

Table of contents

Foreword	2
Table of contents	4
Fraunhofer IKTS in profile	6
Portrait	6
Organizational chart	8
Fraunhofer IKTS in figures	10
Board of trustees	12
The Fraunhofer-Gesellschaft	13
Retrospective	14
Highlights from our business divisions	20
In focus	22
Digital services in analytics and non-destructive testing at Fraunhofer IKTS	22
Digital materials science at Fraunhofer IKTS	24
Microelectronic materials and nanoanalytics for improved performance and reliability	26
Research and development center for transparent ceramics	27
Industrial Hydrogen Technologies Thuringia WaTTh at the Arnstadt site	28
Cognitive Material Diagnostics project group	29
Materials and Processes	30
Direct foaming of ceramic slurries	30
Zirconium carbide – high-temperature material for high technologies	31
Production of high-performance CNT-ceramic composites	32
Sealing ceramic fiber composites with laser technology	33
Energy	34
Lab-scale demonstration of an integrated co-electrolysis-based power-to-X process	34
Degradation study on SOC stacks	35
Simulation-based analysis and economic evaluation of energy systems	36
Optimizing the electrode properties of lithium solid-state batteries	37
Digitized workflows for microstructure evaluation in the battery industry	38
Environmental and Process Engineering	39
Nutrient recycling based on extraction with ceramic membrane contactors	39
Characterizing the gas distribution in bubble columns	40
Mixed-matrix membrane for the extraction of a sustainable solvent from molasse	41
Recultivation materials from sewage sludge composts and mycelium	42

Water	43
Test field for the development of industrial water treatment processes.....	43
Multifunctional test stand for the characterization of ceramic components in water treatment	44
Graphene for micropollutant removal – Thuringian research group "SoWas"	45
Highly active nanostructured TiO ₂ filtration membranes for water disinfection and elimination of trace substances	46
Ceramic electrodes and cold plasma – a combination for efficient wastewater treatment.....	47
Non-Destructive Testing and Monitoring	48
Precise online determination of vessel filling levels with guided waves	48
Mobile ultrasonic rail testing system.....	49
Vertical-axis ultrasonic measurement system for characterizing slurries	50
In-line testing of electrode tapes for Lithium-Ion batteries	51
Electronics and Microsystems	52
Printed ultrasonic transducers for medical imaging and non-destructive testing ..	52
Ultrasound for a faster and safer dental root canal treatment.....	53
Cost-effective copper-silicon nitride composites as circuit boards for power electronics	54
Highly dynamic ceramic matrix heaters for generating fast temperature fields ..	55
Micromechanical in-situ experiments on copper interconnect structures	56
Testing machine for CT units	57
Materials and Process Analysis	58
Determining microscopically adhesive and cohesive material behavior	58
Thermophysical properties of hardmetals as a function of microstructure	59
Al-based quantitative microstructural analysis of ceramic materials	60
Metal-matrix composites with diatoms as fillers	61
Mechanical and Automotive Engineering	62
Polymer ceramics for the insulation of windings in highly stressed electrical machines	62
An innovative milling tool made of cost-efficient sialon in a test run	63
Bio- and Medical Technology	64
Hybrid and degradable bioceramics for jawbone replacement	64
Thin-walled ceramic abutments with high strength and precision.....	65
New bone formation after acute inflammation – assessment in vitro	66
Decentralized monitoring of lung ventilation with Pneumo.Vest.....	67
Tungsten-based composite materials for antiviral and diagnostic applications ..	68
Cooperation in groups, alliances and networks	69
Names, dates, events	75
Events and trade fairs in 2022	76
How to reach us	78