Shape-Controlled Particles Having Subparticle Geometrical Features

Tech ID: 30023 / UC Case 2015-375-0

SUMMARY

UCLA researchers in the Department of Chemistry and Biochemistry have developed a photolithographic method for the high-throughput, parallel production of microscale and nanoscale objects with tailored shapes and dimensions using a single photomask.

BACKGROUND

The high-throughput fabrication of nanoscale and microscale particles with a wide variety of shapes and functionalities is of significant interest in the study of synthetic colloidal chemistry. Photolithography is a promising technique for this purpose, but the fabrication of different shape-designed particles with fine 3D nanoscale features typically requires that a different photomask be used for each different particle shape.

INNOVATION

The technology utilizes the nanopositioning capabilities of an optical stepper lithography stage to fabricate nanoscale and microscale particles with different shapes and functionalities using a single photomask. This potentially eliminates the cost to make a different photomask every time a different shape-designed nanoscale or microscale particle is needed. Out-of-plane features can be generated with this technology.

APPLICATIONS

- Colloidal chemistry studies of synthetic microscale and nanoscale particles (e.g., phase-transition and self-assembly studies of differently shaped components)
- Lock-and-key colloidal separation
- Advanced non-spherical probes and markers for cell biology and live-cell imaging
- MEMS (IC components, microfluidics, etc.)

ADVANTAGES

- Allows high-throughput production of microscale and nanoscale objects having tailored shapes and features using a single photomask
- Reduces the costs and timelines associated with the need for multiple photomasks

STATE OF DEVELOPMENT

The feasibility of the proposed invention to generate microscale particles of different shapes and dimensions with high fidelity has been demonstrated.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,317,799	06/11/2019	2015-375

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Measuring Size Distributions of Small-Scale Objects
- Process For Recycling Surfactant In Nanoemulsion Production
- Method of Making Multicomponent Nanoemulsions
- Novel Multi-Scale Pre-Assembled Phases of Matter
- Ultrastable Nanoemulsions In Disordered And Ordered States

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OTHER INFORMATION

KEYWORDS

Colloids, Lithography, nanolithography, photolithography, nanofabrication, nanoparticle, MEMS

CATEGORIZED AS

- **Nanotechnology**
  - Other
- **Engineering**
  - Other

RELATED CASES

2015-375-0

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