



## 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

- ▶ Process For Creating Stable Double Emulsions
- ▶ 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

### CONTACT

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### INVENTORS

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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

- ▶ [Ultrastable Nanoemulsions In Disordered And Ordered States](#)
- ▶ [Mechanical Process For Creating Particles Using Two Plates](#)
- ▶ [Process For Sorting Dispersed Colloidal Structures](#)

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