

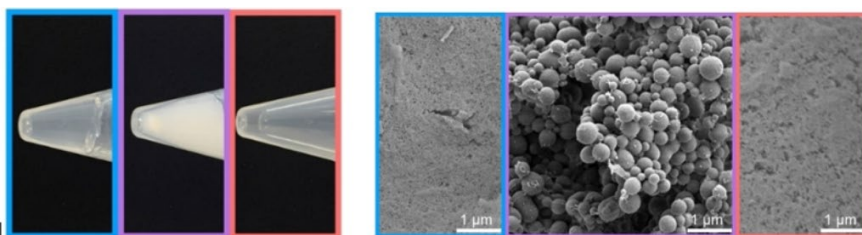


Green Synthesis of Biocompatible Porous Nanostructured Silica-Composite



Reference Number: **2201** \ Principal Investigator: **Prof. Assaf Gal** \ Patent Status: **US-2025-0136455-A1**

Nanostructured silica is widely used in catalysis, encapsulation, drug delivery, bioimaging, biosensing, energy storage, and more. Current synthesis methods rely on harsh chemicals, are costly, and environmentally unfriendly. This technology offers a biomimetic method for synthesizing nanostructured silica via polyanion-polycation phase separation in water. By adjusting reaction conditions, it enables precise control over morphology, size, and porosity, eliminating harsh chemicals and solvents for a more sustainable, efficient process.



— + 5 mM PAA — + 5 mM PAH — + 5 mM PAH + 5 mM PAA

Silicification of $\text{Si}(\text{OH})_4$ in aqueous solution with polyanion (blue), polycation (red), and both polyanion and polycation (purple)

APPLICATIONS

- Catalysis
- Drug delivery
- Biosensing
- Bioimaging
- Food industry
- Paints
- Substances encapsulation
- Scaffold for tissue engineering

DEVELOPMENT STAGE

Varied morphologies of nanostructured silica were synthesized consistently in small scale from $\text{Si}(\text{OH})_4$. Applicative uses are still in development and need further research.

DIFFERENTIATION



Inexpensive and Highly stable



Tailored morphology, sizes and porosity



Easily modified surfaces



Biocompatible



Environmentally Friendly

REFERENCES

- [H. Zhai et al, Chem. Int. Ed. 2022](#)

