ALLRESIST

Innovation
Creativity
Customer-specific solutions

Thermostable Negative Resist SX AR-N 4340/7

Negative photoresist for one- and two-layer systems

Experimental sample/custom-made product

Characterisation

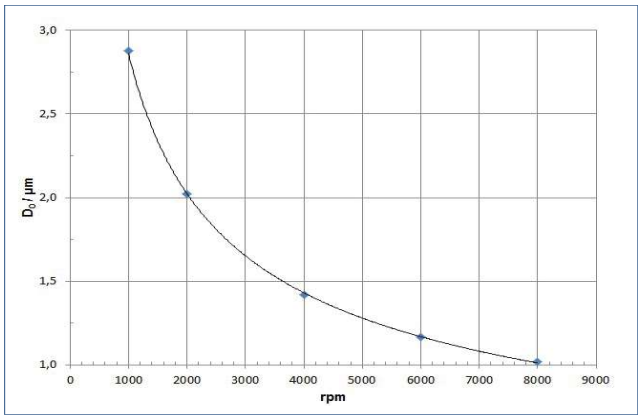
- i-line, g-line, deep UV (248 – 266 nm)
- highest sensitivity, high resolution
- good adhesion properties, high contrast, chemically enhanced
- undercut profiles (lift-off) possible
- may be used with AR-BR 5400 as 2-layer system
- plasma etching stable, thermostable up to 300 °C
- polyhydroxystyrene polymer, with photochemical acid generator and aminic crosslinker
- safer solvent PGMEA

Properties I

Parameter / SX AR-N	4340/7
Solids content (%)	25
Viscosity 25 °C (mPas)	38
Film thickness/4000 rpm (nm)	1.4
Resolution (µm)	0.7
Contrast	5.0
Flash point (°C)	44
Storage temperature (°C)*	10-18

* Products have a guaranteed shelf life of 6 Month from the date of sale if stored correctly and can also be used without guarantee until the date indicated on the label.

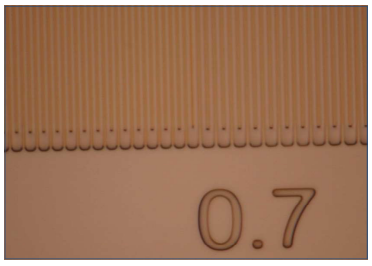
Spin curve



Properties II

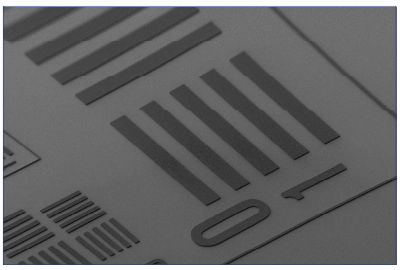
Glass transition temperature (°C)	118	
Dielectric constant	3.1	
Cauchy-Koeffizienten	N_0	1.55
	N_1	82.6
	N_2	0
Plasma etching rates (nm/min) (5 Pa. 240-250 V Bias)	Ar-sputtering:	7
	O_2	175
	CF_4	45
	80 CF_4 + 16 O_2	98

Structure resolution



SX AR-N 4340/7
0.7 µm resolution at a film thickness of 1.4 µm

Resist structures



Resist structures of SX AR-N 4340/7 after tempering at 300 °C

Process parameters

Substrate	Si 4“ wafer
Soft bake	90 °C, 60 s, hot plate
Exposure	i-line stepper (NA: 0.65)
Development	AR 300-47, 60 s, 22 °C

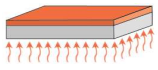
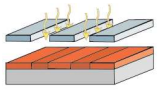
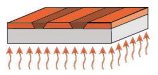
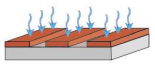
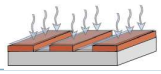
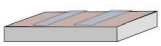
Process chemicals

Adhesion promoter	AR 300-80 new
Developer	AR 300-47
Thinner	AR 300-12
Remover	AR 600-71

Thermostable Negative Resist SX AR-N 4340/7

Process conditions

This diagram shows exemplary process steps for resist SX AR-P 4340/7. 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-N 4340/7 	4000 rpm, 60 s, 1.4 µm
Soft bake (± 1 °C) 	90 °C, 2 min hot plate or 85 °C, 30 min convection oven
UV exposure 	i-line stepper Exposure dose (E_0, i-line stepper): 25 mJ/cm^2
Crosslinking bake 	95 °C, 2 min hot plate or 90 °C, 30 min convection oven
Development (21-23 °C ± 0.5 °C) puddle 	AR 300-47 60 s
Rinse	DI-H_2O, 30 s
Customer-specific technologies 	Generation of e.g. semi-conductor properties or lift-off
Removal 	AR 600-71 or O_2 plasma ashing

Processing instructions for the generation of lift-off structures and supplementary information

An undercut of the resist structure (lift-off) can be obtained with a prolonged development after minimum exposure. The undercut and structures with vertical side walls remain even at high temperatures of up to 300 °C. This high temperature stability is also used in the two-layer system with AR-BR 5400 and allows intensive sputtering processes at very high temperatures (see product information AR-BN 5400).

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