

NANO STAR: NEW PLATFORM FOR TARGETED DRUG DELIVERY & IMAGING

Novel nanoshell design with star polymer occlusion complexes and inorganic shells, offering versatile applications in biomedical and nanotechnology fields.

Case ID:

Joint IBM - SJSU Invention

IP Position:

US Patent [9597405B2](#), PCT [WO2012126115](#)

Development Status:

TRL 8: System complete and qualified.

Opportunity

Partners sought for licensing technology.

Category(s):

Nanotechnology, Biomedical Engineering, Drug Delivery, Nanomaterials, Polymer Chemistry

Keywords:

Nanoshells, Star Polymer, Drug Delivery, Controlled Release, Diagnostic Imaging, Inorganic Shell, Gold Nanoshells, Silica Nanoshell

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Technology Overview

The field of nanomedicine is rapidly growing, and there is a growing need for new and improved nanoparticles for various applications. Existing nanoparticles often have limitations such as poor stability, uncontrolled release of drugs, and difficulty targeting specific cells or tissues.

This invention provides a new type of nanoshell made with a star polymer core and a shell of inorganic material, such as gold, silica, or iron oxide that overcomes some of the limitations of existing nanoparticles. The star polymer core can encapsulate various cargo materials, including pharmaceuticals, imaging agents, and other molecules. Specifically, this technology opens new avenues in nanotechnology with advancements in fields where precise control over materials and their interactions is critical.

Overall, this technology lays the foundation for a novel and versatile approach to nanoshell design, with potential implications for healthcare, materials science, and beyond.

Key Features & Benefits

- **Unique Design:** nanoshells with a star-shaped structure, incorporating a tiny crosslinked core and multiple arms that can encapsulate substances like drugs, imaging agents, or other molecules.
- **Controlled Size and Release:** The size and release rate of cargo material can be controlled by the thickness and composition of the shell.
- **Improved Stability:** The star polymer core provides a stable platform for the cargo material and helps to prevent it from degradation.
- **Targeted Delivery:** The surface of the nanoshell can be modified with targeting moieties to deliver the cargo material to specific cells or tissues.

Potential Applications

- **Multifunctional:** The nanoshells can be used for a variety of applications, including drug delivery, diagnostic imaging, photothermal therapy, and other applications.

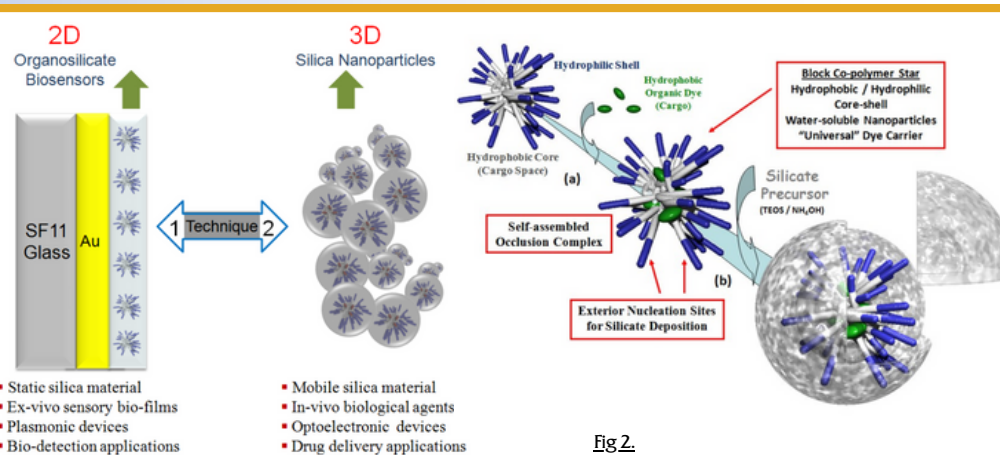


Fig 1.

Organosilicate-based plasmonic biosensors (2D) and star polymer templated silica nanoparticles (3D) as powerful tools in nanobiotechnology

Fig 2.

Scheme showing the development of 3D core-shell templated silica nanoparticles, from the occlusion complex (a) to silica deposition (b)