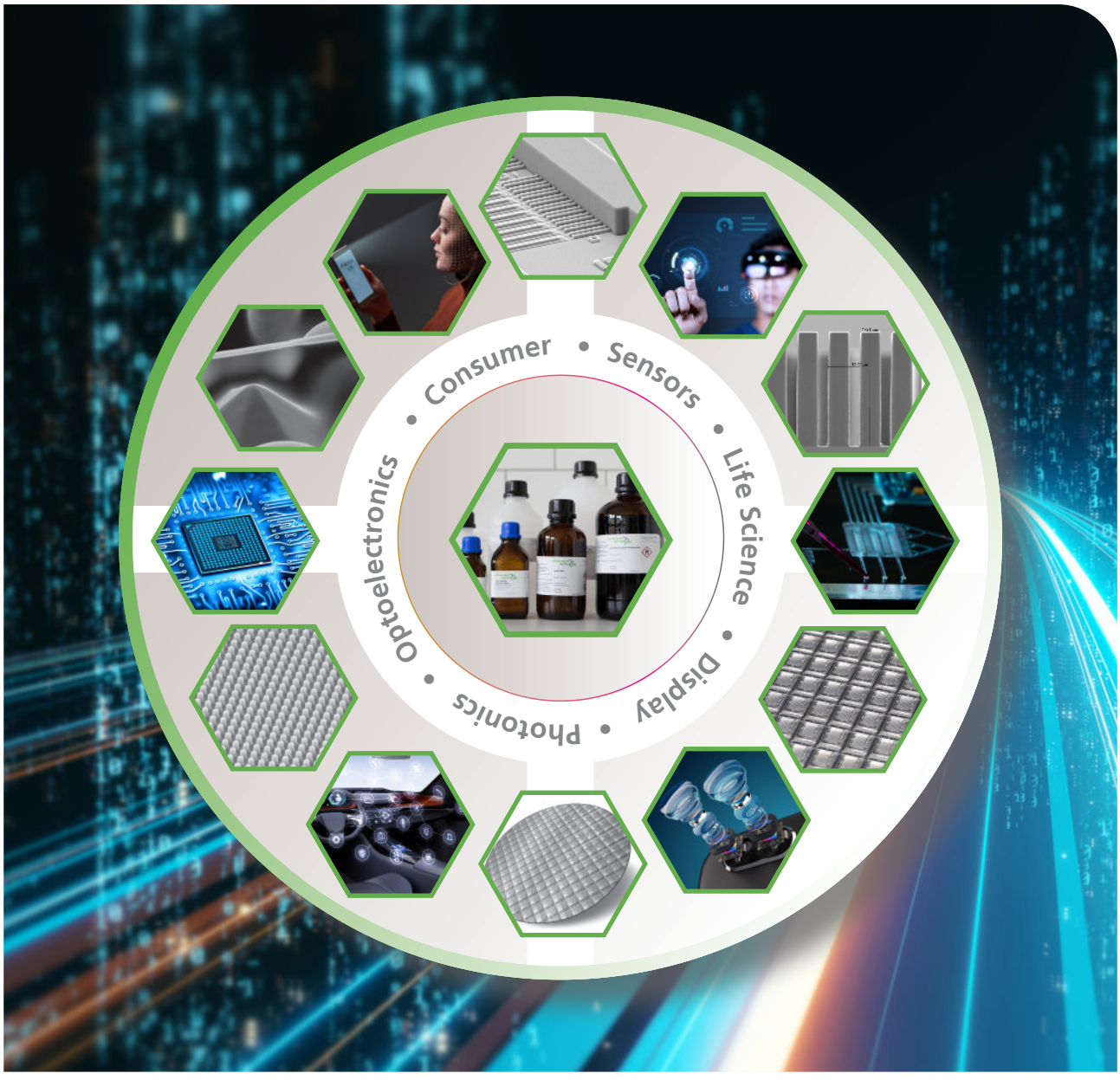
micro resist technology

High Performance Material Supplier
for innovative resists, polymers, photopolymers and ancillaries



Product overview

Negative Photoresists
for UV (mask aligner, laser), Deep UV and e-beam lithography

Positive Photoresists
for UV, laser lithography and greyscale patterning

Hybrid Polymers
for micro- and nano-optical applications

Nanoimprint Resists
for thermal and UV-based nanoimprint lithography

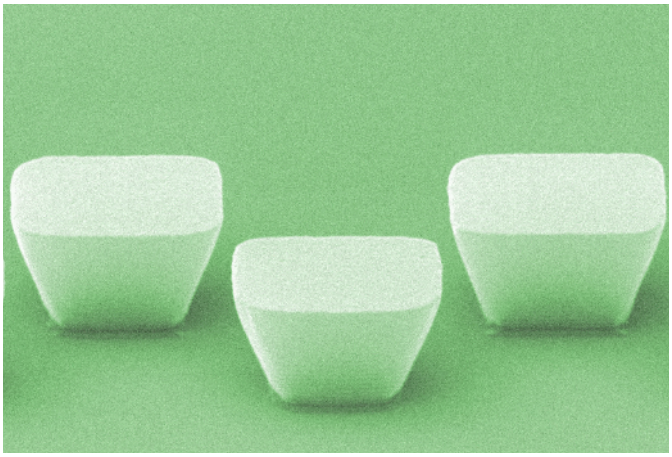
Inkjet Materials
functional materials for inkjet-printing

Ancillaries

Negative Photoresists

Photoresists for UV (mask aligner, laser)/ DUV and e-beam lithography

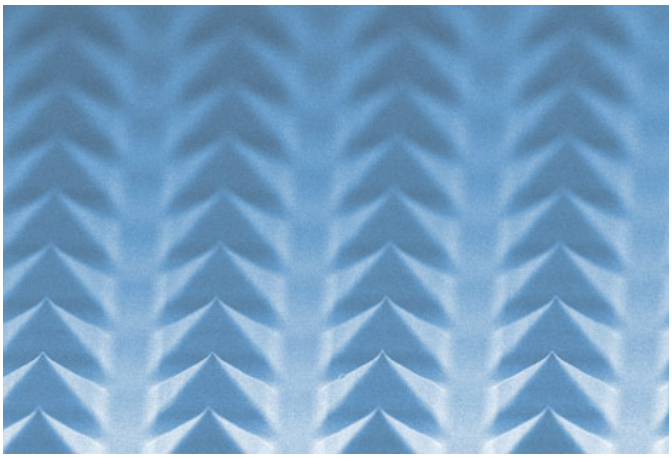
- Effective for broadband, i-line, Deep UV, e-beam exposure, or laser direct writing @ 405 nm
- Lift-off resists with tunable pattern profile, high temperature stability up to 160 °C
- Variety of viscosities for different film thicknesses in one spin-coating step



Product series	Material class	Compatible processes	Prefered applications	Unique features
ma-N 1400	Aromatic bisazide/ novolak, non-CAR	UV mask aligner, laser & stepper lithography	Single layer lift off, etch mask, mould for electroplating	aqueous-alkaline development, thermal stability up to 110°C, easy to remove
ma-N 400	Aromatic bisazide/ novolak, non-CAR	UV mask aligner, laser & stepper lithography	Single layer lift off, etch mask, mould for electroplating	aqueous-alkaline development, thermal stable up to 160°C, easy to remove
ma-N 2400	Aromatic bisazide/ novolak, non-CAR	e-beam, Deep UV lithography	Etch mask	aqueous-alkaline development, robust & easy processing, easy to remove
mr-DWL	Epoxy resin, CAR	UV mask aligner, laser & stepper lithography, 2PP	Mold for electro-plating, master for replication, etch mask	light sensitive up to 410 nm, for pattern transfer processes and permanent applica-tions
EpoCore & EpoClad	Epoxy resin, CAR	UV lithography	Polymer based waveguides, mould for electroplating, master for replication, etch mask	highly transparent to visible light, high thermal stability, for pattern transfer pro-cesses and permanent applications
mr-EBL 6000	Epoxy resin, CAR	e-beam, UV lithography	Etch mask	for pattern transfer processes and perma-nent applications

Positive Photoresists

Positive Photoresists for UV lithography (mask aligner, laser, greyscale exposure)



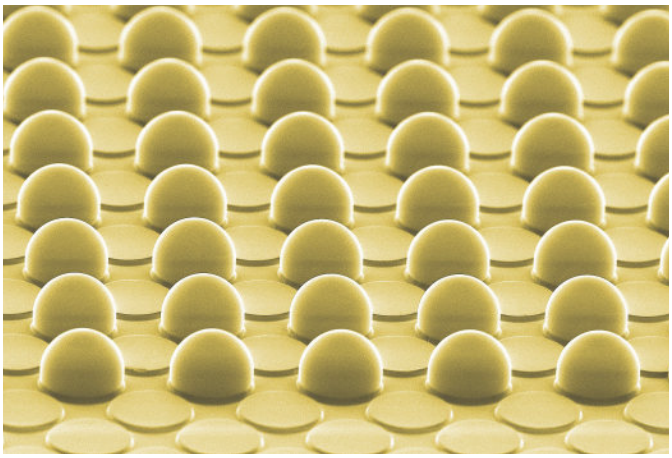
- Variety of viscosities for 0.1 µm – 60 µm film thickness in one spin-coating step
- Effective for broadband, g-line, h-line or i-line exposure and laser direct writing at 350…450 nm
- No post exposure bake
- Easy removal

Product series	Material class	Compatible processes	Prefered applications	Unique features
ma-P 1200G	DNQ/ novolak	Greyscale lithography, UV lithography, Laser interference lithography	UV moulding,Electro-plating, Dry etching •2.5D structures in micro-optics, MEMS and MOEMS, wafer-level optics, micro-fluidics	1-60 µm film thickness by spin-coating, Aqueous-alkaline development, Easy to remove, For pattern transfer
ma-1200	DNQ/ novolak	UV lithography	Dry etching, Ion implantation,Electro-plating,Pattern reflow + UV moulding •LEDs, microsystems, semiconductor com-ponents, microoptics	0.3-40 µm film thick-ness by spin-coating, Aqueous-alkaline development, Easy to remove, For pattern transfer
ma-P1275HV	DNQ/ novolak	UV lithography	Electroplating, Dry etching, Ion implanta-tion, Pattern reflow + UV moulding •microsystems, micro-optics	10-50 µm film thick-ness by spin-coating, Aqueous-alkaline development, Easy to remove, For pattern transfer
mr-P 1200 LIL	DNQ/ novolak	Laser interference lithography, UV lithography	Dry etching, electro-plating •Laminar grids, VSL grids	0.1-0.5 µm film thick-ness by spin-coating, Aqueous-alkaline development, Easy to remove, For pattern transfer

Hybrid Polymers

UV-curable Hybrid Polymers for for micro-optical applications.

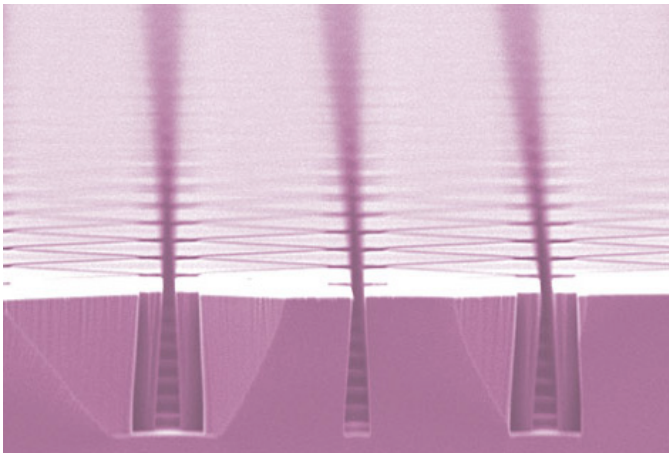
- Excellent transparency
- Excellent mechanical properties
- High chemical and physical stability
- Excellent replication fidelity
- Ready-to-use solutions



Product series	Material class	Compatible processes	Prefered applications	Unique features
OrmoComp®	Si-containing acrylate-functionalized pre-cursor polymer	UV Molding, UV Lithography, 2PP, 3D printing	Micro- and nano-optical devices (e.g. micro lenses, DOE, gratings)	very high temperature and climate stability, PDMS compatibility
OrmoStamp®	Si-containing acrylate-functionalized pre-cursor polymer	UV Molding	Working stamp fabri-cation	Intrinsic release properties, excellent pattern fidelity down to sub-100nm features
OrmoClear®FX	Si-containing acrylate-functionalized pre-cursor polymer	UV Molding, UV Litho-graphy, 2PP	Micro- and nanoopti-cal devices (e.g. micro lenses, DOE, gratings), micro fluidics	high temperature and climate stability, PDMS compatibility
OrmoClear® series	Si-containing acrylate-functionalized pre-cursor polymer	UV Molding, UV Litho-graphy, 2PP	Micro-optical devices (e.g. micro lenses, DOE, gratings)	Low volume shrinkage
OrmoCore and OrmoClad	Si-containing acrylate-functionalized pre-cursor polymer	UV Molding, UV Litho-graphy	Wave guides, beam splitter, optical inter connectors	Low optical loss, no birefringence

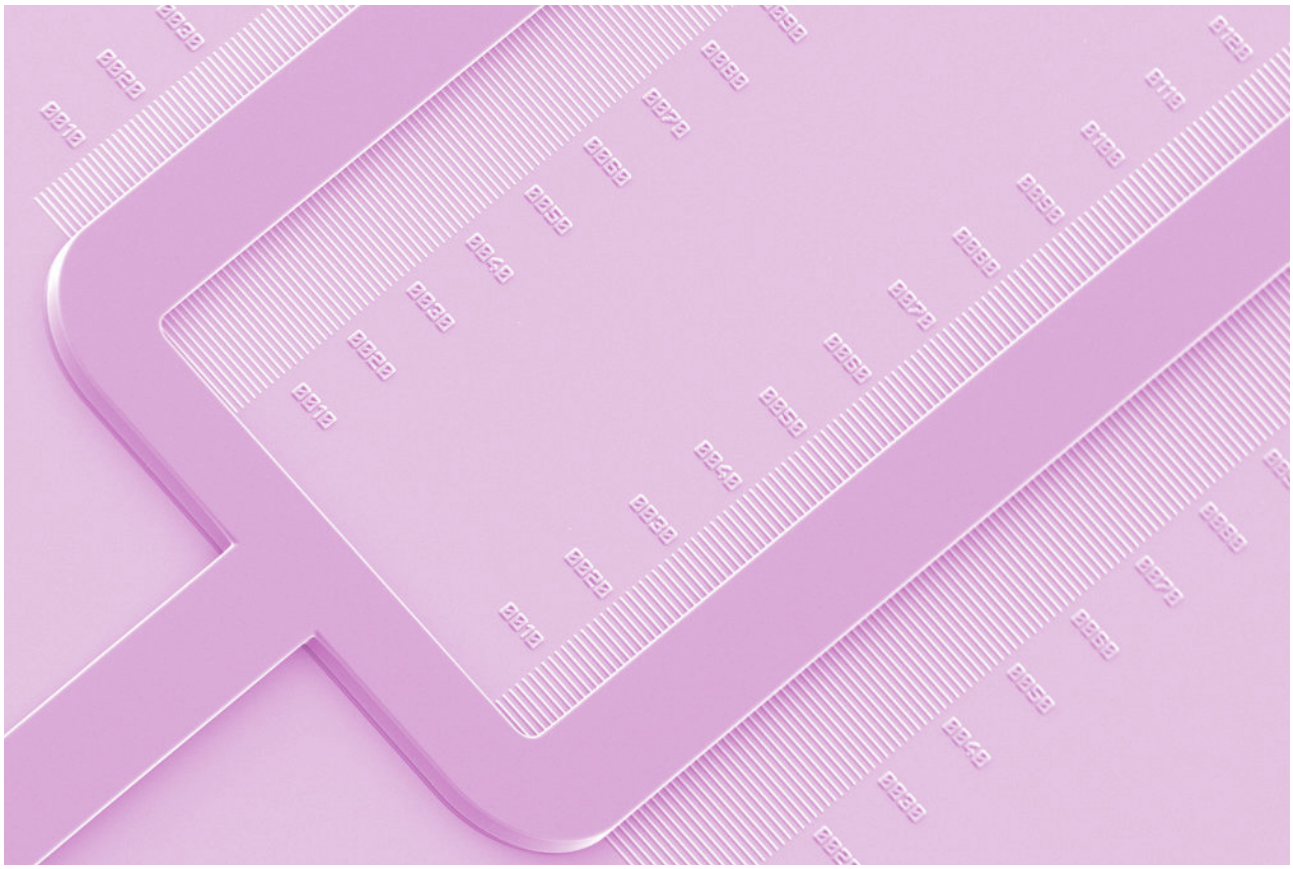
Nanoimprint Resists

Nanoimprint Lithography (NIL) is a straight forward, low cost, and high throughput capable technology for the fabrication of nanometer scaled patterns. Main application fields are photonics, next generation electronics, as well as bio- and sensor applications.



Product series	Material class	Compatible processes	Prefered applications	Unique features
mr-NIL200 series	Acrylate monomer formulation	UV-NIL	Dry etch mask for pattern transfer by plasma etching, for gas impermeable working stamps	UV-crosslinking, purely organic, no primer needed, low viscosity, insensitive versus oxygen
mr-NIL210 series	Acrylate monomer formulation	soft UV-NIL	Dry etch mask, for gas permeable working stamps	UV-crosslinking, purely organic
mr-NIL212FC series	Acrylate monomer formulation	soft UV-NIL	Dry etch mask, for gas permeable working stamps	UV-crosslinking, fast curing, compatible to low exposure dose in the presence of oxygen
mr-UVCur26SF	Acrylate monomer formulation	R2R UV-NIL, S&R UV-NIL	Dry etch mask, permanent optical applications, for gas impermeable working stamps	Very low viscosity, solvent-free
mr-XNIL26SF	Acrylate monomer formulation	UV-NIL	Dry etch mask, for gas impermeable working stamps	UV-crosslinking, purely organic, high content of fluorinated compounds

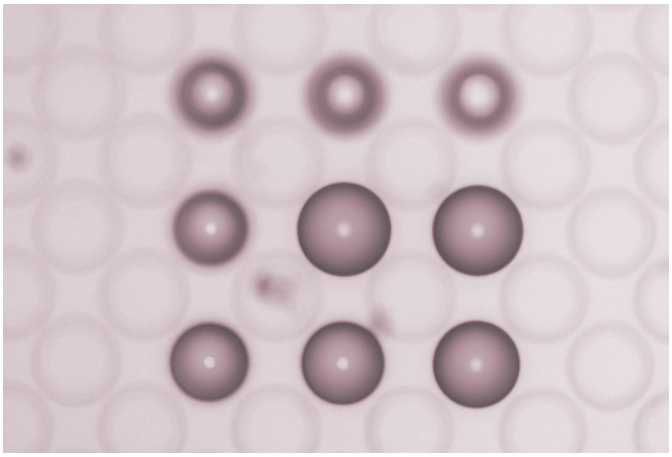
Product series	Material class	Compatible processes	Prefered applications	Unique features
mr-I T85 series	Cycloolefin-Copolymer, thermoplastic poylmer formulation	T-NIL	optical devices, micro fluidics, lab-on-a-chip	Purely organic, very non-polar, insoluble in acids and alcaline solutions, T_g 85°C
mr-I 7000R series	Thermoplastic polymer formulation	T-NIL	Dry etch mask	Purely organic, T_g = 60 °C
mr-I 8000R series	Thermoplastic polymer formulation	T-NIL	Dry etch mask	Purely organic, T_g = 115 °C
mr-I 9000M series	Thermoset polymer formulation	T-NIL	Dry etch mask	Purely organic, T_g = 35 °C, thermal curing, no T_g after imprint
mr-NIL 6000E series	Epoxy oligomer formulation	thermal assisted UV-NIL	Dry etch mask	Purely organic, T_g = 1 °C
SIPOL series	Thermoplastic polymer formulation	T-NIL	Dry etch mask, 2-layer system with UL1 for deep trenches etching	Si-containing, T_g = 63 °C
mr-I PMMA35k series	Thermoplastic polymer formulation	T-NIL	Rudimental NIL investigations	Purely organic, T_g = 105 °C



Inkjet Materials

Functional materials for inkjet-printing

- Available in different viscosities (adjustable)
- Suitable in commercial inkjet printing devices
- Focused on high reliability of droplet generation
- UV-curable formulations



Product series	Material class	Compatible processes	Prefered applications	Unique features
InkEpo	Epoxy resin based, CAR	Inkjet Printing	Protecting layer, micro lenses & micro lens array, spacer, glue	solvent containing, UV curable, excellent thermal, mechanical and chemical stability, optically transparent
InkOrmo	Si-containing acrylate-functionalized precursor polymer	Inkjet Printing	micro-lenses, waveguides, microfluidics	UV-cureable, excellent thermal, mechanical and chemical stability of cured patterns
mr-UVCur26SF	Acrylate monomer formulation	Inkjet Printing, step & repeat NIL process, R2R UV-NIL	large area permanent nano structuring	solvent-free, organic, photo-curable nano-imprint resist for inkjet dispensing

Ancillaries

Overview Ancillaries

- Thinner
- Primer
- Developer
- Remover
- Protection and transfer layers
- Etching solutions

Product	Material class	Compatible processes/ product series	Prefered applications/ comments
Thinner			
ma-T 1045	Solvent based	mr-NIL 6000E, mr-I 9000M	NIL resists
ma-T 1046	Solvent based	ma-N 1400	-
ma-T 1050	Solvent based	ma-P 1200(HV), ma-P 1200 G, ma-P 1200LIL, Hybrid polymers, mr-I 7000, mr-I 8000, mr-NIL26SF, mr-NIL212FC	Positive and NIL resists, hybrid polymers for FT[1]< 500 nm
mr-T 1049	Solvent based	ma-N 400	-
mr-T 1075	Solvent based	mr-NIL210, FT[1] >500nm	NIL resists
mr-T 1078	Solvent based	mr-NIL210, mr-NIL200, film thickness <500nm	NIL resists
mr-T 1090	Solvent based	ma-N 2400	-
OrmoThin	Solvent based	Hybrid polymers for FT[1] > 500 nm	Hybrid polymers for FT[1] > 500nm
Primer			
HMDS-Primer	HMDS based	ma-N 400, ma-N 1400, ma-P 1200G, ma-P 1200(HV), ma-P 1200LIL	Si, SiO_2 and glass substrates
mr-Primer 80/20	HMDS based	ma-N 2400, ma-N 400, ma-N 1400 ma-P 1200(HV)	Si, SiO_2 and glass substrates

[1] FT = film thickness

Product	Material class	Compatible processes/ product series	Prefered applications/ comments
SurPass 3000	Aqueous	Epoxy resists - SU-8, EpoCore, EpoClad and mr-DWL	Various substrates
SurPass 4000	Aqueous	ma-N 2400, ma-N 400, ma-N 1400, ma-P 1200G, ma-P 1200(HV), ma-P 1200LIL	Various substrates
OrmoPrime®08	Si-containing adhesion promoter	OrmoClear®FX, OrmoClear®, OrmoComp®, OrmoCore & OrmoClad, OrmoStamp®	Various substrates e.g. Si, glass, quartz, ~ 130nm FT[1] by spin coating
OrmoPrime®20	Si-containing adhesion promoter	OrmoClear®FX, OrmoClear®, OrmoComp®, OrmoCore & OrmoClad, OrmoStamp®	Various substrates e.g. Si, glass, quartz, FT[1] < 20nm by spin coating or deposition from the gas phase
mr-APS1	Si-containing adhesion promoter	mr-NIL210, mr-NIL212FC, mr-UVCur26SF mr-XNIL26SF	Forms covalent bonds to oxidic surfaces and acrylate based coatings, FT[1](spin-coating) < 10nm
Developer			
ma-D 331	Aqueous-alkaline, NaOH based	ma-P 1200(HV), ma-P 1200G in binary UV lithography, thin layers of ma-N 2400	-
ma-D 331/S	Aqueous-alkaline, NaOH based	ma-P 1200(HV), ma-P 1200G in binary UV lithography, thin layers of ma-N 400	Surfactant containing
ma-D 332	Aqueous-alkaline, NaOH based	thicker layers of ma-N 2400	-
ma-D 332/S	Aqueous-alkaline, NaOH based	thicker layers of ma-N 400	Surfactant containing
ma-D 374/S	Aqueous-alkaline, sodium metasilicate based	ma-P 1200LIL	Surfactant containing
ma-D 377	Aqueous-alkaline, sodium metasilicate based	ma-N 2400, ma-N 400, ma-P 1200(HV)	on sensitive, e.g. Al containing substrates
ma-D 525	Aqueous-alkaline, TMAH based	ma-N 2400	-
ma-D 530/S	Aqueous-alkaline, TMAH based	thin layers of ma-N 400	Surfactant containing

[1] FT = film thickness

Product	Material class	Compatible processes/ product series	Prefered applications/ comments
ma-D 531/S	Aqueous-alkaline, TMAH based	thin layers of ma-N 400	Surfactant containing
ma-D 532/S	Aqueous-alkaline, TMAH based	ma-P 1200G greyscale lithography for ≥ 15µm FT[1], thicker layers of ma-N 400	Surfactant containing
ma-D 533/S	Aqueous-alkaline, TMAH based	ma-N 1400	Surfactant containing
mr-D 526/S	Aqueous-alkaline, TMAH based	ma-P 1200G gray scale lithography for < 15 µm FT[1], ma-P 1200(HV)	Surfactant containing
mr-D 4000/75	Aqueous-alkaline, K_2CO_3 based	DuPont MX5000 dry film resists	Spray development
ma-D 4000/100	Aqueous-alkaline, K_2CO_3 based	DuPont WBR2000 dry film resists	Spray development
mr-Dev 600	Solvent based	EpoCore, EpoClad, mr-DWL, mr-UVL 6000, mr-EBL 6000, (all SU-8 resists, DJML SUEX dry film)	-
mr-DevCH	Solvent based	DJML ADEX dry film series	-
OrmoDev	Solvent based	Hybrid polymers	-
Remover			
mr-Rem 500	Solvent based, NMP-free, NEP-containing	ma-N 2400, ma-N 400, ma-N 1400 mr-EBL 6000, mr-DWL, EpoCore, EpoClad, ma-P 1200G, ma-P 1200(HV) ma-P 1200LIL, InkEpo, mr-UVCur26SF, SU-8, SU-8 2000, SU-8 3000, SU-8 TF 6000, PMMA/Co-Polymer, LOR / PMGI	-
mr-Rem 700	Solvent based, NMP- & NEP-free, pH ~ 8	ma-N 2400, ma-N 400, ma-N 1400, mr-EBL 6000, mr-DWL, EpoCore,EpoClad, ma-P 1200G, ma-P 1200(HV), ma-P 1200LIL, InkEpo, SU-8, SU-8 2000, SU-8 3000, SU-8 TF 6000, PMMA/Co-Polymere, LOR / PMGI	-
ma-R 404/S	Aqueous ,strongly alkaline, NaOH based	ma-N 2400, ma-N 400, ma-N 1400, ma-P 1200G, ma-P 1200(HV), ma-P 1200LIL	Surfactant containing

[1] FT = film thickness

Product	Material class	Compatible processes/ product series	Prefered applications/ comments
Protection and transfer layers			
UL1 series	Thermoplastic polymer thin film formulation	SIPOL	Organic underlayer / transfer layer for pattern magnification via etching
mr-Conductive Layer	Aqueous polymer solution	ma-N 2400	for patterning by electron beam lithogaphy on non-conductive substrates and for SEM inspection of non-conductive samples
DisCharge H2O	Aqueous polymer solution	PMMA/Co-Polymere	for patterning by electron beam lithogaphy on non-conductive substrates and for SEM inspection of non-conductive samples
mr-PL series	Novolak resin solution	Covering sensible metal patterns or topography	Protection layer
Etching solutions			
Chrome Etch 18	Strongly acidic, aqueous etchant	Etching of Cr layers	for mask manufacturing and thin film Chrom patterning

[1] FT = film thickness

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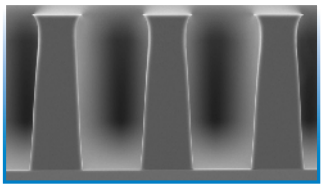
micro resist technology

Your Experts for Photoresists and Polymers

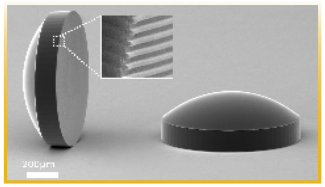
Materials and Technologies for Micro- and Nanofabrication

UV Lithography - Thick Film Processing



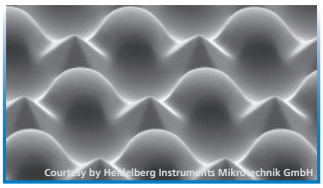
Pattern in 100µm thick positive tone resist
ma-P 1200 series
ma-P 1275HV

Micro Optical Components



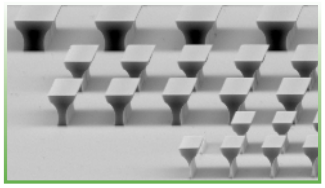
Microlens made of InkOrmo, with integrated nano grating by combination of inkjet dispensing and UV replication

Greyscale lithography



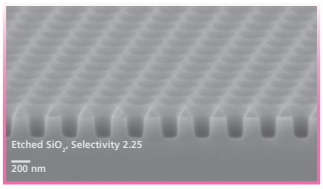
Master generation by laser direct writing in
mr-P 1275G

Lift-Off Processing



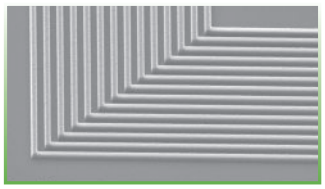
Single layer lift off pattern made by UV lithography in ma-N 1440

UV nanoimprint lithography



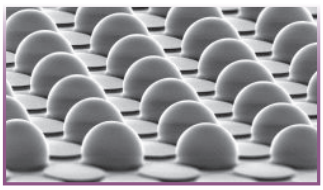
Pillar structure after pattern transfer by RIE into SiO_2 (selectivity 1:2.25) Etch mask made in mr-NIL212FC by UV imprinting

E-Beam lithography



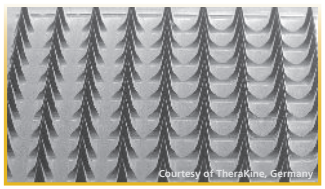
Etch mask
200nm pattern in ma-N2400
by e-beam lithography

Inkjet Printing



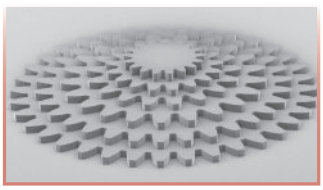
Micro lenses in InkOrmo adjustable lense shape by controlling droplet size and number during the inkjet printing

UV Replication



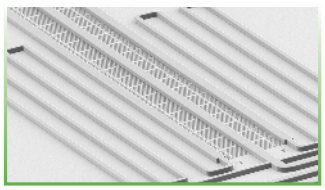
OrmoComp®/
OrmoClear®FX
pattern for
life science application

Dry Film - Multi Layer Lithography



Multi layer pattern in dry films for complex 3D-architectures

UV Lithography - Multi Layer Processing



Pattern in thick negative tone resist

3-layer microfludic pattern made of SU-8 3000 and modified SU-8

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