

Roll-to-Roll Processing of Metallic Nanostructures Using Laser-Induced Superplasticity

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Categories:

- Materials and Manufacturing

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- CO2 Laser
- Electronics
- Materials and Manufacturing
- Nanoforming
- Nanomanufacturing
- Plasmonics
- Roll-to-Roll

Large-scale manufacturing of metallic nanostructures is necessary to exploit their potential applications in a variety of fields such as electronics, biosciences, and medical technology. Many nanopatterning processes enable the cost-effective fabrication of metallic nanostructures, but the required post-patterning steps increase the cost, complexity, and processing time, reducing throughput. Additionally, these steps can affect the crystallinity, sharp corners, and homogeneity of the lateral walls of the final nanostructure.

Researchers at Purdue University have developed a manufacturing process that enables the continuous forming of thin metallic layers with nanoscale accuracy on a variety of polymeric substrates using a CO2 laser as the radiation source. CO2 laser engravers are more conventional and cheaper than current systems in use. The process can be performed at ambient conditions, is scalable, inexpensive, and uses easily fabricated nanomolds. Nanopatterned metallic films can be attached to flexible polymeric substrates with sufficient strength for practical applications. Tuning the laser intensity enables the control of the final hardness and aspect ratio of the fabricated nanostructures. This method is versatile, cost-effective, scalable, and ideal for the development of future applications of metallic nanostructures.

Advantages:

- High Throughput
- Ambient Conditions
- Inexpensive
- Aspect Ratio
- Attach Films to Flexible Polymeric Substrates

Potential Applications:

- VÆV7G&öæ-70

- ÖVF-6 Å FPvices

- W&÷7 6R æB Vehicle Manufacturing

- &-÷6Vç6÷'0

People:

- Martinez, Ramses Valentin (Project leader)
- Goswami, Debkalpa

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Contact OTC:

Purdue Office of Technology Commercialization
1801 Newman Road
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org