PFAS-free products - we pay attention

micro resist technology

UV-Curable Hybrid Polymers

Ready-to-use high performance materials for micro optics, photonics, and life sciences

- Excellent process compatibility, solvent-free
- Glass-like transparency
- High chemical inertness
- Temperature stability
- RoHS compliance
- Production according to ISO 9001 and ISO 14001

- Made in Germany -

micro resist technology GmbH
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Hybrid polymers

High perfomance materials for micro optics, photonics...

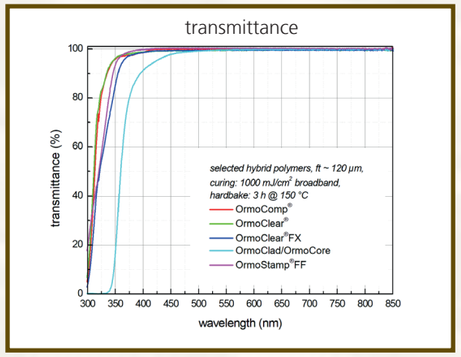
Properties of the cured materials

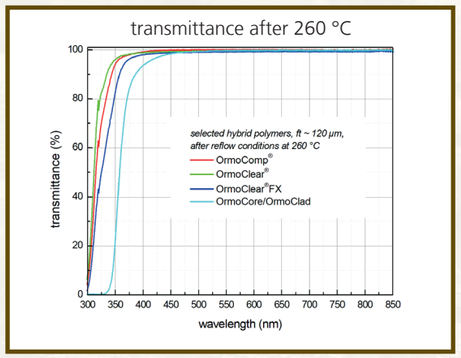
Parameter	OrmoComp®	OrmoClear®	OrmoClear®30	OrmoClear®FX	OrmoClad	OrmoCore	OrmoStamp®FF
Refractive Index @ 589 nm	1.52	1.55	1.56	1.55	1.53	1.55	1.51
Transmission @ 400 nm [%], layer thickness 120 µm	99.3	98.8	98.7	98.5	91.2	91.2	98.3
Abbe number	47	34	34	34	33	34	n.d.
dn/dT (589 nm) [10^{-4} K]	-2.0	-2.1	-2.3	-2.7	-2.7	-2.2	n.d.
CTE (20 - 150 °C) [ppm/K]	150	150	160	160	180	150	140
Young's modulus [GPa] @ 1Hz, 25°C, DMA	~2	~1.7	~1.8	~1.3	n.d.	~1.7	1.8
Shore D Hardness*	75	75	>80	80	80	75	>80
Optical loss [dB/cm] @ 1310/1550 nm, TE mode	0.3/0.2	0.3/0.7	n.d.	0.3/0.4	0.3/0.5	0.3/0.7	n.d.
Application examples	Micro lenses and MLAs, waveguides, gratings, DOEs, micro fluidics, lab-on-chip ...				Waveguides		Fabrication of polymeric working stamps

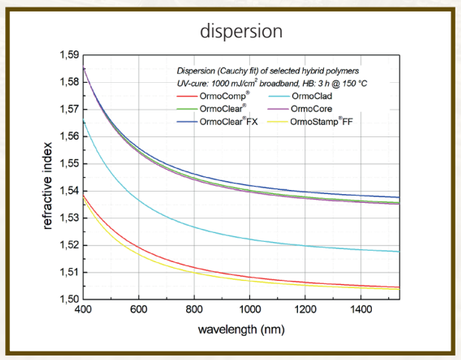
* According to DIN53505 with cone tip 30
** Any viscosity between 30and 30 Pa*s available upon request

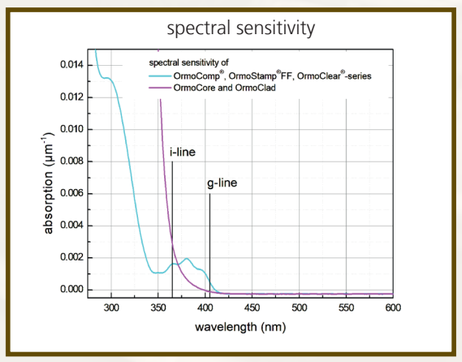
Properties of the liquid materials

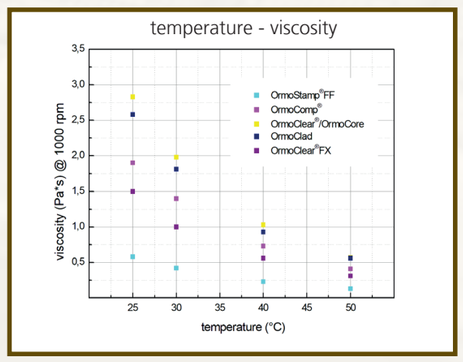
Parameter	OrmoComp®	OrmoClear®	OrmoClear®30	OrmoClear®FX	OrmoClad	OrmoCore	OrmoStamp®FF
Viscosity @ 25 °C [Pa*s]	2.0 ± 0.5	2.9 ± 0.3	30 ± 3	1.5 ± 0.3	2.5 ± 0.5	2.9 ± 0.4	0.5 ± 0.1
Density [g/cm²]	1.14	1.17	1.18	1.18	1.21	1.17	1.11
Film thickness by spin-coating [µm]							
3000 rpm	20	30	100	20	30	30	10
6000 - 1000 rpm	10 - 60	20 - 95	50 - 270	10 - 60	20 - 90	20 - 90	5 - 31
Volume shrinkage [%]	5 - 7	3 - 5	<2	3 - 5	2 - 5	2 - 5	4 - 6
Oxygen sensitivity during UV-curing	no	yes	yes	no	yes	yes	no
PFAS-free	yes	yes	yes	yes	no	yes	yes

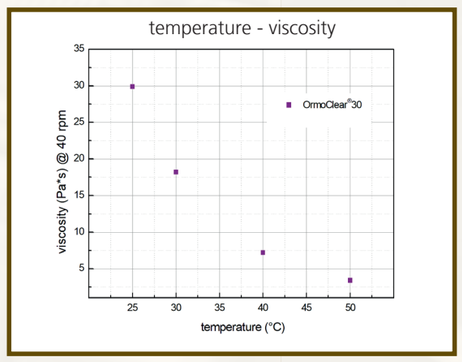


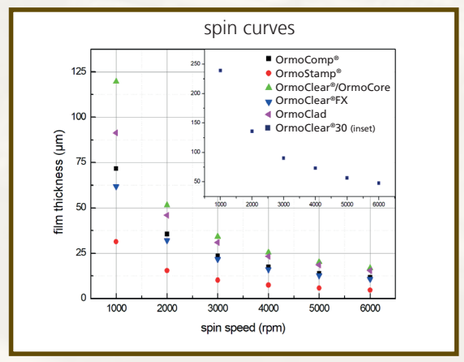








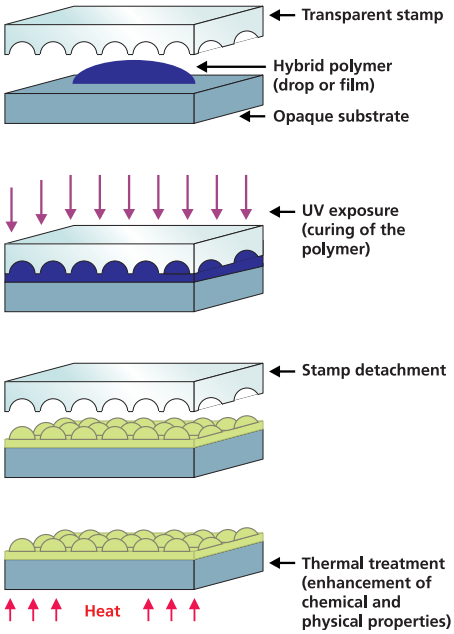




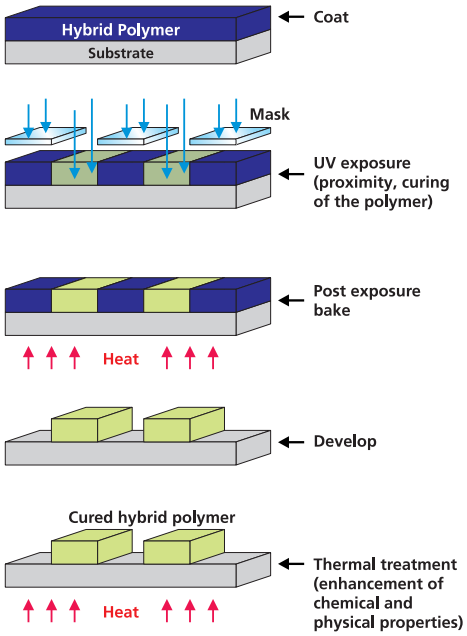
Manufactured in Berlin, Germany

... and more

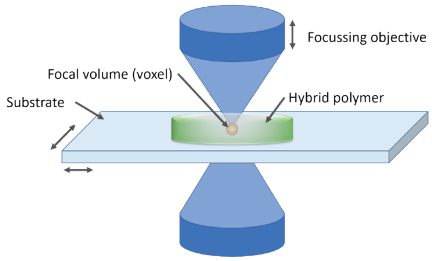
Process flow imprint lithography

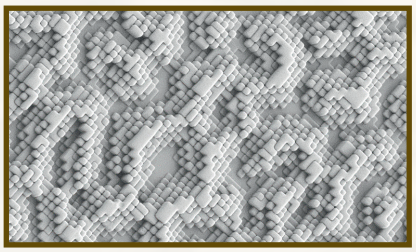


Process flow UV lithography

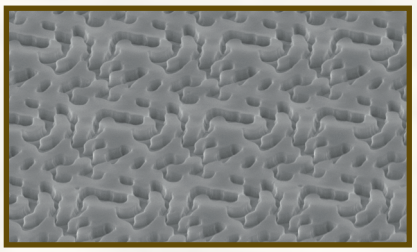


Two-photon polymerisation (2PP)

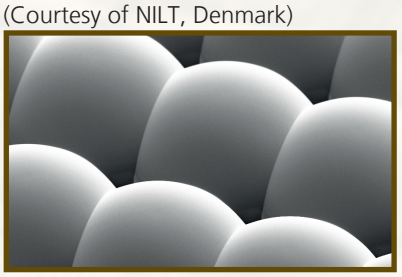




Replicated 16 level DOE structure in OrmoStamp® with 500 nm pixel size (Courtesy of NILT, Denmark)

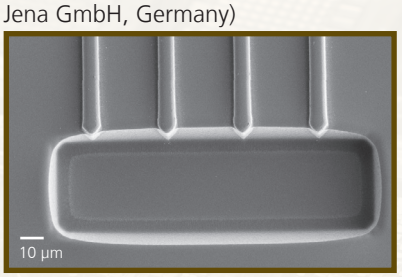


Diffractive optical structure replicated in OrmoClear®

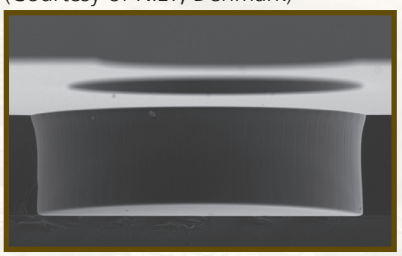


Microlens array replicated in OrmoStamp® (Courtesy of Carl Zeiss Jena GmbH, Germany)

Slanted gratings in OrmoStamp® fabricated by replication (Courtesy of NILT, Denmark)

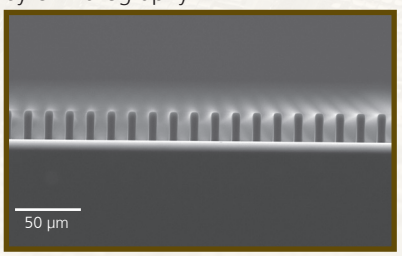


Waveguides in OrmoCore on OrmoClad made by UV-lithography (Courtesy of TU Dresden, Germany)

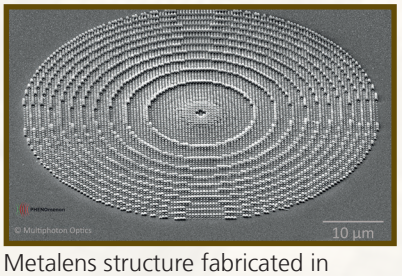


Cavity of 1.5 mm diameter in OrmoComp® fabricated by UV-lithography

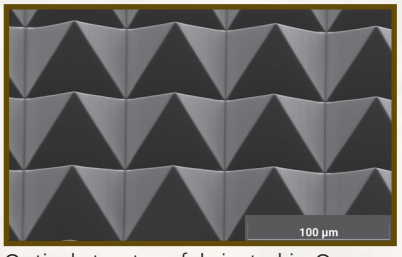
Binary test pattern for UV lithography in OrmoComp®



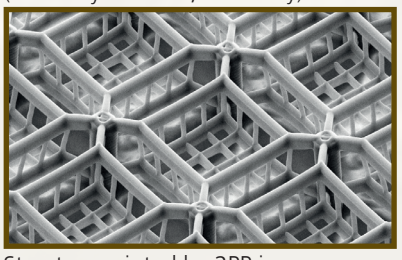
Line & Space pattern in OrmoComp® using i-line stepper lithography



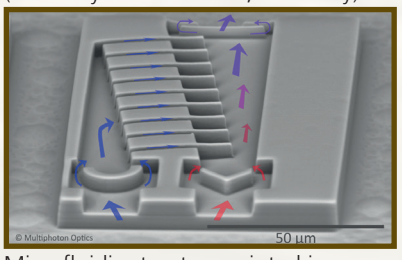
Metalens structure fabricated in OrmoComp® by 2PP (Courtesy of HIMT, Germany)



Optical structure fabricated in Ormo-Comp® by 2PP (Courtesy of nanoscribe, Germany)

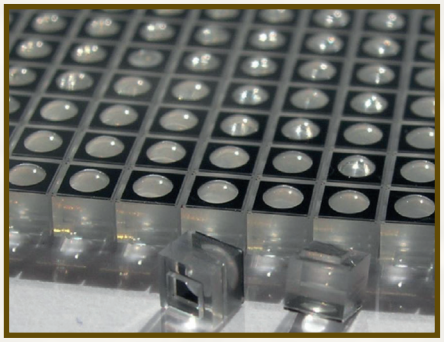


Structure printed by 2PP in OrmoComp® for cell studies (Courtesy of KIT, Germany)

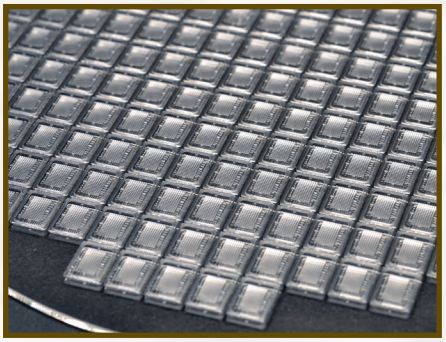


Microfluidic structure printed in OrmoComp® by 2PP (Courtesy of HIMT, Germany)

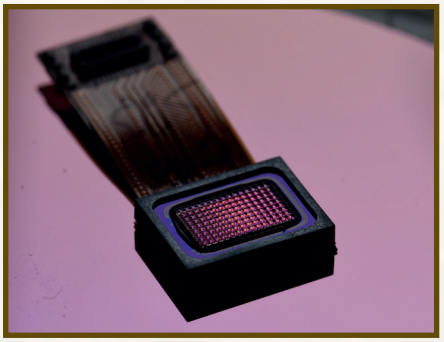
Hybrid polymers
applications examples



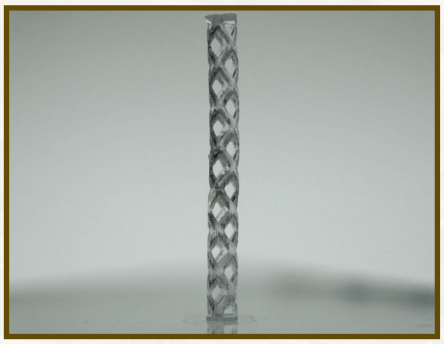
OrmoComp® microlenses on glass fabricated by wafer level UV-replication (Courtesy of FhG IOF, Germany)



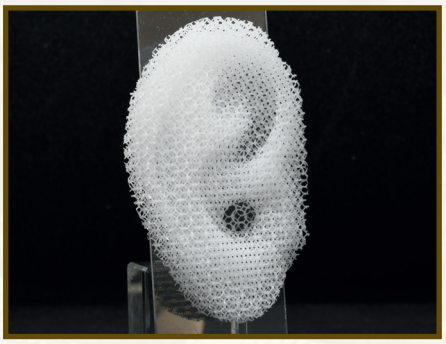
Microlens array in OrmoComp® fabricated by step&repeat UV-replication (Courtesy of FhG IOF, Germany)



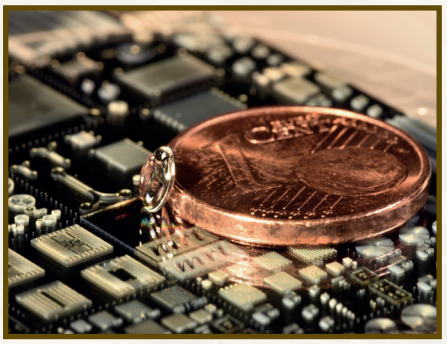
Optical component with integrated micro-lens array made of OrmoComp® (Courtesy of FhG IOF, Germany)



10 mm stent structure fabricated by 2PP in OrmoClear®FX (Courtesy of Vital3D Technologies, Lithuania)



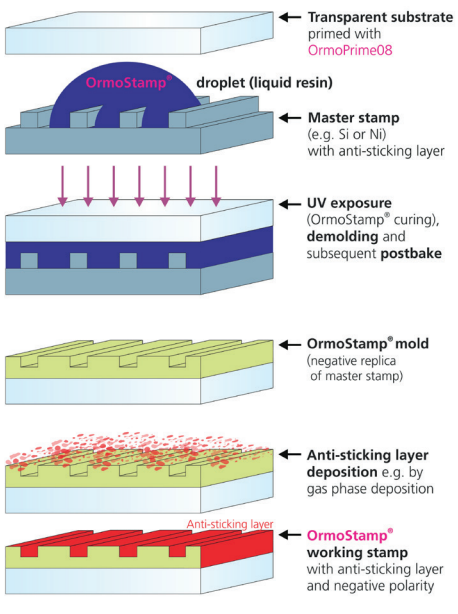
Scaffold of a human ear in OrmoComp® fabricated by 2PP (Courtesy of HIMT, Germany)

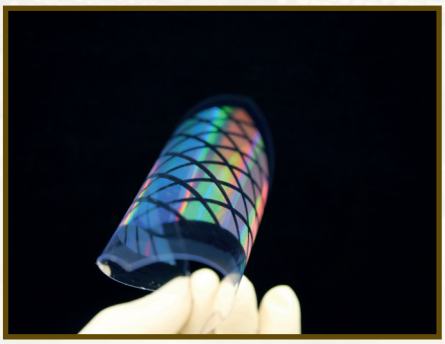


OrmoComp® macroscopic lens fabricated by combination of soft NIL and inkjet printing

Transparent polymer working stamps

Process flow for working stamp fabrication





Nanometer test pattern in OrmoStamp®FF on polycarbonate foil

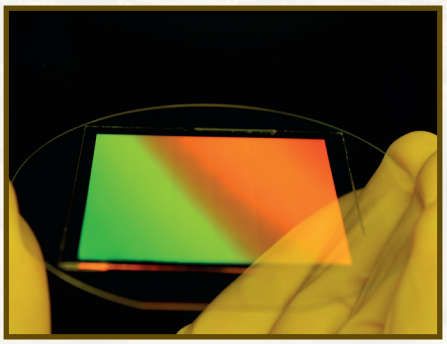
Main features

⇨ For UV and Thermal NIL

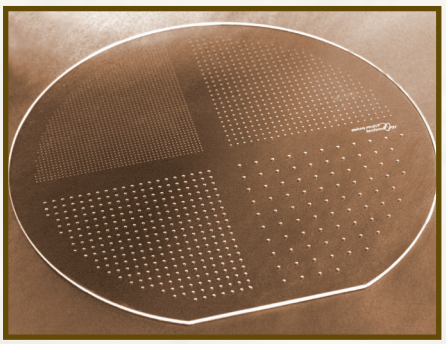
⇨ Cost efficient alternative to quartz

⇨ Excellent pattern replication down to 10 nm

⇨ High mechanical stability



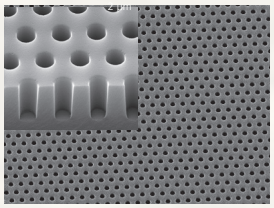
OrmoStamp®FF on glass substrate



Replication in OrmoStamp® using 6 inch glass substrate

Hybrid polymers
highlights and experimental products

Highlight: Our classic stamp material now PFAS free - OrmoStamp®FF



Main features

⇨ Based on proven base recipe but now **PFAS free**

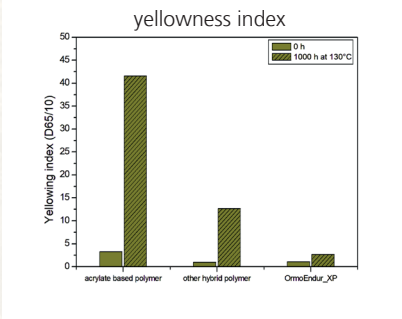
⇨ Improved wetting behavior and homogeneity in spin coating applications

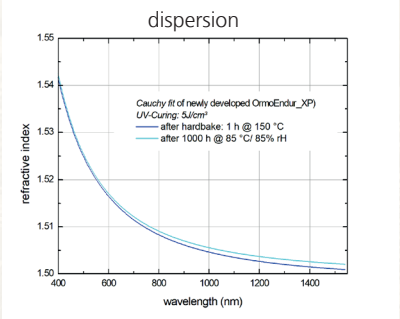
⇨ Improved shelf life

⇨ Experimental inkjetable version available

Experimental products:

OrmoEndur_XP with enhanced durability for automotive projected lighting



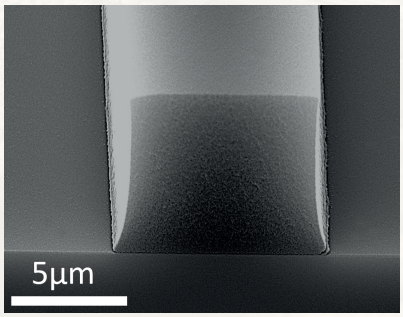


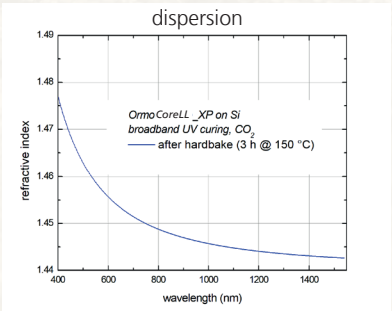
Main features

⇨ Preservation of transarency >95% after 1000 h @130 °C in 500 µm film

⇨ Maintainance of optical properties after damp heat storage (85 °C/ 85 %rH)

OrmoCoreLL_XP with ultra low optical loss for photonic integrated circuits





Main features

⇨ Low optical loss <0.25 dB/cm @ 1310 nm & 1550 nm

⇨ Refractive index ~1.45 adapted to fused silica

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LinkedIn

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