High sensitive negative resists Medusa 82 UV

Etch-stable, high-resolution e-beam resists SX AR-N 8250

Experimental sample/custom-made product

Characterization

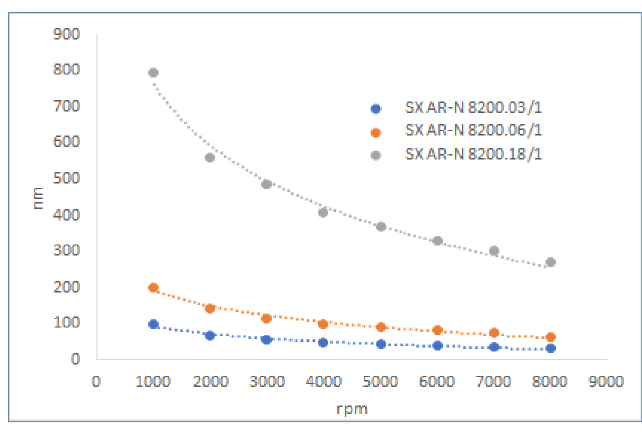
- high-resolution e-beam resist, also sensitive in EUV (13.5 nm) and DUV (250 nm) range
- comparable to HSQ, but with by a factor of 20 higher sensitivity, easier to remove
- considerably higher shelf life
- silsesquioxane and acid generator dissolved in 1-methoxy-2-propanol

Properties I

Parameter SX AR-N	8250.03	8250.06	8250.18
Solids content (%)	3,0	6,0	18,0
Viscosity 25°C (mPas)	2,3	2,5	3,2
Film thickness/4000 rpm (µm)	50	100	400
Resolution (nm)	15	15	20
Contrast	8	8	8
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.

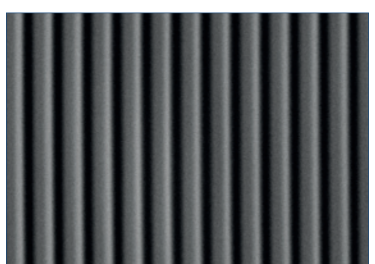
Spin curve



Properties II

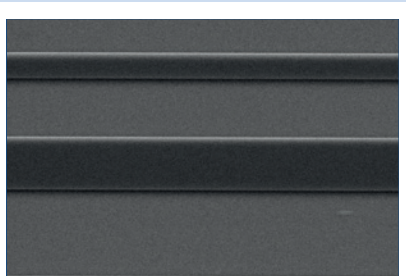
Glass trans. temperature (°C)	-	
Dielectric constant	-	
Cauchy coefficients	N0	1,461
	N1	72
	N2	0
Plasma etching rates (nm/min) (1 Pa, 240-250 V Bias)	Ar sputtern	
	O_2	7
	CF_4	
	30 CF_4 + 5 O_2	240

Strukturauflösung



200 nm bars, written at 100 kV with SX AR-N 8200.03/1

Resist structures



Medusa 82 UV structure with higher sensitivity

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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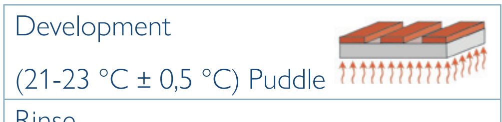
Process conditions

This diagram shows exemplary process steps for resist SX AR-N 8250. 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			
Coating	SX AR-N 8250.03	SX AR-N 8250.06	SX AR-N 8250.18
	4.000 rpm, 50 nm	4.000 rpm, 100 nm	4.000 rpm, 400 nm
Softbake (± 1 °C)	150 °C, 10 min, hot plate		
E beam exposure	Raith Pioneer, acceleration voltage 30 kV		
	Exposure dose (E0): 60 µC/cm²		85 µC/cm²
Hardbake (optional)	Hardbake can be omitted since no further sensitivity increase is achieved.		
Development (21-23 °C ± 0,5 °C) Puddle 	AR 300-44 90 s		
Rinse	DI-Wasser, 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 8 - 12 °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.

As of January 2020