Novel Multi-Scale Pre-Assembled Phases of Matter

Tech ID: 29827 / UC Case 2018-362-0

SUMMARY

UCLA researchers from the Departments of Chemistry and Physics have developed a novel method for creating multi-scale pre-assembled phases of matter with customizable symmetries, topologies, and degrees of order and disorder.

BACKGROUND

Microscale and nanoscale structures are important to many applications including biosensors, drug delivery, bio-scaffoldings, material science, industrial chemistry, environmental sensors, and battery technology. The assembly of complex structures is an issue due to the difficulty in manipulating components at such small scales. Therefore, typical structures often need to rely on self-assembling methods, which constrains the possible design space.

INNOVATION

UCLA researchers have developed a novel method to create 2D monolayers or 3D phases of complex multi-scale materials with customizable symmetries, topologies, and degrees of order and disorder. This method allows the use of computer-aided design (CAD) software and lithography to fabricate, position, and orient many shape-designed colloidal particles into a desired complex configuration. For example, this method has been demonstrated to easily generate rings, chiral stars, dendrimers, linear and ring A/B copolymers, honeycomb sheets and lattices, and square mesh lattices. This key breakthrough allows the explicit specification of the desired colloidal particle structure as opposed to relying on the inherent self-assembling properties of the particles.

APPLICATIONS

- Complex microscale and nanoscale structures
- Condensed-matter materials
- Material science and engineering

ADVANTAGES

- Ability to specify desired design through CAD and lithography

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,052,700	07/06/2021	2018-362

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Measuring Size Distributions of Small-Scale Objects
- Process For Recycling Surfactant In Nanoemulsion Production
- Method of Making Multicomponent Nanoemulsions
- Ultrastable Nanoemulsions In Disordered And Ordered States
- Shape-Controlled Particles Having Subparticle Geometrical Features

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.

INVENTORS

- Mason, Thomas G.

OTHER INFORMATION

KEYWORDS

Monolayer, lattice, nanostructure, microstructure, condensed matter, lithography, multi-scale materials, polymers, nanotechnology, colloids, copolymers

CATEGORIZED AS

- **Computer**
  - Software
- **Materials & Chemicals**
  - Composites
  - Other
  - Polymers
- **Nanotechnology**
  - Materials

RELATED CASES

2018-362-0

UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920,Los Angeles,CA 90095

https://tdg.ucla.edu

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu