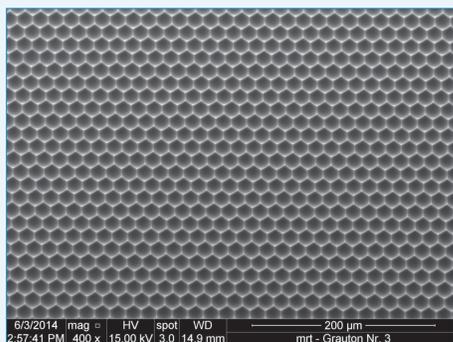
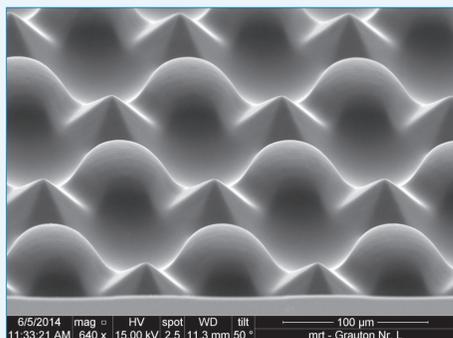


# ma-P 1200G — Positive Greyscale Photoresist

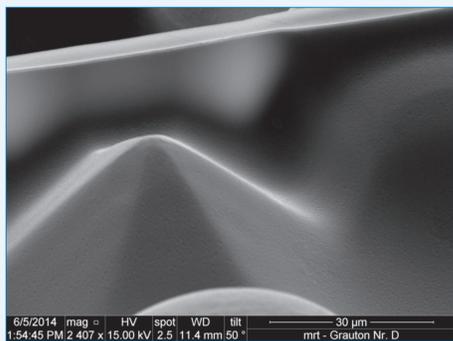
## Positive Photoresists for Greyscale lithography



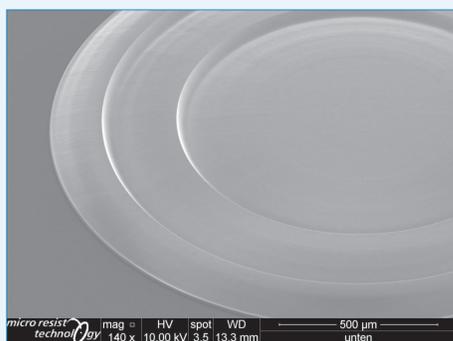
Hexagonal concave lenses, ~ 17 μm width



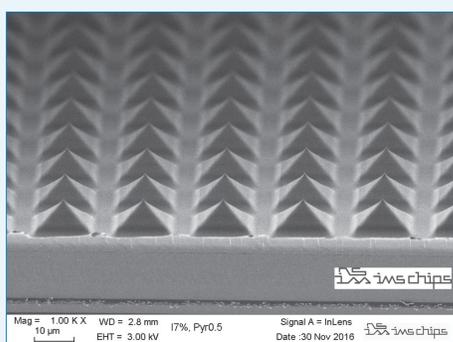
Convex and concave lenses and hexagonal pyramids in a honeycomb arrangement (hexagon diameter = 80 μm)



Straight line among greyscale patterns



48 μm high Fresnel lens, 2 mm diameter



Pyramids - 10μm base, 5μm height, 45° angle

Exposures with DWL66+ at 405nm at Heidelberg Instruments; bottom picture courtesy of IMS Chips, exposure with VPG400 at 355nm; Fresnel lens with LED exposure through HEBS glass greyscale mask by Canyon Materials Inc.

### Characteristics

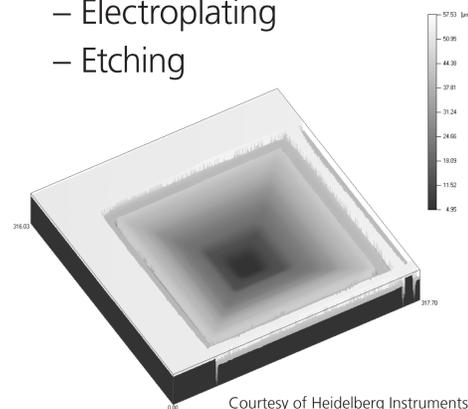
**Positive tone photoresist series specifically designed for the requirements of greyscale lithography. An application in standard binary lithography is also possible.**

- Reduced contrast
- Film thickness up to 60 μm and higher
- 50 - 60 μm depth range of the patterns possible in greyscale lithography
- Spectral sensitivity 350...450 nm
- High intensity laser exposure possible without outgassing
- Aqueous alkaline development, for greyscale lithography with TMAH based developers, for standard binary lithography also with metal ion bearing developers
- Suitable for electroplating
- Suitable for dry etch processes e.g. with CHF<sub>3</sub>, CF<sub>4</sub>, SF<sub>6</sub>
- Suitable for pattern reflow after standard binary lithography

### Applications

Use of manufactured 3D patterns in micro-optics, MEMS and MOEMS, displays

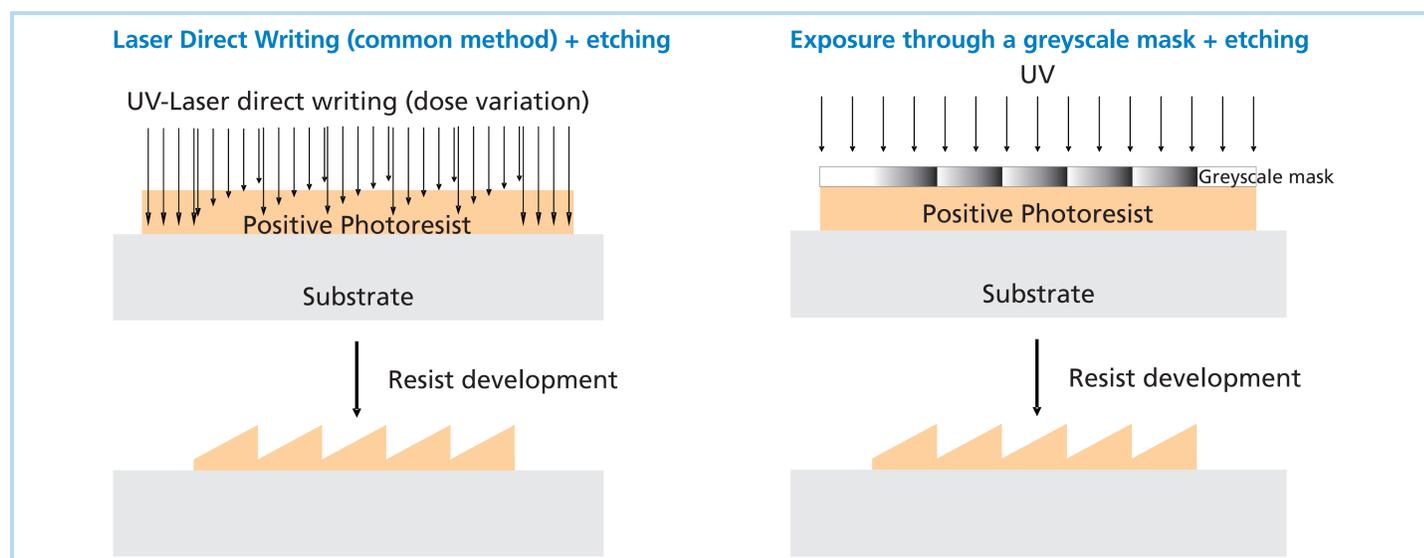
- Pattern transfer by
- UV or thermal moulding
  - Electroplating
  - Etching



~ 53 μm pattern depth in  
 ~ 58 μm thick ma-P 1275G

Exposure with μPG301 at 390 nm at Heidelberg Instruments

### Process flow



### Film thickness

Resist	ma-P	1215G	1225G	1240G	1275G			
Film thickness	μm	1.5	2.5	4.0	9.5	15	30	60
Spin-coating	rpm	3000	3000	3000	3000	1500	500	1000
Time	s	30	30	30	30	30	60	4

