Innovation
Creativity
Customer-specific solutions

Alkali-stable Positive Resist SX AR-P 5900/4

Experimental sample

Positive photoresist, also applicable as protective coating

Experimental sample/custom-made product

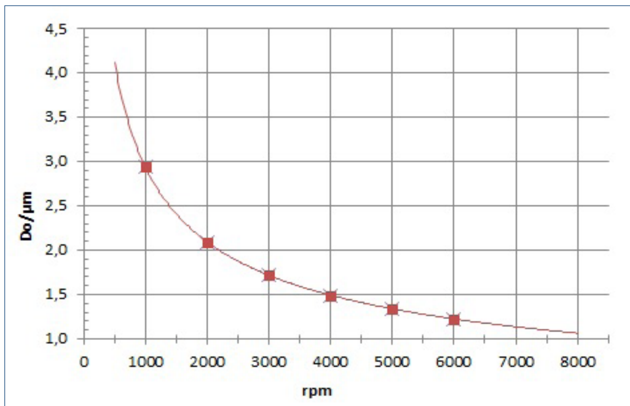
Characterisation

- broadband-UV, i-line, g-line
- stable in alkaline media, layer withstands 10 minutes in 2 n sodium hydroxide
- very good adhesion, also applicable as protective coating
- plasma etching stable
- combination of novolac and naphthoquinone diazide with alkali-resistant components
- safer solvent PGMEA

Properties I

Parameter / SX AR-P	5900/4
Solids content (%)	26
Viscosity 25 °C (mPas)	24
Film thickness/4000 rpm (µm)	1.4
Resolution (µm)	2.0
Contrast	3.0
Flash point (°C)	42
Lagerung 6 Monate (°C)	10 - 18

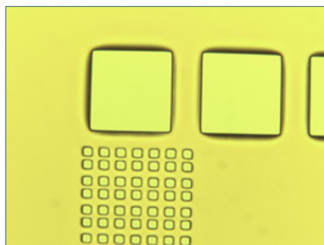
Spin curve



Properties II

Glass transition temperature (°C)	108	
Dielectric constant	3.1	
Cauchy coefficients	N_0	1.639
	N_1	164.7
	N_2	0
Plasma etching rates (nm/min)	Ar-sputtering	7
(5 Pa. 240-250 V Bias)	O_2	165
	CF_4	31
	80 CF_4 + 16 O_2	83

Resist structures



SX AR-P 5900/4
Resist structure after treatment with 2 n NaOH

Process parameters

Substrate	Si 4“ wafer
Soft bake	100 °C, 3 min, hot plate
Exposure	g-line stepper (NA: 0.56)
Development	2 n NaOH, 1 min, 22 °C

Process chemicals

Adhesion promoter	AR 300-80 new
Developer	2 n NaOH
Thinner	AR 300-12
Remover	AR 300-76

As of: April 2019

Alkali-stable Positive Resist SX AR-P 5900/4

Process conditions

This diagram shows exemplary process steps for SX AR-P 5900/4 resists. 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".

Process step	Conditions
Coating with AR-P 5900/4	4000 rpm, 60 s 1.4 µm
Soft bake (± 1 °C)	100 °C, 3 min hot plate or 95 °C, 40 min convection oven
UV exposure	Broadband UV, 365 nm, 405 nm, 436 nm Exposure dose (E_0, BB-UV stepper): > 1000 mJ/cm²
Development (21-23 °C ± 0.5 °C) puddle	2 n NaOH 1 min
Rinse	DI-H_2O, 30 s
Post-bake (optional)	Only required if used as protective coating without structuring (max. at 130 °C)
Customer-specific technologies	Generation of e.g. semi-conductor properties or etching with alkaline media
Removal	AR 300-76 or O_2 plasma ashing

Processing instructions and supplementary information

Instead of developer AR 300-26 (undiluted), also 1 – 2 n sodium hydroxide may be used. To prevent a washing off of structures during the rigid development process, the use of adhesion promoter AR 300-80 is recommended.

Due to the high alkali-stability, long exposure times must be scheduled.

Resist structures should not be tempered above 105 °C to prevent the converging of structures. If this resist is only used as protective coating, a post-bake at 130 °C is recommended to improve alkaline stability.

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