ALLRESIST

Innovation
Creativity
Customer-specific solutions

Negative E-Beam Resist X AR-N 7700/30

Experimental sample

Chemically enhanced e-beam resist with very high sensitivity

Experimental sample/custom-made product

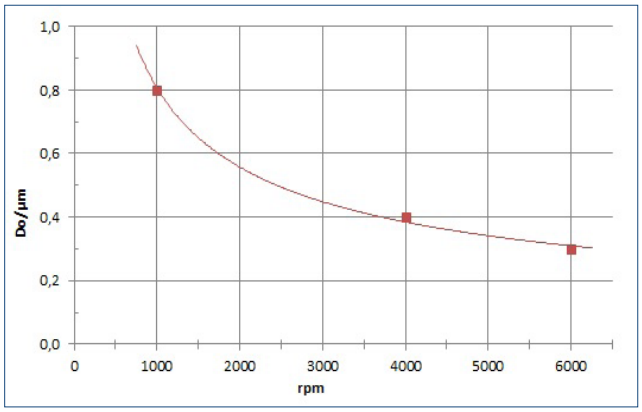
Characterisation

- e-beam, BB-UV
- highest sensitivity, good resolution
- good adhesion properties, high contrast, chemically enhanced
- mix & match processes between e-beam and BB-UV are possible
- plasma etching resistant, very process-stable
- novolac with photosensitive acid generator and aminic crosslinker
- safer solvent PGMEA

Properties I

Parameter / X AR-N	7700/30
Solids content (%)	19
Viscosity 25 °C (mPas)	9
Film thickness/4000 rpm (µm)	0.4
Resolution (µm)	0.15
Contrast	5.0
Flash point (°C)	42
Storage 6 month (°C)	10 - 18

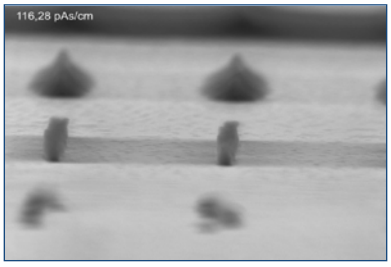
Spin curve



Properties II

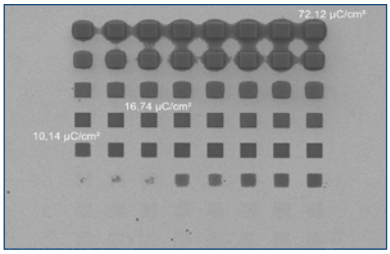
Glass transition temperature °C	108	
Dielectric constant	3.1	
Cauchy coefficients	N_0	1.604
	N_1	85.5
	N_2	56.9
Plasma etching rates (nm/min) (5 Pa. 240-250 V Bias)	Ar-sputtering	8
	O_2	168
	CF_4	38
	80 CF_4 + 16 O_2	89

Structure resolution



SX AR-N 7700/30
150 nm bars at a film thickness of 300 nm. Not sufficiently cross-linked structures in the foreground, strong overexposure (proxiwithy-effect) in the background

Sensitivity at 20 kV



Exposure dose series of SX AR-N 7700/30, lowest dose 10.14 µCi/cm²

Process parameters

Substrate	Si 4“ wafer
Soft bake	85 °C, 60 s, hot plate
Exposure	Vistec Lion 20 kV
Development	AR 300-475, 60 s, 22 °C

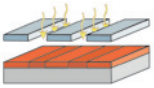
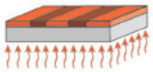
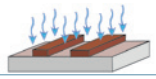
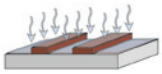
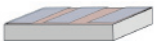
Process chemicals

Adhesion promoter	AR 300-80 new
Developer	AR 300-475
Thinner	AR 300-12
Remover	AR 300-76, AR 300-73

Negative E-Beam Resist X AR-N 7700/30

Process conditions

This diagram shows exemplary process steps for resist X AR-N 7700/30. 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 e-beam resists". For recommendations on waste water treatment and general safety instructions ☞ „General product information on Allresist e-beam resists".

Coating with X AR-N 7700/30		4000 rpm, 60 s 0.4 µm
Softbake (± 1 °C)		90 °C, 1 min hot plate or 85 °C, 25 min convection oven
E-beam exposure		Vistec Lion, acceleration voltage 20 kV E-beam exposure dose (E_0): 6 µC/cm^2, 0.4 µm Exposure dose (E_0, BB-UV stepper): 20 mJ/cm^2, 0.4 µm
Crosslinking bake (± 1 °C)		110 °C, 2 min hot plate or 105 °C, 30 min convection oven
Development (21-23 °C ± 0.5 °C) puddle		 AR 300-475, 60 s
Rinse		DI-H_2O, 30 s
Post-bake (optional)		85 °C, 1 min hot plate or 85 °C, 25 min convection oven for slightly enhanced plasma etching stability
Customer-specific technologies		z.B. Generation of e.g. semi-conductor properties
Removal		AR 300-76 or O_2 plasma ashing

Supplementary information

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