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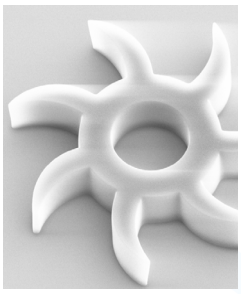
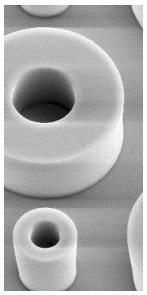
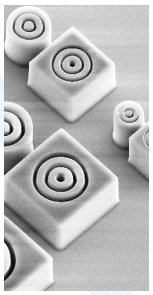
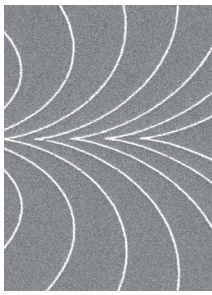
Product information

Positive E-Beam Resists AR-P 6200 (CSAR 62)

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THE ALLRESIST GMBH

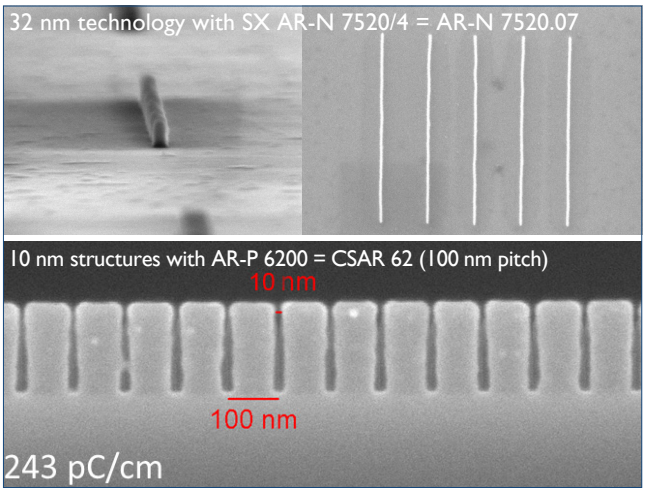
Company for chemical Products


The executive board

The company is represented worldwide with an extensive product range. In addition to our standard products, we also manufacture customer-specific products on request.

Allresist furthermore develops innovative products for future-oriented technologies like e.g. microsystems technologies and electron beam lithography. In these constantly growing markets, top-performance resists with high sensitivity and a high resolution are in strong demand.

Our newly developed e-beam resists CSAR 62 and AR-N 7520 meet these demands, pushing forward innovative technologies with their excellent properties.



The Allresist GmbH offers a wide range of resists and process chemicals for all standard applications of photo and e-beam lithography which are required for the fabrication of electronic components.

As independent resist manufacturer, we develop, produce and distribute our products worldwide. On the market since 1992, Allresist benefits from a comprehensive know-how gained in 30 years of resist research, and fabricates products with highest quality (ISO 9001 : 2008).

As chemical company, we are particularly aware of our obligation to a healthy environment. A responsible and protective resource management and voluntary replacement of environmentally hazardous products is living politics for us. Allresist is environmentally certified (ISO 14001) and environmental partner of the Federal State of Brandenburg.


Our Team

Our flexible approach to customer's demands, together with effective production technologies, allows us to provide fast availability which results in very short delivery times, small packaging sizes from ¼ l onwards, 30 ml test samples as well as an individually tailored advisory service.

Allresist received a number of awards for scientific and economic top performance (technology transfer prize, customer's champion, quality award and Ludwig-Erhard-prize).

Interesting news and further information for you are compiled on our web page where you will find answers to many questions in our resist-WiKi and the FAQs.

WWW.ALLRESIST.DE

OUR NEWS

for Microstructuring

2014

Due to the classification of the raw material NEP which is contained in removers AR 300-70 and 300-72 as toxic for reproduction, Allresist now introduced the less harmful new remover **AR 300-76** with equivalent properties with respect to dissolving power.

Additional eight PMMA solids complement the PMMA product portfolio which now comprises 43 solids contents.

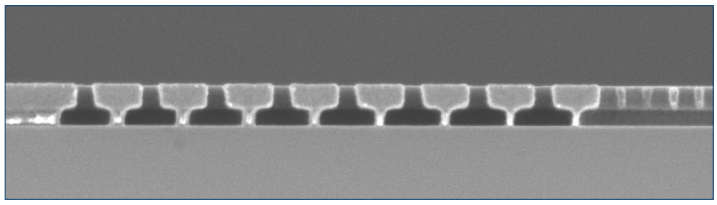
2013

The new 5 µm-resist **AR 4400-05** completes the CAR series 44 and represents an efficient alternative to SU-8. The possible film thickness values now range from 2.5 µm to 100 µm.

The new remover **AR 600-71** is already at room temperature particularly efficient for the removal of e-beam- and photoresist films baked at higher temperatures (210 °C or 170 °C, respectively).

The new electron beam resist **CSAR 62** is a further development of the well-known ZEP resists. This copolymer on the basis of methyl styrene-co-α-chloromethacrylate with addition of halogenated acid generators ensures a high sensitivity and excellent resolution, a steep contrast as well as excellent plasma etching stability.

With different developers, a resolution of up to 10 nm and sensitivities of about 10 µC/cm^2 can be realised. If used in a two-layer system with PMMA, the fabrication of smallest structures with extreme undercuts is possible:



22 nm structures with two-layer system AR-P 6200 / AR-P 679.03

2012

With the new e-beam resist **AR-N 7520/4** (replacing resist AR-N 7520), Allresist introduces a high-resolution and at the same time sensitive new resist onto the market. In contrast to currently available e-beam resists, this resist is characterised by a 7-fold higher sensitivity. The dose to clear a 100-nm layer reduces the writing times at 30 KV to 35 µC/cm^2.

18 new anisole-PMMA resists AR-P 632…672 of types 50K, 200K, 600K and 950K complement the current anisole PMMA resist palette which also, just like the chlorobenzene PMMAs, meet the high demands of e-beam lithography.

2011

Allresist offers the new ready-to-use spray resist series **AR-P 1200 and AR-N 2200** which are suitable for an even coverage of vertical trenches, for etched 54° slopes as well as for the deposition of resists by spin coating.

2010

On repeated request by our customers, we developed the 50 % HF-stable protective coating **SX AR-PC 5000/40.**

Other new products are polyimide resists which are temperature-stable up to 400 °C: protective coating **SX AR-PC 5000/80** and the positive resist **AR-P 5000/82**.

Currently still in development

The negative e-beam resists **SX AR-N 7530** (nor CAR, like 7520) and **SX AR-N 7730** (CAR, like 7720) were developed for users of e-beam technologies which have no (or not yet) access to yellow light conditions. These resists can be processed under white light.

The exposure range from > 500 nm up to NIR is covered by the new photoresists **SX AR-N 4420**. Excellent results are obtained with pulsed lasers at 532 nm. The new resists are also well suited for laser interference lithography (LIL) and allow to fabricate vertical and even lift-off structures in the sub-nm range. These resists were specifically designed with flat gradation for sinusoidal three-dimensional structures.

For an efficient dissipation of charges on insulating substrates during e-beam lithography, **SX AR-PC 5000/90.2** was developed which will replace the predecessor product SX AR-PC 5000/90.1. The new conductive protective coating can be used for all resists (PMMA, novolac-based and CSAR 62) and is characterised by a considerably increased conductivity. In addition, it can be removed easily and completely after the process.

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Positive E-Beam Resists AR-P 6200 (CSAR 62)

AR-P 6200 e-beam resists with highest resolution

High-contrast e-beam resists for the production of integrated circuits and masks

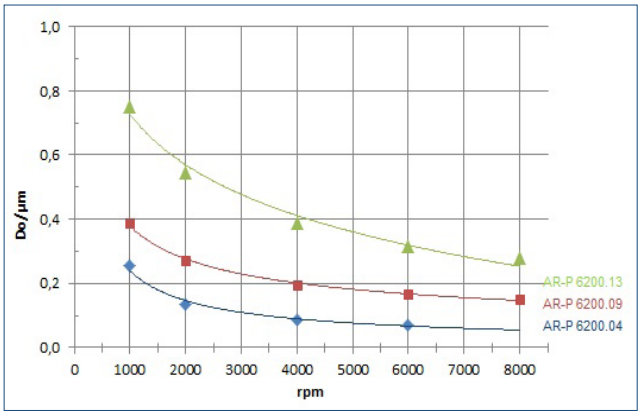
Characterisation

- e-beam
- high sensitivity which can be adjusted via the developer
- highest resolution (< 10 nm) and very high contrast
- highly process-stable, high plasma etching resistance
- easy fabrication of lift-off structures
- poly(α-methyl styrene-co-α-chloroacrylate methyl ester) and an enhancer of sensitivity
- safer solvent anisole

Properties I

Parameter / AR-P	6200.13	6200.09	6200.04
Solids content (%)	13	9	4
Viscosity 25 °C (mPas)	11	6	2
Film thickness/4000 rpm (µm)	0.40	0.20	0.08
Resolution best value (nm)	6		
Contrast	14		
Flash point (°C)	43		
Storage 6 month (°C)	8 - 12		

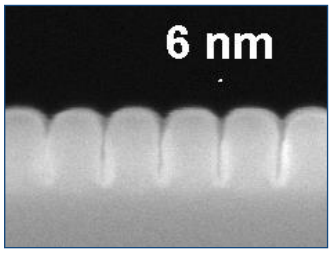
Spin curve



Properties II

Glass trans. temperature (°C)	148	
Dielectric constant	2.8	
Cauchy coefficients	N_0	1.543
	N_1	71.4
	N_2	0
Plasma etching rates (nm/min) (5 Pa, 240-250 V Bias)	Ar-sputtering	10
	O_2	180
	CF_4	45
	80 CF_4 + 16 O_2	99

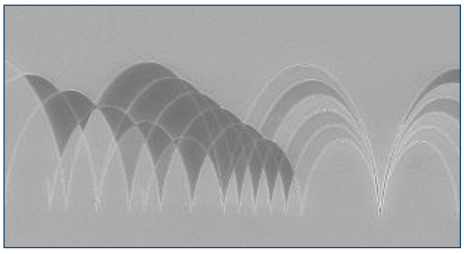
Structure resolution



AR-P 6200.04

Resolution of up to 6 nm at film thickness of 80 nm

Resist structures



AR-P 6200.09
25-nm structures, film thickness of 180 nm, artwork

Process parameters

Substrate	Si 4“ waver
Tempering	150 °C, 60 s, hot plate
Exposure	Raith Pioneer, 30 kV
Development	AR 600-546, 60 s, 22 °C

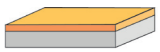
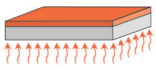
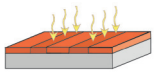
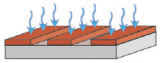
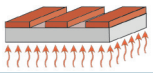
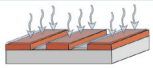
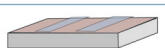
Process chemicals

Adhesion promoter	AR 300-80
Developer	AR 600-546, 600-549
Thinner	AR 600-02
Stopper	AR 600-60
Remover	AR 600-71, 300-76

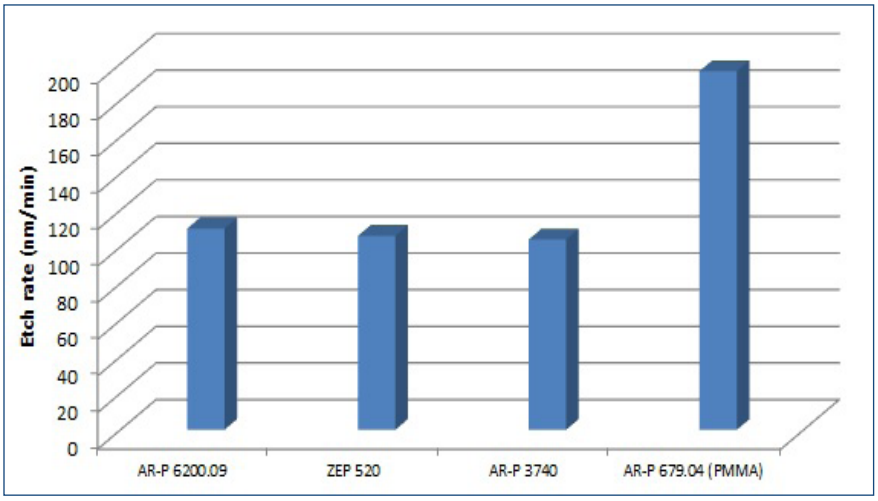
Positive E-Beam Resists AR-P 6200 (CSAR 62)

Process conditions

This diagram shows exemplary process steps for AR-P 6200 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 e-beam resists". For recommendations on waste water treatment and general safety instructions, ☞ "General product information on Allresist e-beam resists".

Coating 	AR-P 6200.09
	4000 rpm, 60 s 0.2 µm
Tempering (± 1 °C) 	150 °C, 1 min hot plate or
	150 °C, 30 min convection oven
E-beam exposure 	Raith Pioneer, 30 kV
	Exposure dose (E_0): 65 µC/cm²
Development (21-23 °C ± 0,5 °C) puddle 	AR 600-546 1 min
Stopping / Rinse	AR 600-60, 30 s / DI-H_2O, 30 s
Post-bake (optional) 	130 °C, 1 min hot plate or 130 °C, 25 min convection oven for slightly enhanced plasma etching resistance
Customer-specific technologies 	Generation of semiconductor properties
Removal 	AR 600-71 or O_2 plasma ashing

Plasma etching resistance



CSAR 62 is characterized by a high plasma etching resistance. In this diagram, plasma etching rates of AR-P 6200.09 are compared with those of AR-P 3740 (photoresist), AR-P 679.04 (PMMA resist) and ZEP 520 in CF_4 + O_2 plasma.

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Positive E-Beam Resists AR-P 6200 (CSAR 62)

Processing instructions

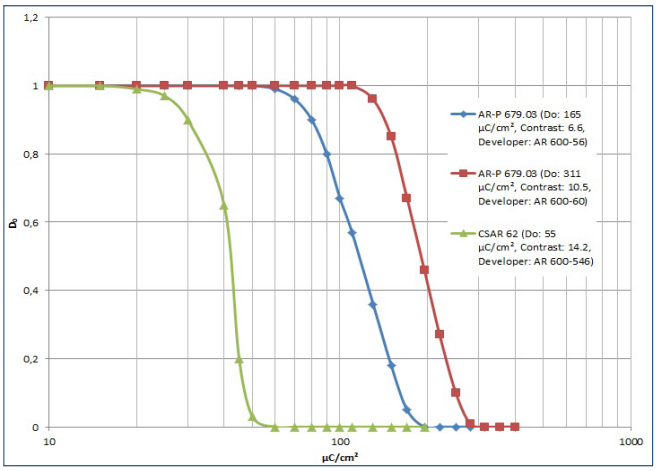
E-beam exposure: The required e-beam exposure dose for structural imaging mainly depends on the desired minimum structure size, the developer, the acceleration voltage (1 - 100 kV), and the film thickness.

The exposure dose for AR-P 6200.09 was in this experiment (☞ diagram comparison of CSAR 62 and PMMA) 55 µC/cm² (dose to clear D_0, 30 kV, 170 nm layer, developer AR 600-546, si wafer). The contrast was determined here to 14.2.

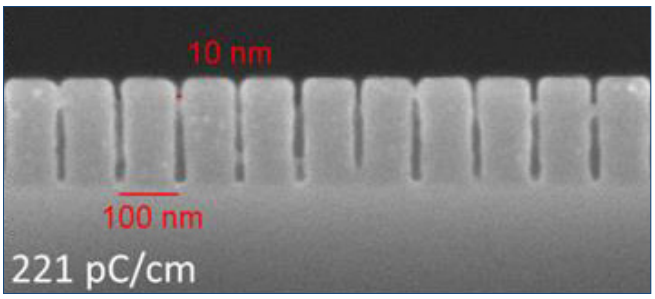
CSAR 62 is thus 3x more sensitive as compared to the standard PMMA resist AR-P 679.03 (developed in AR 600-56), or 6x more sensitive if developed in AR 600-60. Also the contrast is higher by a factor of 2 and 1.4, respectively.

An additional increase in sensitivity due to addition of sensitivity-enhancing components occurs already during exposure. A post-exposure bake is thus not required.

For the fabrication of 10-nm trenches (174 nm film, 100n pitch), AR 6200.09 requires a dose of approx. 220 pC/cm (30 kV, developer AR 600-546)



Comparison D_0 and contrast CSAR 62 and PMMA



Maximum resolution CSAR 62 of 10 nm (180 nm)

Development: For the development of exposed resist films, developers AR 600-546, 600-548 and 600-549 are recommended. As weaker developer, AR 600-546 provides a wider process window. If the stronger developer AR 600-548 is used, the sensitivity can be increased 6-fold to < 10 µC/cm². The intermediate developer AR 600-549 renders the CSAR 62 twice as sensitive as compared to AR 600-546, it shows also no dark erosion and has a contrast of 4.

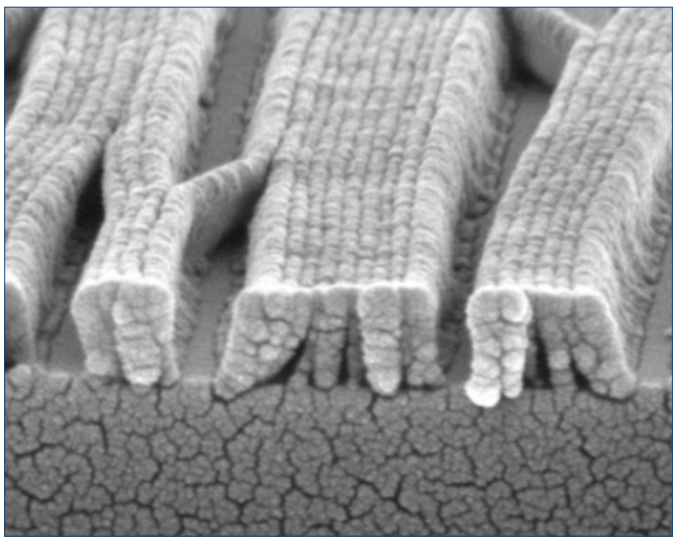
For immersion development, generally development times of 30 - 60 seconds are recommended. If developer AR 600-546 is used, even after 10 minutes at room temperature no erosion of unexposed areas is detected.

Developer AR 600-548 in contrast attacks resist surfaces already after two minutes visibly. If however the development process is carried out at temperatures of approx. 0 °C, no dark erosion is observed even after 5 minutes (which is however associated with a reduction of sensitivity).

The development procedure should be stopped quickly. For this purpose, the substrate is moved for 30 seconds in stopper AR 600-60. Optionally, the substrate may thereafter be rinsed for 30 seconds with DI water to remove all residual solvent.

Note: Please take into account that rigid rinsing procedures may lead to a collapse of smaller structures (☞ see image below).

A post-bake for special working steps at max. 130 °C results in a slightly improved etching stability during wet-chemical and plasma-chemical processes.

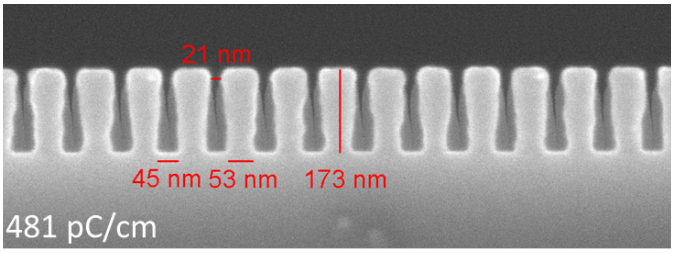


Danger of collapsed lines after too rigid rinsing

Positive E-Beam Resists AR-P 6200 (CSAR 62)

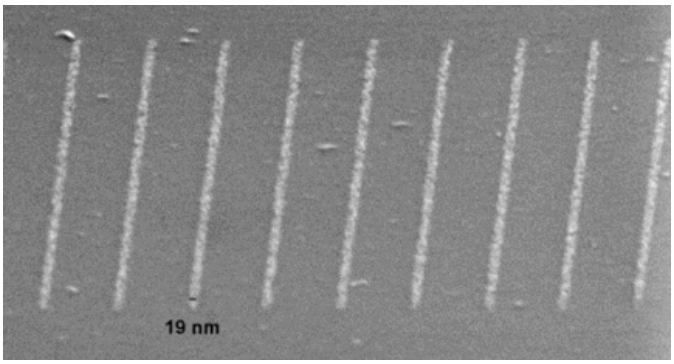
Processing instructions

Lift-off structures:
Resist CSAR 62 is well suited to generate lift-off structures with a resolution of up to 10 nm. If the dose is increased by a factor of 1.5 - 2, narrow trenches with defined undercut can be fabricated with AR-P 6200.09.

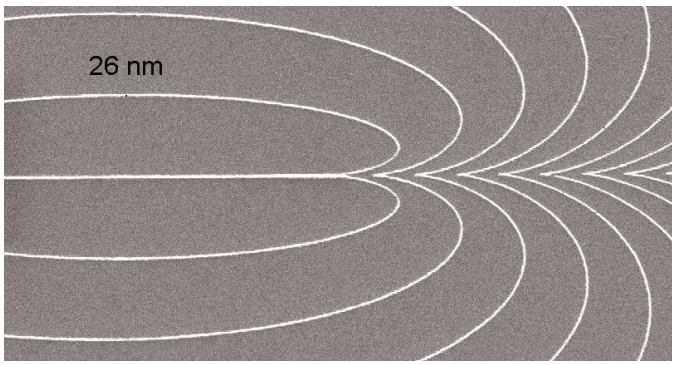


Undercut structures obtained with increased exposure dose

After vapour-deposition of metal and subsequent easy lift-off, metal structures remain

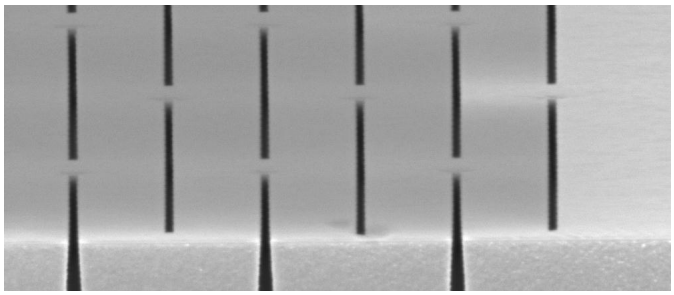


19-nm metal lines after lift-off process with AR-P 6200.09

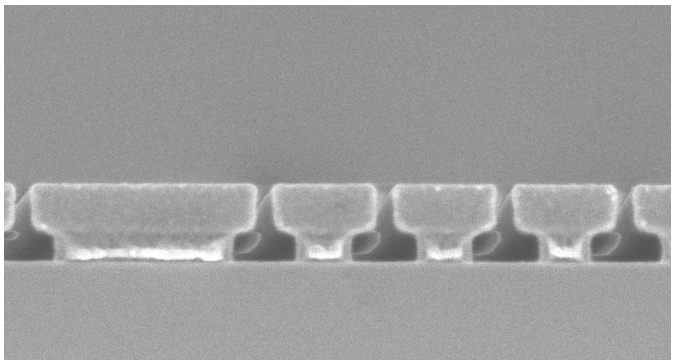


CrAu test structures with a line width of 26 nm

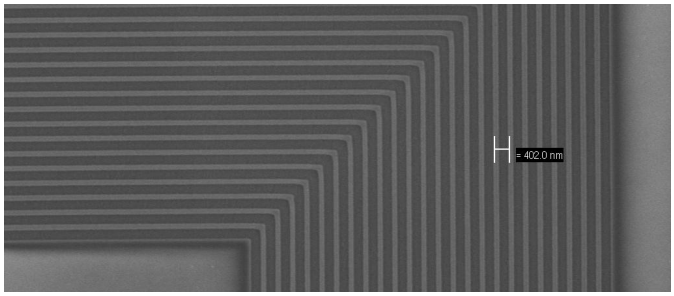
High layers for special applications:
Films with a thickness of up to 800 nm can be produced With AR-P 6200.13, and even 1.5-µm films are possible with experimental sample SX AR-P 6200/10.


AR-P 6200.13: 100-nm trenches in 830-nm thick layer

CSAR 62 is also applied in various two-layer systems and can be used both as bottom and as top resist.


AR-P 6200.09 as top resist for extreme lift-off applications

Another field of application for CSAR 62 is the production of mask blanks which are coated with our resist and offered by our partners:



At a film thickness of 380 nm, 100-nm lines and spaces can be obtained on a chrome mask with AR-P 6200.13. The sensitivity is 12 µC/cm^2 (20 kV, AR 600-548).

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Positive E-Beam Resists AR-P 6200 (CSAR 62)

Application examples for CSAR 62

Circuits for the 5 GHz range which are primarily needed for wireless Bluetooth or Wi-Fi technologies can in future be produced with CSAR 62. E-beam lithography is also required for the research on nanomaterials like graphene, for three-dimensional integrated circuits as well as for optical and quan-tum computers. The computing power or memory density is constantly increased in each of these technologies. Applications with the highest demands on computing power (supercomputers), e.g. in computational fluid dynamics or in space applications, thus also demand microchips with highest inte-gration density.

CSAR 62 on mask blanks

Experts at the HHI Berlin have already tested CSAR 62 on mask blanks (☞ Fig. 1). They immediately achieved a resolution of 50 nm which is an excellent value for masks. To date, 100 nm lines and above are used on masks. Currently test coatings of mask blanks with CSAR 62 are conducted, and samples will be offered by our partners to all customers in the near future.

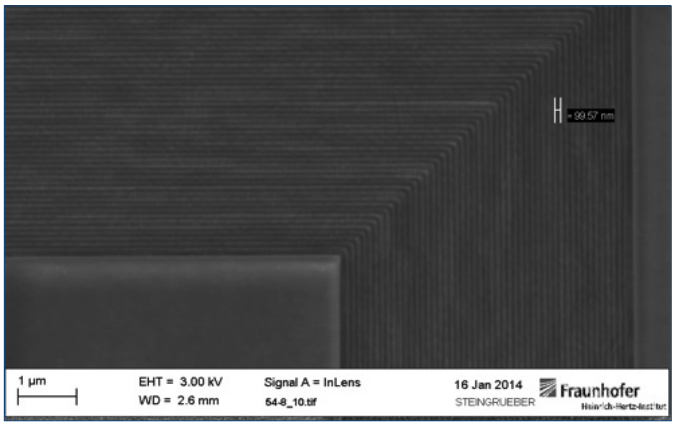

Fig. 1 CSAR 62 test structure on a mask blank with 50 nm lines and 50 nm trenches, pitch line & space 99.57 nm

Fabrication of plasmonic nanomaterials

The work group for quantum detection has for already many years successfully promoted electron beam projects for nanostructuring. This group in particular emphasised the high process stability of CSAR 62 as compared to ZEP 520 (☞ Fig. 2). CSAR 62 is able to balance out small process fluc-tuations and still reliably provides the desired high resolution. The new Allresist product furthermore showed 1.5-fold higher contrast values than ZEP in comparative measurements.

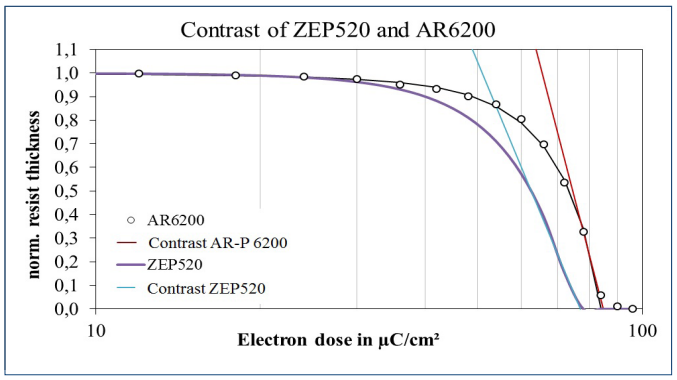

Fig. 2 Contrast curves AR-P 6200 and ZEP 520, 50kV, substrate: Si; ZEP 520, film thickness 220 nm, 60 s ZED N-50, contrast 6; AR-P 6200, film thickness 260 nm, 60 s AR 600-546, contrast 9

CSAR 62 for highest-resolution lithography

In the work group for nanostructured materials, CSAR 62 is mainly used in highest-resolution lithography for the lift-off and as etching mask for dry chemical etching processes. The new resist offers several specific advantages. It achieves the high resolution of PMMA, but at a much lower dose, which is favourable for the following reason: CSAR 62 however counterbalances this effect due to its higher sensitivity, and in combination with the more favourable contrast curve can slight undercuts be achieved even in thin layers. This allows a uniform lift-off in the sub-100 nm range.

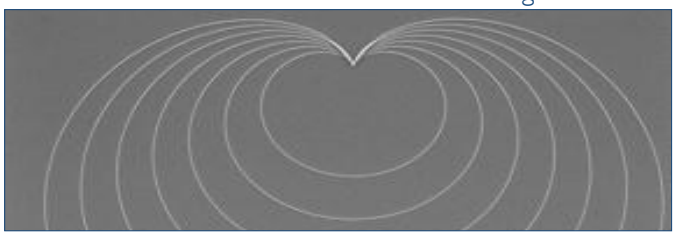

Fig. 3 Chrome structures with 20 nm lines after lift-off

The goal in the lift-off of metal structures is however not always to go beyond the limits of resolution. Typical applications for example in the contacting of nanowires rather require dimensions in a range of 30-50 nm, which can also be realised with other resists. The „resolution reserve“ of CSAR 62 however allows for significantly improved structure accuracy and faster design with less iteration:

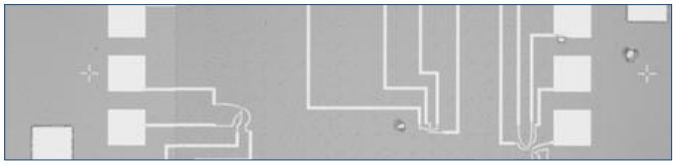

Fig. 4 Typical structure for contacting nanowires. Large areas are mixed with small details

Positive E-Beam Resists AR-P 6200 (CSAR 62)

Application examples for CSAR 62

During dry chemical etching, for example in the structuring of silicon nitride, CSAR combines the best of two worlds: It not only allows the use as a high resolution positive resist similar to PMMA, but also offers a stability which is comparable to novolacs. This facilitates the production of masks with sharp edges that provide the required etch stability without the otherwise frequently occurring disturbing faceted edges. In addition, a new variant of CSAR 62 with an extremely high layer thickness (1 µm) was assessed. The thick layer allows producing a strong undercut with only one layer, which is perfectly suitable for lift-off (☞ Fig. 5). The process is designed for larger surface areas in the micrometer range which should however clearly be defined since the pronounced undercut (as obvious from the figures) restricts the minimum distance between different structures.

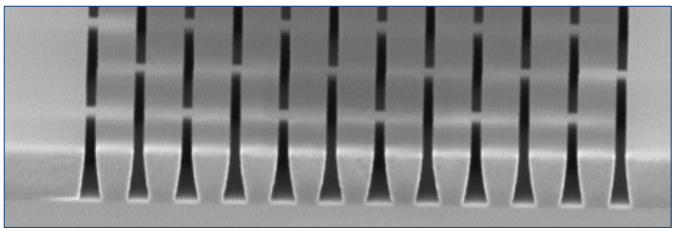

Fig. 5 Particularly thick CSAR with pronounced undercut for extreme lift-off applications

Comparison of CSAR 62 and ZEP 520A

A leading company for electron-beam devices conducted a comparison of CSAR 62 and ZEP 520A. Using the current e-beam system SB 250, three comparative studies of CSAR 62 (AR-P 6200.09) and ZEP 520A were carried out which focused on the parameters structural resolution, contrast and sensitivity in the respective native developers:

1. Structural resolution: The comparison of 90 nm lines of both resists (☞ Fig. 6 and 7) in the centre of a silicon wafer with a film thickness of 200 nm shows that both CSAR and ZEP are characterised by an excellent structural resolution (trench width of 91 nm, pitch 202 nm) and comparable broad process windows:

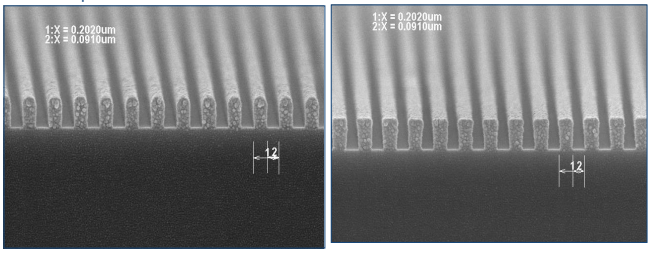

Fig. 6 ZEP 520A, 200 nm, ZED N50, 50kV, 80 µC/cm²
Fig. 7 AR-P 6200.09, 200 nm, AR 600-546, 50 kV, 85 µC/cm²

2. Contrast: The diagram (Fig. 8) illustrates the comparison of contrast values: ZEP 520 in the corresponding developer ZED-N50 and CSAR in developers AR 600-546 and 600-549. While systems ZEP-ZED-N50 and CSAR-AR 600-549 provide almost equally good contrast values, the contrast of CSAR in developer AR 600-546 (which was specifically optimised for this purpose) is almost twice as high. This system is therefore ideally suited for high-resolution applications:

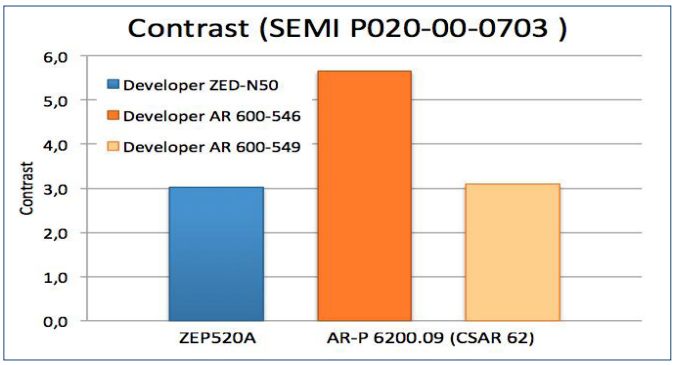

Fig. 8 Contrast ZEP 520A, 200 nm, ZED N50 as well as AR-P 6200.09, 200 nm, AR 600-546 and AR 600-549

3. Sensitivity (dose to clear): The diagram (Fig. 9) demonstrates a good range for the required dose of both resists. Again however, the CSAR resist-developer system with AR 600-546 is twice as sensitive in comparison to the ZEP resist-developer system:

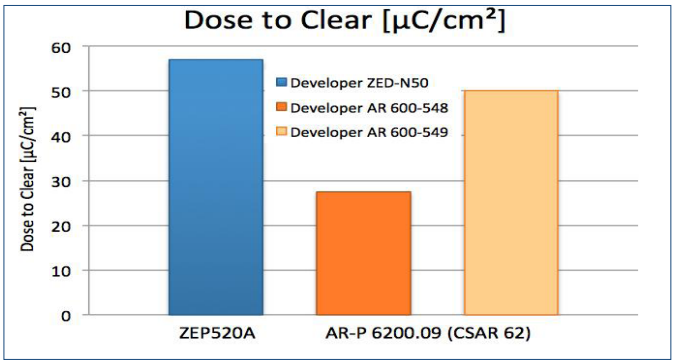

Fig. 9 Sensitivity ZEP 520 A, 200 nm, ZED-N50 as well as AR-P 6200.09, 200 nm, AR 600-548 and 600-549

All three studies come to the conclusion that ZEP 520A and CSAR 62 are both characterised by very good properties. CSAR 62 is thus an attractive alternative - with partly even more favourable application parameters. Advantages of CSAR 62 also arise from the variety of developers offered by Allresist, i.e. AR 600-546, 600-548 and 600-549.

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Thinner for AR resists

AR 300-12, 600-01, 600-02, 600-07, 600-09 thinner

For adjusting the film thickness of photoresists and e-beam resists

Characterisation

- ultra-filtered, colourless, high-purity organic solvent mixtures
- adjustment of resist film thickness by defined dilution:
  AR 300-12 for photoresists, AR 600-01…09 for e-beam resists
- edge bead removal of coated substrates as well as cleaning of equipment
- AR 300-12: removal of photoresist films tempered at up to 150 °C and of non-tempered e-beam resist films

Properties

safer solvent

Parameter / AR	300-12	600-01	600-02	600-07	600-09
Main component	PGMEA	chlorbenzene	anisole	methoxypropanol	ethyl lactate
Density at 20 °C (g/cm³)	0.970	1.108	0.990	0.960	1.036
Refractive index at 20 °C	1.402	1.524	1.517	1.403	1.413
Water content max. (%)	0.1				
Non-volatiles max. (%)	0.002				
Flash point (°C)	42	28	43	38	46
Filtration (µm)	0.2				
Suitable for dilution of AR photoresists	3000, 4000, 5000	-	-	-	-
Suitable for dilution of AR e-beam resists	6510, 7000	631, 641, 661, 671	632, 642, 662, 672, 6200	617	639, 649, 669, 679
Storage 6 month (°C)	10-22				

Application properties

Dilution is performed as follows: 1. placing of defined amount of resist, 2. addition of defined amount of thinner, 3. homogenisation by stirring (both liquids should be mixed quickly), and 4. fine filtration (0.2 µm).

Information on dilution

Higher dilutions of resists may cause gel formation of the polymers which leads to particle deposition in the resist film during the coating step. Diluted resists should therefore be subjected to ultra-filtration (0.2 µm) prior to use. In most cases it is more advantageous to adjust the desired film thickness by varying the spin speed or to utilise a pre-adjusted resist. Special adjustments of thickness values are possible on request for an additional charge.

Formula for dilutions

Example: Starting with a resist with 35 % solids content (AR-P 3510), a solids content of 31 % is desired. Requested is the amount of thinner AR 300-12 in g which has to be added to 100 g resist with 35 % solids content (mass m in g, solids content c /100).

$$\text{m thinner} = \frac{\text{m resist (c resist} - \text{c desired)}}{\text{c desired}} = \frac{100.0\ \text{g}\ (0.35 - 0.31)}{0.31} = 12.9\ \text{g thinner}$$

If 100.0 g resist (35 % solids content = AR-P 3510) are diluted with 12.9 g thinner in defined manner, 112.9 g diluted resist (31 % solids content = AR-P 3540) will be obtained.
With this dilution, the film thickness is reduced from 2.0 to 1.4 µm at a spin speed of 4000 rpm.

Developer for AR E-Beam Resists

AR 600-50, -51, 600-546, -548, -549, 600-55, -56 developer

For the development of e-beam resists films

Characterisation

- ultrapure, ultra-filtered (0.2 µm) solvent mixtures
- storage at 10-22 °C for 6 month

Properties

safer solvent | optimally suited | suited

AR resist / developer	AR 600-50 (new)	AR 600-51	AR 600-55	AR 600-56
Fields of application/conditions	dip, puddle, spray development at 21-23 °C ± 1 °C			
Main component(s)	methoxypropanol / isopropyl alcohol	butoxyethoxy ethanol	methyl isobutyl ketone (MIBK)	methyl isobutyl ketone (MIBK)
Properties			strong developer	weaker developer
Density at 20 °C (g/cm3)	0.871	0.972	0.792	0.788
Refractive index at 20 °C	1.395	1.430	1.384	1.381
Water content max. (%)	0.1	15	0.1	0.1
Flash point (°C)	21	85	12	12
AR-P 617	2-3 min	5 min	3 min	3 min
AR-P 630 - 670 series	-	3 min	1-3 min	1-3 min
AR-P 6500	-	1 h	-	-

AR resist / developer	AR 600-546	AR 600-548	AR 600-549	
Fields of application/conditions	dip, puddle, spray development at 21-23 °C ± 1 °C			
Main component(s)	amyl acetate	diethyl ketone / diethyl malonate	diethyl malonate / anisole	
Properties	weaker developer	strong developer	moderate developer	
Density at 20 °C (g/cm3)	0.876	0.917	1.053	
Refractive index at 20 °C	1.402	1.401	1.417	
Water content max. (%)	0.1	0.1	0.1	
Flash point (°C)	41	22	85	
AR-P 6200	1 min	1 min	1 min	

Information on developer processing

The choice of the developer strongly influences the development rate, the sensitivity and the profile of the resist structures. Coated and exposed substrates are treated with developers which are suitable for the respective process (puddle, spray, immersion bath) at a temperature of 21-23 °C kept as constant as possible. The required development time depends in each case on the resist film thickness. Films with a thickness of less than 0.2 µm can for example be completely developed after 30 s. The development process can be slowed down for AR 600-50, -55 and -56 by adding 10-20 % of the stopper AR 600-60.

Weaker developers like AR 600-56 and AR 600-546 provide a higher resolution without dark erosion, while a significantly higher sensitivity with at the same time higher dark erosion can be obtained with developers AR 600-55 and AR 600-548. If CSAR 62 is processed with developer AR 600-548 at a development temperature of about 0 °C, even after 10 minutes no erosion is observed at the prolonged development time. Substrates have to be rinsed immediately after development for 30 seconds with stopper and are subsequently dried.

Stopper for AR Resists

AR 600-60, 600-61 stopper

For the stopping of e-beam resist film development with solvents

Characterisation

- immediate interruption of the development process
- ultrapure solvent mixtures for residue-free removal of remaining developer
- AR 600-60 for AR-P 617, 630-670er, 6200
- AR 600-61 for AR-P 6510

Properties I

Parameter / AR	600-60	600-61
Density at 20 °C (g/cm³)	0.785	0.964
Water content max. (%)	0.1	20
Non-volatiles max. (%)	0.002	0.002
Flash point (°C)	12	105
Filtration (µm)	0.2	
Storage up to 6 month (°C)	10-22	

Information on remover processing

The addition of stopper for approximately 30 s after development interrupts the development process and leads to a rapid rinsing of residual developer.

Due the processing regime however, constantly developer is transferred into the stopper bath. Already small amounts of the developer will affect the efficiency of the stopping process. It is thus highly recommended to constantly exchange the stopper or to use two stopper baths which are arranged consecutively.

If 10-20 % of stopper AR 600-60 is added to developers AR 600-50, 600-55 and 600-56, the development process is slowed down.

If the stopper AR 600-60 is used for developers AR-P 630-670, higher contrast values up to 10 are possible, while the sensitivity of the PMMA resists is at the same time decreased. Higher exposure doses and prolonged development times are thus required in this case.

Remover for AR Resists

AR-P 600-70, 600-71, 300-76, 300-70, 300-72, 300-73 remover

For the stripping of tempered photoresist and e-beam resist films

Characterisation

- aqueous-alkaline solution (AR 300-73) or organic solvents (all others)

Remover recommendations after tempering:

- photoresists up to 180 °C: AR 600-71, 300-76
- photoresists up to 200 °C: AR 300-76, 300-71
- PMMAs up to 200 °C: AR 600-71, 300-76
- copolymers up to 210 °C: AR 600-71, 300-76
- CSAR 62 up to 200 °C: AR 600-71, 300-76
- novolac e-beam resists 150 °C: AR 300-73, 300-76

Properties

Parameter / AR	600-70	600-71	300-76 new	300-70, -72	300-73
Main component	acetone	dioxolane	DMG	NEP	TMAH
Density at 20 °C (g/cm3)	0.79	1.02	1.08	1.03	1.00
Non-volatiles max. (%)	0.002				
Flash point (°C)	-16	-4	103	98	-
Filtration (µm)	0.2				
Storage up to 6 month (°C)	10-22	10-18	15-25	10-22	10-22

Remover recommendations

optimally suitable | suitable | limited suitability | unsuitable

Properties / Remover AR average time for removal at 1.5 µm	600-70	600-71	300-76 new * heated to 80 °C		300-70, 300-72 * heated to 80 °C		300-73 + heated to 50 °C	
Suitability for tempered photoresist films (21 °C)	inexpensive, commonly used	efficient all-rounder	universal, replacing the reprod. toxic, NEP: = AR 300-70, -72		universal, especially for thin films, but toxic for reproduction		special: AR-BR 5400, AR-P 3100, 3500, 3700	
120 °C	15 s	10 s	25 s		20 s		30 s	
150 °C	20 s	15 s	3 min	25 s *	2 min	20 s *	2 min	60 s +
180 °C	5 min	4 min	2 h	60 s *	2 h	50 s *	2 h	2 min +
200 °C				30 min *		25 min *		30 min +
Suitability for tempered e-beam resist films (21 °C)	inexpensive, commonly used	efficient all-rounder	universal, replacing reprod. -toxic NEP:		universal, but toxic for reproduction		special: AR-N 7520, 7700	
PMMA 150 °C	25 s	20 s	20 min	10 s *	18 min	10 s *	15 min +	
PMMA 180 °C	2 min	2 min	30 min	30 s *	28 min	30 s *	25 min +	
PMMA 200 °C	3 min	3 min	42 min	50 s *	40 min	50 s *		
Copolymer 190 - 210 °C	10 s	5 s		60 s *		50 s *	20 min +	
CSAR 62 150 °C		30 s		60 s *		50 s *	10 min +	
CSAR 62 180 - 200 °C		40 - 60 s		5 min *		4 min *	15 - 25 min +	
Novolac-based 85 - 120 °C	5 - 60 s except 7700	3 - 50 s except 7700	5 s * except 7520, 7700		5 s * except 7520, 7700		25 s - 3 min +	
Novolac-based 150 °C	10 s - 9 min except 7520, 7700	5 s - 7 min except 7520, 7700	30 s * except 7520, 7700		10 s * except 7520, 7700		10 s - 50 min +	

Processing instructions for removers

Substrates coated with resist are exposed to the effect of the remover by immersion (puddle or dip). To reduce the dissolution time for tempered layers, removers AR 300-70, 300-72 and 300-76 may be heated to up to 80 °C, remover AR 300-73 to up to 50 °C or megasound may be helpful in this case. It is recommended to rinse off the remover with DI water, clean remover or with a suitable thinner. A stripping of very hard-baked layers (> 220 °C) with remover is hardly possible any more. In this case, oxidizing acids or oxygen plasma may be used for stripping. Further detailed remover specifications for a large variety of resists are listed on the following pages.

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Remover for A Resists

Remover recommendations

< 20/60 s optimally suitable | < 5/30 min suitable | < 1-6 h limited suitability | ≥ 6 h unsuitable

Product AR	Film thickness (µm)	Tempering (°C)	Recommend.	600-70	600-71	300-76 new		300-70, 300-72		300-73	
				21 °C	21 °C	21 °C	80 °C	21 °C	80 °C	21 °C	50 °C
AR-P 3100 Example 3110	1.5	95 - 120	300-76 300-73 (300-72)	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		150			3 h	< 20 s		< 20 s		< 60 s	
		180			6 h	< 5 min	< 60 s	< 5 min	< 60 s	1 h	< 60 s
		200					< 30 min		< 30 min		< 30 min
AR-P 3200 Example 3220	10	95	600-71 300-76 300-73	< 20 s	< 20 s	< 20 s		< 20 s		< 5 min	< 60 s
		120		< 20 s	< 20 s	< 60 s		< 60 s		< 30 min	< 5 min
		150		< 60 s	< 20 s	< 5 min	< 60 s	< 5 min	< 60 s	< 30 min	< 5 min
		180			4 h	1 h	< 30 min	1 h	< 30 min		< 30 min
		200					1 h		1 h		2 h
AR-P 3500 Example 3540	1.5	95 - 150	600-71 300-73 300-76	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		180		< 30 min	< 5 min	< 5 min	< 20 s	< 5 min	< 20 s	< 60 s	< 20 s
		200					< 1 h		< 1 h	3 h	< 30 min
AR-P 3500 T Example 3540 T	1.5	95 - 120	600-71 300-76 (300-72)	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		150		4 h	< 5 min	< 60 s	< 20 s	< 5 min	< 20 s	< 30 min	< 5 min
		180				< 30 min	< 5 min		< 5 min		< 30 min
		200					1 h		1 h		
AR-P 3700 / 3800 Example 3740	1.5	95	600-71 300-76 300-73	< 20 s	< 20 s	< 20 s		< 20 s		< 60 s	
		120		< 20 s	< 20 s	< 20 s		< 20 s		< 5 min	< 20 s
		150		< 60 s	< 20 s	< 60 s		< 60 s		< 5 min	< 20 s
		180		< 30 min	< 30 min	< 5 min	< 60 s	< 5 min	< 60 s	< 30 min	< 60 s
		200					< 30 min		< 30 min	6 h	< 30 min
AR-P 5300 Example 5350	1.5	95 - 150	600-71 300-73 300-76	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		180		< 60 s	< 60 s	< 60 s		< 60 s		< 60 s	
		200					1 h		1 h		< 30 min
AR-U 4000 Example 4040	1.5	95	600-71 300-76 (300-72)	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		120		< 20 s	< 20 s	< 20 s		< 20 s		< 60 s	
		150					< 5 min		< 5 min		3 h
		180					< 30 min		< 30 min		
AR-PC 500 Example 504	2.0	150	600-71 300-76 (300-72)	< 5 min	< 5 min	< 1 h	< 5 min	< 1 h	< 5 min		< 5 min
		190		< 30 min	< 30 min	1 h	< 5 min	1 h	< 5 min		4 h
AR-P 5900 Example 5910	5.0	85 - 120	300-76 300-73 (300-72)	< 20 s	< 20 s	< 20 s		< 20 s		< 5 min	
		150				< 2 h	< 30 min	< 2 h	< 30 min	< 2 h	< 5 min
		180									< 2 h
		200									
AR-N 4200 Example 4240	1.5	85 - 150	600-71 300-76 300-73	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		180		< 20 s	< 20 s	< 60 s		< 60 s		< 5 min	
		200					< 1 h		< 1 h		< 1 h

Remover for AR Resists

Remover recommendations

< 20/60 s optimally suitable | < 5/30 min suitable | < 1-6 h limited suitability | ≥ 6 h unsuitable

Product AR	Film thickness (µm)	Tempering (°C)	Recommend.	600-70	600-71	300-76 new		300-70, 300-72		300-73	
				21 °C	21 °C	21 °C	80 °C	21 °C	80 °C	21 °C	50 °C
AR-N 4300 Example 4340	1.5	95	300-76 (300-72) 300-73	< 20 s	< 20 s	< 20 s		< 20 s		< 60 s	
		110				< 60 s		< 60 s		1 h	< 60 s
		120				< 30 min	< 5 min	< 5 min		6 h	< 30 min
		150				1 h	< 30 min	< 30 min	< 5 min		< 30 min
		180				6 h	1 h	1 h	< 30 min		
		200						5 h	1 h		
AR-N 4400 Example 4400-50	50	95	600-71 600-70	< 20 s	< 20 s	< 5 min	< 5 min	< 5 min	< 60 s	< 60 s	
		120		< 5 min	< 5 min	6 h	< 60 s	5 h	< 60 s	6 h	< 30 min
		150		< 5 min	< 5 min		1 h		1 h		2 h
		180		< 30 min	< 30 min		2 h		2 h		
		200		5 h	4 h						
AR-P 617 Example 617.08	0.5	190	600-71 300-76 300-73	< 5 min	< 5 min	< 1 h	< 60 s	< 1 h	< 60 s		< 30 min
		210		< 30 min	< 5 min	6 h	< 5 min	6 h	< 5 min		< 30 min
AR-P 630-670 Example 671.05	0.5	150	600-71 300-76 (300-72)	< 20 s	< 20 s	< 30 min	< 20 s	< 30 min	< 20 s		< 30 min
		180		< 5 min	< 5 min	< 30 min	< 60 s	< 30 min	< 60 s		< 30 min
		200		< 5 min	< 5 min	< 1 h	< 60 s	< 1 h	< 60 s		
AR-P 6200 new Example 6200.09	0.4	150	600-71 300-76 300-73		< 20 s	< 30 min	< 5 min	< 30 min	< 5 min	< 30 min	< 5 min
		180			< 60 s	< 30 min	< 5 min	< 30 min	< 5 min	< 1 h	< 30 min
		200			< 60 s	< 30 min	< 60 s	< 30 min	< 60 s		< 30 min
AR-P 7400 Example 7400.23	1.5	105	600-71 300-76 (300-72)	< 20 s	< 20 s	< 20 s	< 20 s	< 20 s		< 20 s	
		120		< 20 s	< 20 s	< 20 s	< 20 s	< 20 s		< 20 s	
		150					< 5 min		< 5 min		3 h
		180					< 30 min		< 30 min		
AR-N 7500 Example 7500.18	0.4	85-150	600-71 300-76 300-73	< 20 s	< 20 s	< 20 s		< 20 s		< 20 s	
		180					6 h		4 h	3 h	< 10 min
AR-N 7520 new Example 7520.17	0.4	85	600-71 300-73 300-76	< 20 s	< 20 s	< 20 s		< 20 s	< 20 s	< 60 s	
		105		< 20 s	< 20 s	< 20 s		< 20 s	< 20 s	< 5 min	
		120					4 h		3 h	< 30 min	< 5 min
		150					6 h		4 h		< 1 h
AR-N 7700 Example 7700.18	0.4	105	300-76 300-73			< 1 h	< 30 s		< 1 h	< 1 h	< 60 s
		120								< 1 h	< 5 min
		150								3 h	< 30 min
AR-N 7720 Example 7720.18	1.4	105-120	600-71 300-76 (300-72)	< 60 s	< 60 s	< 20 s		< 20 s		< 20 s	
		150		< 5 min	< 5 min	3 h	< 5 min	2 h	< 5 min	< 60 s	
		180					< 30 min	< 30 min	< 30 min	< 30 min	< 5 min
		200					1 h		1 h		

The average times required for removal as listed under "properties" are divided into time clusters (< 20 s, < 60 s …) for better orientation. In the column for remover recommendations, the first entry applies to low-baked and the second entry (or, if applicable, the third) to resist films baked at higher temperatures. The recommendation for remover AR 300-72 is indicated in brackets, since this remover is highly effective, but also classified as toxic for reproduction and thus not prioritized by Allresist. As replacement, we recommend the equivalent removers AR 300-76 and 600-71.

Adhesion Promoter for AR Resists

AR 300-80 and HMDS adhesion promoter

For improving the adhesive strength of photo and e-beam resists

Characterisation

- improvement of the adhesive strength of photo and e-beam resist films
- especially for surfaces with low adhesion properties, e.g. metal, SiO_2, GaAs
- AR 300-80: spin coating of a diphenylsilanediol solution = improved adhesion properties and simple, cheaper alternative to HDMS
- HMDS: evaporation of HMDS on the substrate surface (equipment required)

Properties

Parameter / AR	300-80	HMDS
Density at 20 °C (g/cm3)	0.971	0.774
Flash point (°C)	42	14
Filtration (µm)	0.2	0.2
Storage 6 month (°C)	10-22	

Processing information AR 300-80

AR 300-80 is applied by spin coating between 1000 and 6000 rpm. The film thickness can be adjusted by varying the spin speed to the optimum conditions of the respective process.

Higher spin speeds and thus thinner films are preferable, e.g. 4000 rpm with approx. 15 nm thickness. Too high concentrations (film thickness values) may reduce or neutralise the adhesion-promoting effect.
It is recommended to perform the subsequent tempering on a hot plate for 2 min or in a convection oven for 25 min at 180 °C. During tempering, a very uniform, extremely thin layer of adhesion promoter is generated on the substrate (approx. 15 nm).

After cooling of the substrate, the resist can be applied as usual.

An excess of adhesion promoter may be rinsed off with organic solvents like e.g. AR 600-70 or AR 600-71. The optimised surface properties are maintained without restriction.

Processing information HMDS

Appropriate equipment is required for the processing of HMDS.

The pre-treatment should be performed immediately prior to resist coating. Generally, hot plates with integrated HMDS-evaporation are used in the production. If this option is not available, the substrate is placed in a desiccator where HMDS evaporates at room temperature or at temperatures up to 160 °C max. HMDS is under these conditions deposited as monomolecular layer (approx. 5 nm) on the substrate surface.

The treated substrate can be coated with resist immediately after HMDS-deposition without subsequent tempering, or stored in a closed container for a couple of days.

The storage stability may be limited due to an uptake of water from the atmosphere. Storage in open containers should thus be avoided.

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Product Portfolio Photoresists

We deliver our products within 1 week ex work, in-stock stock items are delivered immediately or on the desired date. Resists are available in package sizes of ¼ ℓ, 0,5 ℓ,1 ℓ, 2,5 ℓ, 6 x 1 ℓ, 4 x 2,5 ℓ and corresponding process chemicals in package sizes of 1 ℓ, 2,5 ℓ, 5 ℓ, 4 x 2,5 ℓ, 4 x 5 ℓ. Test samples/smallest quantities of 30 ml and 100 ml are possible.Please request our price lists.

Resist system	Product	Do/ µm 4000 rpm	Type	Characteristic Properties	Applica-tion	Resolution [µm]	Con-trast	Expo-sure	Thinner	Deve--loper	Remo-ver
AR-P 1200	1210,1220, 1230	[0.5 - 10]	positive resist	spray resist, var. applications	MEMS	1	3	i-line, g-line, BB-UV	-	300-44 300-35	300-76 300-73
AR-P 3100	3110, 3120, 3170	1.0 ; 0.6 ; 0.1		high resolution, adhesion-enhanced	masks, lattices	0.5 ; 0.4 ; 0.4	3.0		300-12	300-35 300-26	300-76 300-73
AR-P 3200	3210, 3220, 3250	10 ; 10 ; 5		thick resist with high dimen. accuracy up to 100 µm	electro-plating, MST	4 ; 3 ; 1.2	2.0 ; 2.0 ; 2.5		300-12	300-26	600-71 300-76
AR-P 3500	3510, 3540	2.0 ; 1.4		wide process range, high resolution	ICs	0.8 ; 0.7	4.0 ; 4.5		300-12	300-35 300-26	300-76 300-73
AR-P 3500 T	3510 T, 3540 T	2.0 ; 1.4		wide process range, high res., developable in 0.26 n TMAH	ICs	0.6 ; 0.5	4.5 ; 5.0		300-12	300-44 300-26	300-76 300-72
AR-P 3700, 3800	3740, 3840	1.4 ; 1.4		highest resolution, sub-µm, high cont-rast, 3840 dyed	VLSIC	0.4 ; 0.4	6.0 ; 6.0		300-12	300-47 300-26	600-71 300-76
AR-P 5300	5320, 5340	5.0 ; 1.0		undercut structures (single layer lift-off)	evapor-ation structures	2 ; 0.5	4 ; 5		300-12	300-26	600-71 300-73
AR-U 4000	4030, 4040 4060	1.8 ; 1.6 ; 0.6	special application	optinally pos. or neg., lift off	ICs	0.8 ; 0.7; 0.5	3 ; 3 ; 3.5		300-12	300-35 300-26	300-76 300-72
AR-PC 500	503 dyed 504	1.2 ; 2.2		protective coating, 40% KOH etch-stable	protecti-ve film	-	-	-	600-01	-	600-71 300-76
AR-BR 5400	5460, 5480	1.0 ; 0.5		bottom resist for 2L lift-off	lift-off (pos./neg.)	3 ; 1.5	lift-off	-	-	-	300-73 300-76
AR-P 5900	5910	5.0		complicated patten. up to 5 % HF / BOE	MEMS	2	2.0	i-line, g-line, BB-UV	300-12	300-26	300-76 300-73
AR-N 2200	2210, 2220, 2230	[0.5 - 10]	negative resist	spray resist, var. applications	MEMS	1	3		-	300-44	600-71 300-73
AR-N 4200	4240	1.4		highly sensitive, high resolution	ICs	0.6	2.8	deep UV, i-line	300-12	300-26 300-47	600-71 300-76
AR-N 4300	4340	1.4		highest sensitivity, high resolution, CAR	ICs	0.5	5	i-line, g-line	300-12	300-26 300-475	600-76 300-72
AR-N 4400	4400-50, -25, -10, -05	1000 rpm: 50 ; 25 ; 10 ; 5		thick films up to 100, 50, 20, 10 µm, easy removal	electro-plating, MST, LIGA	5.0 ; 3.5 ; 2.0 ; 1.0	6 ; 5 ; 4 ; 4	X-ray, e-beam, i-line	300-12	300-44 bis -475	600-71 600-70
AR-N 4450	4450-10	1000 rpm: 10		thick films up to 20 µm, lift-off		2.0 3.5	10 lift-off		300-12	300-47	600-71 600-70

All resist systems show optimal adhesion features with adhesion promoter AR 300-80 which is applied prior to resist deposition.

Product Portfolio E-Beam Resists

We deliver our products within 1 week ex work, in-stock stock items are delivered immediately or on the desired date. Resists are available in package sizes of ¼ ℓ, 0,5 ℓ,1 ℓ, 2,5 ℓ, 6 x 1 ℓ, 4 x 2,5 ℓ and corresponding process chemicals in package sizes of 1 ℓ, 2,5 ℓ, 5 ℓ, 4 x 2,5 ℓ, 4 x 5 ℓ. Test samples/smallest quantities of 30 ml and 100 ml are possible.Please request our price lists.

Resist system	Product	Do/ µm 4000 rpm	Type	Characteristic Properties	Applica-tion	Resoluti-on [µm] *	Con-trast	Expo-sure	Thin-ner	Deve-loper	Remo-ver
AR-P 617	copolymer PMMA/MA 33%	0.09-1.75 methoxy propanole	positive	highest resolution, 2x more sensitiver than PMMA, lift off	ICs, masks	10 / 100	6.0	e-beam, deep UV	600-07	600-50 600-55	600-71 300-76
AR-P 631-671	PMMA 50K, 200K, 600K, 950K	0.02-1.70 chloroben-zene	positive	highest resolution, pro-cess stable, universally, simple processing	ICs, masks	6 / 100	7.0	e-beam, deep UV	600-01	600-55 600-56	600-71 300-76
AR-P 632-672	PMMA 50K, 200K, 600K, 950K	0.01-1.87 anisole	positive	highest resolution, pro-cess stable, universally, simple processing	ICs, masks	6 / 100	7.0	e-beam, deep UV	600-02	600-55 600-56	600-71 300-76
AR-P 639-679	PMMA 50K, 200K, 600K, 950K	0.02-0.74 ethyl lactate	positive	highest resolution, pro-cess stable, universally, simple processing	ICs, masks	6 / 100	7.0	e-beam, deep UV	600-09	300-55 300-56	600-71 300-76
AR-P 6200 new CSAR 62	6200.04, .09, 6200.13 styrene acrylate	0.08 ; 0.4 ; 0.2	positive	highest resolution, high sensitivity, plas-ma etching-resistant	ICs, sensors, masks	6	15	e-beam, deep UV	600-02	600-546 600-548 600-549	600-71 300-76
AR-P 6500	6510.17, .18, 6510.19 PMMA	350 rpm: 45. 80. 150	positive	thick PMMA films up to 250 µm for MST, synchrotron	micro compo-nents	1 µm (x-ray)	10 (x-ray)	x-ray, e-beam	300-12	600-51 600-56	600-71 300-76
AR-P 7400	7400.23 novolac	0.6	positive	mix&match, high reso-lution, plasma etching-resistant, also neg.	ICs, masks	40 / 150	4.0	e-beam, deep UV, g-line, i-line	300-12	300-47 300-26	300-76 600-71
AR-N 7500	7500.08, 7500.18 novolac	0.1 ; 0.4	negative	mix&match, high reso-lution, plasma etching-resistant, pos./neg.	ICs, masks	40 / 100	5.0	e-beam, deep UV, g-line, i-line	300-12	300-47	600-71 300-73
AR-N 7520 new	7520.07, .11, 7520.17 novolac	0.1 ; 0.2; 0.4	negative	mix&match, highest resolution, plasma etching resistent	ICs, masks	30	8.0	e-beam, deep UV, i-line,	300-12	300-46 300-47	600-71 300-73
AR-N 7700	7700.08, 7700.18 novolac	0.1 ; 0.4	negative	CAR, high resoluti-on, high sensitivity, steep gradation	ICs, masks	80 / 100	5.0	e-beam, deep UV	300-12	300-46 300-47	300-76 300-73
AR-N 7720	7720.13, 7720.30 novolac	0.25 ; 1.4	negative	CAR, high resolu-tion, flat gradation for 3-dimens. struct.	diffract. optics	80 / 200	< 1.0	e-beam, deep UV	300-12	300-46 300-47	300-76 300-72

All resist systems show optimal adhesion features with adhesion promoter AR 300-80 which is applied prior to the resist.

Note: If the stopper AR 600-60 is used for developer AR-P 631-679, higher contrast values of up to 10 can be achieved.

Resists AR-P 617, 631-679, 6200 require brief stopping in stopper AR 600-60 after development.

Resists of the AR-P 6500 series require brief stopping in stopper AR 600-61 after development.

* best value / industrial application

ALLRESIST

Innovation
Creativity
Customer-specific solutions

Product Portfolio Experimental Samples

We deliver our products within 1 week ex work, in-stock stock items are delivered immediately or on the desired date. Resists are available in package sizes of ¼ ℓ, 0,5 ℓ,1 ℓ, 2,5 ℓ, 6 x 1 ℓ, 4 x 2,5 ℓ and corresponding process chemicals in package sizes of 1 ℓ, 2,5 ℓ, 5 ℓ, 4 x 2,5 ℓ, 4 x 5 ℓ. Test samples/smallest quantities of 30 ml and 100 ml are possible.Please request our price lists.

Special product	Do/ µm 4000 rpm	Type	Characteristic properties / Application	Resolution [µm] *	Contrast	Exposure	Thinner	Developer	Remover
Market-ready experimental samples									
X AR-P 3220/7	6.0	positive	temperature-/ plasma etching stable thick resist	2	2	i-line. g-line, BB-UV	300-12	300-26	300-76 300-72
X AR-P 5800/7	0.6		plasma etching positive resist for deep UV	0.6	3	deep UV, i-line	300-12	300-35 300-47	600-70
X AR-P 5900/4	1.4		positive photoresist, alkali-stable up to pH 14	1	2	i-line, g-line	300-12	300-26	600-70
X AR-N 7700/30	0.4	neg.	highly sensitive, highest-resolution CA negative e-beam resist	0.2	5	e-beam, deep UV	300-12	300-475	600-70 300-76
Special designs / Experimental samples									
SX AR-P 3500/6	2.0	positive	positive photoresist for holography (488 nm)	1	3	i-line. g-line, BB-UV	300-12	300-47	600-70 300-76
SX AR-P 3740/4	1.4		positive photoresist, highly process-stable, high contrast	0.6	5	i-line. g-line, BB-UV	300-12	300-475	600-70 300-76
SX AR-N 4340/7	1.4	neg.	temperature-stable negative resist up to 300 °C (2L-system)	0.5	5	i-line, g-line	300-12	300-47	300-76 600-71
SX AR-PC 5000/22.2	0.02	-	protective coating for spray application, smooth surface	-	-	-	600-09	-	600-70 300-76
SX AR-PC 5000/40	5.0	-	protective coating 40% KOH- and 50% HF-resistant	- 2 L: 10	- 2 L: 1	- 2 L: i-line	300-74/1	300-26	300-74/1
SX AR-PC 5000/80.2	0.4	-	polyimide photoresist, protective coating for 2 L-patterning	- 2 L: 2	- 2 L: 1	- 2 L: i-line	300-12/3	-	600-70 300-76
SX AR-P 5000/82.7	0.8	-	polyimide photoresist, structurable and temperature-stable	1.5	2	i-line	300-12/3	300-26 300-47	300-76 300-72
SX AR-PC 5000/90.1	0.1	-	conductive protective coating for PMMA-e-beam resists	-	-	-	-	-	DI water
SX AR-N 7530 new SX AR-N 7730 new	0.2 0.2	neg.	white light e-beam resist like AR-N 7520 white light e-beam resist like AR-N 7720	0.03 0.08	8 < 1.0	e-beam, deep UV	300-12	300-47 300-47	600-71 300-76

All resist systems show optimal adhesion features with adhesion promoter AR 300-80 which is applied prior to resist deposition.

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Creditreform
Bonitätsindex: 187
PD: 0,23 %