Synthesis and Patterning of Polymer Nanowires

A method for the large-scale fabrication of patterned organic nanowire (NW) arrays

Georgia Tech inventors have developed a method for the large-scale fabrication of patterned organic nanowire (NW) arrays demonstrated by the use of laser interference patterning (LIP) in conjunction with inductively coupled plasma (ICP) etching. The NW arrays can be fabricated after a short ICP etching of periodic patterns produced through LIP. Arrays of NWs have been fabricated in UV-absorbent polymers, such as PET (polyethylene terephthalate) and Dura film (76% polyethylene and 24% polycarbonate), through laser interference photon ablation and in UV transparent polymers such as PVA (polyvinyl acetate) and PP (polypropylene) through laser interference lithography of a thin layer of photoresist coated atop the polymer surface.

Summary Bullets

- Reliable
- High-throughput
- Low-cost

Solution Advantages

- Reliable
- High-throughput
- Low-cost

Potential Commercial Applications

- Biomedical and electronic applications
- Nanotechnology
- Bioscience
- Organic light-emitting diodes (OLED)
- Sensors and field-effect transistors (FET)
- Organic solar cells

Background and More Information

One-dimensional nanomaterial devices of inorganic semiconductors and functional oxides have been studied for applications in electrics, mechanics, photonics, bioscience, and energy science. Fabrication of patterned inorganic nanowires (NW) has been widely developed via different methods, such as electron beam lithography (EBL) and nanoimprint lithography (NIL). However, none of these approaches provide a reliable, high-throughput, and low-cost solution for large-scale fabrication of patterned organic NW arrays at a level required for industrial applications.

Inventors

- Dr. Zhong Wang
  Former Hightower Chair, Regents' Professor - Georgia Tech School of Materials Science and Engineering; Distinguished Professor - Georgia Tech College of Engineering
- Jenny Ruth Morber Morber
  Student – Georgia Tech School of Materials Science and Engineering
- Jin Liu
  Graduate Student - Georgia Tech School of Materials Science and Engineering
- Xudong Wang
  Student - Georgia Tech School of Materials Science and Engineering

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Publications

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