



AR NEWS

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Allresist GmbH

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Welcome to our 25th issue of the AR NEWS, an issue presented on our 20th company anniversary. In a new layout, we would like to inform you again about the further development of the company and our research activities:

1. 20 years of Allresist – a development from MBO to a business of excellence

When we founded the Allresist GmbH exactly 20 years ago according to the Managements-By-Out (MBO) approach, we shared enthusiasm, good ideas and the strong will to create something important. We started off successfully with the “old” microelectronics customers, and many of them still belong to our key account customers today: CiS Erfurt, Photronics MZD Dresden; TDK-EPC (Aktiv Sensor) Stahnsdorf, POG Gera, IHP Frankfurt/O. and others. The sales figures for resists could slightly be increased year by year and scientific projects added further financial resources. Taken together, we were able to protect our expertise and to secure existing jobs.

With the new company-owned facility in Strausberg, we established the foundation for a successful enterprise. The certification according to DIN EN ISO 9001 was the obvious basis for optimized processes.

In 2006, we came into contact with the EFQM model (European Foundation for Quality Management). The management realised that a sustainable, both economic and social development according to the eight fundamental concepts of excellence, in particular the balance of interests of all partners and in combination with RADAR logic, offers a great potential for development. Applying this model, the targeted and systematic development of our company was initiated in 2007.



Fig. 1: Team of Allresist-1995 in front of the old building in Berlin

On this basis, the team created a future-oriented mission statement, which in addition to a clear vision with milestones until 2020 also includes shared basic values and a mission for the customers.

In the following years, the market was analysed in detail, core competencies and unique selling points were focused and the relationship with our

Vision: “In 2015, Allresist is the number 1 for innovative customer-specific photoresists and a globally established producer of e-beam resists. Our increasing market success is equally based on highly motivated employees and on excellent customer partnerships.”

customers was raised to an even higher level. Meanwhile, five customer service agents support our customers and maintain a very personal relationship which is also reflected by high customer satisfaction values.



Fig. 2: New Allresist facility in Strausberg, 1999

An emotional highlight for us was the awarding of "Germany's Customer Champion 2010". For this award, many of our customers were surveyed (as some of you will certainly remember). We received a very good evaluation of our performance and placed third in the competition.

In line with the eight fundamental concepts, the employees as the most important knowledge carrier were "brought on board", scientific partnerships providing mutual benefit were formed and environmental as well as social concerns received a high level of attention. Allresist is furthermore environmentally certified and environmental partner of the Federal State of Brandenburg.



Fig. 3: Quality Award ceremony in Berlin's Rotes Rathaus (City Hall) in 2010

On our way to excellence, we experienced recognition and appreciation by several awards and prizes gained in competitions for economic top performance. After we won an award at the Ludwig Erhard Prize (LEP) in 2009 and received the Quality Award Berlin-Brandenburg in 2010, we now hope to take home the coveted LEP-trophy this year. The decision with respect to the placing will officially be announced on November 26, 2012 in a festive ceremony in Berlin.

The Ludwig Erhard Prize is equivalent to winning the German Championship. This award would demonstrate that Allresist has already advanced far on the road to Excellence.

2. Successful Assessment during a site visit for the Ludwig Erhard Prize

We decided already in 2009 to participate again in 2012 in the Ludwig Erhard Prize award process. The 75-page application brochure in which the Allresist presented its development in accordance with the nine criteria of the EFQM model already in advance gained recognition. The added value of work arises from a reflection of what has already been achieved. It forces us to continue consistently and to permanently re-evaluate what once has been initiated.

On September 3, our five assessors appeared well-prepared and were at first informed about the company and the processes. Then interviews were conducted with respect to the nine criteria. The Allresist team was divided into several groups and interviewed topic-specifically for two long days by the assessors. The third day was reserved for clarifying questions, and the fourth day was devoted to the completion of the final report.

All interviews took place in a friendly and appreciating atmosphere. Even the skilled workers who expressed mixed feelings before the interviews were satisfied with the assessment and their own performance. The team leader Heinz Neppach presented the most striking strengths and few potentials and could predict a good result for us at the final presentation.

We would like to thank all assessors for their excellent voluntary work. All of them provided highly professional external advice and we obtained valuable suggestions for our future development.



Fig. 4 and 5: Team of Allresist with LEP assessors

3. VEGAS project submitted

With the completion of the 20th business year of Allresist, also the 20th scientific project was submitted. Within the framework of the association "Secure Identity Berlin-Brandenburg" in which the Allresist participates, the project "Procedures and devices for electronically controllable display systems on cards with safety features" (VEGAS) was initiated. Partners in this project are the company L  th and D  mchen in Berlin, the TU Berlin and the Fraunhofer Society IAP Golm. The aims of this project can be described as follows:

Plastic cards in the form of identification cards, chip cards, credit cards and the like play an important role in our everyday life. The information deposited on these cards is often temporally limited. A repeated re-issuing of cards is required, however with consequences for the environment, additional logistics costs and inflexible user scenarios. The project is thus aimed at the development of a system including a new generation of plastic cards – the so-called smart cards, which allow a repeated re-programming of these cards with visually ascertainable information. In this context, in particular market-relevant cost aspects like for example manufacturing, marketing and compatibility will be taken into account.

Figure 6 depicts a smart card as described above. Easily recognisable is the complexity of the card manufacturing procedure. The main task for Allresist - and an interesting issue for our users at this point – is the "development of functional structured resists". Further subtasks are the development of conductive organic layers, 3D-structures for thick layers and resist structures which are only visible in the infrared range.

The conductive layers will be coated via the readout function of the card. After contacting the layer, a variable voltage can be applied which prevents an unauthorized data readout and thus provides an additional safety feature.

The import of information onto the smart card is performed with a writing unit still to be designed. For this purpose, an electrical field is generated which corresponds to the information to be transmitted (e.g. a logo or an image) and which is then transferred onto the smart card by approximation to a distance of a few 100 µm. The pixels of the writing unit are structured using a thick resist. In the simplest case, pixels are column-shaped with a height of 10 – 20 µm. Also conceivable is that conical cylinders are better suited to transfer the electrical fields onto the card. The resist must be suitable to also allow a realisation of these structural modifications.

A further safety feature are structures which are only visible under infrared (IR) light. The corresponding IR dyes are mixed with the resists and applied on the cards with different methods or patterned. These features provide higher safety if the authenticity of a card is verified.

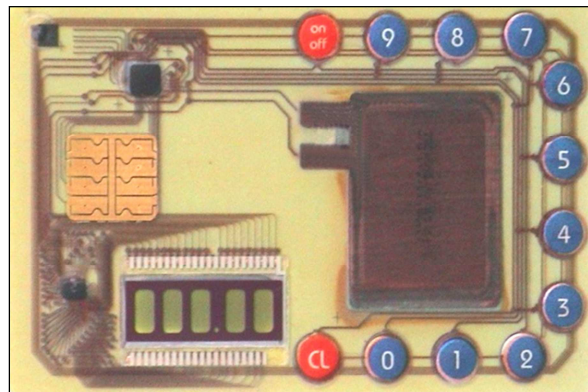


Fig. 6: Multifunctional smart card

In the case that readers of the AR NEWS are faced with similar tasks, we would like to encourage your expression of interest and to include your input into our ongoing research.

4. Our new developments – first results

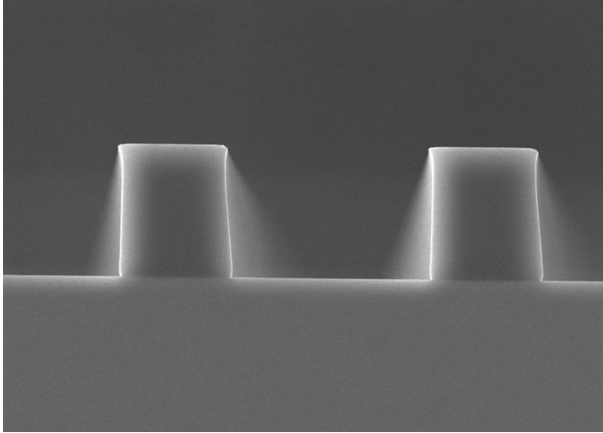
4.1. PMMA resists cross-linked with chemical enhancement

In addition to our established negative-working PMMA-based photoresist SX AR-N 4800/16 (which can be developed in water-free solvents and is thus well suited for moisture-sensitive substrates), we are now able to offer a corresponding CAR-PMMA resist. The new resist system is characterised by a 20fold higher sensitivity. As suitable developer, X AR 300/74.1 or other solvent mixtures are recommended.

PMMA-resists which are structured with commonly used photolithography (exposure wavelengths of 300 – 440 nm, thus also suitable for g-line applications) can easily be used for two-component systems in combination with photoresists. This would in principle allow for example applications like the production of optical fibres since the optical features of the PMMA remain more or less unchanged if cross-linking additives are added to the resist. Used in two-component systems, a selective removal is possible both for the PMMA and the photoresist.

4.2. Improved bake regime for negative resist AR-N 4400

For the new project VEGAS, columnar resist structures with a thickness of 10 to up to 60 nm are required. These columns should be producible in a strictly cylindrical shape or, if needed, also conical narrowing down to the bottom.



40-µm structures with optimized bake step for CAR 44

In order to achieve this variability, the bake regime for AR-N 4400 (CAR 44) was optimized. Vertical side walls were obtained with a multi-step coating procedure. A fourfold coating of 10 µm-layers each with consecutive bake step after each coating resulted in a total film thickness of 40 µm. This particular coating procedure completely prevents the formation of usually occurring and disturbing edge beads. The development speed turned out to be constant across the entire

film thickness, and vertical structures resulted. Even a slight undercut can be adjusted by varying the bake times of single coating steps. For this purpose, bottom layers are dried faster.

By multiple coating steps (up to 4-fold) with AR-N 4400-25, film thickness values of approximately 100 micrometer and for AR-N 4400-50 even 150 micrometer can be achieved, which allow, due to the even distribution of the resist solvent content, the generation of vertical profiles of the structures. Together with a still simple removal procedure, thus in particular applications for galvanic processes are offered.

4.3. Enhancing the sensitivity of AR-N 4240 by new cross-linking agents

The negative photoresist AR-N 4240 counts already for a long time among our most successful standard products. Due to an optimised recipe using a new cross-linking agent we are now able to offer a variant which is particularly characterized by a sensitivity which is increased by a factor of 30. For this new resist, the use of a stronger developer is recommended.

The new photosensitive bisazides were developed within the scope of an innovation voucher in cooperation with the IDM e.V. Teltow.

We hope to have offered a few interesting ideas also for you and strongly encouraged our interested customers to communicate all your desires, requests and comments already at an early stage.

Our next issue of the AR NEWS will again be presented in April 2013.

Successful times until then!



Strausberg, 16.10.2012
Matthias & Brigitte Schirmer
Team of Allresist