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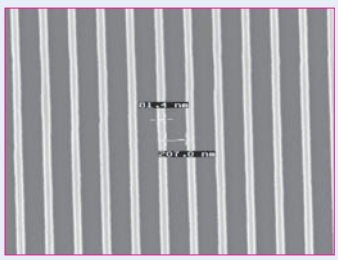
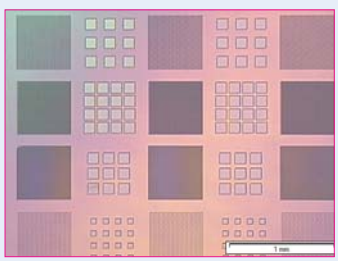
UV-curable polymer for UV-based nanoimprint lithography

mr-UVCur21 – fast curing polymer system for pattern transfer

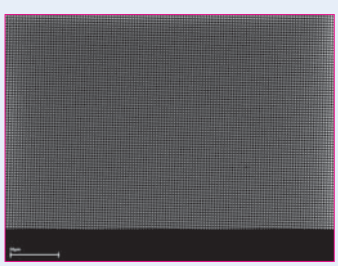


Imprinted 80 nm lines, pattern depth 110 nm (Courtesy of AMO)

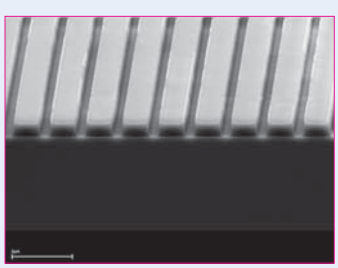


Excellent filling of mould patterns with demanding filling factors, 100x100 µm² squares (Courtesy of AMO)

Imprinted lines, sub-30 nm resolution (Courtesy of AMO)



Imprinted 800 nm squares, 1200 nm pitch, large-area imprint (Courtesy of Profactor)



Imprinted 350 nm trenches, residual layer thickness < 10 nm (Courtesy of Profactor)

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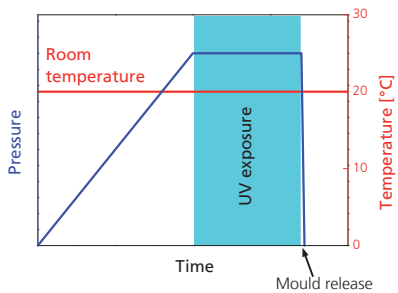
Attributes

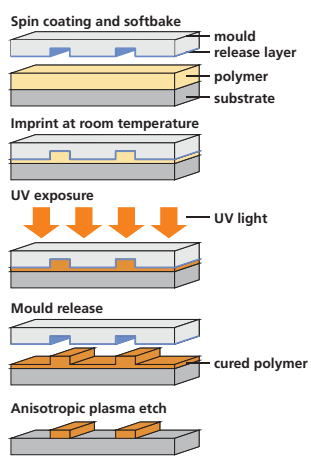
- Compatibility with various nanoimprint tools:
  - Wafer-scale or step&repeat UV-imprints
  - Imprinting in vacuum or under atmospheric pressure
- Excellent film quality and thickness uniformity
- **Short cycle times** due to fast filling of mould cavities
- Pattern **resolution below 30 nm** (mr-UVCur21, limited by the mould, not by the polymer)
- **Very low residual layer thickness** (< 10 nm)
- **Short curing times,** low UV doses, compatibility with various UV lamps and filter systems
- **High plasma etch resistance,** no residues after oxygen plasma etching (silicon-free polymer)
- Appropriate adhesion promoter available



Applications

- Etch mask for pattern transfer processes (dry and wet etching)
- Fabrication of nanopatterns
  - Data storage
  - Nano-optical devices, sub-wavelength optical elements
  - Photonic crystals
  - Micro- and Nanofluidics
  - Microelectronics
- Coating of various substrate materials, e.g. Si, SiO_2, Al

Process Flow



Technical Data

UV-curable Polymer	mr-UVCur21	mr-UVCur21SF
Coating method	Spin coating	Dispensing, spin coating
Process conditions	Imprint: room temperature process, low imprint pressures (>100 mbar), imprint in vacuum or under atmospheric pressure UV exposure: broad band or i-line, curing time few seconds	
Smallest feature size **Aspect ratio**	< 30 nm > 2	< 30 nm > 2
Ready-to-use solutions for various film thicknesses* (3000 rpm)	100nm 200nm 300nm	1.6 µm (spin coating)
Diluents	mr-T 1070	mr-T 1070
Adhesion Promoter	mr-APS1	mr-APS1

* Different film thicknesses are available on request for mr-UVCur21