



Positive Photoresist for Holography SX AR-P 3500/6

Photoresists

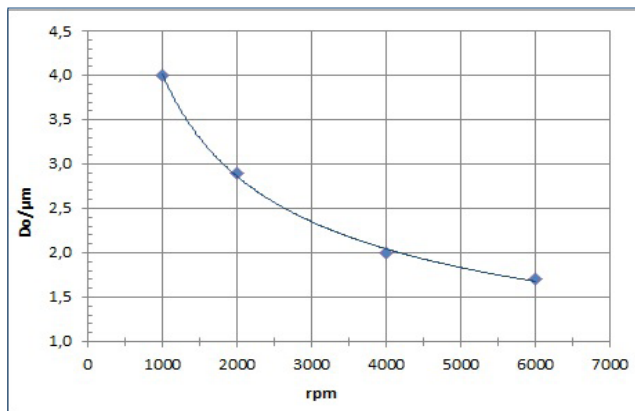
Positive photoresist, also for long-wave exposure

Experimental sample/custom-made product

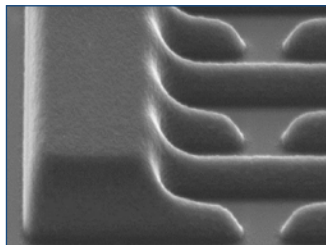
Characterisation

- broadband, i-line, g-line
- sensitive up to a wavelength of 500 nm
- suitable for the production of holographic structures
- processing in BB-UV possible, like AR-P 3510
- plasma etching stable, thermally stable up to 120 °C
- combination of novolac and naphthoquinone diazide
- safer solvent PGMEA

Spin curve



Structure resolution



7 µm Gräben mit dem SX AR-P 3500/8

Properties I

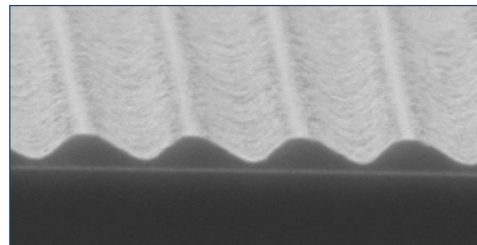
Parameter / SX AR-P	3500/6
Solids content (%)	36
Viscosity 25 °C (mPas)	29
Film thickness/4000 rpm (µm)	2.0
Resolution (µm)	0.8
Contrast	3.0
Flash point (°C)	42
Storage temperature (°C)*	10 - 18

* Products have a guaranteed shelf life of temperatures from the date of sale if stored correctly and can also be used without guarantee until the date indicated on the label.

Properties II

Glass transition temperature (°C)	108	
Dielectric constant	3.1	
Cauchy coefficients	N ₀	1.625
	N ₁	77.0
	N ₂	160.5
Plasma etching rates (nm/min) (5 Pa. 240-250 V Bias)	Ar-sputtering	8
	O ₂	163
	CF ₄	37
	80 CF ₄ + 16 O ₂	87

Resist structures



10 µm Steg des SX AR-P 3500/8 nach einem Hard-Bake von 280 °C

Process parameters

Substrate	Si 4" wafer
Tempering	95 °C, 2 min, hot plate
Exposure	Laser 488 nm
Development	AR 300-26. 2 : 1, 1 min. 22 °C


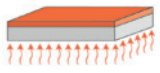
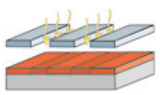
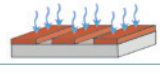
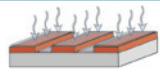
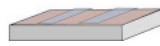
Process chemicals

Adhesion promoter	AR 300-80 new
Developer	AR 300-26
Thinner	AR 300-12
Remover	AR 300-76, AR 600-70

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Process conditions

This diagram shows exemplary process steps for resist SX AR-P 3500/6. All specifications are guideline values which have to be adapted to own specific conditions. For further information on processing ⇨ "Detailed instructions for optimum processing of photoresists". For recommendations on waste water treatment and general safety instructions ⇨ "General product information on Allresist photoresists".

Coating with SX AR-P 3500/6		4000 rpm, 60 s 2.0 µm						
Tempering (± 1 °C)		100 °C, 2 min, hot plate 95 °C, 30 min, convection oven						
UV exposure		<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 50%;">Broadband UV</td> <td style="width: 50%;">bis 490 nm</td> </tr> <tr> <td>Exposure dose (E₀, BB-UV stepper)</td> <td>488 nm Laser</td> </tr> <tr> <td>40 mJ/cm²</td> <td>2 J/cm²</td> </tr> </tbody> </table>	Broadband UV	bis 490 nm	Exposure dose (E ₀ , BB-UV stepper)	488 nm Laser	40 mJ/cm ²	2 J/cm ²
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40 mJ/cm ²	2 J/cm ²							
Development (21-23 °C ± 0.5 °C) puddle Rinse		AR 300-26, 1 : 1 60 s DI-H ₂ O, 30 s						
Customer-specific technologies		Generation of e.g. semi-conductor properties						
Removal		AR 300-76 or O ₂ plasma ashing						

Supplementary information

For the production of holographic reliefs or structures, exposure wavelengths up to 500 nm and in particular the 488 nm laser wavelength may be used. Sensitivity is in this case however low, as compared to i- or g-line exposure. The resist may also be used without restrictions in the BB-UV.

This resist formulation is currently successfully processed by our customers, may however also be modified according to new customer's requirements.

Development recommendations

Resist / Developer	AR 300-26
SX AR-P 3500/6	undiluted up to 1 : 1