Laser-based hybrid microfabrication solutions

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EPIC Online Technology Meeting on Additive Manufacturing, 2023-05-15

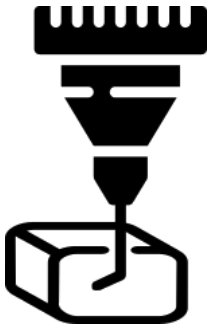
Additive-subtractive manufacturing processes

Radiation intensity (TW/cm^2)

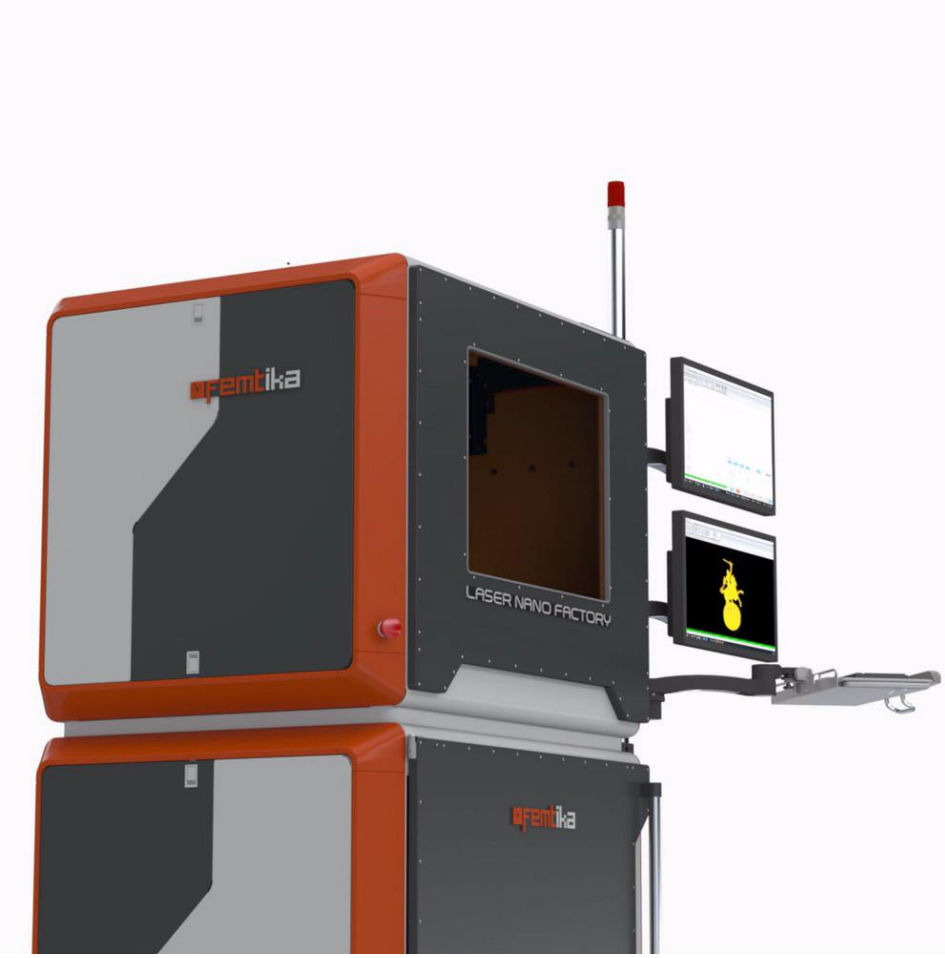
Multi-photon polymerization

- Sub-diffraction limited resolution
- True 3D fabrication
- Variety of available polymers with different functionality

Selective Glass Etching

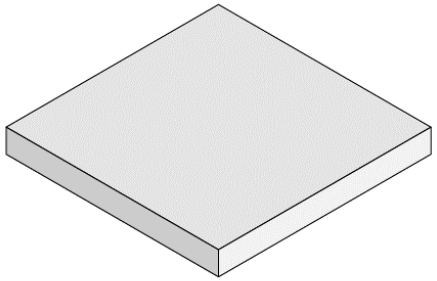


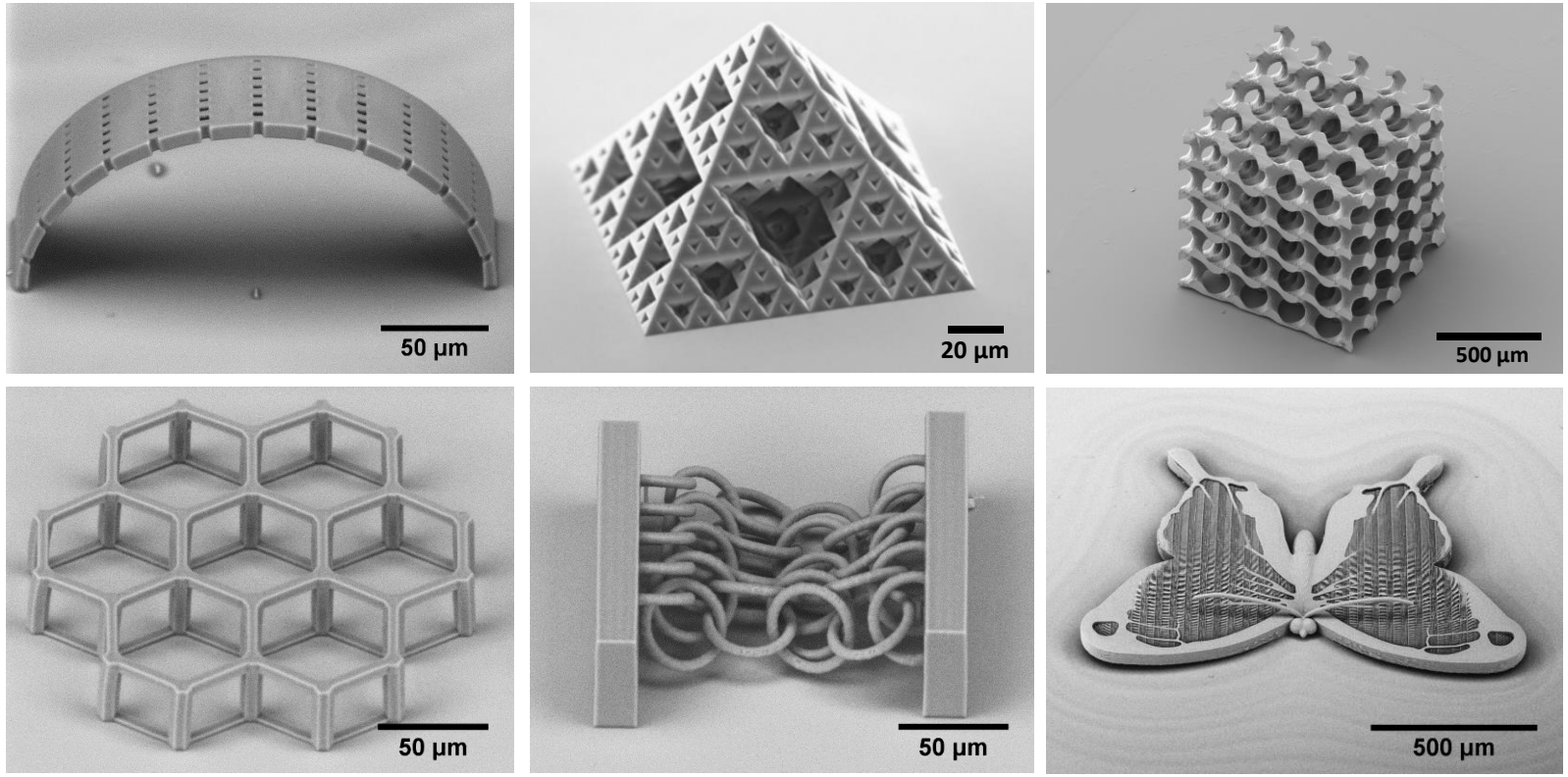
- Free-form 3D glass structures
- µm level precision
- mm-cm structures achievable



Multi-Photon Polymerization (MPP) - Additive

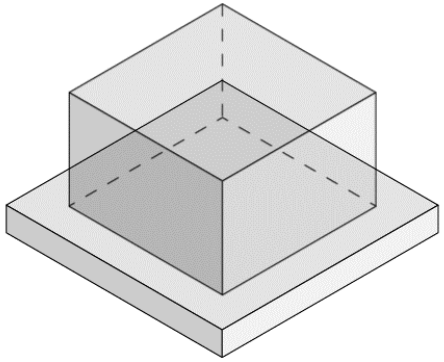
- Unlimited 3D architecture
- Ultra-high spatial resolution (<150 nm)
- Wide variety of materials (proteins, hydrogels, acrylates, silicone elastomers, hybrid organic-inorganic materials)

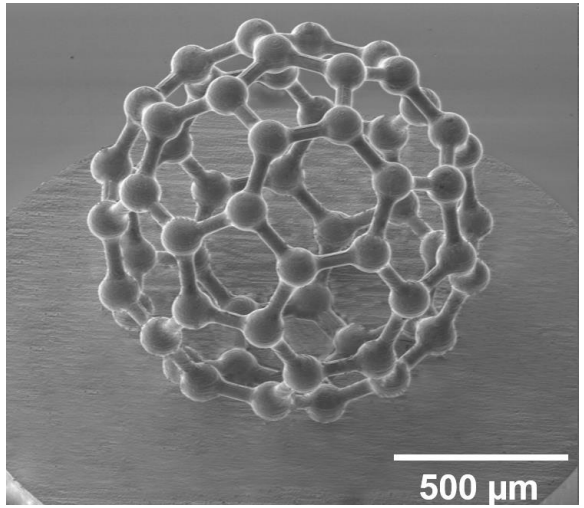


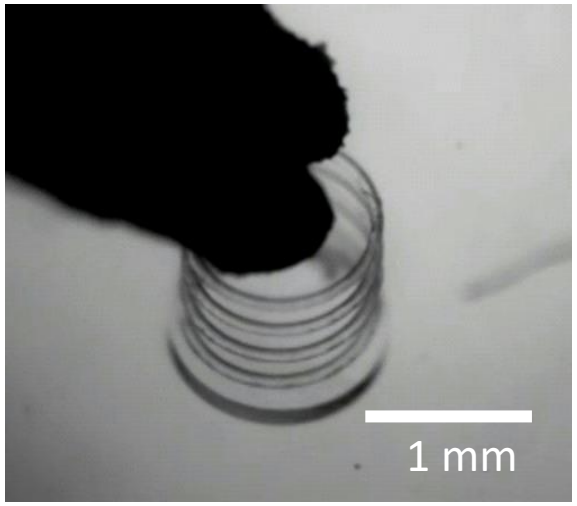


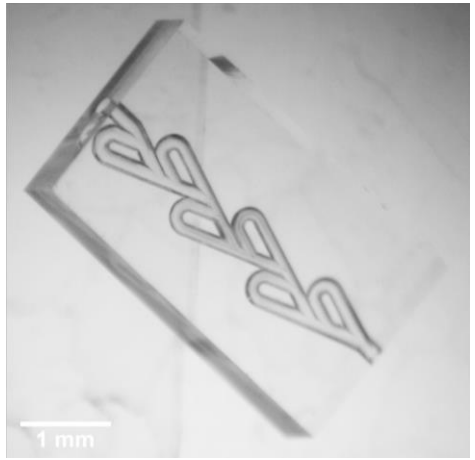
Selective Laser Etching (SLE) - Subtractive

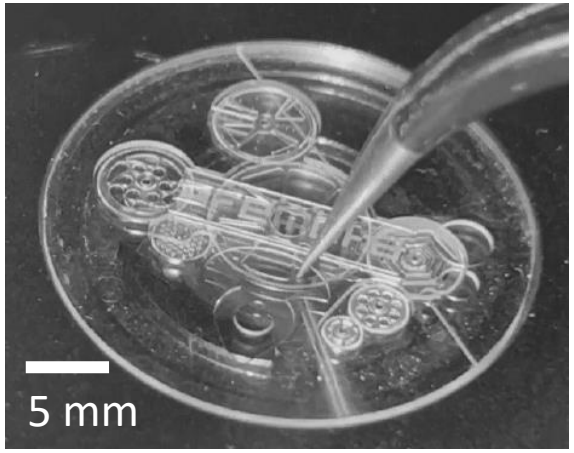
- Arbitrary 3D shapes from fused silica glass
- Surface roughness down to 200 nm
- Internal channels fabrication
- Possibilities for large structures (~cm)

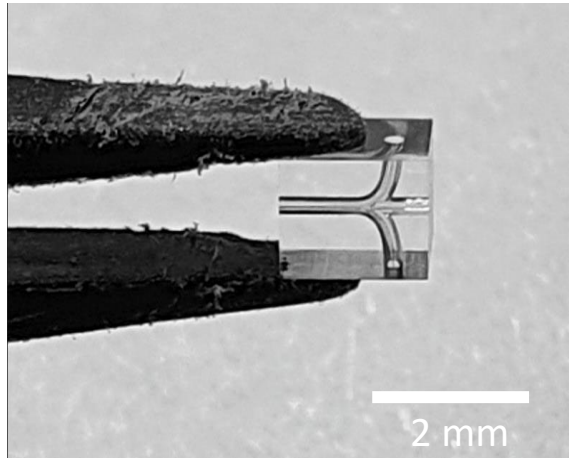




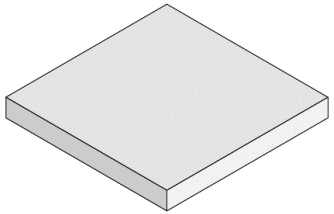






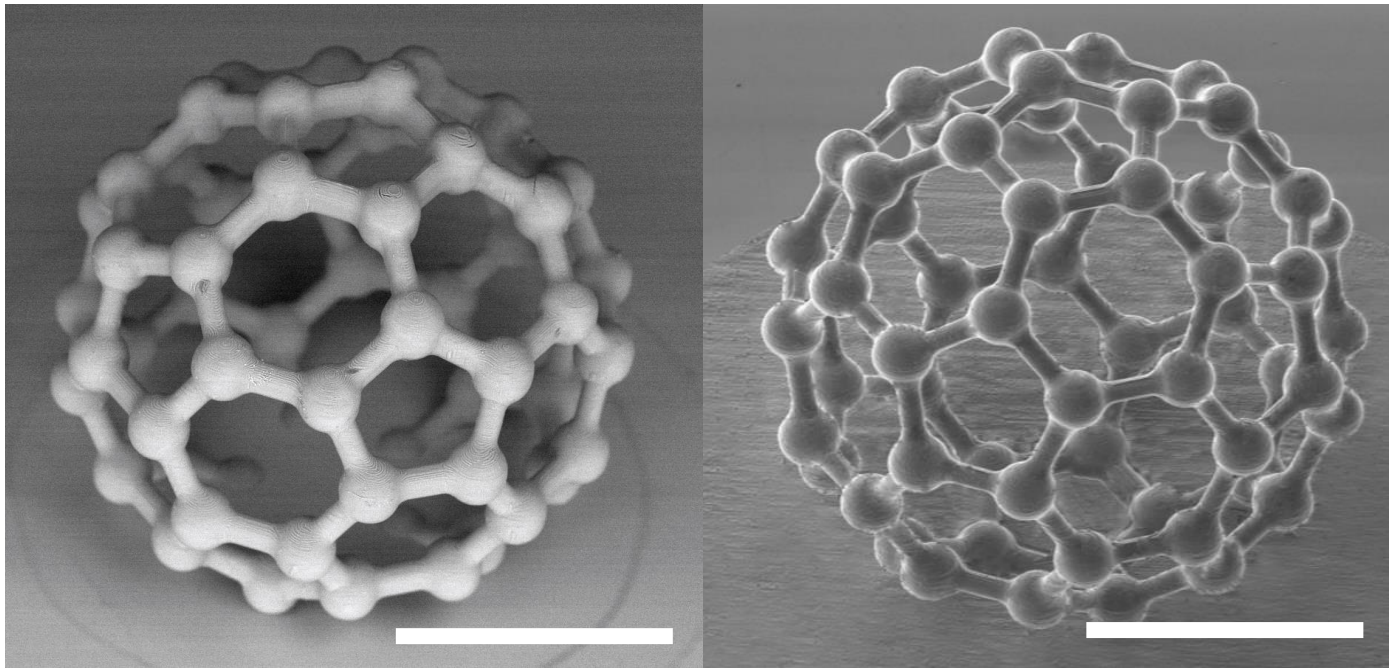


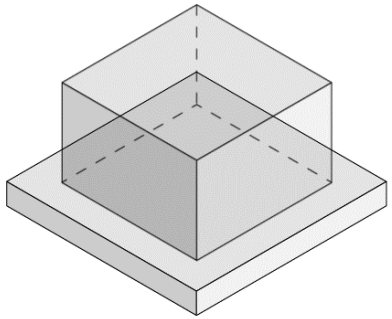
Additive vs subtractive



Polymer

Glass

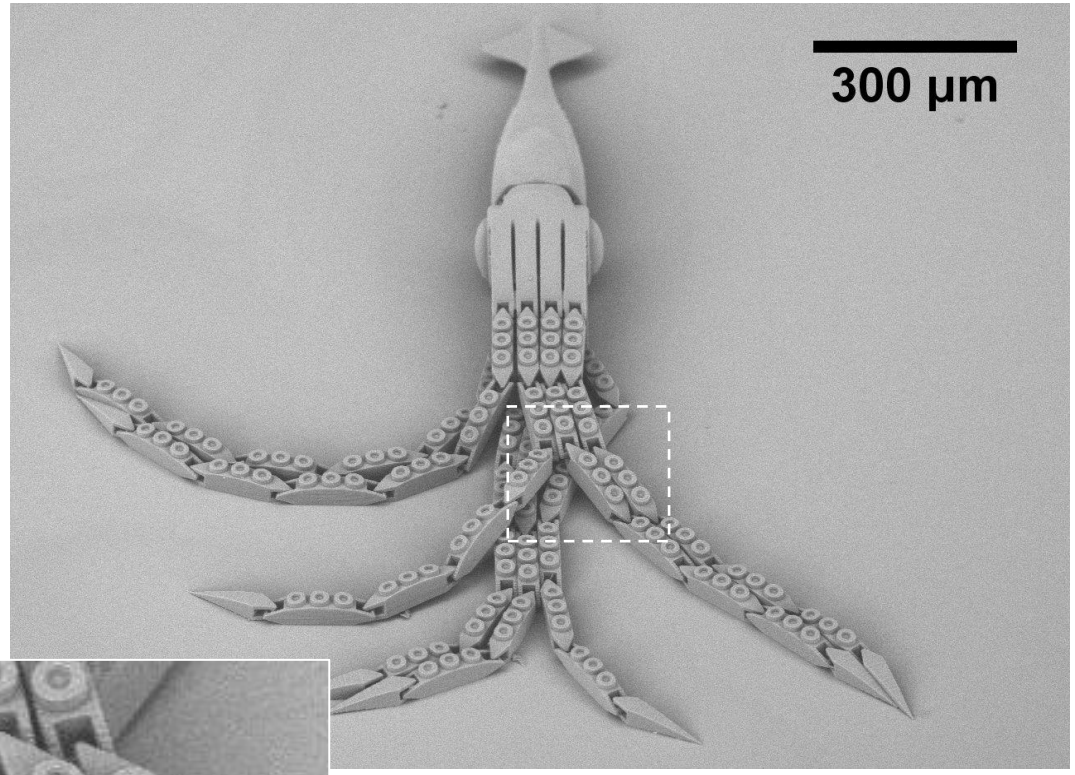


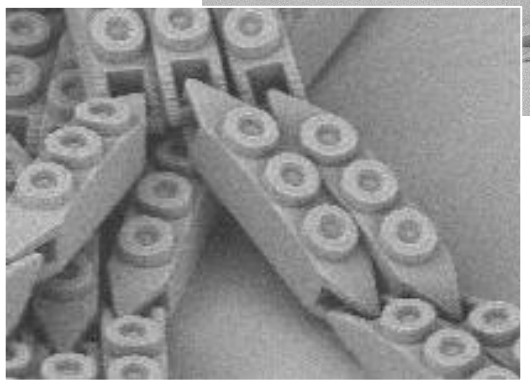


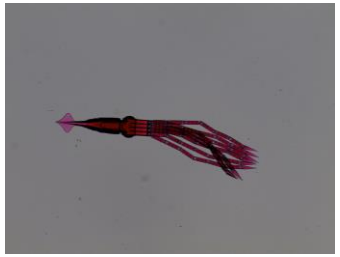
3D fullerene molecule model fabricated using MPP and SLE. Scale bar 500 µm.

Functional samples

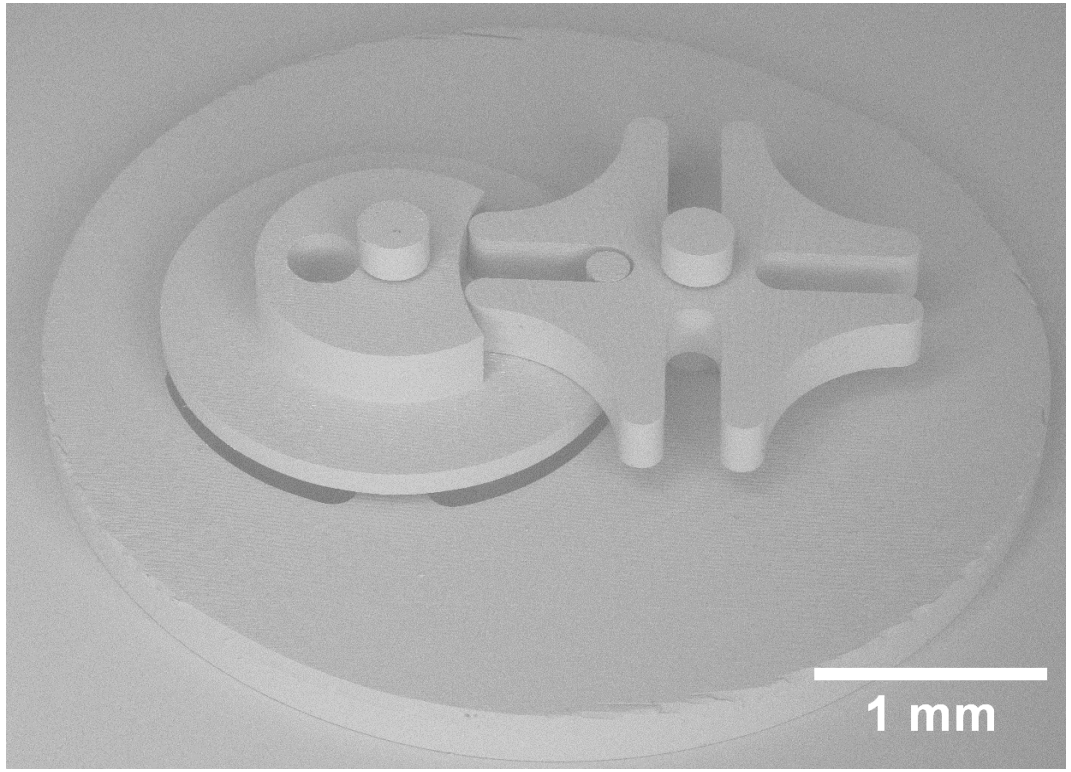
MPP in polymers





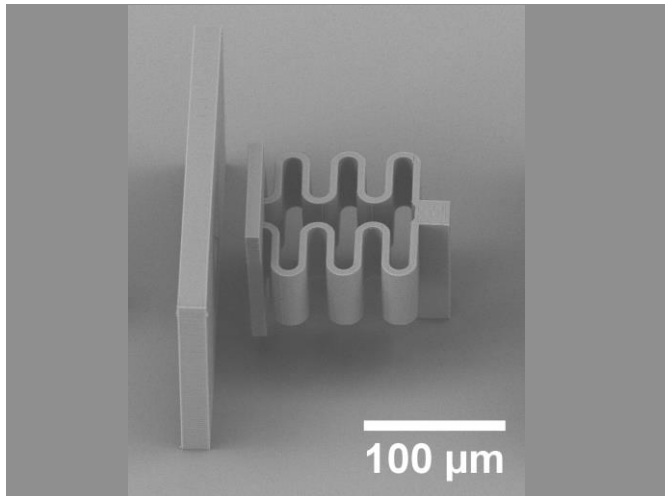


SLE in glass

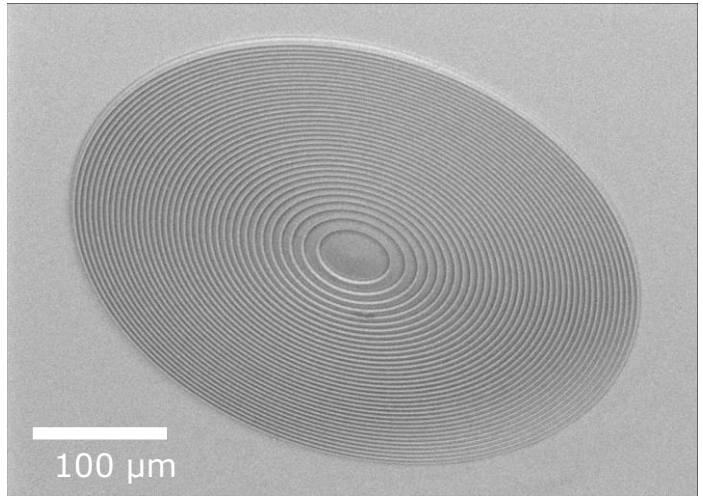


Applications

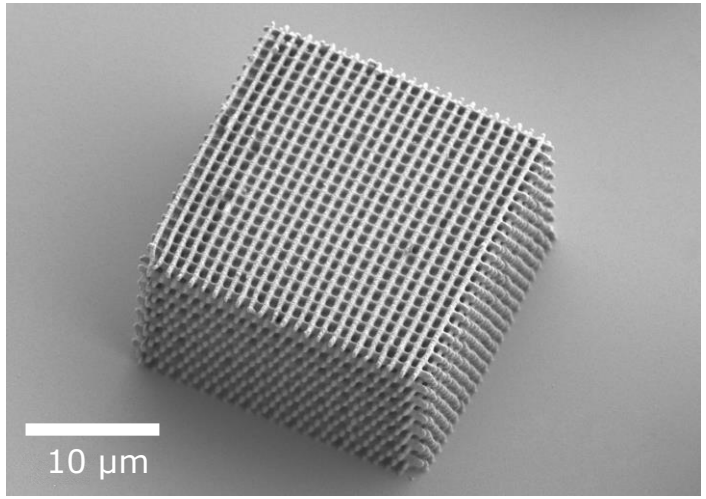
Sensors



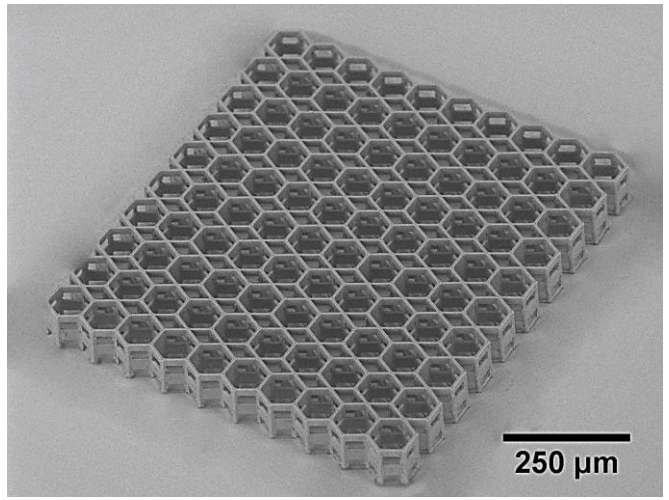
Microoptics



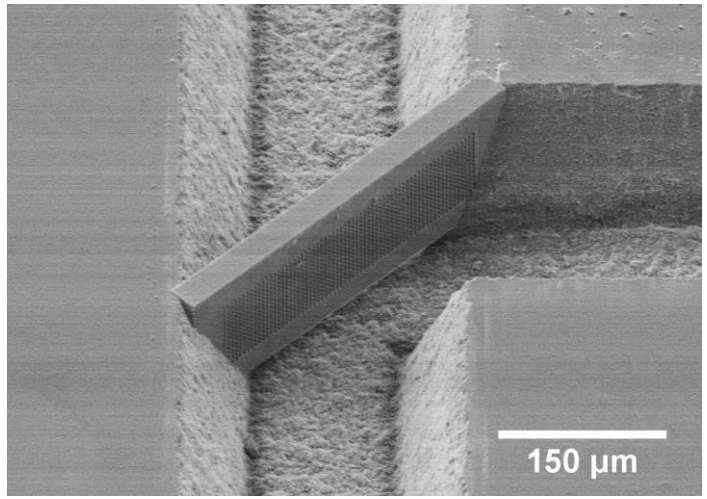
Photonics



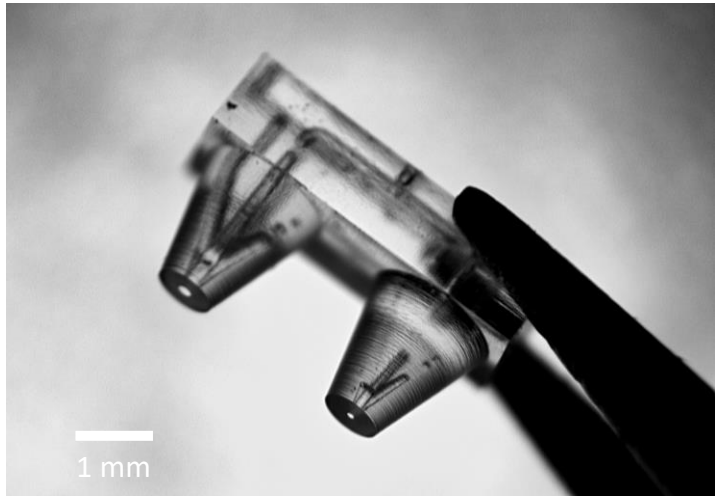
Scaffolds



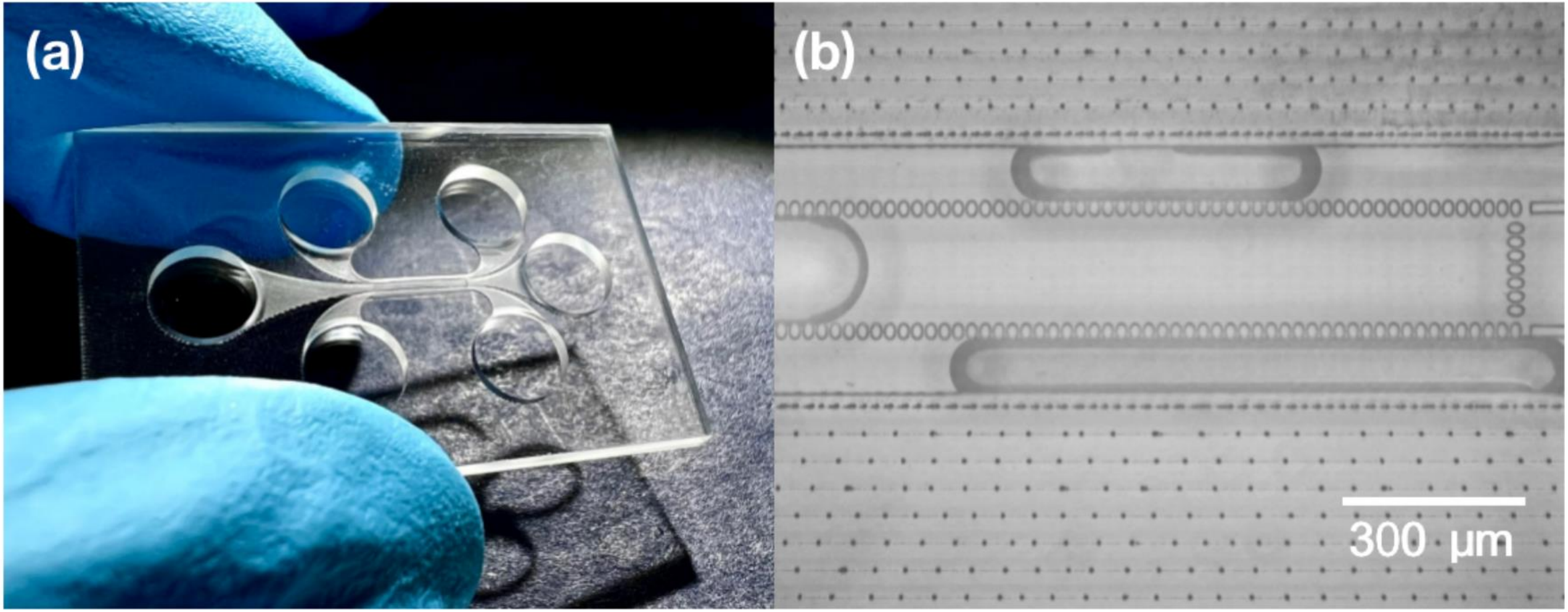
Microfluidics (LAB-on-CHIP)

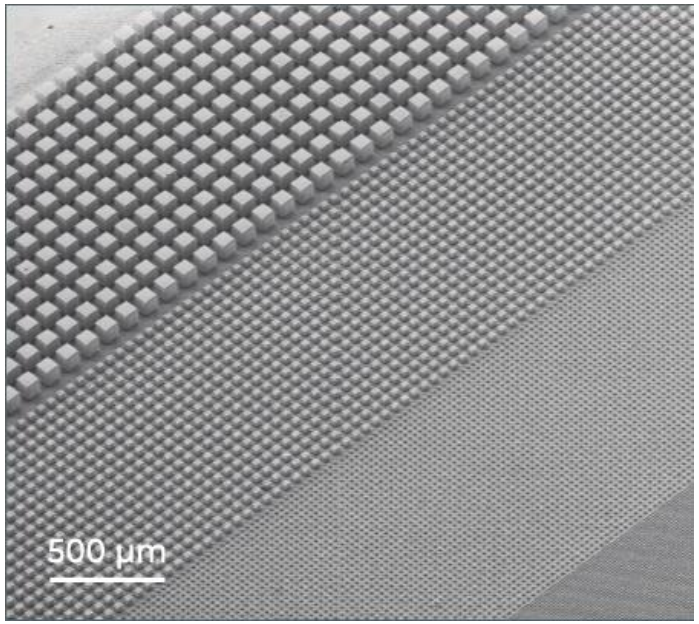


Nozzles



Lab-on-chip





Thank you!

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