COOPERATION IN GROUPS, ALLIANCES AND NETWORKS

Scientists at Fraunhofer IKTS are active in numerous thematically oriented networks, alliances and groups. Therefore, our customers benefit from having a coordinated range of joint services available to them.

Membership in Fraunhofer Groups, Alliances and Networks

AGENT-3D

AMA Association for Sensors and Measurement

American Ceramic Society (ACerS)

Arbeitsgemeinschaft industrieller Forschungseinrichtungen »Otto von Guericke«

Association Competence Center for Aerospace and Space Technology Saxony/Thuringia (LRT)

Association of Electrochemical Research Institutes (AGEF)

Association of German Engineers (VDI)

Association for Manufacturing Technology and Development (GFE)

Association of Thermal Spraying (GTS)

Automotive Thuringia

BfR Commission for Risk Research and Risk Perception (RISKOM)

biosaxony

BTS Rail Saxony

Carbon Composites (CCeV)

CiS Forschungsinstitut für Mikrosensorik GmbH

CO_2 Value Europe AiSBL

Competence Center for Nano Evaluation nanoeva®

Competence Network on Optical Technologies (Optonet)

COMPOSITES UNITED

Cool Silicon

DECHEMA – Society for Chemical Engineering and Biotechnology

DeepSea Mining Alliance

Deutsche Glastechnische Gesellschaft (DGG)

Deutsche Keramische Gesellschaft (DKG/German Ceramic Society)

DIN Standards Committee Information Technology and selected IT Applications (NIA)

DKG/DGM Community Committee

DRESDEN-concept

Dresden Fraunhofer Cluster Nanoanalysis

Dresdner Gesprächskreis der Wirtschaft und der Wissenschaft

ECPE European Cluster for Power Electronics

EIT Health

Energy Saxony

European Powder Metallurgy Association (EPMA)

European Research Association for Sheet Metal Working (EFB)

European Society of Thin Films (EFDS)

Expert Group on Ceramic Injection Molding in the German Ceramic Society

Expert Group on High-Temperature Sensing Technology in the German Society for Materials Science

Fördergemeinschaft für das Süddeutsche Kunststoff-Zentrum

Fördergesellschaft Erneuerbare Energien (FEE)

Fraunhofer Adaptronics Alliance

Fraunhofer Additive Manufacturing Alliance

Fraunhofer Battery Alliance

Fraunhofer Big Data Alliance

Fraunhofer Energy Alliance

Fraunhofer Group for Materials and Components – MATERIALS

Fraunhofer Lightweight Design Alliance

Fraunhofer Nanotechnology Alliance

Fraunhofer Numerical Simulation of Products and Processes Alliance

Fraunhofer Textile Alliance

Fraunhofer Water Systems Alliance (SysWasser)

German Association for Small and Medium-sized Businesses (BVMW)

German Association of University Professors and Lecturers (DHV)

German Biogas Association

German Chemical Society (GDCh)

German Electroplating and Surface Treatment Association (DGO)

German Energy Storage Association (BVES)

German Federation of Industrial Research Associations (AiF)

German Materials Society (DGM)

German Society for Crystallography (DGK)

German Society for Membrane Technology (DGMT)

German Society for Non-Destructive Testing (DGZfP)

German Phosphor Plattform

German Physical Society

German Platform NanoBioMedizin

Gesellschaft für Fertigungstechnik und Entwicklung (GFE)

German Thermoelectric Society (DTG)

HYPOS Hydrogen Power Storage & Solutions East Germany

INAM e. V. Innovation Institute for Nanotechnology and Correlative Microscopics

InDeKo Innovationszentrum Deutschland Korea

InfectoGnostics Research Campus Jena

Initiative Erfurter Kreuz

Innovationszentrum Bahntechnik Europa

Institut für Energie- und Umwelttechnik (IUTA)

Institut für Mikroelektronik- und Mechatronik-Systeme gGmbH

International Microelectronics and Packaging Society, IMAPS Deutschland

International Zeolite Association

JenaVersum network

KMM-VIN (European Virtual Institute on Knowledge-based Multifunctional Materials AiSBL)

Materials Research Network Dresden (MFD)

medways

Meeting of Refractory Experts Freiberg (MORE)

Micro-Nanotechnology Thuringia (MNT)

Nachhaltigkeitsabkommen Thüringen

Organic Electronics Saxony

Ostthüringer Ausbildungsverbund Jena

ProcessNet – an initiative of DECHEMA and VDI-GVC

Research Association for Diesel Emission Control Technologies (FAD)

Research Association of the German Ceramic Society (FDKG)

Research Association on Welding and Allied Processes of the German Welding Society (DVS)

Silicon Saxony

smart³

SmartTex Network

Society for Corrosion Protection (GfKORR)

Thueringer Erneuerbare Energien Netzwerk (ThEEN)

Traegerverein Institut für Holztechnologie Dresden

Treffpunkt Keramik (Ceramics Meeting Point)

TRIDELTA CAMPUS HERMSDORF

VDMA Medical technology

Verband Deutscher Maschinen- und Anlagenbau e. V. (VDMA)

Verein für Regional- und Technikgeschichte Hermsdorf

Wachstumskern smood® smart neighborhood

Wind Energy Network Rostock

FRAUNHOFER GROUP FOR MATERIALS AND COMPONENTS – MATERIALS

Materials science and engineering at Fraunhofer covers the entire value chain, from developing new and improving existing materials to manufacturing technology on a quasi-industrial scale, in addition to characterizing properties and assessing service behavior. This also applies to the components and products made from these materials and their system behavior in relevant applications. Where materials are concerned, Fraunhofer MATERIALS covers the full spectrum of metals, inorganic non-metals, polymers, and materials made from renewable resources, as well as semiconductor materials. The scientists deploy their expertise in the fields of mobility, healthcare, mechanical engineering/plant construction, building construction/living, microsystems technology, safety and energy, and environment. Digitization of materials along their entire value chain is considered as a key requirement for the lasting success of Industry 4.0. With the initiative Materials Data Space© (MDS) founded in 2015, the Group supports this development. Special attention is also given to the development of customized materials for additive manufacturing, e.g. for multi- material systems. Another key topic is hybrid lightweight construction. Climate change, scarcity of resources and an increasing need for mobility call for a rethink in product development: Resource efficiency with weight- and function-optimized design of components is becoming a central target parameter. Lightweight construction as a holistic challenge focuses on sustainable, recyclable materials, intelligent hybrid structure design and consistent material and component evaluations. The importance of renewable energies is rapidly gaining momentum as energy transition continues. A large number of materials, from copper, steel and concrete to rare earths will be used to generate, store, transport and convert energy, to a significantly greater extent compared with traditional energy supply systems. The Group is addressing this set of questions, particularly with a view to resource availability and the creation of closed resource cycles for these systems and components.

Objectives of the Group

- Supporting accelerated innovation in the markets
- Promoting the success of Industrie 4.0 through suitable material concepts (digital twins, Materials Data Space©)
- Increasing the success of additive manufacturing with expanded ranges of materials and technologies
- Supporting the energy transition with material efficiency and resource strategies
- Holistic lightweight solutions as a key to sustainability
- Increasing integration density and improving the usability properties of microelectronic devices and microsystems
- Improving the use of raw materials and the quality of the products manufactured from them, and the development of recycling concepts
- Enhancing safety and comfort and reducing resource consumption in the areas of transport, machine and plant construction, building/living
- Increasing the efficiency of systems in the generation, conversion, storage and distribution of energy
- Improving the biocompatibility and function of materials used in medical biotechnical devices, improving material systems for medical diagnosis, disease prevention and therapy
- Improved protection of people, buildings, infrastructure through high-performance materials in protection concepts

Group chairman

Prof. Dr. Peter Gumbsch, Fraunhofer IWM
www.materials.fraunhofer.de

TREFFPUNKT KERAMIK – CERAMIC APPLICATIONS

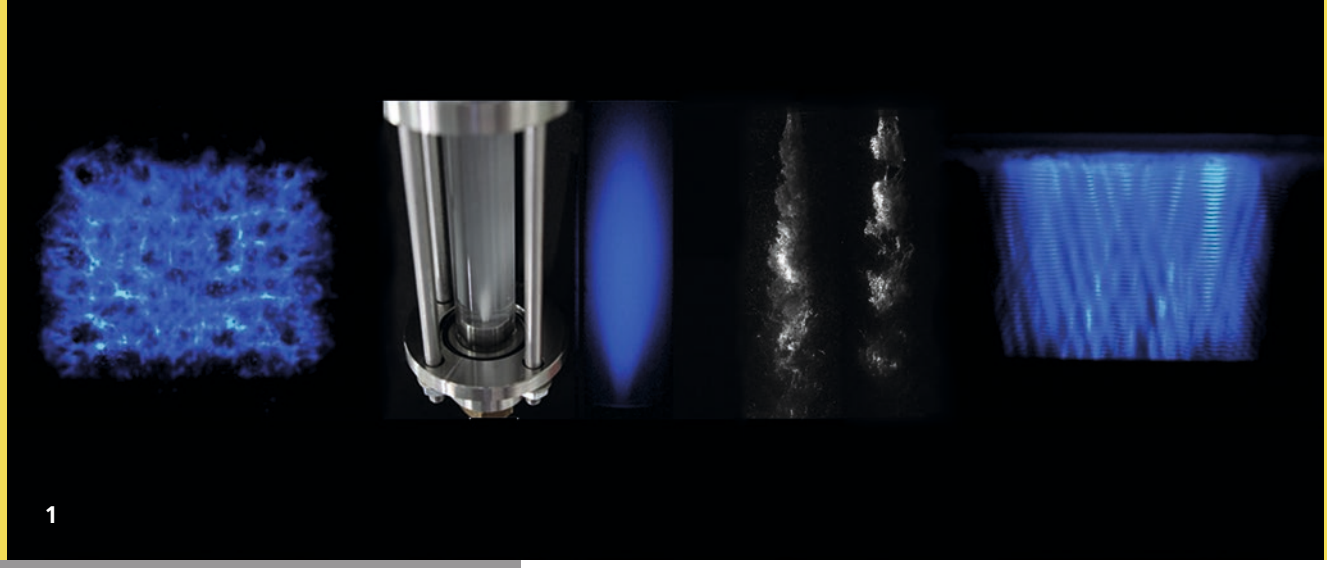
The Ceramics Meeting Point is an integral part of our institute's public relations activities. Due to reconstruction work, the exhibition was moved into the technical centers area. This move makes it possible to include the complete manufacturing chain, from powder to component, in every visitor's tour in a very effective way. In addition to learning about the research infrastructure, visitors can thus also gain insights into the market, with portfolios of more than 50 partner companies presenting real components weighing from a few milligrams to more than 100 kilograms.

Visitors can also observe current focal points of research while getting to know the manufacturers that commercially supply each product. Exhibits you can touch help to build trust in the economic feasibility of new ideas and make it easier to initiate forward-looking projects in the future.

The cooperation with more than 50 partners and members takes place under the label "Ceramic Application" of the publisher Göller Verlag.

Seminars organized by Fraunhofer IKTS, the German Ceramic Society (DKG), and the German Materials Society (DGM) present the state of technology in the industry and provide participants with the desired hands-on experience. With this approach, Fraunhofer IKTS continues to provide a project forum for small and medium-sized companies, facilitating contacts with project sponsors and research institutions.

1 *Ceramics Meeting Point at Fraunhofer IKTS in Dresden-Gruna.*



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CENTER FOR ENERGY AND ENVIRONMENTAL CHEMISTRY JENA (CEEC)

The Center for Energy and Environmental Chemistry Jena (CEEC) is an interfaculty center operated jointly by Fraunhofer IKTS and Friedrich Schiller University (FSU) Jena. The CEEC bundles the activities of the two research institutions in the fields of energy conversion, energy storage, and technical environmental chemistry. Focus is mainly on electrochemical energy storage systems and the materials, especially ceramics and polymers, used for them, energy converters, such as solar cells, and innovative water and wastewater treatment methods. There are currently 13 professorships from FSU and 5 departments from IKTS represented at the CEEC, including the Fraunhofer ATTRACT group "CAV-AQUA" under the leadership of Dr. Patrick Bräutigam. In addition to the new institute building in Jena, which has been in operation since 2015, laboratories and pilot-scale facilities for battery manufacturing and membrane technology are part of the center at IKTS in Hermsdorf.

For IKTS, the CEEC represents a strategic cooperation platform with Friedrich Schiller University Jena, especially in the field of basic research. Numerous joint Master's and PhD theses are organized, joint events offered, research projects initiated, and large-scale equipment used via the center. The "Chemistry – Energy – Environment" Master's program, in which IKTS is particularly prominent with its research activities, is also supervised and overseen by the CEEC and is the only program of its kind offered in Germany.

One focus of the collaboration is the "Technical Environmental Chemistry" chair, which is held by Prof. Michael Stelter. The working group is dedicated to water treatment, water purification, and water analysis using novel methods, such as ultrasound and hydrodynamic cavitation, electrochemistry, and ceramic membrane technology.

In 2019, new equipment for high-performance analytics, penetrating extremely low concentration ranges and providing data on pollutant degradation processes in automated high throughput, could be procured especially in the research area of trace substances. This technology opens the path for digitalization and sensors even in water treatment.

Additional topics addressed at the CEEC and of particular relevance to IKTS include the following:

- Materials for electrochemical reactors and batteries
- Organic active materials and membranes
- Carbon nanomaterials
- Glasses and optically active materials for photovoltaics and photochemistry
- Physical characterization

Contact

Prof. Dr. Michael Stelter
Chair Technical Environmental Chemistry
michael.stelter@uni-jena.de
www.ceec.uni-jena.de

CEEC JENA
Center for Energy and Environmental Chemistry Jena

1 *Hydrodynamic and acoustic cavitation phenomena and visualization of cavitation fields in reactors (source: P. Bräutigam, CEEC).*