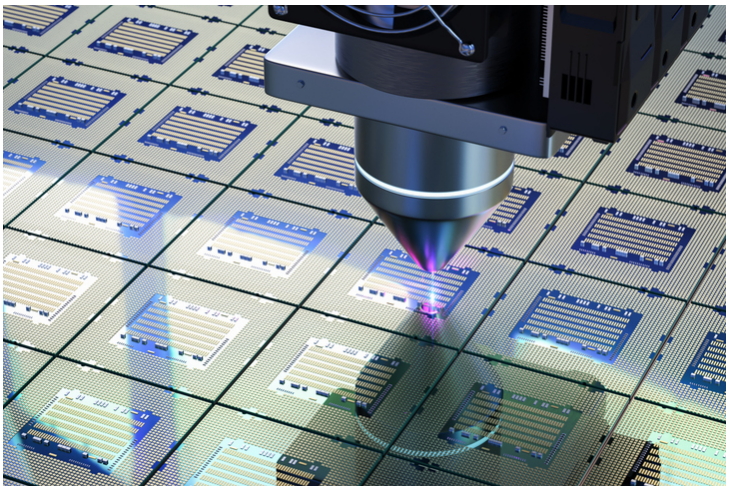
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

# Wire-Grid Polarizers Fabricated by Web-Based Imprinting

**TECHNOLOGY NUMBER: 3395**



## OVERVIEW

Roll-to-roll nanoimprinting lithography for high-resolution, cost-effective nanostructure fabrication

- Increases nanopatterning speed, ensures high throughput, and reduces defects
- Nanostructures fabrication, large area metal wire grid polarizers

## BACKGROUND

Nanolithography is pivotal in nanotechnology, enabling the creation of complex nanostructures essential for numerous applications, including electronics, optics, and materials science. Traditional lithography techniques modify the physical or chemical properties of materials using electrons or photons to produce patterns. While effective, these methods face resolution limitations. Nanoimprint lithography, which relies on mechanical deformation to form patterns, surpasses these resolution constraints. Despite its advantages, achieving a balance between high resolution, throughput, and cost-effectiveness remains a challenge. Conventional methods can be slow, expensive, and prone to defects, limiting their scalability and practical application. The development of an efficient, high-resolution, and cost-effective nanopatterning technique is essential to meet the growing demand for advanced nanostructure fabrication.

### Technology ID

3395

### Category

Manufacturing Process
Engineering & Physical Sciences
Semiconductor, MEMS, and Electronics

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## INNOVATION

Researchers at the University of Michigan have developed a novel lithography method called roll-to-roll nanoimprinting lithography (R2RNIL). This technique, based on mechanical embossing, increased nanopatterning speed at least an order of magnitude faster utilizing a roller-type mold for imprinting on a flexible polymer web. R2RNIL enables high throughput and can pattern large areas with significantly fewer defects. The use of a roller mold facilitates better separation between the mold and the patterned structures, significantly enhancing yield. This innovative approach promises to lower manufacturing costs while delivering high pattern resolution. Potential applications include the fabrication of advanced nanostructures and large area metal wire grid polarizers, crucial for electronic devices and optical components.

## ADDITIONAL INFORMATION

INTELLECTUAL PROPERTY:

US8027086 “Roll to roll nanoimprint lithography”