



mr-P 22G — Thick Film Positive Greyscale Photoresist

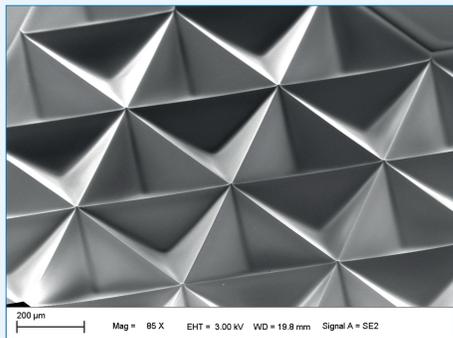
Positive Photoresists for very deep greyscale pattern



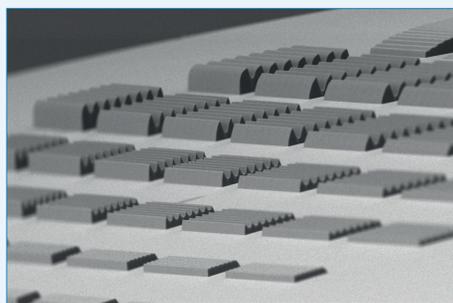
Direct Write Lithography @ $\lambda = 405$ nm with DWL 66⁺:
 70 μ m high, 500 μ m diameter lenses¹⁾



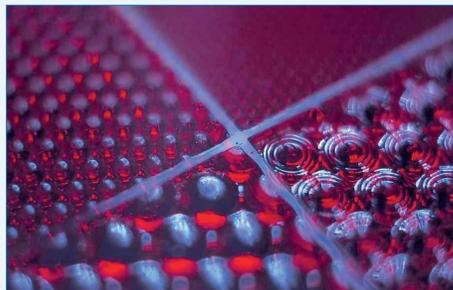
Direct Write Lithography @ $\lambda = 405$ nm with DWL 66⁺:
 103 μ m high, 2 mm diameter Fresnel lens¹⁾



Direct Write Lithography @ $\lambda = 405$ nm with DWL 66⁺:
 155 μ m deep tetrahedrons¹⁾



Mask Aligner exposure with 405 nm filter through a HEBS glass greyscale mask (by Canyon Materials Inc.):
 max. 70 μ m high saw tooth patterns in different heights and pitches



Direct Write Lithography @ $\lambda = 405$ nm with PICOMASTER XF 200: 125 μ m high lenses, 125 μ m, 250 μ m and 500 μ m diameter, Fresnel lenses 500 μ m diameter²⁾

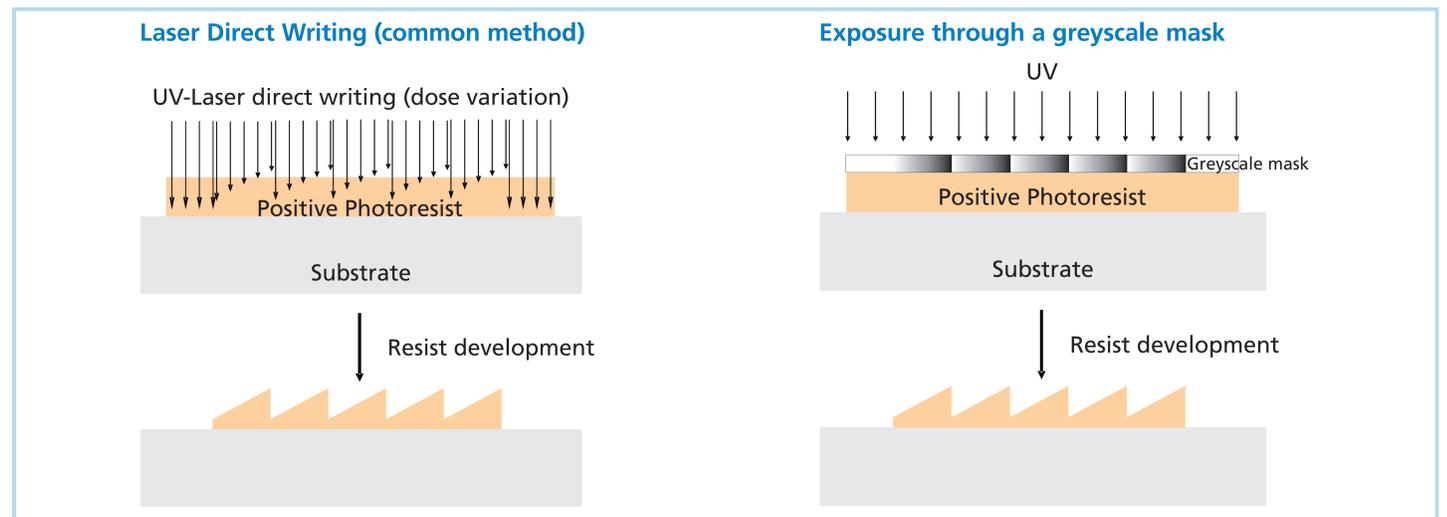
¹⁾ Heidelberg Instruments Mikrotechnik GmbH
²⁾ RAITH laser systems

Characteristics

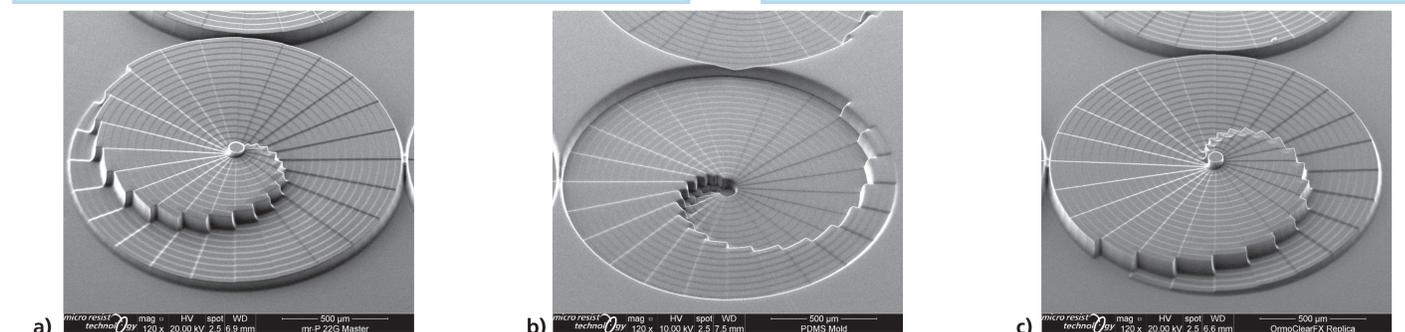
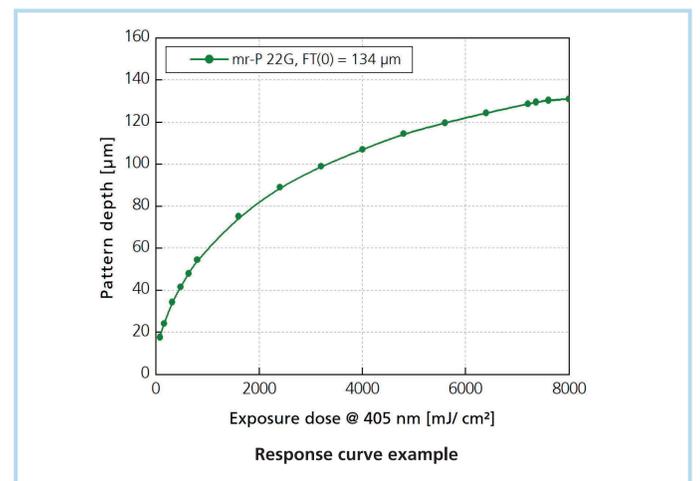
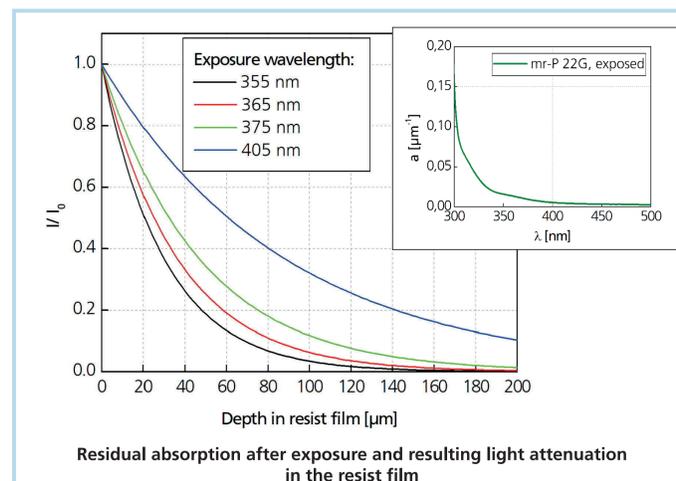
Positive tone photoresist designed for greyscale lithography in up to 200 μ m film thicknesses, for the generation of up to 160 μ m deep greyscale patterns.

- Film thickness up to 100–140 μ m in a single coating step, up to 180–200 μ m with double coating
- Very low residual absorption after exposure enables up to 150–160 μ m pattern depth in greyscale lithography
- Suitable exposure wavelengths: $\lambda = 330$ –420 nm ($\lambda = 405$ nm and higher suited for deep patterns)
- Aqueous alkaline development with TMAH based developers

Process flow



Parameters



Pattern transfer from a 130 μ m deep mr-P 22G pattern (a) by thermal moulding with PDMS, (b) followed by UV moulding with OrmoClear@FX (c)

Applications

Various pattern transfer methods:

- Thermal moulding with PDMS and UV moulding from the PDMS mould into OrmoComp[®] or OrmoClear[®]FX
- UV moulding with OrmoStamp[®]FF, and subsequently with OrmoComp[®]
- Metallization, followed by electroplating and UV moulding from the metal mould into OrmoComp[®]

Use of thus manufactured permanent 2.5D patterns e.g. in micro-optics, MOEMS and MEMS, or also as surfaces for frictional drag reduction etc.