METHOD OF SELECTIVE SYNTHESIS OF NANOMATERIALS

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ABSTRACT

The unique electrical, mechanical and optical properties of nanowires and nanotubes makes them attractive in a variety of applications. However, a significant obstacle to the application of these nanostructures is the difficulty in handling, maneuvering and integrating them with microelectronics to form a complete system. In particular, current synthesis processes for silicon nanowires and carbon nanotubes require high temperatures that can damage the microelectronics on which the nanostructures are being synthesized.

To solve these problems, researchers at the University of California, Berkeley have developed a process for synthesizing nanostructures at a specified location inside a room-temperature chamber. This localized selective synthesis process can directly integrate either silicon nanowires or carbon nanotubes with larger-scale systems, such as foundry-based microelectronics, and it eliminates the need for subsequent assembly processes.

This innovative approach is based on localized resistive heating of suspended microstructures to activate vapor-deposition synthesis, and it yields either silicon nanowires or carbon nanotubes. The process has synthesized nanowires that grow at 1 ?m/min, are 30-80 nm in diameter, and up to 10 ?m in length; and the process has synthesized nanotubes that grow at 0.25 ?m/min, are 10-50 nm in diameter and up to 5 ?m in length.

APPLICATIONS

The integration of nanostructures with larger-scale systems.

ADVANTAGES

Localized, selective and scalable

Occurs at room-temperature

Eliminates post-synthesis assembly of nanostructures

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	7,785,415	08/31/2010	2004-016
United States Of America	Issued Patent	7,311,776	12/25/2007	2004-016

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OTHER INFORMATION

KEYWORDS

MEMS, processing: interconnect

CATEGORIZED AS

- » **Nanotechnology**
  - » Electronics
  - » Tools and Devices
- » **Semiconductors**
  - » Design and Fabrication
  - » Other

RELATED CASES

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