

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Planet–satellite-type supracolloids represent a form of soft matter in which coupling interactions can be engineered by adjusting interparticle spacing.[1] For many applications, a high number of strong coupling interactions and hence many interacting particles with short spacings are sought. This is the case for, e.g., plasmon–plasmon coupling interactions that create local "hot spots" with high electric field enhancement. Thus, applications that are near-field promoted, such as surface-enhanced Raman scattering, provide an example. However, such coupling scenarios are typically realized by particle linkers that form a dense surface layer and may impede access of molecules of interest – be they reactants or analytes – into the hot-spot sites. This presentation will highlight the usefulness of end-grafted polymer-molecule linkers in planet–satellite-type structures. These linking entities form a ligand layer that is not dense in a good solvent environment, thereby ensuring hot-spot accessibility; whereas the stimulus-responsive properties of that linker can be employed to actuate interparticle distances, thereby switching on the desired coupling effect, Figure 1 [2].

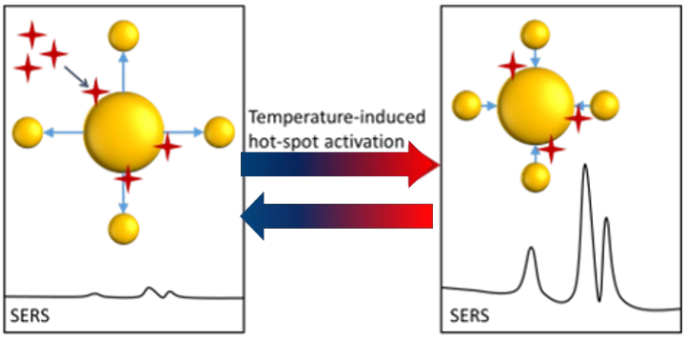

Figure 1: Temperature-moderated hot-spot activation in polymer-linked gold/gold planet–satellite nanostructures (figure is adapted from [2]).

Keywords: surface-grafted polymers, hybrid polymer/inorganic nanomaterials, responsive soft matter

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References

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