TECHNOLOGY

Self Assembling Inorganic Nanoparticle Vesicles - Building Blocks for Functional Nanomaterials

OVERVIEW

Background-

Self-assembly is the process by which the components of a preexisting disordered system spontaneously come together as an organized structure or pattern. The self-assembly of nanoparticles composed of two or more different materials into composite nanoparticles offers promising opportunities for synthesizing a variety of materials with precision and control. The controllable building of larger structures from nanoscale building blocks offers an effective route for fabrication of new materials with unique optical, electronic and magnetic properties.

Innovative Technology

Researchers at the University of Maryland have created a new class of amphiphilic “colloidal molecules” (ACMs) composed of inorganic nanoparticles (NPs) tethered with amphiphilic linear block copolymers (BCPs). The conformational changes of these tethered BCP chains, drive the self-assembly of such ACMs into a well-defined vesicular and tubular nanostructures comprising a monolayer shell of hexagonally packed nanoparticles in selective solvents. The fabrication method allows for control over size, molecular weight, morphologies and geometries of these assemblies.

APPLICATIONS

1. New building blocks for assembling novel functional materials and devices (biomolecular recognition of DNA).

ADVANTAGES

1. Precision and control over the size, molecular weight, morphologies and geometries of the ACMs.
2. Fabrication method allows control of inter-particle distance and hence the fine-tuning of the plasmonic properties of the assemblies of metal NPs.

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Additional Information

INSTITUTION

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PATENT STATUS

Patent(s) pending

LICENSE STATUS

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CATEGORIES

- Nanotechnology + Nanoparticles + Nanomaterials
- Research Tools, Antibodies, & Reagents

EXTERNAL RESOURCES

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