

# Retrospective

In 2023, Fraunhofer IKTS presented its research and services at numerous trade fairs in Germany and abroad and as the organizer of several scientific congresses as well as at various events for the general public.

January 1, 2023

## Carbon recycling at the Freiberg site

With the integration of the Freiberg research group Carbon Cycle Technologies KKT into Fraunhofer IKTS, the institute aims to leverage further synergies in electrolysis, hydrogen and power-to-X technologies and develop sustainable carbon sources for the circular economy. Carbon is a key raw material for countless products in our daily lives. At the new site in Freiberg, chemical recycling processes such as pyrolysis and gasification are being optimized and tested on an industrial scale. In future, these recycling processes are to be combined with high-temperature electrolysis and Fischer-Tropsch synthesis, both core technologies at Fraunhofer IKTS, in order to provide new raw material and energy resources for a green industry.

January 8, 2023

## Research partnership for sustainable shipping and energy

Prof. Alexander Michaelis, Institute Director of Fraunhofer IKTS, has signed a memorandum of understanding with Korea Shipbuilding and Offshore Engineering (KSOE) Co, LTD and the European SOC producer ELCOGEN in Las Vegas. The partners have agreed to cooperate closely in the fields of hydrogen and fuel/electrolysis cells.

February 1, 2023

## Spin-off AMAREA Technology GmbH founded

*(Top image)*

Multi-material 3D printing with high-performance materials makes it possible to print functionalized or functionally graded products within a single process while saving resources – individually, quickly and cost-effectively. The technology was developed at Fraunhofer IKTS and successfully demonstrated in



projects with industrial customers. In February 2023, the developers founded AMAREA Technology GmbH to commercialize the multi-material jetting technology and bring the 3D printers to series production.



March 15, 2023

## Trade fairs: Where you could meet our employees in person

*(Middle image)*

A total of 43 appearances in Germany and abroad reflected the diversity of Fraunhofer IKTS and the areas of application of ceramic components, systems and non-destructive testing technologies. The overarching key topics were increasing efficiency, protecting resources and closing cycles.

The institute demonstrated solutions for water treatment at the **TausendWasser** trade fair in Berlin and at **HANNOVER MESSE**. By combining the latest UV diodes and cellular functional ceramics, highly diluted, dissolved chemical microparticles such as glyphosate, bisphenol A, drug and cosmetic residues can be eliminated from water in an energy-efficient manner, for instance in sewage treatment plants.

Together with Friedrich Schiller University Jena, the institute also focused on sodium-ion batteries in Hanover. With exhibits and presentations, the partners showcased the expertise established in Thuringia and Saxony for the commercialization of these sustainable batteries made from local, readily available raw materials along the “New Via Regia for Batteries”. What these clusters of expertise currently need is strategic coordination and support. Looking ahead, industrial mass production of sodium-ion batteries could be achieved in Germany within five years.

At **FILTECH**, one of the world’s largest trade fairs for filtration and separation technology, IKTS presented, among other things, carbon membranes that can separate CO<sub>2</sub> from industrial gases with concentrations of over 97 %. This CO<sub>2</sub> can be recycled, e.g. as a raw material for non-fossil fuels or chemicals. IKTS presented further solutions from materials to systems for the energy transition at the **European Hydrogen Week** in Brussels and at **ees Europe**.

Visitors to **CONTROL** and **JEC World**, among others, learned about innovative systems for condition monitoring and non-destructive testing. The highlight at **AeroNDT** in South Korea was EddyCus® MPECS flex. This device can be placed on aircraft and other structures and tests 2.5D-curved CFRP surfaces on site. This allows delamination from bird strike or other causes to be detected early on.

IKTS developments also enable precise diagnostics and individualized, gentle treatments in the medical field, for example in dental technology, small joint prosthetics or instrumental medicine, with IPUClean, FingerKit and ClickKit-Well presented at **IDS**, **formnext** and **Compamed**.

March 17 | April 27, 2023

### Schau rein! and Girls’Day – Profession: Chemical and physics laboratory technician

(Top image)

What does it mean to work in the laboratory of a research institution? On March 17 and April 27, Dresden school students spent a day immersed in everyday laboratory life at the IKTS site in Dresden-Gruna as part of the “Week of Open Companies Saxony” and the nationwide Girls’ Day. They got to know the profession of chemistry and physics laboratory technician, tried their hand on some typical lab tasks and gained exciting insights into trainee programs at Fraunhofer IKTS from former trainees and our recruiting team.



March 27–30, 2023

### Annual Meeting of the German Ceramic Society

In spring 2023, the ceramics community met for the annual conference of the German Ceramic Society at the Ernst Abbe University of Applied Sciences in Jena and in Hermsdorf. Over 300 participants took the opportunity for personal networking and attended the three-day lecture program. The high-tech companies at the Tridelta Campus Hermsdorf opened their doors as part of an industry excursion. The up-and-coming ceramists took part in an intensive contest for the best lecture, and in a panel discussion experts from politics, business and research discussed the opportunities and risks for the ceramics industry in the context of the energy transition.



March 29, 2023

### Prof. Michaelis receives Rieke Ring of the DKG

(Bottom image)

Prof. Alexander Michaelis, Institute Director of Fraunhofer IKTS, was honored with the Rieke Ring of the German Ceramic Society for his many years of commitment to the DKG. The award ceremony took place during the DKG Annual Meeting in Jena.



April 17, 2023

### Young researchers welcome

*(Top image)*

The IKTS working group “Condition Monitoring Systems” has a long tradition of inviting preschool children to the institute. In many small experiments, the youngsters learned how monitoring systems help to increase safety for people and the environment and to prolong the service life of systems.

As part of the Junior Doctor program, pupils in grades 3 to 5 experimented with eddy currents and examined various metals for defects that cannot be seen with the naked eye. They found small cracks or even the tiniest changes in the metal, which may later cause a component or device to break.

Under the motto “hands-on science”, primary school pupils took a look into various departments at Fraunhofer IKTS and experienced first hand how multifaceted the activities at a research institute are: from scientific work and supporting work in the laboratory and workshop to administrative tasks.

May 3, 2023

### Nuclear technology and batteries are topics in online seminar series NDT4INDUSTRY

The NDT4INDUSTRY online seminar series presents the latest developments in non-destructive testing (NDT) for industry. In May, the focus was on how the latest ultrasound, eddy current, acoustic and X-ray technology can be used to monitor and test nuclear facilities during operation and what options IKTS offers to support the dismantling of nuclear facilities. The November seminar focused on batteries. Monitoring systems that ensure the fault-free production of battery electrodes were presented at the event. They can be integrated into the production line at various points so that processes such as mixing the electrode mass, coating, drying or calendering

can be continuously monitored. The virtual laboratory tour at Fraunhofer THM in Freiberg showed a pilot line in which IKTS is testing new materials, manufacturing and monitoring technologies for battery electrode production.

June 3, 2023

### Industrieerleben

At the “INDUSTRIEERLEBEN” event, visitors had the opportunity to get to know the companies at the Erfurter Kreuz industrial site. The Battery Innovation and Technology Center BITC also opened its laboratories and pilot plants to the interested public and offered insights into a state-of-the-art research facility. During guided tours of the institute, researchers explained how energy storage systems are tested in complex facilities and how this optimizes the production of batteries. There were also exclusive insights into current research projects in the field of hydrogen technologies.



*Photo: Fraunhofer, Photographer: Andreas Rudolph*

June 7, 2023

### Ground-breaking ceremony for the new institute building of Fraunhofer ZESS

*(Middle image)*

The Fraunhofer Center for Energy Storage and Systems ZESS was launched back in 2019. In the presence of Lower Saxony’s Minister for Science and Culture, Falko Mohrs, and the Mayor of Braunschweig, Dr. Thorsten Kornblum, the ground-breaking ceremony for the new institute building at Braunschweig Research Airport took place on June 7, 2023. From 2025, researchers from the participating Fraunhofer institutes will have the necessary infrastructure in place to advance the development and implementation of innovative energy storage systems from prototype to industrialization.

June 20, 2023

### **abonocare® – sustainable nutrient recycling from organic residues**

In the abonocare® growth core, companies and research institutions have jointly tested technologies for intelligent and sustainable nutrient recycling of organic waste in the spirit of the bioeconomy. Their goal: an economic circular economy in which biogenic waste is recycled into resources. To conclude the project, the partners presented their developments to the public and discussed the recycling and application potential of new types of fertilizer products, processing technologies and social framework conditions.

July 1, 2023

### **Science Night at TU Ilmenau**

Thousands of visitors flocked to the Ilmenau Science Night on July 1 on the campus of the Technical University, where IKTS was also represented in the foyer of Fraunhofer IDMT. In an interactive presentation, visitors were able to find out about the topic of hydrogen and learn more about production research into energy storage systems.

July 4, 2023

### **Opening of the Hightech Incubator**

With the “Hightech Incubator” program, start-ups at Tridelta Campus Hermsdorf can benefit from first-class support. Founders are advised by the Campus Business Angels, among others. Prof. Ingolf Voigt, Deputy Director of the institute and head of the Hermsdorf site, is also part of this mentoring team. The official launch of the program took place at Fraunhofer IKTS, where IKTS researchers are preparing the spin-off POXOS® aiming at the sale of oxygen generators with the support of the Hightech Incubator.

July 6, 2023

### **ThWIC kick-off**

The first alliance meeting of the project partners in the ThWIC Thuringian Water Innovation Cluster took place in Jena with a two-day kick-off event. The main aim of the event was to network the sub-projects and partners in the cluster. The meeting was rounded off with an evening event in the Botanical Garden. The aim of the cluster is to provide impetus for solving global water problems and to use the advantages of Thuringia's small and medium-sized enterprises to open up cutting-edge research for social application more quickly.

August 31, 2023

### **Ceramics Meeting Point on three floors**

The Ceramics Meeting Point at the IKTS site in Dresden-Gruna has been an integral part of Fraunhofer IKTS's public relations work for 20 years. It showcases the institute's range of topics and is therefore an important part of the program for guided tours, customer visits and conferences. In addition, more than 70 partners from industry and research present their range of services at this location as part of the cooperation with Ceramics Applications published by Göller Verlag. Following extensive renovation, the Ceramics Meeting Point was officially reopened on August 31 as part of an employee event.



September 4–5, 2023

### **International Sodium Battery Symposium SBS4**

*(Middle image)*

Sodium batteries are a promising alternative to lithium cells. More than 120 international experts came to Dresden at the beginning of September to discuss established and innovative sodium-based battery concepts – from the fundamentals and active materials to cell concepts, systems, tests, markets and applications. Companies and researchers presented their latest developments at the accompanying industry and poster exhibition.

September 19, 2023

### **Media breakfast: Ceramic technologies for the bioeconomy**

Vitamins from the rooftop? Prof. Michael Stelter, Deputy Director of Fraunhofer IKTS and holder of the Chair of Technical Environmental Chemistry at Friedrich Schiller University Jena, explained what technologies are needed in indoor farms and greenhouses for efficient and compact irrigation water and



nutrient recycling, heat and humidity management, lighting and sensor technology at the press breakfast of the Fraunhofer Institute Center Dresden on September 19. The necessary components and system know-how are readily available at IKTS. An interdisciplinary team is now working on integrating these into an automated and fully digitalized overall system.

**September 25–27, 2023  
Dresden Battery Days**

*(Top image)*

Around 70 international experts in electrochemical energy storage got together for the 4<sup>th</sup> edition of the Dresden Battery Days to discuss the necessary “steps towards a sustainable and circular battery value chain”. Circular processes, digitalization and recycling were the focus of the presentations and discussions at the two-day conference.



*Photo: CATL*

**October 23, 2023  
High-end test center for long-lasting batteries**

*(Bottom image)*

Fraunhofer IKTS has been cooperating with the Chinese battery manufacturer Contemporary Amperex Technology GmbH

(CATL) at the Arnstadt site since 2020. Together, the partners set up a test center in the “BattLife” project to create models for calculating the service life of batteries. Following the successful completion of the project, the continued cooperation in the follow-up project “BattForce” was celebrated at a ceremony. The joint high-end test center aims to further optimize battery production and extend the service life of batteries, particularly for the automotive sector.

**December 1, 2023  
Dutch delegation visits Fraunhofer IKTS**

As part of a delegation visit, Dutch experts from the photovoltaic (PV) industry stopped by Fraunhofer IKTS for a German-Dutch network meeting on solar photovoltaics. The event was organized by the Dutch embassy with the support of the Dutch government and the Free State of Saxony to connect Saxon and Dutch companies, discuss the latest developments in the PV industry and exchange ideas.

**December 7, 2023  
Belgian-Saxon networking event on circular economy**

Belgian and Saxon stakeholders from industry, research and business development discussed promising recycling technologies, expertise and framework conditions “on the path to a decarbonized and circular industry” at a networking event at Fraunhofer IKTS in Dresden. The focus was on networking the players and possible collaboration. The meeting was organized by the Wallonia Export & Investment Agency, hub.brussels, Energy Saxony e. V. and Fraunhofer IKTS – with the kind support of Wirtschaftsförderung Sachsen GmbH.

December 9, 2023

### Best physics laboratory assistant in Saxony and award for dual training at IKTS

Anabell Zeller, who completed her training as a physics laboratory technician at Fraunhofer IKTS in Dresden-Klotzsche, was recognized by the Dresden Chamber of Industry and Commerce as the best in her field. Her outstanding degree also made her the best graduate in her field in the Free State of Saxony. In addition to the young skilled workers, companies training apprentices were also honored for their above-average dual vocational training. In this context, Fraunhofer IKTS at the Dresden-Klotzsche site was once again awarded the title of 'Excellent Training Company'.

January 17, 2024

### Industry Day of the competence clusters "Recycling & Green Batteries" (greenBatt) and "Battery Usage Concepts" (BattNutzung)

Around 100 interested partners from industry and research accepted the invitation of the two competence clusters "greenBatt" and "BattNutzung" to Dresden and learned about the most important results and findings of the cluster projects. Over the past three years, scientific issues relating to the sustainable and lifecycle-oriented design of lithium-ion batteries as well as concepts for their subsequent use and recycling have been researched as part of the umbrella concept of battery research production.



January 24, 2024

### Fraunhofer President Prof. Hanselka on dialog tour

(Bottom image)

On his dialog tour, a series of talks throughout Germany, the new Fraunhofer President Prof. Holger Hanselka visited the Fraunhofer Institute Center Dresden in mid-January. IKTS Institute Director Prof. Alexander Michaelis accompanied him on

a laboratory tour of the institute. Dr. Stefan Rothe presented the electrolysis and fuel cell technologies developed at IKTS. Dr. Lars Schubert demonstrated pressure tank monitoring with ultrasound for safe hydrogen storage. Dr. Matthias Jahn and his team focused on power-to-X technologies and the direct reduction of steel with hydrogen. Daniela Herold presented the sodium solid-state battery for stationary energy storage.



February 20, 2024

### Center for German-Korean research cooperation inaugurated

(Top image)

With a ceremony, the "Germany-Korea Technology Cooperation Center for Global Value Chains" was opened at Fraunhofer IKTS in Dresden-Klotzsche. Together with the Korea Evaluation Institute of Industrial Technology (KEIT), Fraunhofer IKTS will in future operate the center, which will act as a coordination point for R&D cooperation between Fraunhofer institutes, universities and companies from Germany and Korean research and industry partners. Together, technology needs and technology funding programs for joint projects in both countries are identified, project initiation is supported and technology transfer is prepared. Prof. Ingolf Voigt, Deputy Director of Fraunhofer IKTS, was appointed as IKTS representative to the Korea-Germany Future Technology R&D Planning Committee.