Optical 3-D Nanopatterning Technology for Reversible Photo-initiated Transitions without High Intensities
Technology #13566

Applications

Applications include 2-D and 3-D metamaterials, photonic crystals, scaffolds for tissue engineering, nano-electromechanical systems (NEMs), templates for nano-imprint lithography, and nano-bio chips.

Problem Addressed

Currently patterning in 3-D is extremely time consuming, and requires accurate overlay capabilities or high light intensities.

Technology

This invention relates to a method of achieving nano-scale resolution in 3 dimensions using light (optical 3-D nanopatterning technology). The basic idea is to use a material system that can undergo reversible photo-initiated transitions. This method does not require high intensities: specific combinations of chemical species enable patterning, and the method makes use of spectrally selective reversible and irreversible transitions enabled by chemistry. Saturating one of the reversible transitions with an optical node retains a single molecule in one configuration compared to its neighbors. By using a separate irreversible transformation, this molecule can be fixed.

Advantages

- Does not require high light intensities

Categories For This Invention:

- Materials
- Micro & Nanotech
- MEMS/NEMS (Materials)
- Photonics
- Other (Photonics)
- Life Sciences
- Clinical Applications
- Tissue Engineering
- Instrumentation
- MEMS/NEMS (Instrumentation)

Intellectual Property:

Patterning via optical-saturable transitions
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**Publications:**

*Research Update: Sharpening The Lines*
MIT News
December 14, 2011

*Confining Light to Deep Subwavelength Dimensions to Enable Optical Nanopatterning*
Science
15 May 2009: Vol. 324 no. 5929 pp. 917-921

*It's A Fine Line*
MIT News
April 9, 2009

**Image Gallery:**

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