

RETROSPECTIVE



EVENTS AND HIGHLIGHTS

March 25–26, 2015

Second International Symposium on Optical Coherence Tomography for Non-Destructive Testing OCT4NDT

In March 2015, Dresden was the center of the optical coherence tomography (OCT) world. More than 60 people from 18 countries congregated at Fraunhofer IKTS to exchange information about industrial applications for this non-contact process. The high-level symposium program and the accompanying industrial exhibition were well received by the international OCT community. Thanks to the resonating success of the event, it will be continued in the future. The 3rd OCT4NDT symposium is scheduled for 2017 in Linz, Austria.

April 20–23, 2015

11th International Conference and Exhibition on Ceramic Interconnect and Ceramic Microsystems Technologies CICMT

In 2015, for the first time ever, the CICMT was held by Fraunhofer IKTS in Dresden under the auspices of the American Ceramic Society (ACerS), IMAPS Deutschland, and the Deutsche Keramische Gesellschaft (DKG / German Ceramic Society). Over the last decade the conference series has evolved into one of the foremost international forums for discussion of the latest R&D in the fields of ceramic microsystem and ceramic interconnect technologies. More than 140 participants from 19 nations came to Dresden to present their research results.

June 12, 2015

Prime Minister of the Czech Republic Bohuslav Sobotka visits Fraunhofer IKTS in Dresden

Czech Prime Minister Bohuslav Sobotka paid a visit to Fraunhofer IKTS in Dresden on June 12 while in Germany to meet with government officials. Sobotka was accompanied by the Minister President of Saxony Stanislav Tillich, the Saxonian Minister of Economic Affairs Martin Dulig, and the Czech Minister of Transport Dan Tok. At Fraunhofer IKTS, Sobotka was



RETROSPECTIVE

informed about current developments in environmental and energy research. At the heart of the government talks was the furthering of the Saxonian-Czech cooperation in matters related to the economy, transport, science, the environment, and education.

August 25, 2015

Thuringians Minister of Economic Affairs, Science, and the Digital Society Wolfgang Tiefensee at IKTS Hermsdorf

On August 25, the Thuringian Minister of Economic Affairs, Science and the Digital Society visited the Hermsdorf site of Fraunhofer IKTS as well as local technology firms to find out more about the latest research and product developments in advanced and functional ceramics. Ceramic products from Hermsdorf are used, e.g., in environmental and energy technologies, medical technology, optics, test equipment, and the aerospace industry. Minister Tiefensee praised the close networking of companies from diverse industries with Fraunhofer IKTS as an important driver of the Thuringian economy.

September 16, 2015

Fraunhofer Industry Day "Smart Materials"

Although the range of potential applications for smart materials and microsystems is dazzling, smart sensors, energy converters, and piezoelectric actuators are still not yet widely used in many industries. The topic of the second Fraunhofer "Smart Materials" Industry Day was hence to stimulate cooperation between engineers and designers in product development and to explore the question of how organizational and network structures can contribute to accelerating technology transfer to industrial production of smart materials and better aligning research projects to the needs of companies. More than 60 regional representatives from science, economy, and various associations were updated on the latest research projects during the program and took the opportunity to network in the subsequent get-together.

September 17–18, 2015

International Symposium on Piezocomposite Applications ISPA

The sixth ISPA symposium took place in September 2015 at Fraunhofer IKTS in Dresden. The event focused on scientific and technological developments as well as market requirements and future trends in the field of piezoelectric ceramics and their integration into various matrix materials. Over 75 participants and 11 exhibitors from 9 countries made the symposium and the accompanying industrial exhibition an outstanding platform for the exchange of knowledge. The successful symposium series will be continued in 2017 in Dresden.

- 1 *The participants of the OCT4NDT symposium discussed industrial applications of optical coherence tomography.*
- 2 *For the first time, CICMT took place at Fraunhofer IKTS in Dresden.*
- 3 *During the tour through the institute: Institute Director Prof. Alexander Michaelis, Saxonian Minister-President Stanislaw Tillich, Saxonian Minister of Economy Martin Dulig and Czech Prime Minister Bohuslav Sobotka.*
- 4 *Thuringians Minister Wolfgang Tiefensee with Dr. Ingolf Voigt and Dr. Isabel Kinski at Fraunhofer IKTS in Hermsdorf.*



RETROSPECTIVE

September 22–24, 2015

Dresden Battery Days

Fraunhofer IKTS held the first “Dresden Battery Days” in 2015, drawing 85 participants from industry and research. Topics were low-cost, optimized active materials and components, efficient production of electrodes, production-optimized cell and module designs, and improved product yield in the manufacturing of lithium-ion batteries. The “Dresden Battery Days” is the partner event to the “Graz Battery Days” – in the future the event shall be held alternately in Graz and in Dresden on a yearly basis and will address specific aspects of the latest battery research and development.

October 2, 2015

Fraunhofer IZI and Fraunhofer IKTS open Bio-Nanotechnology Applications Lab in Leipzig

On October 2, 2015, the Leipzig-based Fraunhofer Institute for Cell Therapy and Immunology (IZI) and Fraunhofer IKTS officially presented their new equipment inventory for the interdisciplinary management of materials and bioscience issues. Secretary of State Uwe Gaul, in Leipzig for the bionection partnering conference, attended the opening ceremony. The Bio-Nanotechnology laboratory equipment was funded through an investment of three million euros from the Saxonian State Ministry for Science and the Arts (SMWK) under funding from the European Regional Development Fund (EFRE).

October 30, 2015

Inauguration of new Application Center for Membrane Technology in Schmalkalden

In the presence of the Thuringian Secretary of State Georg Maier and other invited guests, Ingolf Voigt, Deputy Director of Fraunhofer IKTS, opened the extension of the “Application Center for Membrane Technology” in Schmalkalden on October 30, 2015. With this extension, the rising demand for



efficient separation techniques in the fields of water and waste water technology, energy and environmental technology, biotechnology, and food technology is met. Secretary of State Maier praised this step as a clear sign of the successful cooperation between research and Thuringian businesses involved in environmental and process technology. With its service offering, the Application Center for Membrane Technology particularly targets small and medium-sized businesses. Complementing the membrane development work performed at the Hermsdorf site, test systems are developed and built according to customer specifications, lab and field tests are conducted, and processes for product separation and purification are optimized in Schmalkalden. The application center also offers consulting on water management, membrane testing, and process design for waste water purification and water treatment.

November 19, 2015

Fraunhofer IKTS signs MoU with South Korean research institutes

On November 19, Institute Director Prof. Alexander Michaelis signed a memorandum of understanding on behalf of Fraunhofer IKTS with Korea Institute of Materials Science and Yonsei University from South Korea. The partners agreed to cooperate in research projects and in joint seminars and publications on materials science, bio- and nanotechnology, environmental and process technology, and energy. In 2016, a joint research center will be built on Yonsei International Campus to provide a central point of contact for academic-industry cooperation with companies, startups, and other research institutions.



RETROSPECTIVE

Awards

October 5, 2015

Thuringian partnership receives prestigious US Environmental Award

In recognition of their ceramic nanofiltration membranes, Fraunhofer IKTS and inopor GmbH from Veilsdorf received the 2015 Corporate Environmental Achievement Award from the American Ceramic Society (ACerS). Filtration and treatment of water is becoming an important global issue. With porous membranes exhibiting the appropriate pore sizes, microorganisms, dissolved organic matter, and salts can be separated from waste water with little energy and no additional chemicals. Fraunhofer IKTS succeeded in developing the world's first ceramic nanofiltration membrane with a pore size of less than 1 nm. Together with inopor GmbH, the institute is producing these membranes on an industrial scale and has already realized numerous applications.

November 23, 2015

Two IKTS trainees among the top Fraunhofer trainees in 2015

Congratulations go out to chemistry laboratory technician Daniela Möbius and physics laboratory technician Jan Ullmann. They completed their training with the grade of "very good" and were among the best trainees at Fraunhofer in 2015. The ceremony recognizing the top trainees was held on November 23 at the headquarters of the Fraunhofer-Gesellschaft in Munich. The teams under Beatrice Bendjus and Lars Rebenklau were honored as the best Fraunhofer trainers.

December 14, 2015

Germany's top physics laboratory technician trainee trained at Fraunhofer IKTS

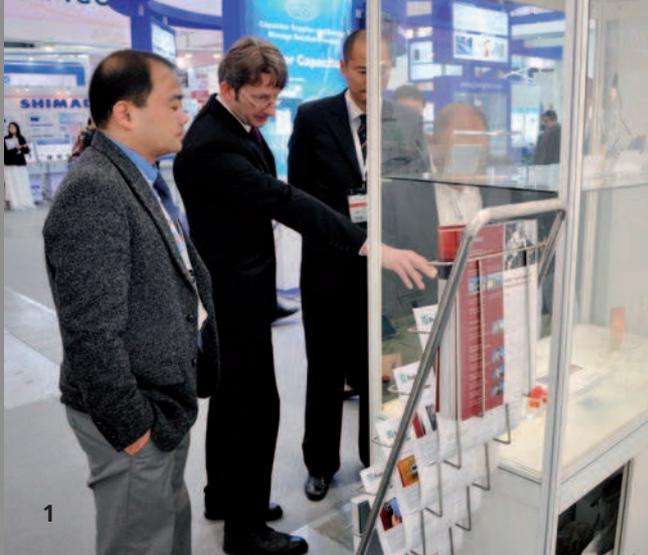
Scoring an outstanding 98.50 points in his final exam with the Chamber of Commerce and Industry (IHK), Jan Ullmann was the best IHK trainee in Saxony and the best IHK physics laboratory technician trainee in all of Germany. The honoring of the country's best took place on December 14 in Berlin. Based on this success, Fraunhofer IKTS received the title of "Outstanding Training Company in 2015" from the Dresden Chamber of Commerce and Industry.

1 More than 75 people from nine different countries took part in ISPA 2015.

2 IKTS project coordinator Dr. Jörg Opitz (center) gives a tour of BNAL to Secretary of State Uwe Gaul (right), Prof. Frank Emmrich, Director of Fraunhofer IZI (left), and other guests.

3 MoU signing at Fraunhofer IKTS: Prof. Alexander Michaelis with Director of the Institute for Global Convergence Technology Muhwan Shin (left) and Director of the Korea Institute of Materials Science Hai-Doo Kim (right).

4 F.l.t.r.: Ingolf Voigt and Petra PuhlfürB (Fraunhofer IKTS), Cheryl Brayman (inopor GmbH), and ACerS President Prof. Kathleen A. Richardson at the awards ceremony in Columbus, Ohio, USA.



RETROSPECTIVE

TRADE FAIR REVIEW 2015 – SCIENCE MEETS MARKET

The unique properties of high-performance ceramics secure their competitiveness in diverse applications. Fraunhofer IKTS as one stop shop for ceramics offers partners extensive R&D services from materials to systems. Last year the institute presented selected research highlights at 41 trade shows in Germany and around the world.

Highlights

Fuel cell systems developed in Dresden enable off-grid power generation. The “Energy” business division presented trade show visitors in Germany and Asia the eneramic® power generator which is mobile and operated with liquefied petroleum gas, and gave a live demonstration to show the launch readiness of the system.

Fraunhofer IKTS debuted at electronica China in Shanghai with a booth in the German Pavilion, where the “Electronics and Microsystems” business division provided information on the production of customer-specific thick-film pastes. An exclusive user workshop on power electronics of the future took place alongside the trade show.

Innovative solutions for the process industry awaited visitors at the AICHEM World Forum in Frankfurt, Germany. The “Environmental and Process Engineering” business division presented a measurement technique developed in-house for monitoring inaccessible pipes and corrosion-prone components in systems. IKTS researchers also demonstrated the latest generation of a mobile oxygen generator for the first time. With mixed conducting ceramic membranes, these systems generate 250 normal liters of pure oxygen per hour via a high-temperature separation process while consuming

considerably less energy than comparable air separation systems do. Oxygen generators are used, e.g., in hospitals, waste water treatment plants, steel production, biomass gasification, and the chemical industry.

In 2015, IKTS continued its tradition of using the platform of the world’s largest industrial trade show, Hannover Messe, to showcase its structural ceramic technologies and applications for medical technology, optics, mechanical engineering, and the automotive industry. Great interest was shown in the filigree and customized ceramic parts made by additive manufacturing. These parts offer exciting new opportunities for use in medical technology, microreactors and microdevices, and the jewelry industry and can be realized resource-efficiently and tool-free in the future. In the field of non-destructive testing, IKTS scientists demonstrated a semi-automated measuring device for live imaging 2D and 3D ceramic specimens based on optical coherence tomography (OCT). Testing is done contact- and contamination-free in a matter of seconds. Hence, it is suitable for industrial-scale application and can additionally be implemented in existing processes.



3



4

RETROSPECTIVE

Overview 2015

nano tech

Tokyo, January 28–30

ChemTech India

Mumbai, January 28–31

Leichtbau-Tagung

Oberhausen, February 11–12

Fuel Cell Expo

Tokyo, February 25–27

Battery Japan

Tokyo, February 25–27

LOPEC

Munich, March 4–5

Energy Storage

Düsseldorf, March 8–11

IDS International Dental Show

Cologne, March 10–15

JEC Composites Show

Paris, March 10–12

electronica China

Shanghai, March 17–19

Hannover Messe

Hannover, April 13–17

FCMN Frontiers of Characterization and Metrology

for Nanoelectronics

Dresden, April 14–16

ThEGA-Forum

Weimar, April 20

Ceramics Expo

Cleveland, April 28–30

SMT Hybrid Packaging

Nuremberg, May 5–7

Wind & Maritime

Rostock, May 6–7

DGZfP DACH-Tagung

Salzburg, May 11–13

PCIM Europe

Nuremberg, May 19–21

Sensor+Test

Nuremberg, May 19–21

Electrical Energy Storage

Munich, June 10–12

RapidTech

Erfurt, June 10–11

ACHEMA

Frankfurt a.M., June 15–19

Energy Saxony Summit

Dresden, June 24

Carbon

Dresden, July 12–16

Laser World of Photonics

Munich, July 22–25

Cancer Diagnosis & Therapy Congress

London, September 3–4

Materialsweek

Dresden, September 14–17

Euromat

Warsaw, September 20–24

ISPA International Symposium on Piezocomposite Applications

Dresden, September 17–18

Dresden Battery Days

Dresden, September 22–24

200. DGZfP-Arbeitskreis

Dresden, October 1

EuroPM European Powder Metallurgy Congress and Exhibition

Reims, October 4–7

Semicon Europa

Dresden, October 6–8

World of Energy Solutions

Stuttgart, October 12–14

Kraftwerkstechnisches Kolloquium

Dresden, October 13–14

Ceramitec

Munich, October 20–23

FAD Conference

Dresden, November 4–5

productronica

Munich, November 10–13

PRORA Fachtagung "Prozessnahe Röntgenanalytik"

Adlershof, November 12–13

Hagener Symposium

Hagen, November 25–27

Dresdner Sensor-Symposium

Dresden, December 7–9

1 *electronica China, Shanghai: Dr. Eberstein presents the IKTS thick-film paste range.*

2 *ACHEMA, Frankfurt a.M., Germany: premiere of the mobile oxygen generator.*

3 *ceramitec, Munich, Germany: the leading international trade show for the ceramic industry brings together manufacturers, suppliers, and scientists from more than 40 different countries.*

4 *Hannover Messe: Fraunhofer IKTS offers partnerships from technology and prototype development to application in the fields of fuel cells and batteries.*