Protective Coatings AR-PC 500(0)

AR-PC 504, 5040 adhesion-enhanced KOH-resistant resists

Wafer backside protection during front side etchings for the production of deep structures in silicon

Characterisation

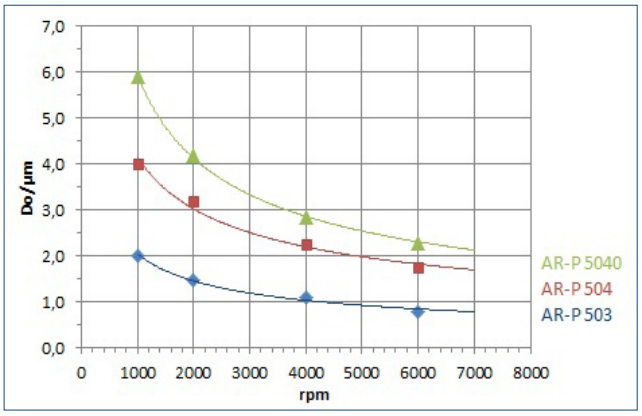
- not light-sensitive > 300 nm, no yellow light required
- protection of wafer backside when etching the front side
- offers reliable protection against mechanical damage during handling and transport
- temperature-stable up to 250°C
- PMMA with different molecular weights,
- solvent 504 chlorobenzene; 5040 anisole

Properties I

Parameter / AR-PC	504	5040
Solids content (%)	13	17
Viscosity 25 °C (mPas)	350	550
Film thickness/4000 rpm (µm)	2.2	2.8
Resolution (µm)	-	-
Contrast	-	-
Flash point (°C)		42
Storage temperature (°C)*	10 - 25	

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

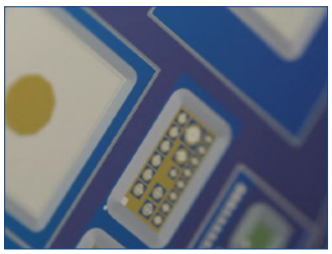
Spin curve



Properties II

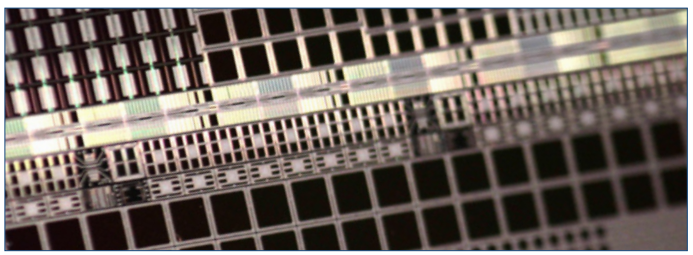
Glass transition temperature	105	
Dielectric constant	2.6	
Cauchy coefficients AR-PC 503	N_0	1.528
	N_1	34.6
	N_2	0
Plasma etching rates (nm/min) (5 Pa, 240-250 V Bias)	Ar-sputtering	20
	O_2	340
	CF_4	61
	80 CF_4 + 16 O_2	160

Photo of coated wafer

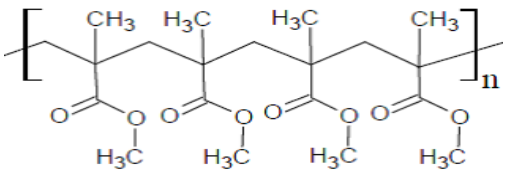


Protective coating AR-P 503 covering sensitive structures

Topology of the backside



Structural formula poly(methyl methacrylate)



Process chemicals

Adhesion promoter	AR 300-80
Developer	-
Thinner	AR 600-01
Remover	AR 300-76, AR 600-71

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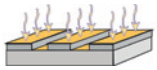
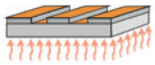
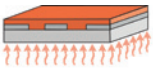
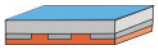
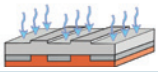
Process conditions

This diagram shows exemplary process steps for AR-PC 500(0) resists. 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".

Pre-coating with AR 300-80		Adhesive bonding, resulting film thickness 15 nm
1. Tempering		180 °C, 2 min hot plate or 180 °C, 25 min convection oven
Coating protective film		1000 rpm, 60 s, 4.5 µm
2. Tempering (± 1 °C)		140 °C, 1.5 min hot plate or 135 °C, 60 min convection oven
Fabrication of etch mask on the backside		Customer-specific process to generate the hard mask
Customer-specific technologies		Etching: 40 % KOH, 85 °C
Removal of protective coating		AR 300-76 or O_2 plasma ashing

Processing instructions

Pre-treatment prior to coating: The protective effect during etching can be extended to up to 8 hours if the surface is pre-treated with adhesion promoter AR 300-80. The coating is preferably performed at 4000 rpm. After tempering at 180 °C for 2 min (hot plate), a uniform, 15 nm thin layer of adhesion promoter is formed (-> Product information AR 300-80).

Coating: A rotational speed of 1000 rpm is recommended for protective coatings, since at a film thickness of 2 - 5 µm wafer edges are best protected due to a certain "edge wrapping" of the resist. At higher spin speeds or if 6-inch wafers and above are used, the relatively high amount of resist which is deposited on the wafer may cause the so-called candy-floss effect. Low spin speeds, local exhaustion or removal of the "candy floss" with a glass rod during coating reduces these highly disturbing effects.

Tempering: To obtain a particularly high protective effect for the fabrication of hard-baked films, tempering temperatures of 190 °C are recommended.

Etch process: The protective coating is even after hours not attacked by 40 % KOH. Possibly occurring problems only derive from insufficient adhesive strength and can be significantly reduced with a pre-treatment with AR 300-80.