Low-Cost Self-Assembly of Supraparticles

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BACKGROUND

Supraparticles have a wide range of chemical compositions, controlled sizes, and defined morphologies. Different supraparticles have superior and useful properties that may be applied to different areas of science and technology, including optics, magnetics, electronics, mechanics, sensing, or catalysis. Current methods to fabricate supraparticles are limited. Specifically the supraparticles formed are size-limited and the building blocks of the supraparticles require chemical modifications.

BRIEF DESCRIPTION

Prof. Yadong Yin and his colleagues from the University of California, Riverside have developed a new method for the self-assembly of supraparticles at all scales. The method uses an emulsion-based template-assisted self-assembly of superstructures unrestricted to the chemical composition of the building blocks. Emulsion droplets containing materials that will form the supraparticles are distributed by using uniform holes patterned on a template film as a collective and size-controllable platform of superstructures. This emulsion method allows for the superstructuring of various shapes and types of building blocks at all scales without any additional surfactants to the system.

Additionally, external stimuli such as magnetic or electric fields may be used to tune the assembly of supraparticles.

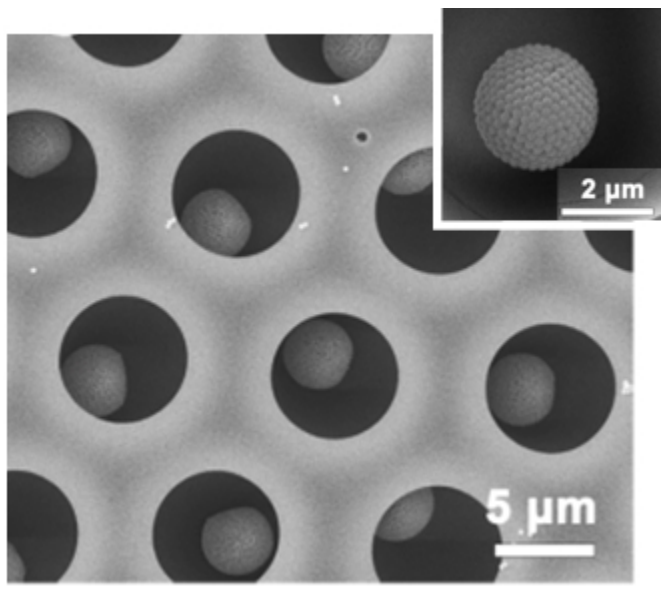

Fig 1. A scanning electron microscope image of the supraparticles of silica nanoparticles formed in the micro-hole template. The inset highlights one supraparticle.

APPLICATIONS

- This is a time-saving, versatile and low-cost method for fabricating supraparticles that may be used for a variety of applications ranging from anisotropic conductive films to pharmaceutical agents
- This may be used to create uniform supraparticles of varying sizes and morphologies

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OTHER INFORMATION

KEYWORDS

supraparticles, nanoparticles, all-scale

CATEGORIZED AS

- Materials & Chemicals
  - Nanomaterials

RELATED CASES

2021-815-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240002780	01/04/2024	2021-815

RELATED MATERIALS

- Liu, D. Self-assembly of superstructures at all scales, Matter, 2021, 2590-2385 - 01/14/2021

INVENTION BY PROF. YADONG YIN

Please review all inventions by Prof. Yadong Yin and his team at UCR.

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