Assembly of patchy colloids towards the development of functional nanomaterials

Angela CAPOCEFALO - *CNR-ISC, Rome*

The guided assembly of plasmonic nanoparticles (NPs) has proved to be an effective route for the fabrication of novel bottom-up nanomaterials with tailored properties. Here we employ as building blocks anionic gold nanocolloids (AuNPs) decorated by a positively charged antibacterial enzyme. The presence of discrete charge patches at the nanoparticles' surface induces anisotropic interactions among the colloids, triggering a self-limited aggregation process that eventually results in the formation of fractal clusters.
We demonstrate that by acting on the enzyme-AuNP number ratio it is possible to obtain a multifunctional hybrid nanomaterial with adjustable functional and optical properties showing both responsivity to external stimuli such as pH and temperature and antibacterial capabilities.