

COOPERATION IN GROUPS, ALLIANCES AND NETWORKS

ANNUAL REPORT 2015/16

Membership in Fraunhofer 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.

AMA Association for Sensors and Measurement	Competence Network on Optical Technologies (Optonet)	Ernst Abbe University of Applied Sciences Jena, university council
American Ceramic Society (ACerS)	Cool Silicon	European Powder Metallurgy Association (EPMA)
Association Competence Center for Aerospace and Space Technology Saxony/Thuringia (LRT)	DECHEMA – Society for Chemical Engineering and Biotechnology	European Rail Innovation Center
Association for Manufacturing Technology and Development (GFE)	Deutsche Glastechnische Gesellschaft (DGG)	European Research Association for Sheet Metal Working (EFB)
Association of Electrochemical Research Institutes (AGEF)	DIN – German Institute for Standardization	European Society of Thin Films (EFDS)
Association of German Engineers (VDI)	Deutsche Keramische Gesellschaft (DKG / German Ceramic Society)	Expert Group on Ceramic Injection Molding in the German Ceramic Society
Association of the Thuringian Economy, Committee of Research and Innovation	DKG/DGM Community Committee	Expert Group on High-Temperature Sensing Technology in the German Society for Materials Science
Association of Thermal Spraying (GTS)	DRESDEN concept	Fraunhofer Adaptronics Alliance
biosaxony	Dresden Fraunhofer Cluster Nanoanalysis	Fraunhofer Additive Manufacturing Alliance
Carbon Composites (CCeV)	Dresdner Gesprächskreis der Wirtschaft und der Wissenschaft	Fraunhofer AdvanCer Alliance
Ceramics Meeting Point Dresden	Dual Career Network Central Germany	Fraunhofer Battery Alliance
Competence Center for Nano Evaluation nanoeva®	Energy Saxony	Fraunhofer Cluster 3D Integration

Fraunhofer Energy Alliance	German Society for Materials Research (DGM)	Nanotechnology Center of Excellence for "Ultrathin Functional Layers"
Fraunhofer Group for Materials and Components – MATERIALS	German Society for Non-Destructive Testing (DGZfP)	ProcessNet – an Initiative of DECHEMA and VDI-GVC
Fraunhofer Group for Micro-electronics	German Thermoelectric Society (DTG)	Research Association for Diesel Emission Control Technologies (FAD)
Fraunhofer Lightweight Design Alliance	Hydrogen Power Storage & Solutions East Germany	Research Association for Measurement Technology, Sensors and Medical Technology Dresden (fms)
Fraunhofer Nanotechnology Alliance	International Energy Agency (IEA) Implementing Agreement on Advanced Fuel Cells	Research Association on Welding and Allied Processes of the German Welding Society (DVS)
Fraunhofer Numerical Simulation of Products and Processes Alliance	International Zeolite Association	Silicon Saxony
Fraunhofer Textile Alliance	KMM-VIN (European Virtual Institute on Knowledge-based Multifunctional Materials AISBL)	smart ³
Fraunhofer Water Systems Alliance (SysWasser)		SmartTex Network
German Acoustical Society (DEGA)	Materials Research Network Dresden (MFD)	Society for Corrosion Protection (GfKORR)
German Biogas Association	medways	Wasserwirtschaftliches Energiezentrum Dresden
German Electroplating and Surface Treatment Association (DGO)	Meeting of Refractory Experts Freiberg (MORE)	WindEnergy Network Rostock
German Energy Storage Association (BVES)	Micro-Nanotechnology Thuringia (MNT)	
German Engineering Association (VDMA)	NanoMat – Supraregional Network for Materials Used in Nanotechnology	

FRAUNHOFER GROUP FOR MATERIALS AND COMPONENTS – MATERIALS

The Fraunhofer Group MATERIALS integrates the expertise of 15 Fraunhofer Institutes working in the field of materials science. Fraunhofer materials research covers the entire value chain, from new material development and improvement of existing materials through manufacturing technology on a quasi-industrial scale, to the characterization of properties and assessment of service behavior. The same research scope applies to the components made from these materials and the way they function in systems. In all these fields, experimental studies in laboratories and technical institutes are supplemented by equally important numerical simulation and modeling techniques – across all scales, from individual molecules up to components and process simulation. As far as materials are concerned, the Fraunhofer MATERIALS Group covers the full spectrum of metals, inorganic non-metals, polymers and materials made from renewable resources, as well as semiconductor materials. The Group's expertise is concentrated specifically in the fields of energy and environment, mobility, health, machine and plant construction, building construction and living, microsystems technology and safety. Innovative systems are developed using materials and components customized for specific applications, and based on the assessment of the behavior of a material or component under specific conditions of use. Strategic forecasts promote the development of novel, future-oriented materials and technologies.

Objectives of the Group are:

- Enhancing safety and comfort and reducing resource consumption in the fields of transport, machine and plant construction, building construction and living
- Increasing the efficiency of systems for energy generation, energy conversion, energy storage and distribution

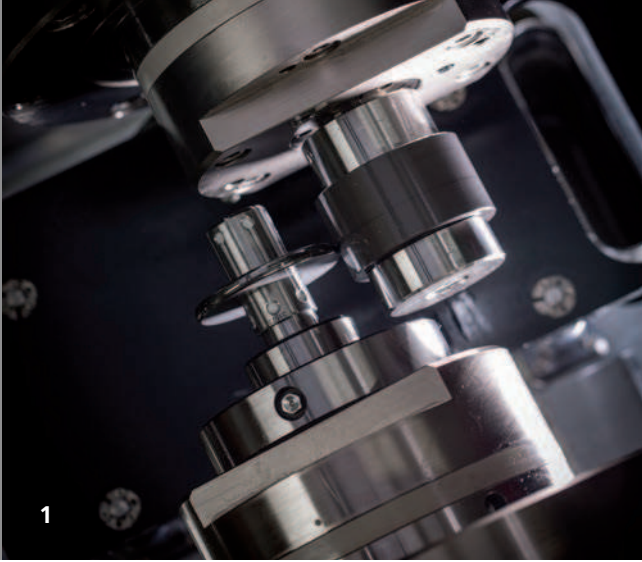
- Improving the biocompatibility and functioning of medical materials and materials used in biotechnology
- Increasing integration density and improving the usability characteristics of microelectronic components and microsystems
- Enhancing the utilization of natural resources and improving the quality of products made with them
- Development of recycling concepts

Members are the Fraunhofer Institutes for

- Applied Polymer Research IAP
- Building Physics IBP
- Structural Durability and System Reliability LBF
- Chemical Technology ICT
- Manufacturing Technology and Advanced Materials IFAM
- Wood Research, Wilhelm-Klauditz-Institut, WKI
- Ceramic Technologies and Systems IKTS
- High-Speed Dynamics, Ernst-Mach-Institut, EMI
- Microstructure of Materials and Systems IMWS
- Silicate Research ISC
- Solar Energy Systems ISE
- Systems and Innovations Research ISI
- Mechanics of Materials IWM
- Non-Destructive Testing IZFP
- Wind Energy and Energy System Technology IWES
- Industrial Mathematics ITWM (assoc. institute)
- Interfacial Engineering and Biotechnology IGB (assoc. institute)
- Integrated Circuits IIS (assoc. institute)

Group chairman

Prof. Dr.-Ing. Peter Elsner, Fraunhofer ICT
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FRAUNHOFER ADVANCER ALLIANCE

Systems development with high-performance ceramics

The usage of high-performance ceramics allows for new applications in energy engineering, mechanical and plant engineering, and medical technology. Well-known examples are highly efficient tools and coatings, new material and manufacturing technologies for medical-technical products as well as creative solutions for energy and resource saving industrial processes. At present, AdvanCer is working in a joint project developing systems solutions and test methods for the oil and gas industry as well as for deep sea mining. It is the objective to develop new diamond-ceramic and hard metal materials as well as the appropriate manufacturing technologies. So, components may be realized which allow for the maintenance-free operation in up to 6000 m depth in the sea.

Four Fraunhofer Institutes (IKTS, IPK, ISC/HTL and IWM) have joined together to form the Fraunhofer AdvanCer Alliance. It is the aim of AdvanCer to develop individual systems solutions with advanced ceramics for industry. The research activities of the Fraunhofer Alliance extend along the entire value-added chain from modeling and simulation through application-oriented materials development, production and machining of ceramic parts to component characterization, evaluation and non-destructive testing under application conditions. Development work is conducted and supported by modeling and simulation methods.

Furthermore, AdvanCer has established a comprehensive range of training and consultancy services to support small and medium-sized companies in solving complex tasks ranging from prototype development to technology transfer.

Fields of cooperation

- Materials development for structural and functional ceramics, fiber-reinforced ceramics, cermets and ceramic composites
- Component design and development of prototypes
- Systems integration and verification of batch-production capabilities
- Development of powder, fiber and coating technologies
- Materials, component and process simulation
- Materials and component testing
- Defect analysis, failure analysis, quality management
- Analysis of energy demand for thermal processes and to improve energy efficiency
- Increase of efficiency using ceramic components

Services offered

- Development, testing and evaluation of materials
- Prototype and small series production
- Technology development and technology transfer
- Process analysis and design
- Consulting, feasibility studies, training programs

Spokesperson of the Alliance

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1 Test stand for the tribological testing of ceramic materials and components (Source: Dirk Mahler/Fraunhofer).



GROUPS, ALLIANCES, NETWORKS

CERAMICS MEETING POINT – CERAMIC APPLICATIONS

The Ceramics Meeting Point is an integral part of the public relations activities of Fraunhofer IKTS. The closed production chain from powder to component is displayed, not only from a scientific point of view but also as a mirror of technologies and capacities available in the industry. The visitor gets an impression of current focal points in research and is simultaneously informed about which manufacturers offer certain product types commercially. With respective touchable models, the trust in the economic feasibility of new ideas is strengthened and the initiation of new projects facilitated.

Ceramic Applications of the Goeller Verlag, which took over the TASK GmbH business, embodies the new label of the cooperation with its currently 43 partners and members. The opportunity to see the latest research topics up to systems testing in one room and to get into contact with possible suppliers will be extended. The members of the Fraunhofer AdvanCer Alliance also benefit from this infrastructure.

In the workshops and training courses of the Fraunhofer AdvanCer Alliance and the Deutsche Keramische Gesellschaft (DKG / German Ceramic Society), the Ceramics Meeting Point is used to present the state of the art in industry and to show the practical relevance desired by the participants. Thus, a project forum particularly for small and medium-sized companies has developed, facilitating contacts to project initiators and research institutes. By visiting the Ceramics Meeting Point within the framework of numerous events taking place at Fraunhofer IKTS, more than 1500 visitors informed themselves about ceramic product innovations and manufacturers in 2015.

The highlight in 2015 was the “Technical Ceramics Day” at the ceramitec in Munich, Germany. All together 1214 visitors participated in the event, making it the most visited at the forum. The Fraunhofer AdvanCer Alliance together with Ceramic Applications was responsible for the scientific organization of the lecture program.

1 Forum “Technical Ceramics Day” at ceramitec 2015.