



Achieving Non-Regular Nanostructures Using Block Copolymer Melt

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WARF: P110149US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing techniques for fabricating non-regular nanopatterned structures having few defects.

Overview

In microelectronics and other precision manufacturing, the best method to create nanoscale device structures utilizes block copolymers. These are units of various polymer materials connected end-to-end by chemical bonds. When deposited on a patterned base, the copolymer is made to assemble and replicate the pattern.

However, forming more challenging components like integrated circuits requires the replication of non-regular shapes like corners, rings, jogs or T-junctions. Conventional polymers can produce defects. To overcome this limitation a new approach needs to provide more structural flexibility.

The Invention

A UW-Madison researcher and others have developed block copolymers for better replication of non-regular structures. The method combines covalently and non-covalently bonded (supramolecular) blocks in melt form.

Nanostructures like films can be formed by depositing a layer of the block copolymer onto a patterned substrate and applying conditions that cause it to assemble and replicate the pattern. The desired shape can be irregular because the bonding between the non-covalent subunits is highly sensitive and responsive to designed conditions like temperature and solvent type.

Applications

- Nanoscale lithography
- Semiconductor processing, integrated circuits and hard drives
- Nanoscale conductive lines
- Cell-based assays
- Nanoprinting
- Photovoltaic cells

Key Benefits

- More structural flexibility
- Non-regular structures replicated with less than 25 percent error
- Reduced defects

Additional Information

Related Technologies

- [WARF reference number P110192US02 describes an improved solvent annealing method for the directed assembly of patterned block copolymers useful in microelectronics.](#)

Tech Fields

- [Semiconductors & Integrated Circuits : Lithography.](#)

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842