



AR NEWS

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Welcome to the 44th issue of the AR NEWS – alas, still in the shadow of the ongoing COVID–19 pandemic. And again, we would like to keep you informed about the further development of our company and its research projects.

1. Working in the times of Corona

When our last AR NEWS was published half a year ago, COVID-19 vaccinations became widely available and we thus hoped that life would largely return to normal in the near future. This hope has however only partially been fulfilled. Unmistakably, progress has been made, but more solidarity could have been possible on the part of many; an opinion, which obviously not everybody in our society shared.

All our full-time employees are now fully vaccinated and work has returned to normal. The hygiene regulations are of course still maintained, but masks are only required if the minimum distance is below 1.50 m. We've got fairly well though the pandemic, without any production downtimes or delivery delays. Since 2020, we've built up a large stock of the most important raw and packaging materials so that we can meet the increasing demand for our products always on time.

The EIBPN (Triplebeam) congress, scheduled to be conducted in San Diego, was held only virtually, but still turned out to be an impressively prosperous communication platform

for discussions and meetings practically around the globe, even though this option did not completely replace personal contacts.

In this respect, we are full of hope and anticipation that the EIPBN 2022 (New Orleans) at the end of May and the MNE 2022 (Leuven) in mid-September will again be freely accessible to all participants. We thus really look forward to your visit and personal contact.



Electron, Ion and Photon Beam Technology and Nanofabrication
The Sheraton New Orleans Louisiana 31.05.2022 – 03.06.2022



Micro & Nano Engineering (MNE) 2022

Gasthuisberg, Leuven, Belgium, 19.09.2022 – 23.09.2022

2. More efficient manufacture of Electra 92

Many of our customers now use conductive Electra layers for their processes and technologies. Since its introduction on the market in 2018, synthesis and processing of Electra have been continuously improved. It was for example possible to increase the conductivity by a factor of 5 in the period from 2018 to 2020. An undesirable side effect, however, turned out to be that the long-term stability of certain batches fell below 6 months, resulting in defects during coating. We now solved this problem with an innovative manufacturing technology.

At first, we thoroughly investigated all synthesis process parameters and applied a sophisticated temperature regime with defined pH values kept at all times. The yield increased by 42 %, while still meeting the optimum spectroscopic extinction values to guarantee our high product quality.

During the tests we discovered that the drying step after dialysis which had been carried out up to that point was the reason for the reduced long-term stability of the polymers with the highest conductivity. Looking for alternative solutions, we came across the Tangential Flow Filtration (TFF). The Sartorius company then adapted a SARTOFLOW device precisely to our requirements (see AR NEWS April 2021).



Tangential Flow Filtration with SARTOFLOW

First test runs in spring 2021 were quite successful. As usual in our company, the device was more elegantly renamed and is now called Tiffi (TFF) 😊. The working time per approach is reduced to 1/30 compared to the old technology, and 80 % of the previously required DI water can now be saved. The entire Electra production via Tiffi is running significantly faster with the usual high product quality, but much more environmentally consciously.

Our investigations also revealed that an addition of ethanol instead of isopropanol improves the coating behavior and long-term stability.



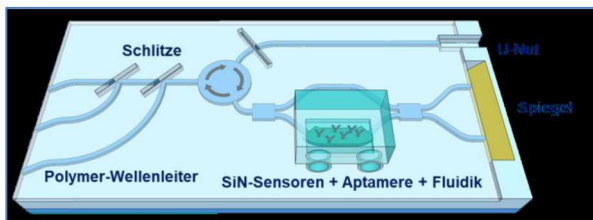
Oliver Schirmer (right) and Eric Röschke (left), exchanging filters at the „Tiffi“

3. RUBIN – highly promising project in optical sensor technology

A consortium of 13 national, mostly regional partners from the Berlin/Brandenburg area is applying for the “PolyChrome” project within the framework of the BMBF funding program “Regional entrepreneurial alliances for innovation” (RUBIN). Aim of the RUBIN guideline is to strengthen innovation ecosystems to improve competitiveness and employment prospects of structurally weaker regions.

The overall goal of the project is to provide a universal technology platform for the realisation of multifunctional polymer-based components for optical sensors, analytics, and environmental monitoring covering a spectral range from visible light (Vis) from 400 nm to near-infrared light (NIR) up to 1650 nm.

Photonics is one of the key technologies for the advancing digitisation in today's information society. Polymer materials are particularly suitable for a fast and inexpensive production of miniaturised hybrid-optical components. The proposed project "Poly-Chrome" is thus intended to considerably expand the wavelength range from the "PolyPhotonics Berlin" project from NIR to the beginning of visible light at 400 nm to meet the high requirements of damping, index contrast and durability. In addition, the integration capability of the "PolyBoard" technology platform can be used to generate new functions through an implementation of quantum dots, silicon nitride (SiN), passive microfluidic structures, and the functionalisation of waveguides using specific capture molecules (aptamers).



Innovation basis for „PolyChrome“and related key topics for material development

For the development of waveguide materials, Allresist will resort to their well-proven, broad-range raw materials for the production of resists, but also develop adapted synthesis processes to optimize these polymers. The focus of the applications will be in the VIS wavelength range (400 - 1,000 nm).

The project starts on April 1st, 2022. With this report we want to give all interested readers the opportunity to find out about the details and to think about possible cooperations.

4. EOS 72, a chemically amplified positive e-beam resist

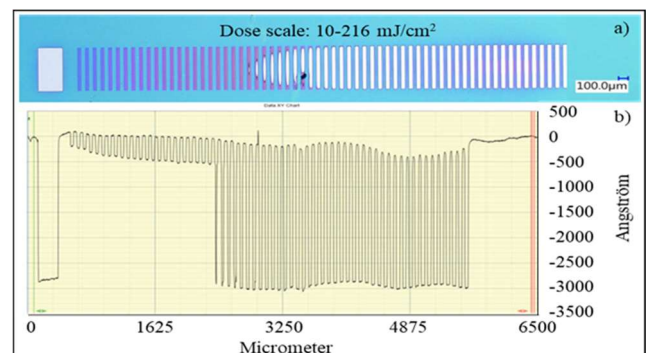
At the MNE in Turin, we presented a poster concerning our new development EOS 72. These works were conducted in cooperation with the Interdisciplinary Center for Materials Science, Martin Luther University (MLU), Hal-

le-Wittenberg, and the Institute of Microstructure Technology (IMT), Karlsruhe Institute of Technology (KIT).

EOS 72 is composed of a copolymer, various acid generators and a base as a quencher, dissolved in methoxypropyl acetate. The working dose for e-beam applications is currently approx. 5-10 $\mu\text{C}/\text{cm}^2$; for photolithography approx. 30-45 mJ/cm^2 in a wavelength range of 365 to 405 nm. The high alkaline stability could already be confirmed for first prototypes; EOS 72 can for example be developed with 0.70 n TMAH solutions.



Test structures with EOS 72 (KIT)



Gradation curve with steep contrast (MLU)

5. Contribution against climate changes: Allresist plants trees

In addition to COVID-19, climate changes with partly devastating effects have drawn much attention this year. Even many politicians are now realizing that the future might be very uncomfortable for our next generations, unless we change the vast consumption of fossil energies and the destruction of natural habitats.

Allresist continuously makes (small) contributions to provide a suitable world for

our grandchildren. We use photovoltaic energy and our green roof improves the microclimate, feeds and shelters insects.

Our manufacturing and synthesis processes are already now optimized to conserve resources as much as possible.

As a team, we decided to help in one more way. In November, we will plant trees in the village of Gottesgabe in the Märkisch-Oderland district for a healthy climate. From our donation, seedlings were bought whose planting is now prepared by the local forester.

The following two pictures show what it will look like, and actual pictures of this new project will follow in the next issue of our AR NEWS.



Foto: Horizonte-magazin.ch



Foto: Forestbook.info

We hope that you found some interesting news or suggestions and look forward to your comments. The next issue of our AR NEWS will again be presented in October 2021.

Until then, we wish you and ourselves every success. Stay healthy! 😊



Strausberg, 16.10.2021
Matthias & Brigitte Schirmer in the Team of Allresist