



AR NEWS

50th issue, October 2024, Allresist GmbH



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Welcome to our 50th anniversary issue of the AR NEWS!

With the end of the Cold War in the 1990s and the global failure of socialism, there was hope for a peaceful development of humanity. Unfortunately, this proved to be an illusion. Starting with the wars in Kosovo and Afghanistan, conflicts are currently flaring up with dramatic consequences (Ukraine/Russia, Gaza/Israel/Lebanon/Iran). Sadly, those who are responsible for the wars lack the political will to resolve these conflicts.

Also in Germany, we see democracy at risk. The fact that discussions about migration and the related growing rejection can dramatically influence election outcomes while sweeping really important issues (climate changes, social security, education, economy) off the table is deeply concerning. The Allresist team is well aware that we are not able to influence any of these problematic developments, but we will nevertheless continue to do our best with our commitment to sustainability and an environmentally friendly production. We actively engage in climate protection with various projects and support the socially disadvantaged, as well as those affected by wars and environmental disasters, with generous donations. We also contribute to strengthening the economy through scientific projects.

As in every April and October, we would like to inform you again about the development of our company and its research projects.

1. Allresist at the EIPBN and MNE conferences 2024

Allresist continues to maintain a strong international presence. The EIPBN 2024 took place on the West Coast of the USA in San Diego this May. As every year, we participated as a Gold Sponsor with a large, informative stand.

Many users who now work with resists like our flagship products, CSAR 62 and Electra 92, visited our stand to discuss their results and experiences with our resists and to ask further questions. They in particular praised the high quality of our products and the short delivery times.

Especially our new development Medusa 84, which we introduced for the first time in San Diego, raised great interest. With this resist, we have created an

alternative to the HSQ resist with far more user-friendly properties (→ point 2).



Fig. 1 Allresist R&D team at the EIPBN in San Diego

At both conferences, we presented an informative poster for our new resist Medusa 84 which was introduced by Harry Biller to interested parties (Fig. 2).

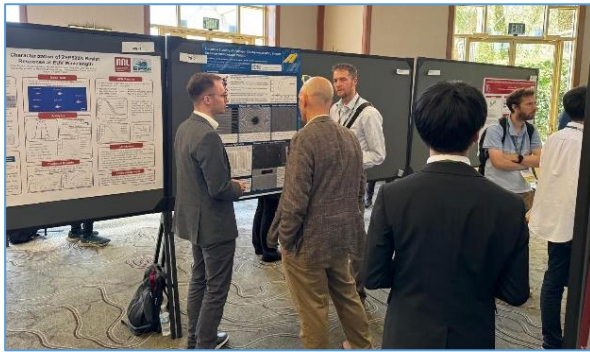


Fig. 2 Allresist poster presentation of Medusa 84. On the left: Harry Biller

In an industry talk, Mandy Sendel gave a brief overview of Allresist's latest developments (Fig. 3).

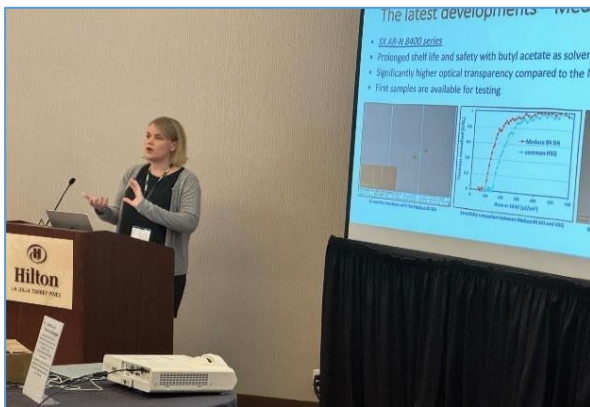


Fig. 3 Mandy Sendel during her industry talk at the EIPN

In September, the 50th MNE 2024 took place in Montpellier, and we again participated as a Gold Sponsors with an attractive stand. Our portfolio raised great interest as usual, with Allresist's main focus at the conference being Medusa 84 this year. Initial results with this resist were already presented in San Diego, while in Montpellier many interesting applications with excellent performance characteristics could be shown (→ Fig. 5 to 9). We hope that with Medusa 84, we have addressed one of the challenges in electron beam lithography. Please refer to the technical details in point 2 below.

As word spread during the conference that Allresist was offering a significantly improved version of HSQ with Medusa 84, many constructive discussions took place and numerous users expressed interest in trying Medusa 84 in practice.



Fig. 4 R&D team presents Allresist products at the MNE

2. Worldwide interest in Medusa 84 - AR-N 8400 SiH

HSQ, a frequently used e-beam resist, will in the near future no longer be offered by the current manufacturer (DOW). Despite its undisputed advantages, HSQ also has serious drawbacks: the long-term stability is unsatisfactory (less than three months even when stored in a refrigerator), processing must be completed in a short time, and the resist must be prepared from a solid itself. A comparable HSQ from other suppliers does not improve these properties since they are all based on the same commercial polymer.

In the interest of users, there was an urgent need for significant improvement. Allresist has taken on the technological challenge of developing a similar, but improved polymer with considerably better application features. Through a targeted synthesis (which specifically separates the stable and sensitive molecular fraction of hydrogen silsesquioxane) and extensive purification processes, we are now able to offer a resist with much higher stability. Even after six months of storage in the refrigerator at 10 °C, the excellent application properties remain unchanged. Additionally, the process for electron beam lithography can be interrupted for several days without altering parameters. This stability is achieved through the addition of special stabilisers.

Several users meanwhile tested Medusa 84 and not only praised its ease of use, but also confirmed that its properties did not change during the tests over several days.

A comparison with a commercial HSQ under identical conditions yielded the following results:

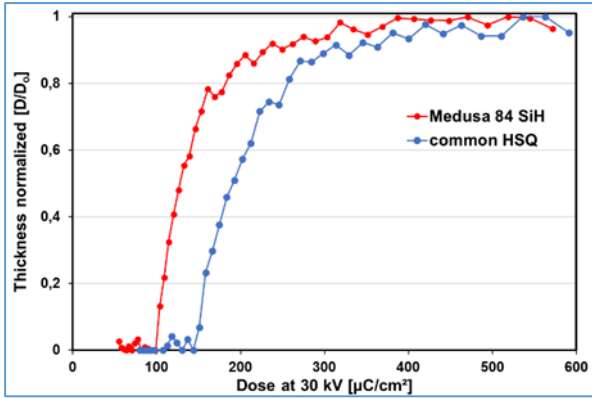


Fig. 5 Comparison of sensitivities of Medusa 84 SiH and HSQ; developer AR 300-73 @Heyroth, MLU, Halle

The sensitivity of Medusa 84 is even slightly higher in this application.

Medusa 84 has now been used in various applications; some examples are shown below.

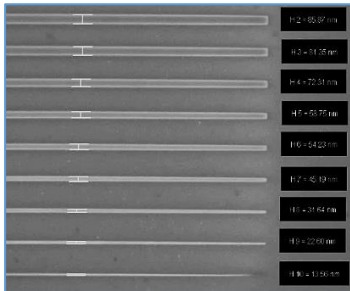


Fig. 6 Single line structures of Medusa 84 SiH on GaAs, written at 30 kV. A TMAH-salt developer was used to enhance contrast while maintaining good adhesion properties (@ E. Maggiolini, JKU Linz)

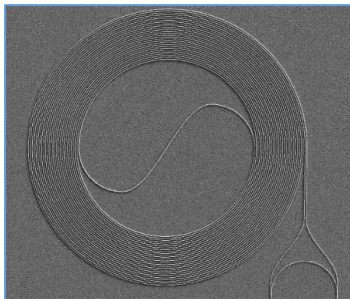


Fig. 7 Circular 100 nm line/space structures written on silicon at 1000 μC/cm² at 100 kV and developed with AR 300-73 (6.5 % TMAH solution). @ J. Hohmann, KIT-IMT, Karlsruhe

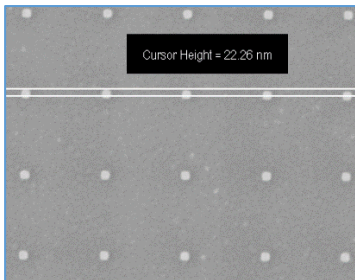


Fig. 8 Square columns with 22 nm edge length and 50 nm height on GaAs, written at 30 kV and developed with AR 300-44 (2.38 % TMAH). (@ E. Maggiolini, JKU Linz)

For the structuring of Medusa 84 on insulating substrates such as quartz, the new variant of Electra 92 (SX AR-PC 5092.02/1) is an excellent choice. This conductive resist is spun onto Medusa 84 and dissipates charges during exposure. The layer has excellent coating and adhesion properties and is suitable for both HSQ and Medusa 84, but also for other resists.

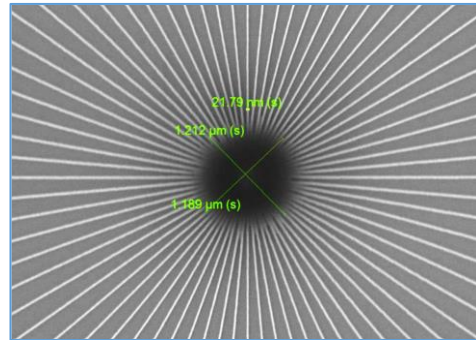


Fig. 9 Medusa 84 Siemens star written on quartz with the new conductive layer Electra 92 (SX AR-PC 5092.02/1). © B. Drent, AMOLF NanoLab Amsterdam

We would be happy to provide further information to interested readers, e.g. details on the greyscale application (see poster Fig. 10; © Z. Márton, ELI-ALPS Szeged).

Allresist will soon offer ready-to-use resists in three different layer thicknesses:

- 50 nm (4,000 rpm, 4 % solids)
- 100 nm (4,000 rpm, 7 % solids)
- 400 nm (4,000 rpm, 23 % solids) (→ 1.0 μm / 800 rpm)

For future users, we have two further pieces of information regarding availability and pricing: Medusa 84 can be purchased as a stock item from January 2025 and at moderate prices.

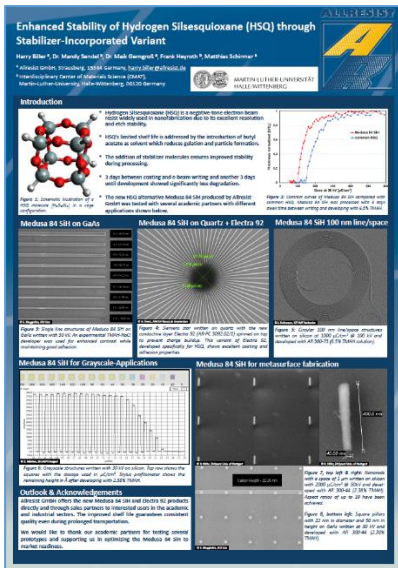


Fig. 10 Medusa 84 poster presented at the congresses
 You are welcome to download this Medusa poster ([Link to Allresist website](#)).

3. Daughter Ulrike Schirmer now appointed as Managing Director

Brigitte and Matthias Schirmer founded the Allresist GmbH in 1992. The couple has been managing partners for 32 years meanwhile, and now it is time pass the baton of responsibility. We are very fortunate that our daughter Ulrike will continue to lead the company in our spirit. She decided to join Allresist in 2011 and gained extensive business experience after completing her second degree as a Master of Business Administration, including working as an assistant to the management. On 1.8.2024, she was appointed Managing Director alongside her mother, Brigitte Schirmer. Her father, Matthias

We hope that you found something interesting and inspiring and would appreciate your feedback. The next issue of the AR NEWS will be presented again in April 2025. Until then, we wish you and us much success 😊.



Strausberg, 16.10.2024
 Matthias, Brigitte and Ulrike Schirmer and the team of Allresist

Schirmer, will continue to support Allresist as a Senior Advisor.

4. Our current environmental activities: Tree planting



Fig. 11 Tree planting event in autumn 2024

Our annual tree-planting day has become a cherished tradition. The entire team gathers in the forest near Gottesgabe in the Märkisch Oderland district to plant saplings. Since 2020, we have supported the local forester with generous donations, enabling him to purchase hundreds of saplings which we then plant together. If ever the word "team-building" was appropriate, it's here. And we look forward to seeing our resilient Allresist forest grow 😊.

5. No price increases for listed products in 2025 😊

Dear customer, you will be pleased with this positive news: Allresist will keep the prices of its listed products stable in 2025. This is our contribution to strengthening the economy, which was also made possible by the improvement and streamlining of our internal production processes.