Polyimide Resist SX AR-PC 5000/80.2

Thermally stable resist, also applicable as protective coating

Experimental sample/custom-made product

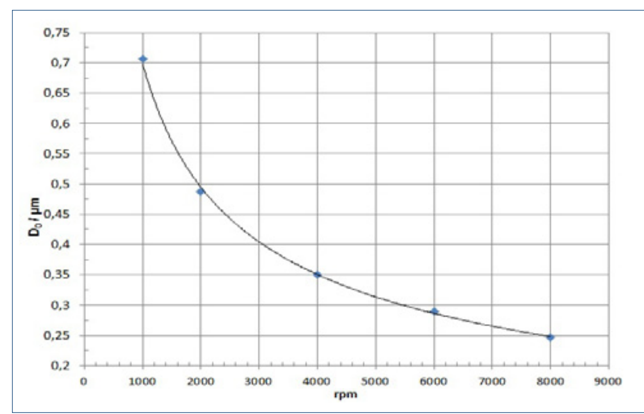
Characterisation

- not light-sensitive > 300 nm, no yellow light required
- thin protective film for surface protection
- plasma etching resistant, thermally stable up to 450 °C
- applicable as sensor material or insulating layer
- structurable in two-component system with AR-P 3500 T
- polyimide
- safer solvent PGMEA and N-methyl pyrrolidone

Properties I

Parameter / AR-PC	5000/80.2
Solids content (%)	10
Viscosity 25°C (mPas)	19
Film thickness/4000 rpm (µm)	0.4
Resolution (µm)	-
Contrast	-
Flash point (°C)	52
Storage 6 month (°C)	8 - 12

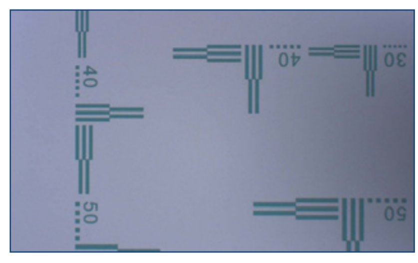
Spin curve



Properties II

Glass transition temperature °C	170	
Dielectric constant	2.9	
Cauchy-Koeffizienten	N_0	1.581
	N_1	146.7
	N_2	0
Plasma etching rates (nm/min) (5 Pa. 240-250 V Bias)	Ar-sputtering	5
	O_2	208
	CF_4	43
	80 CF_4 + 16 O_2	186

Resist structures



Resist structures of AR-PC 5000/80.2 After processing in two-component system with AR-P 3510 T

Structural formula

Process parameters

Substrat	Si 4“ wafer
Soft bake	150 °C, 2 min, hot plate

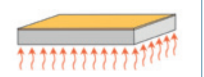
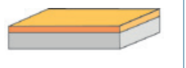
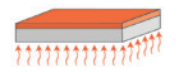
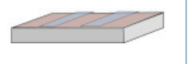
Process chemicals

Adhesion promoter	AR 300-80 new
Developer	1-layer system: - 2-layer system: AR 300-46
Thinner	X AR 300-12/3
Remover	AR 300-76, 300-47

Polyimide Resist SX AR-PC 5000/80.2

Process conditions - One-layer process

This diagram shows exemplary process steps for resist SX AR-PC 5000/80.2. All specifications are guideline values which have to be adapted to own specific conditions.

Process step		Conditions
Pre-coating with AR 300-80		Adhesive bonding at 2000 rpm, resulting film thickness 15 nm
1. Soft bake		180 °C, 2 min hot plate or 180 °C, 25 min convection oven
Coating protective film with SX AR-PC 5000/80.2		1000 rpm, 60 s, 0.8 µm
2. Soft bake (± 1 °C)		100 °C, 2 min hot plate or 95 °C, 30 min convection oven
Removal AR-PC 5000/80.2 (optional)		AR 300-76 or O_2 plasma ashing

Processing instructions

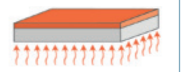
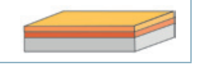
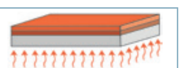
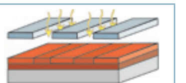
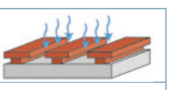
If SX AR-PC 5000/80.2 is only required as protective coating, as sensor material or for insulation purposes, the process is finished after the 2nd tempering step.

Polyimidresist SX AR-PC 5000/80.2

Experimental sample

Process conditions - Two-layer process

Dieses Schema zeigt ein Prozessierungsbeispiel für den Resist SX AR-PC 5000/80.2. Die Angaben sind Richtwerte, die auf die eigenen spezifischen Bedingungen angepasst werden müssen.

Step	Conditions
Pre-coating with AR 300-80	Adhesive bonding at 2000 rpm, resulting film thickness 15 nm
1. Soft bake	180 °C, 2 min hot plate or 180 °C, 25 min convection oven
Coating protective film with SX AR-PC 5000/80.2	1000 rpm, 60 s, 0.8 µm
2. Soft bake (± 1 °C) 	100 °C, 2 min hot plate or 95 °C °C, 30 min convection oven
Coating AR-P 3540 T 	4000 rpm, 1.4 µm
3. Soft bake (± 1 °C) 	100 °C, 2 min hot plate or 95 °C, 30 min convection oven
UV exposure 	Broadband UV, 365 nm, 405 nm, 436 nm Exposure dose (E_0, BB-UV stepper): 120 mJ/cm^2, 1,4 µm
Development of both resist films (21-23 °C ± 0.5 °C) puddle 	AR 300-46, 40 s
Rinse	DI-H_2O, 30 s
Flood exposure	Broadband UV, 240 mJ/cm^2
Removal AR-P 3540 T	AR 300-47, 20 s Only polyimide structures remain
Removal AR-P 5000/80.2 (optional)	AR 300-76 or O_2 plasma ashing

Processing instructions

For a two-component structuring however, an additional coating with photoresist is necessary. The two-component system can be developed in one step after exposure.

Developer AR 300-46 begins to dissolve exposed areas of AR-P 3540 T as usual and then attacks the underlying polyimide in anisotropic manner, i.e. the structures in polyimide widen only marginally. A prolonged exposure (> 1.5 min) however results in a pronounced undercut.

As of: April 2014