



Printing materials for 2PP-based 3D printing

High-performance resins for nano- and microfabrication
in optics, photonic integration, life sciences, and more



High-performance 3D printing materials

Materials developed specifically for high-precision nano- and microfabrication, tailored to applications on various scales – from nanoscale features to millimeter-sized components

Achieving the full precision potential of state-of-the-art microfabrication requires both the best 3D microprinting systems and materials that are specifically tailored for Two-Photon Polymerization (2PP). That is why we offer a portfolio of high-performance resins.

These resins are designed to deliver outstanding shape accuracy and easy processing for your microfabrication needs. To ensure reliable and efficient printing, our printer software provides optimized parameter presets for each resin.

In addition to our own materials, Nanoscribe systems are open and compatible with third-party UV-curable resins, hydrogels, nanoparticle composites and custom formulations.

We also expand your possibilities further through collaborations with BIO INX, Advanced BioMatrix and micro resist technology, offering further materials for bioprinting and engineering purposes.

High-resolution 3D printing



Materials should allow easy handling, processing, and long-term stability. Since you choose Two-Photon Polymerization (2PP) to achieve high resolution, all these resins must deliver high structure fidelity and reliability. Low volume shrinkage ensures shape accuracy, while high viscosity supports reproducible results. Excellent substrate adhesion and optimized mechanical stability are essential in fields such as materials engineering, micromechanics, and microfluidics.

High-resolution 3D biofabrication



Resins must be suitable for life science applications such as cell seeding, cell encapsulation and tissue engineering. They should be biocompatible, with low toxicity to ensure cell viability, and exhibit low autofluorescence for optimal imaging. Additionally, soft material properties and degradation rates should match the target application.

Optics manufacturing



Resins for high-resolution optics require high viscosity, low volume shrinkage, and thermal stability. Highest shape fidelity is essential to ensure that printed structures match the design precisely right from the start. Mechanical and materials stability needs to fit the application. We offer a selection of resins with different refractive indices, transmission properties, and Abbe numbers, allowing you to choose the optimal material for the VIS or NIR range.

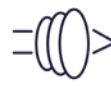
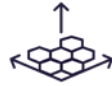
2.5D surface patterning



Materials for Two-Photon Grayscale Lithography (2GL[®]) of 2.5D micro-optics need low volume shrinkage to maintain precise profiles, high UV sensitivity for efficient exposure, and low surface roughness after development. Excellent shape fidelity is essential to achieve the intended optical performance. These materials serve direct fabrication or high-precision masters for replication. The materials' excellent adhesion and mechanical stability are beneficial for processes related to mastering.

Pick the optimal resin for your application

Different applications require resins with tailored properties to ensure optimal results. Depending on your task, parameters like refractive index, Young's modulus, shrinkage, transmission or biocompatibility may be critical. Selecting the right resin ensures performance and reliability. Read on to discover the key material properties that enable success in each application.



High-res 3D printing

High-res 3D biofabrication

Optics manufacturing

2.5D surface patterning

	High-res 3D printing	High-res 3D biofabrication	Optics manufacturing	2.5D surface patterning
Polymer printing				
IPX-Clear	■	■	■	■
IP-S	■	■	■	■
IP-n162			■	
IP-Dip2	■		■	■
OrmoComp	■		■	■
IPX-S			■	■
IPX-M	■			
IPX-Q	■	■		
IP-PDMS	■	■		
IP-Visio		■		
Glass printing				
GP-Silica	■	■		
Bioprinting				
Hydrobio INX N400		■		
Hydrotech INX N200		■		
Degrad INX N100		■		
PhotoGel		■		
PhotoHA-Stiff		■		
PhotoDextran		■		



IPX-Clear

Optically clear, biocompatible, low autofluorescence

- ▶ High transmittance from 350 nm (> 95%)
- ▶ Refractive index (20 °C, 589 nm): 1.544
- ▶ Surface roughness R_a : < 10 nm
- ▶ Shape accuracy S_a : < 200 nm

Find out more: nanoscribe.com/ipx-clear



Typical print sets used

Small Features



Medium Features



Large Features



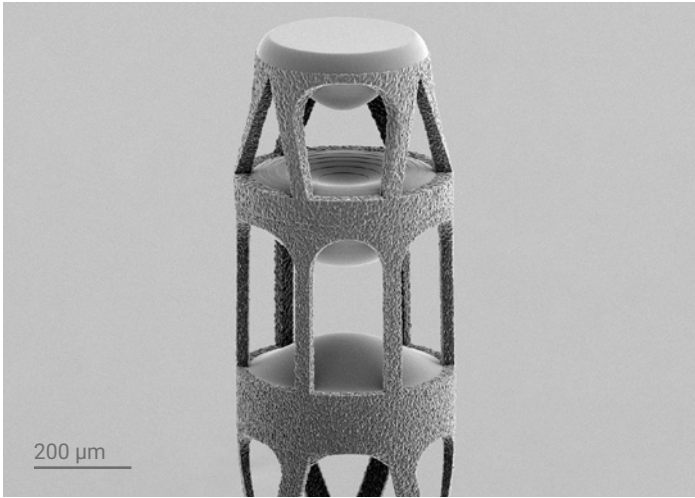
Extra Large Features



"IPX-Clear is the ideal resin for optics, outperforming all other resins we've tested regarding transparency and shape accuracy, while matching or exceeding their long-term stability."

Dr. Simon Thiele, CTO of Printoptix, Stuttgart (DE)





IP-S

General purpose, biocompatible

- ▶ Refractive index (20 °C, 589 nm): 1.515
- ▶ Young's modulus [GPa]: 2.1
- ▶ Print structures in optical quality with high shape accuracy and smooth surfaces

Find out more: nanoscribe.com/ip-s

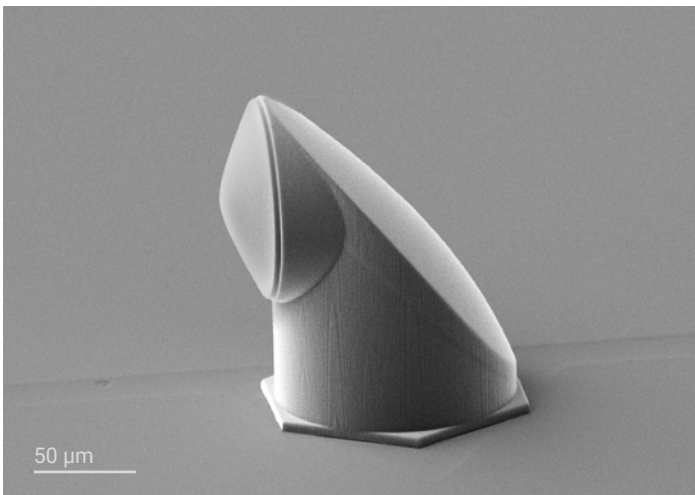
Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features



IP-n162

High refractive index resin

- ▶ Refractive index (20 °C, 589 nm): 1.622
- ▶ Highest refractive index and highest dispersion among Nanoscribe resins
- ▶ Low shrinkage
- ▶ Smooth structural surface finish

Find out more: nanoscribe.com/ip-n162

Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features

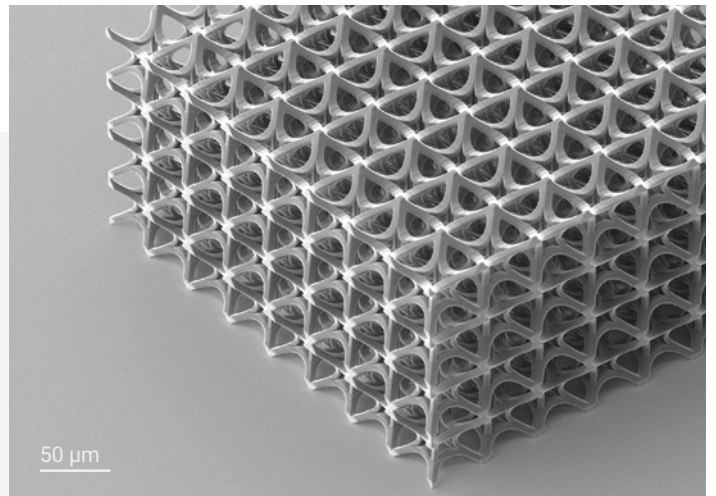


IP-Dip2

High resolution and high aspect ratio printing

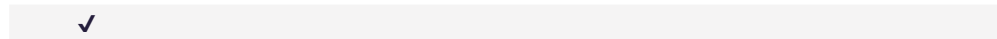
- ▶ Refractive index (20 °C, 589 nm): 1.547
- ▶ Young's modulus [GPa]: 1.5

Find out more: nanoscribe.com/ip-dip2



Typical print sets used

Small Features Medium Features Large Features Extra Large Features

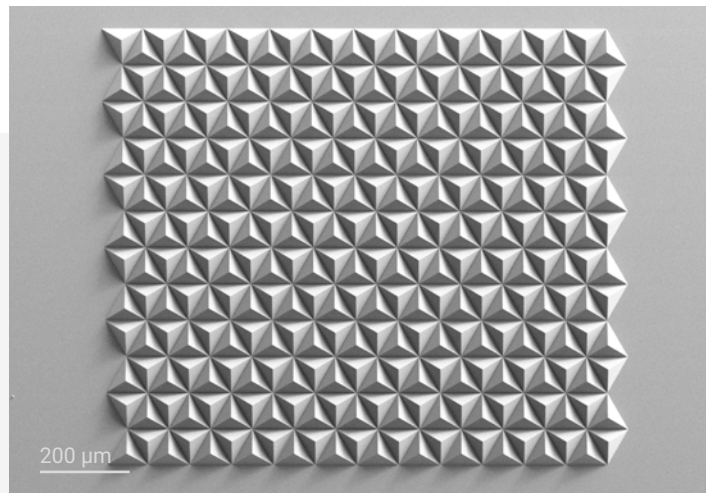


OrmoComp®

High transparency photoresin

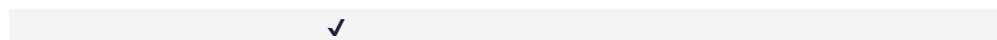
- ▶ Refractive index (20 °C, 589 nm): 1.520
- ▶ Young's modulus [GPa]: ~2
- ▶ Printed structures stable up to 270 °C
- ▶ Available through our partner micro resist technology

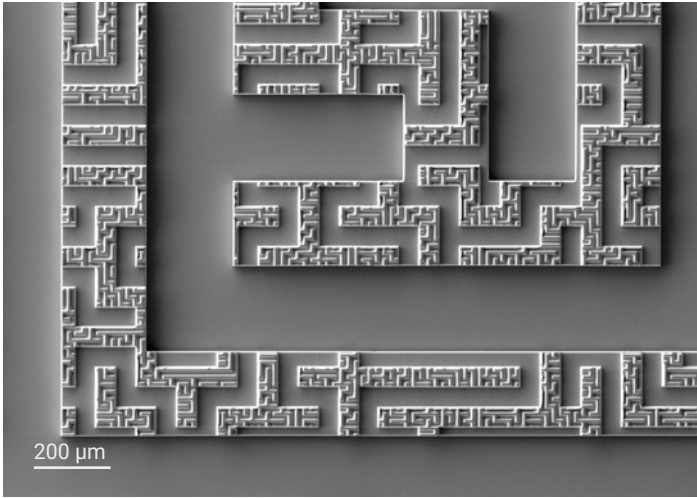
Find out more: nanoscribe.com/ormocomp



Typical print sets used

Small Features Medium Features Large Features Extra Large Features





IPX-S

Fast and precise resin for 2.5D prototyping and mastering

- ▶ Refractive index (20 °C, 589 nm): 1.510
- ▶ Young's modulus [GPa]: 2.2
- ▶ Designed for printing large sized 2.5D features
- ▶ Smooth structural surface finish perfect for micro-optics

Find out more: nanoscribe.com/ipx-s

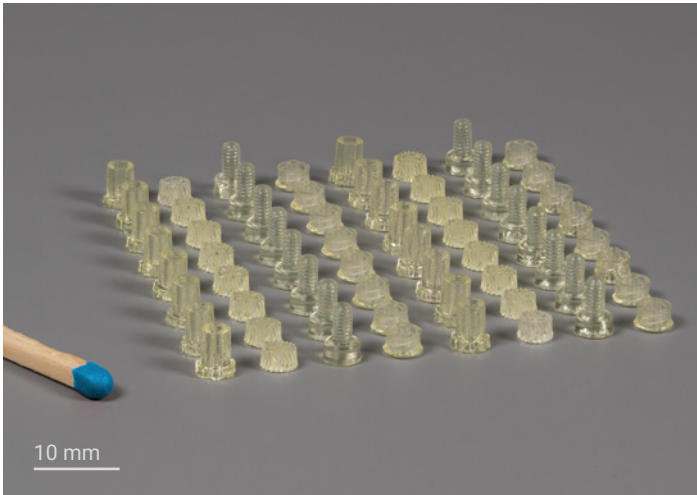
Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features



IPX-M

Macroscale 3D prints with high throughput

- ▶ Refractive index (20 °C, 589 nm): 1.499
- ▶ Young's modulus [GPa]: 1.3
- ▶ Designed for printing volumes up to 30 cm³
- ▶ Enables rapid prototyping and small-batch production
- ▶ Tailored for 2PP and also suitable for UV-curing

Find out more: nanoscribe.com/ipx-m

Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features

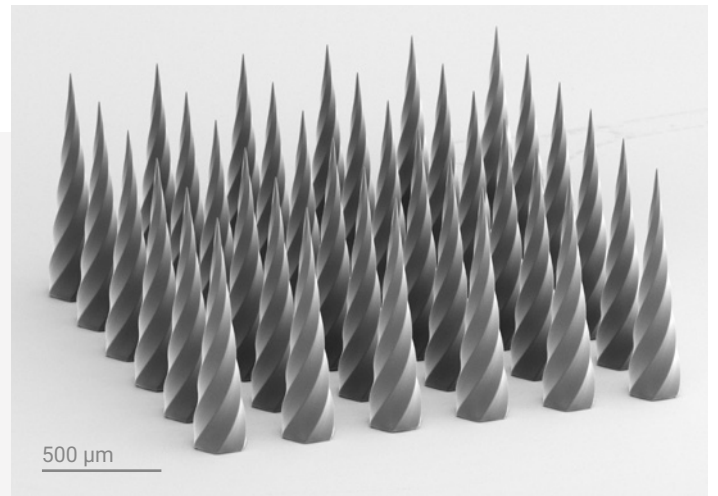


IPX-Q

Fast printing of stiff, large-scale (bio)structures

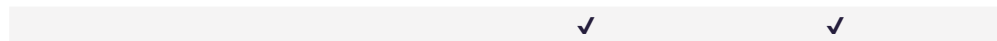
- ▶ Refractive index (20 °C, 589 nm): 1.511
- ▶ Young's modulus [GPa]: 2.2
- ▶ Designed for printing high-volume 3D objects and fast prototyping
- ▶ For printing structures with high shape accuracy, ranging from millimeters to centimeters

Find out more: nanoscribe.com/ipx-q



Typical print sets used

Small Features Medium Features Large Features Extra Large Features

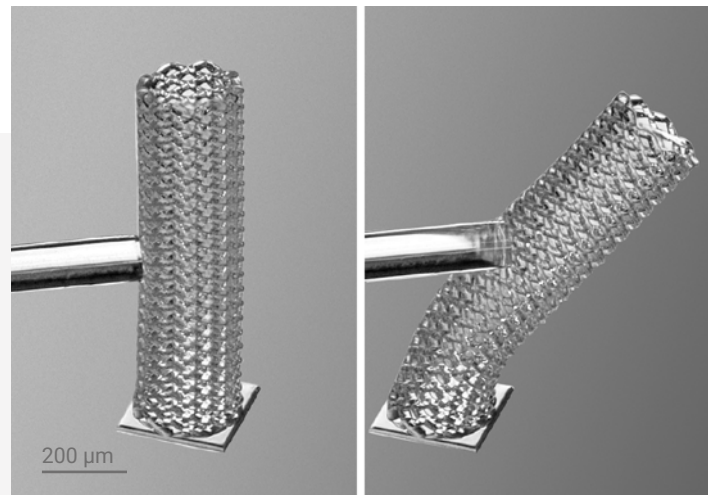


IP-PDMS

Soft, flexible resin for elastic microstructures

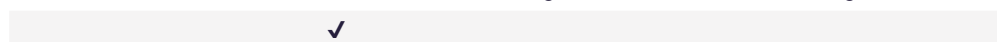
- ▶ Refractive index (20 °C, 589 nm): 1.450
- ▶ Young's modulus [GPa]: 0.015
- ▶ Lowest refractive index among Nanoscribe resins
- ▶ Exceptional stretchability (≥ 240 % elongation)

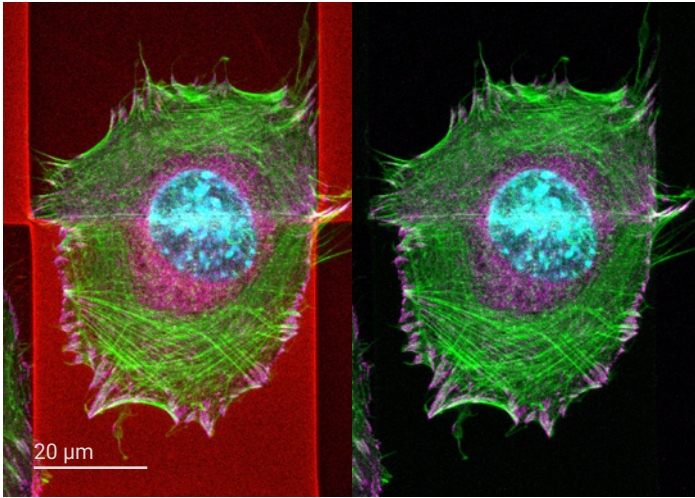
Find out more: nanoscribe.com/ip-pdms



Typical print sets used

Small Features Medium Features Large Features Extra Large Features





IP-Visio

Low autofluorescence resin for fluorescence imaging

- ▶ Refractive index (20 °C, 589 nm): 1.511
- ▶ Parts printed with IP-Visio show very low autofluorescence
- ▶ Ideal for cell culture and tissue engineering applications

Find out more: nanoscribe.com/ip-visio

Typical print sets used

Small Features

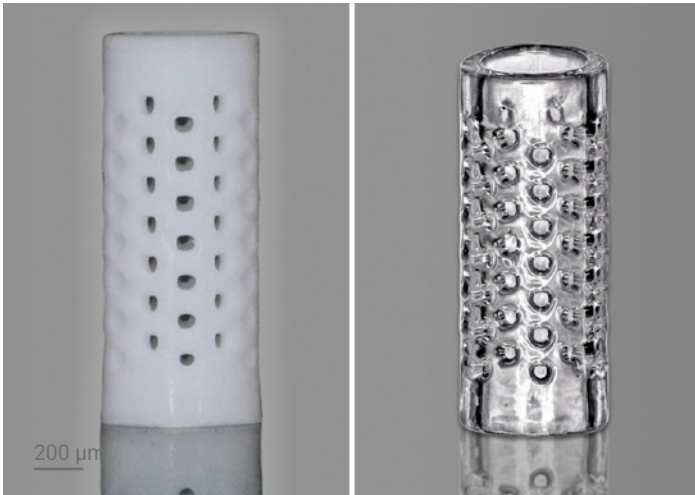
Medium Features

Large Features

Extra Large Features



Glass printing



GP-Silica

2PP printing of high-resolution glass composite resin

- ▶ Refractive index (20 °C, 589 nm): 1.458
- ▶ Young's modulus [GPa]: 68.3
- ▶ High thermal resistance (up to > 1,000 °C)
- ▶ Inorganic material
- ▶ 3D printing of glass microstructures

Find out more: nanoscribe.com/gp-silica

Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features



BIO INX

Hydrogels and biodegradable resins for bioprinting

Hydrobio INX N400

- ▶ Refractive index (20 °C, 589 nm): 1.34-1.36
- ▶ Young's modulus [MPa]: 0.006-0.054
- ▶ Biodegradable
- ▶ Supports cell encapsulation prior to printing
- ▶ Cell viability: 75% after one week
- ▶ Optimized for Photonic Professional System

Degrad INX N100

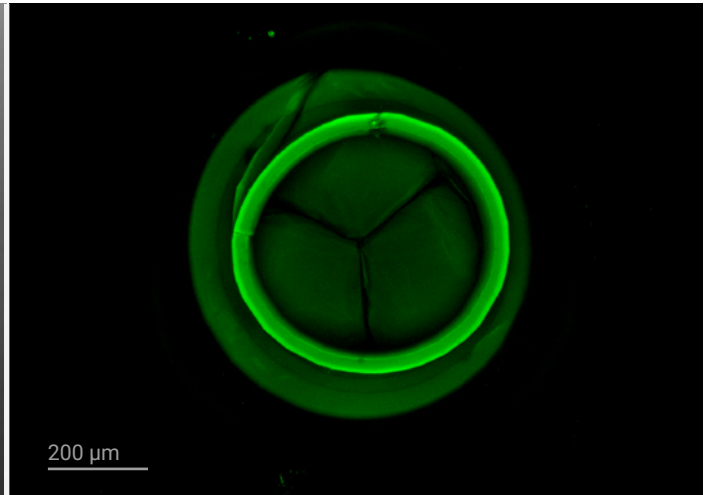
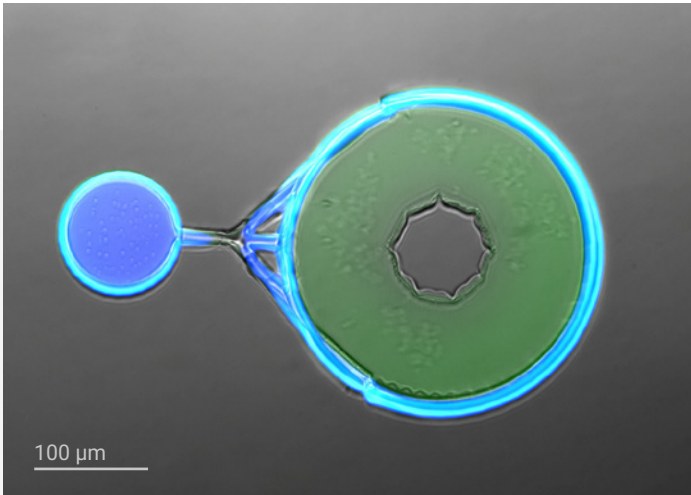
- ▶ Refractive index (20 °C, 589 nm): 1.46-1.48
- ▶ Young's modulus [MPa]: 50-60
- ▶ Biodegradable polyester for 2PP-based printing
- ▶ Printed structures are highly elastic
- ▶ Highest resolution ever reported for a biodegradable resin (< 500 nm)
- ▶ Optimized for Photonic Professional System

Hydrotech INX N200

- ▶ Refractive index (20 °C, 589 nm): 1.46-1.48
- ▶ Young's modulus [MPa]: 3-4
- ▶ Synthetic liquid hydrogel
- ▶ Non-biodegradable and biologically inert
- ▶ Printed structures are highly flexible
- ▶ Optimized for Photonic Professional System
- ▶ Compatible with Quantum X bio

Find out more: nanoscribe.com/bio-inx

Easy handling: All resins are delivered in a ready-to-use kit containing a concentrated stock solution, dilution buffer and crosslinker for 10 prints.



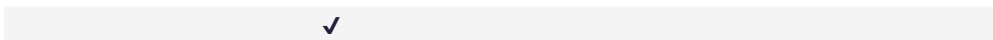
Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features



Advanced BioMatrix

Hydrogels for tunable, cell-friendly 3D tissue engineering

PhotoGel® (GelMA)

- ▶ Hydrogel made from methacrylated gelatin
- ▶ Adjustable gel stiffness via concentration and crosslinking
- ▶ Ideal for live-cell printing

PhotoDextran®

- ▶ Hydrogel made from methacrylated dextran
- ▶ Made through fermentation and isolation
- ▶ Allows for customizable stiffness

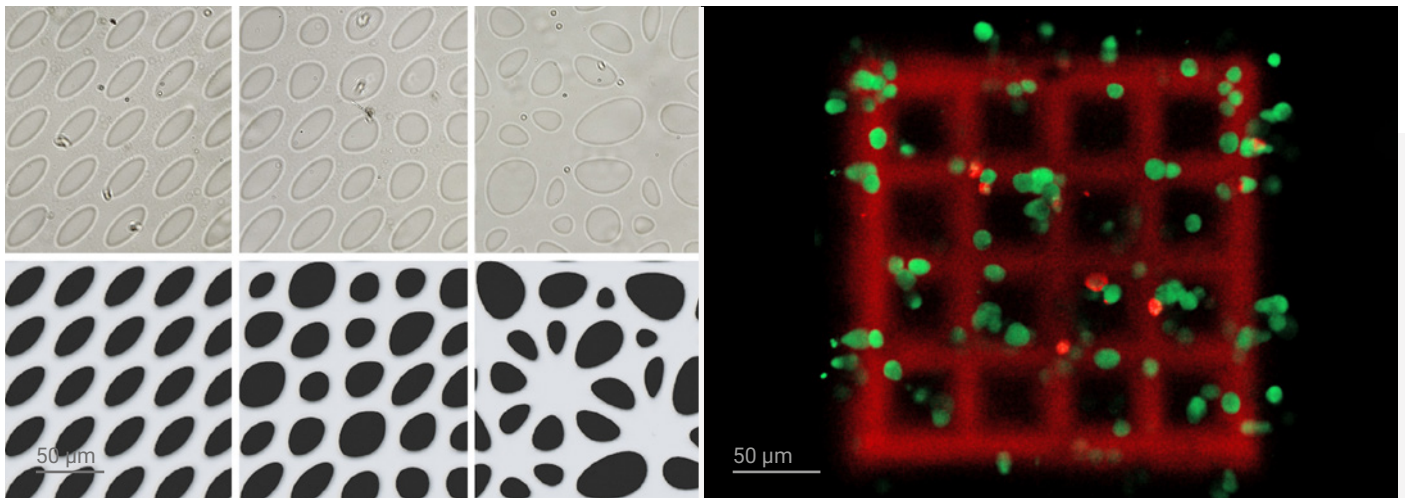
PhotoHA™-Stiff

- ▶ Hydrogel made from methacrylated hyaluronic acid
- ▶ Allows for customizable stiffness
- ▶ Solubilized PhotoHA™ stable 1 month at 2-10 °C

Find out more: nanoscribe.com/abm

All bioresins are

- ▶ compatible with the Quantum X bio
- ▶ available in a kit that includes the lyophilized hydrogel and the photoinitiator lithium-phenyl-2,4,6-trimethylbenzoylphosphinate (LAP)



Typical print sets used

Small Features

Medium Features

Large Features

Extra Large Features





Why Nanoscribe

As the pioneer and market leader in high-precision additive manufacturing, we are your reliable partner for microfabrication systems, software, and solutions. Founded in 2007 as a spin-off of the Karlsruhe Institute of Technology (KIT), we are a vibrant, award-winning company and part of the Lab14 Group since December 2024. With our field-proven systems, straightforward 3D printing workflows and all-in-one solutions, our more than 5,500 system users are driving future-shaping applications.

Our partners, customers and users are innovators and thought leaders across a broad spectrum of scientific research and industries including life sciences, micro-optics, photonics, materials engineering, microfluidics, micromechanics and MEMS. Their fascinating innovations, published in more than 2,500 peer-reviewed journals, are opening up new applications and driving industrial markets. Join the Nanoscribe community!

HIGH-PERFORMANCE MATERIALS DEVELOPMENT

Nanoscribe offers grayscale lithography systems and 3D printers for micro-fabrication. High-performance printing materials play a crucial role in this technology to meet the requirements of Two-Photon Polymerization printing. For this reason, Nanoscribe invests in material development with an own R&D unit and in cooperation with experienced partners.

Our material development works in constant interaction with our hardware and software team as well as with our process and application engineers. Also, close collaboration with our customers allows us to develop tailor-made solutions to satisfy the market needs.



Nanoscribe GmbH & Co. KG
Hermann-von-Helmholtz-Platz 6
76344 Eggenstein-Leopoldshafen
Germany

Phone +49 721 981 980 200
Fax +49 721 981 980 130

info@nanoscribe.com
nanoscribe.com

Nanoscribe China Co., Ltd.
Shanghai, China
+86 135 1215 1378

Nanoscribe
Woburn, MA, USA
+1 857 919 8069

Nanoscribe is certified

ISO 9001: Quality Management Systems • ISO 14001: Environmental Management Systems