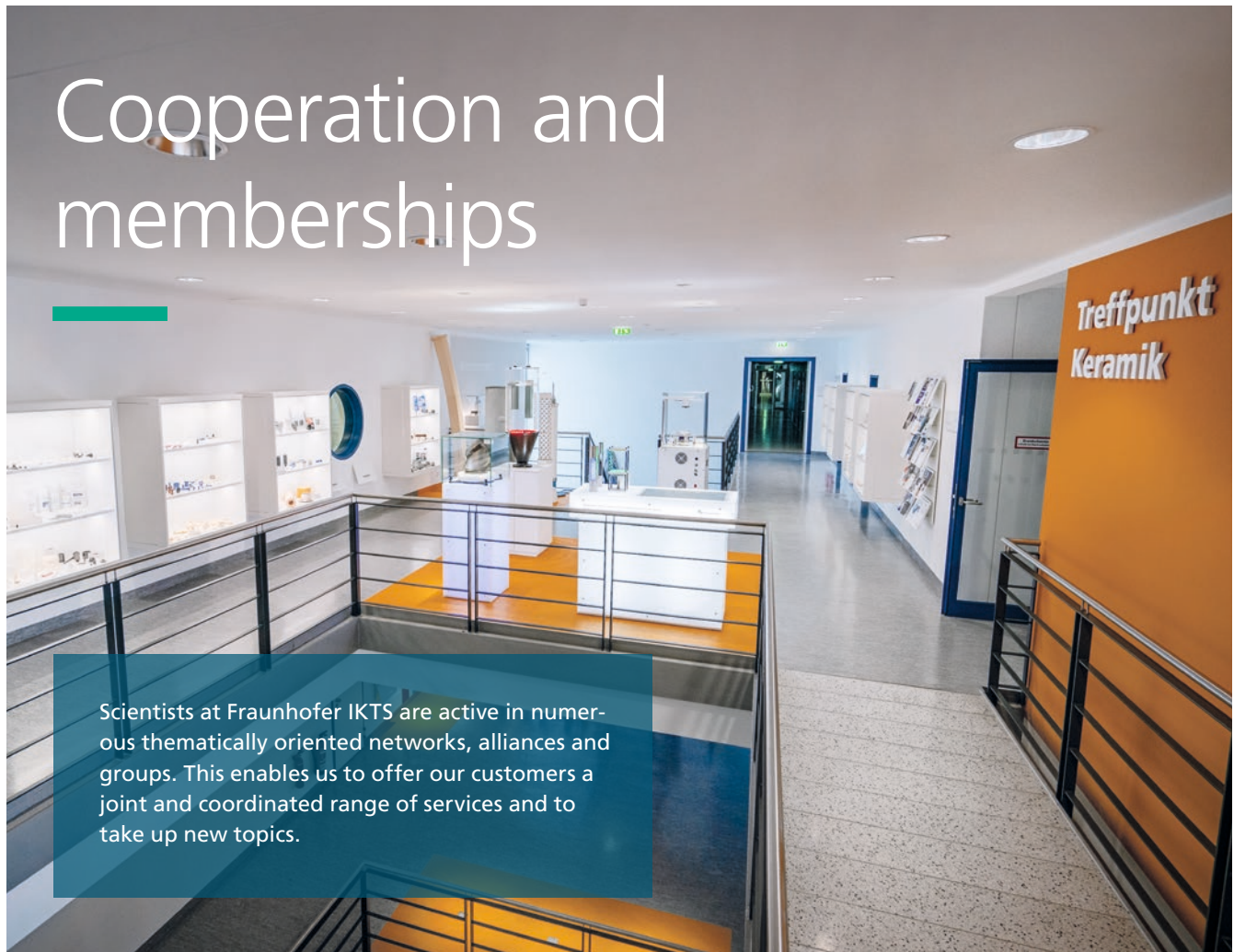


# Cooperation and memberships



Scientists at Fraunhofer IKTS are active in numerous thematically oriented networks, alliances and groups. This enables us to offer our customers a joint and coordinated range of services and to take up new topics.

## Memberships

AGENT-3D

AMA Association for Sensors and Measurement

American Ceramic Society (ACerS)

Arbeitsgemeinschaft industrieller Forschungseinrichtungen  
"Otto von Guericke" e. V. / German Federation of Industrial  
Research Associations

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

Association for Manufacturing Technology and  
Development (GFE)

Association of Electrochemical Research Institutes (AGEF)

Association of German Engineers (VDI)

Association of Thermal Spraying (GTS)

Automotive Thuringia

BfR Commission for Risk Research and Risk Perception  
(RISKOM)

biosaxony e. V.

Carbon Composites e. V. (CCeV)

Ceramics Applications

Ceramics Meeting Point

CIS Forschungsinstitut für Mikrosensorik GmbH

CO<sub>2</sub> Value Europe AiSBL

Competence Center for Nano Evaluation nanoeva®

Competence Network on Optical Technologies (Optonet)

COMPOSITES UNITED e. V.	Fördergemeinschaft für das Süddeutsche Kunststoff-Zentrum e. V.
Cool Silicon e. V.	Fördergesellschaft Erneuerbare Energien (FEE)
DECHEMA – Society for Chemical Engineering and Biotechnology	Fraunhofer Adaptronics Alliance
DeepSea Mining Alliance e. V.	Fraunhofer Battery Alliance
Deutsche Glastechnische Gesellschaft e. V. (DGG)	Fraunhofer Big Data and Artificial Intelligence Alliance
Deutsche Industrie- und Handelskammer, Industrie- und Forschungsausschuss	Fraunhofer Chemistry Alliance
Deutsche Keramische Gesellschaft e. V. (DKG) / German Ceramic Society	Fraunhofer Competence Field Additive Manufacturing
DIN/VDI Standards Committee Acoustics, Noise Control and Vibration Engineering	Fraunhofer Energy Alliance
DIN Standards Committee Information Technology and selected IT Applications (NIA)	Fraunhofer Group for Materials and Components – MATERIALS
DIN Standards Committee Precision Mechanics and Optics	Fraunhofer Nanotechnology Network FNT
DKG Anwenderkreis Additive Keramische Fertigung	Fraunhofer Simulation Network
DRESDEN-concept e. V.	Fraunhofer Research Field Lightweight Construction
Dresden Fraunhofer Cluster Nanoanalysis	Fraunhofer Water Systems Alliance (SysWasser)
ECPE European Cluster for Power Electronics	German Association for Small and Medium-sized Businesses (BVMW)
EIT Health	German Association of University Professors and Lecturers (DHV)
Energy Saxony e. V.	German Biogas Association
European Powder Metallurgy Association (EPMA)	German Chemical Society (GDCh)
European Research Association for Sheet Metal Working (EFB)	German Electroplating and Surface Treatment Association (DGO)
European Society of Thin Films (EFDS)	German Energy Storage Association (BVES)
Expert Group on Ceramic Injection Molding in the German Ceramic Society (DKG)	German Federation of Industrial Research Associations (AiF)
Expert Group on High-Temperature Sensing Technology in the German Society for Materials Science (DGM)	German Materials Society (DGM)
Fachverband Pulvermetallurgie	German Phosphor Plattform
FarmTech Society (FTS) ASBL	German Physical Society
	German Platform NanoBioMedizin
	German Society for Crystallography (DGK)
	German Society for Membrane Technology (DGMT)

German Society for Non-Destructive Testing (DGZfP)	microTEC Südwest
German Thermoelectric Society (DTG)	Nachhaltigkeitsabkommen Thüringen
Growth core smood® – smart neighborhood	NAFEMS – International Association Engineering Modelling
HERMSDORF e. V.	Organic Electronics Saxony
HYPOS Hydrogen Power Storage & Solutions East Germany	Ostthüringer Ausbildungsverbund e. V. Jena
HySON – Förderverein Institut für Angewandte Wasserstoff-forschung Sonneberg e. V.	ProcessNet – an initiative of DECHEMA and VDI-GVC
InDeKo Innovationszentrum Deutschland Korea	QBN Quantum Business Network
InfectoGnostics Research Campus Jena	Rail.S e. V.
Initiative Erfurter Kreuz e. V.	Regionale Aktionsgruppe Saale Holzland e. V.
Innovation Institute for Nanotechnology and Correlative Microscopics – INAM e. V.	Research Association for Diesel Emission Control Technologies (FAD)
Innovationszentrum Bahntechnik Europa	Research Association Mechatronic Integrated Devices 3-D MID
Institut für Anwendungstechnik	Research Association of the German Ceramic Society (FDKG)
Institut für Energie- und Umwelttechnik e. V. (IUTA)	Research Association on Welding and Allied Processes of the German Welding Society (DVS)
Institut für Mikroelektronik- und Mechatronik-Systeme gGmbH	Silicon Saxony e. V.
International Microelectronics and Packaging Society, IMAPS Deutschland	smart <sup>3</sup> e. V.
International SOS GmbH	SmartTex Network
International Zeolite Association	Society for Corrosion Protection (GfKORR)
ISSS Geschäftsstelle IGD-R	Thüringer Erneuerbare Energien Netzwerk e. V. (THEEN)
JenaVersum network	Thüringer Wasser-Innovationscluster
Joint Committee High Performance Ceramics of the German Materials Society (DGM) and the German Ceramic Society (DKG)	TITK Materials research institute for polymer functional and engineering materials
KMM-VIN (European Virtual Institute on Knowledge-based Multifunctional Materials AiSBL)	TRIDELTA CAMPUS HERMSDORF e. V.
Materials Research Network Dresden (MFD)	TWI Innovation Network
medways e. V.	VDMA Medical technology
Meeting of Refractory Experts Freiberg (MORE)	Verband Deutscher Maschinen- und Anlagenbau e. V. (VDMA)
	Verein für Regional- und Technikgeschichte e. V. Hermsdorf
	Wind Energy Network Rostock

# Fraunhofer Group for Materials and Components – MATERIALS

The Fraunhofer Group for Materials, Components – MATERIALS stands for cross-scale materials expertise along industrial value chains. It applies its expertise from materials science fundamentals to materials engineering system solutions to create innovations for the markets of its customers and partners.

The Fraunhofer MATERIALS Group bundles the competencies of materials science and materials engineering in the Fraunhofer-Gesellschaft. This applies in particular to the development of new and improved materials, the application-specific (re)design of existing materials, the appropriate manufacturing processes and process technologies up to quasi-industrial scale, the characterization of material and component properties up to the evaluation of the system behavior of materials and components in products.

Numerical modeling and simulation techniques are used as well as state-of-the-art experimental investigations in laboratories and pilot plants. Both are carried out across all scales from molecules and components to complex systems and process technology. In parallel, the methods and tools used are constantly being developed to the highest standards. In terms of materials, the Fraunhofer MATERIALS Group covers the entire range of metallic, inorganic-non-metallic and polymeric materials, and materials produced from renewable raw materials, as well as semiconductor materials, hybrid and composite materials.

The scientists in the collaborative institutes apply their know-how and expertise primarily in the business areas of mobility, health, mechanical and plant engineering, construction and housing, microsystems technology, safety and security, and energy and the environment. They are well networked at national, European and international level and make a significant contribution to innovation processes at these levels. At European level, for example, the Group is committed to strengthening Europe's technological sovereignty through excellent materials science and engineering as part of the Advanced Materials Initiative (AMI 2030).

In the view of the Fraunhofer MATERIALS Group, a key function lies in the digitization of materials research and materials technology throughout the entire value creation process, along the life cycle of materials. Digitization in this area is an essential prerequisite for the sustainable success of Industry 4.0, as well

as for the realization of resource efficiency. Data generation and the development of digital material twins are therefore a particular focus of the Fraunhofer Group's projects.

Climate change, scarcity of resources and a simultaneous increase in demand for mobility, living space and comfort call for a general rethinking in product development. From the point of view of the Fraunhofer MATERIALS Group, hybrid lightweight system construction offers a high potential for solutions. The target parameter in the development process here is resource efficiency with a weight-optimized and at the same time function-optimized design of components. The Group sees lightweight construction as a holistic challenge and focuses on sustainable, recyclable materials, intelligent hybrid structure design and integrated material and component evaluations.

Renewable energies are gaining a dominant importance in the course of the energy transition. In order to generate, store, transport and convert them, a variety of materials will be used to a much greater extent than for classic energy supply systems, from copper, steel and concrete to rare earths. The Fraunhofer Group for Materials, Components – MATERIALS is working on this complex of issues in the context of sustainability, particularly with regard to resource efficiency, the development of new material flows and the creation of closed resource cycles.

## Contact

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## Ceramics Meeting Point

The Treffpunkt Keramik (Ceramics Meeting Point) in Dresden continues to be an integral part of our institute's public relations activities. In total, more than 70 partners use this platform to present their range of services with exhibits and information material to new users in industry and research. The cooperation with the "Ceramic Applications" of publishers Göller Verlag is an effective combination of science and communication practice.

Because of the successful acquisition of large-scale projects, the previous area of Treffpunkt Keramik is needed as logistics space. Following an elaborate redesign of the circulation areas, the exhibition is now presented over three floors in the center of the institute. Combined with modern presentation technology, it is a highlight at all tours of the institute, seminars and conferences, as well as at employee talks. In future, coffee breaks will evolve into impromptu further training and forays into market research. Raw material suppliers are to be found there as well as suppliers of machine technology. However, the focus will continue to be on component manufacturers and the research highlights of Fraunhofer IKTS.

Additively manufactured components in oxide and non-oxide ceramics are presented next to material composites. If requested,

this can be followed by a visit to the corresponding laboratories. Systems from more than 10 manufacturers are tested for the latest applications, from the jewelry industry to fusion technology.

Gigantic structural ceramic components made of silicon carbide and weighing more than 50 kg can be viewed in addition to complex, modular, brazed structures made of aluminum oxide and more than two meters high. Of course, there are also energy or hydrogen technology exhibits. Even after 20 years of Treffpunkt Keramik in Dresden, the material continues to fascinate visitors.

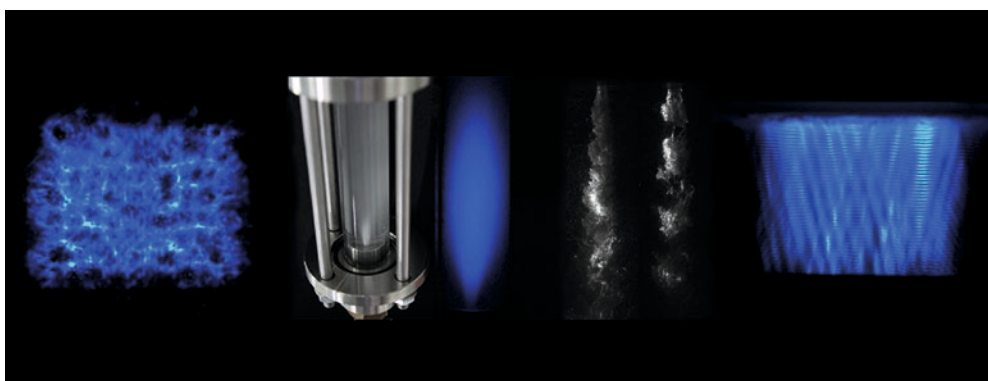
In 2024, there will once again be seminars and training sessions of Fraunhofer IKTS, the German Ceramic Society (DKG) and the German Materials Society (DGM). In-house training at companies also remains an option.

A second "Ceramics Meeting Point" was inaugurated at the IKTS site in Hermsdorf in March 2024. Exhibits from the site's key research areas of oxide ceramics, functional ceramics, battery and membrane technology are on display in four showcases.



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

## Center for Energy and Environmental Chemistry Jena (CEEC)



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

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