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3D Printing of Optical Lenses by Precision Spin Coating

Spin-coated stereolithography prints nm-smooth, distortion-free lenses in minutes.

Purdue researchers have introduced a cutting-edge micro-stereolithography technique for rapid 3D printing of imaging lenses. By combining defocusing photopolymerization with a spin coating equilibrium postâ€“curing process, they were able to eliminate pixelated surface and layered stepping imperfections typically found in conventional additive manufacturing techniques. The lenses produced through this method exhibit minimal distortion, high optical clarity across the visible light spectrum, and can be reproduced consistently. The technique was validated by printing multi-scale lenses ranging from 3 mm to 70 mm in diameter, with the capability to fabricate an array of lenses in a single print, reducing production time to just 3 minutes per lens. The findings about this technique show promising potential of 3D printing in the optical realm and pave the way for new devices that could completely change freeform optics and optical imaging systems.

Technology Validation:

This technology has been validated through experimentation. The technique has proven its ability to produce optical components with excellent surface smoothness; less than 1 nm surface roughness and 1 Âµm profile accuracy

Advantages:

-Speed

-Structural Optimization

-Cost Effectiveness

Applications:

-Microscopy

Technology ID

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Category

Semiconductors/Devices & Components
Digital Health & Medtech/Medical Image Processing
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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Further information

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