



High-resolution negative resists Medusa 82

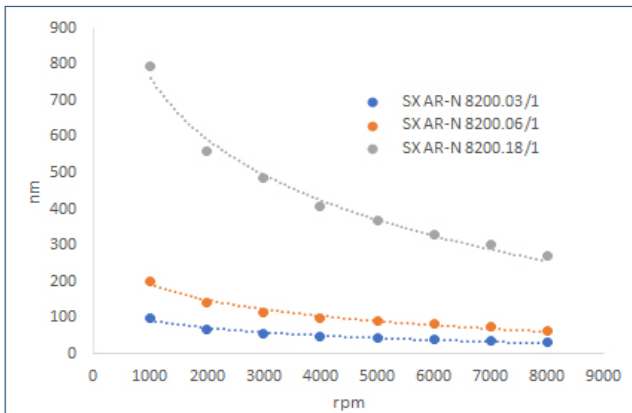
Etch-stable e-beam resists SX AR-N 8200

Experimental sample/custom-made product

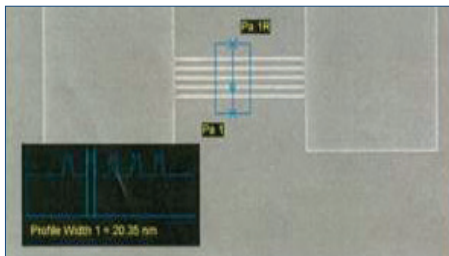
Characterization

- high-resolution e-beam resist (10 nm)
- etch-stable resist structures available in two film thicknesses
- comparable to HSQ, but higher process stability, easier to remove, considerably higher shelf life
- sensitivity is increased by a factor of 20 if an additional tempering step is applied
- silsesquioxane dissolved in 1-methoxy-2-propanol

Spin curve



Structure resolution



11 nm structures produced with SX AR-N 8200.03/1

Properties I

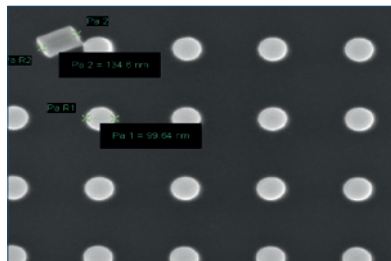
Parameter	SX AR-N	8200.03	8200.06	8200.18
Solids content (%)		3,0	6,0	18,0
Viscosity 25°C (mPas)		2,3	2,5	3,2
Film thickness/4000 rpm (nm)		50	100	400
Resolution (nm)		10	13	20
Contrast		5	5	5
Flash point (°C)		38		
Storage temperature (°C)*		8 - 12		

* Products have a guaranteed shelf life of 6 months 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 trans. temperature (°C)	-	
Dielectric constant	-	
Cauchy coefficients	N0	1,461
	N1	72
	N2	0
Plasma etching rates (nm/min) (1 Pa, 230 W Bias)	Ar sputter	
	O ₂	6
	CF ₄	
	30 CF ₄ + 5 O ₂	220

Resist structures



100 nm bars with SX AR-N 8200.06/1

Process parameter

Substrate	Si 4" wafer
Softbake	150 °C, 10 min, hot plate
Exposure	Raith Pioneer 30 KV
Development	AR 300-44, 90 s, 23 °C

Process chemicals

Developer	AR 300-44
Thinner	AR 600-07
Stopper	DI water
Remover	2n NaOH, BOE

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Process conditions

This diagram shows exemplary process steps for resist SX AR-N 8200. 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		SX AR-N 8200.03 4.000 rpm, 50 nm	SX AR-N 8200.06 4.000 rpm, 100 nm	SX AR-N 8200.18 4.000 rpm, 400 nm
Softbake ($\pm 1\text{ }^{\circ}\text{C}$)		150 $^{\circ}\text{C}$, 10 min, hot plate		
E beam exposure		Raith Pioneer, acceleration voltage 30 kV Exposure dose (E0): 1300 $\mu\text{C}/\text{cm}^2$		2000 $\mu\text{C}/\text{cm}^2$
Hardbake (optional)		To enhance the sensitivity 170 $^{\circ}\text{C}$, 10 min, hot plate 60 $\mu\text{C}/\text{cm}^2$		85 $\mu\text{C}/\text{cm}^2$
Development (21-23 $^{\circ}\text{C} \pm 0,5\text{ }^{\circ}\text{C}$) Puddle		AR 300-44 90 s		
Rinse		DI water, 30 s		
Customer-specific Technologies		Plasma etching steps		
Removing		2 n NaOH		

Note on stability: Liquid Medusa resists are stable for up to 6 months if kept refrigerated at least 8 - 12 $^{\circ}\text{C}$. Coated substrates can be stored under normal conditions and processed without any loss of sensitivity or resolution even after several weeks. Current studies show that irradiated substrates can be processed even after 21 days without significant loss of sensitivity.