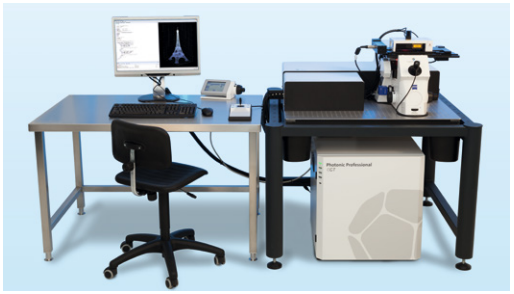
MICRO-OPTICS

Nanoscribe's 3D printer Photonic Professional *GT* allows producing almost arbitrary micro-shapes with optically smooth surfaces in an additive and tool-free way. This effectively circumvents limitations imposed by mechanical tools, and geometrical or process design-constraints often encountered with techniques such as subtractive machining, (greyscale) lithography, photoresist reflow and wet-etching. In this way, steep slopes for high numerical aperture micro-lenses, arrays with high filling factors and varying curvatures, as well as more complex 3D shapes can be achieved. Mass replication is possible by using metal replicas of these shapes.

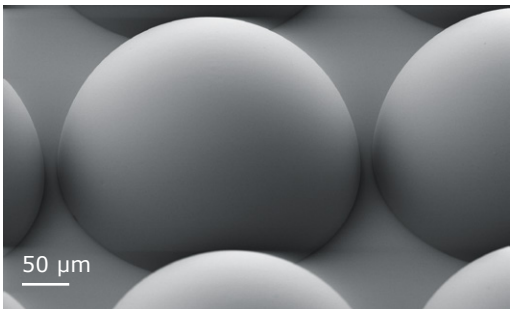


VERTICAL SIDEWALLS

Challenge: Hemispherical micro lenses with steep slopes to achieve low f-numbers in a closely spaced array.

Solution: The layer by layer writing process allows for smooth surfaces over a 0° to 90° angular range, and even for negative slopes (undercuts).

Source: www.nanoscribe.de/en/applications/micro-optics/

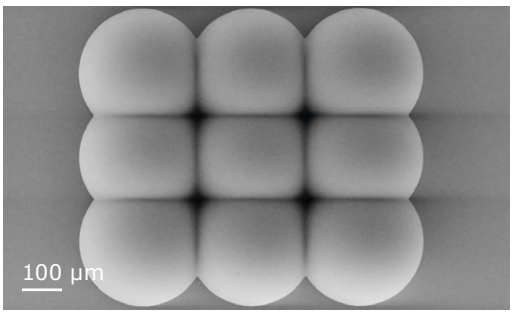


HIGH FILLING FACTOR / COMPACT ARRAY

Challenge: Microlens arrays with increased optical efficiency due to closely packed lenses.

Solution: 3D printing allows overlapping lenses, enabling designs with 100% filling factor. Arbitrary grids are possible and the lens shape can be varied throughout the array.

Source: www.nanoscribe.de/en/applications/micro-optics/

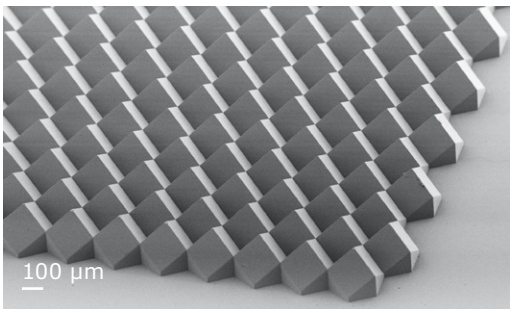


SHARP EDGES AND INTERNAL ANGLES

Challenge: Fabricate corner cube arrays on the microscopic scale with well-defined edges.

Solution: The absence of a mechanical tool and the highly localized polymerization from two-photon absorption allow for internal angles and the small feature sizes necessary for sharp corners.

Source: www.nanoscribe.de/en/applications/micro-optics/

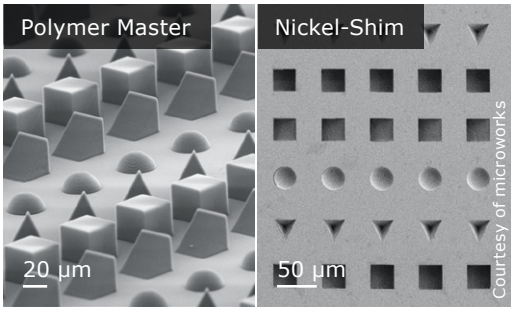


MASS REPLICATION VIA NI-SHIM

Challenge: Fast and low cost production of micro-optical elements.

Solution: A nickel shim can be fabricated from the printed polymer structures by electroforming, allowing standard replication techniques such as injection molding or hot embossing to be used.

Source: www.nanoscribe.de/en/applications/micro-optics/



Learn more about the world's highest resolution 3D printer
Photonic Professional GT

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