Innovation
Creativity
Customer-specific solutions

Positive Photoresist for Holography SX AR-P 3500/6

Experimental sample

Positive photoresist, also for long-wave exposure

Experimental sample/custom-made product

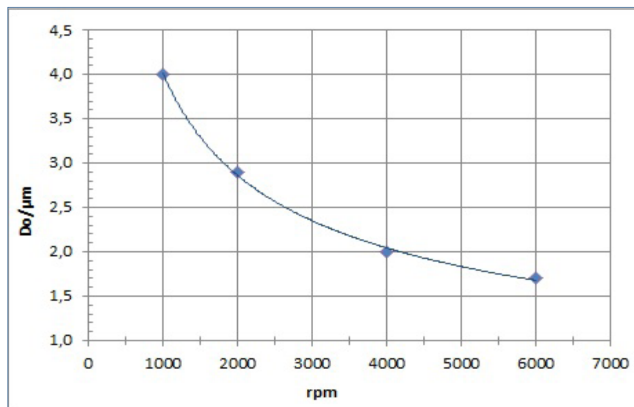
Characterisation

- 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

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 6 month (°C)	10 - 18

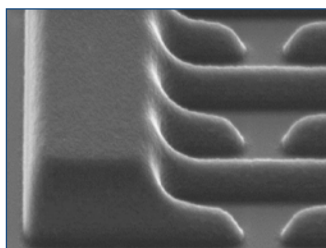
Spin curve



Properties II

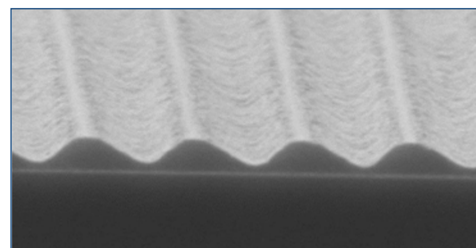
Glass transition temperature (°C)	108	
Dielectric constant	3.1	
Cauchy coefficients	N_0	1.625
	N_1	77.0
	N_2	160.5
Plasma etching rates (nm/min)	Ar-sputtering	8
(5 Pa. 240-250 V Bias)	O_2	163
	CF_4	37
	80 CF_4 + 16 O_2	87

Structure resolution



7 µm Gräben mit dem SX AR-P 3500/8

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

ALLRESIST

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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".

Step	Conditions	
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	Broadband UV	bis 490 nm
	Exposure dose (E_0, BB-UV stepper)	488 nm Laser
	40 mJ/cm²	2 J/cm²
Development (21-23 °C ± 0.5 °C) puddle	AR 300-26, 1 : 1 60 s	
Rinse	DI-H_2O, 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	

Experimental sample

As of: April 2014