PURDUE INNOVATES | Office of Technology Commercialization

Integrated Control of Nanocrystal Growth by Pulsed Laser in Laser-Induced Chemical Deposition

A pulsed laser integrated manufacturing and control tool provides a high-rate, flexible method for producing and integrating all forms of nanostructures (0D, 1D, 2D, and 3D) with consistent quality for industrial applications.

By creating arrays of nanostructures engineers can push the frontiers of industrial applications for significant economic gains and for the benefit of society. The roadblocks against realizing the potential of a variety of nanostructures and devices are due to low growth rate, unfit morphology, orientation, and inconsistent quality. Currently, there is no nanomanufacturing method known that can control the quality required for industrial production of devices consisting of manufactured nanostructured materials. There are numerous processes that have a slow rate of production.

Researchers at Purdue University have developed new ideas and practices to produce and control the quality of nanostructured materials using a pulsed laser as an integrated manufacturing and control tool. This process has a high production rate and high flexibility of making different materials that can be chemically synthesized. It also allows for the making and integration of all 0, 1, 2, and 3 D nanostructures and features while using the same equipment that can be easily scaled up.

Advantages:

-High production rate and flexibility

-Allows for the making and integration of all nanostructures

Potential Applications:

-Particles, films, and rings

-Wires/tubes

Technology ID
2019-LIU-68483

Category
Materials Science & Nanotechnology/Nanomaterials & Nanostructures
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

Authors
Chunghorng Richard Liu
Siyu Liu

Further information
Parag Vasekar
psvasekar@prf.org

View online

-Layered 3D devices

TRL: 2

Intellectual Property:

Utility Patent, 2019-10-14, United States | CIP-Patent, 2019-11-29, United States | DIV-Patent, 2022-11-22, United States

Keywords: nanostructures, nanomanufacturing, pulsed laser, integrated manufacturing, quality control, high production rate, chemically synthesized materials, 0D 1D 2D 3D nanostructures, scale up, layered 3D devices