TABLE OF CONTENTS

Fraunhofer IKTS in profile
6 Portrait
8 Core competencies
10 Fraunhofer IKTS in figures
12 Organizational chart
14 Board of trustees
15 The Fraunhofer-Gesellschaft

Highlights from our business divisions
22 Materials and Processes
24 ZrC materials for ultra-high-temperature applications up to 2000 °C
25 Additive manufacturing of ceramic parts through fused-filament-fabrication (FFF)
26 Reaction-bonded ZrO2 ceramic foams – high-strength, heat-stable, cost-efficient
27 High-purity MgO tapes as sintering aid for MIEC ceramic flat membranes
28 Shaping of MOFs through powder-technological processes
29 Silicon carbide-bonded diamond materials with highest wear resistance
30 Surface-conformal powder coating using ALD and CVD processes
31 Core-shell coating for improved hardness and strength of ZTA ceramics

Mechanical and Automotive Engineering
32 Ceramic suspensions for abrasion and corrosion protection coatings
33 Pastes for laser-sintered functional layers on 3D steel components

Electronics and Microsystems
34 Limiting current type oxygen sensor for industrial applications
35 Model-based design of fast-switching solid-state actuators for valves
36 Reliability assessment of 28-nm SRAM cells with applied mechanical load
37 Compact PTC heaters made of foam ceramics
38 Ceramic-integrated miniaturized coils for speed measurement in turbochargers
Energy
39 Corrosion protection coatings for ceramic fiber composite materials
40 Materials and process development for LATP-based all-solid-state batteries
41 Optimized ceramic receivers for solar-thermal power plants
42 Braze development for high-temperature-stable ceramic composites
43 Cells and stacks for the production of syngas through co-electrolysis

Environmental and Process Engineering
44 Fischer-Tropsch synthesis – development of selective catalysis and processes
45 High-dynamic microwave heating of reactors
46 Materials for electrochemical degradation of pharmaceutical residues in water
47 Recycling of rare metals with ceramic membranes
48 Increased product yield by applying membrane reactors
49 Thin supported membrane layers for oxygen generators
50 Palladium membranes for H₂ separation from hot and humid gases

Bio- and Medical Technology
51 Theranostic implants – smart functionalization and monitoring
52 In vitro test methods for the biological evaluation of ceramic materials
53 1-3 piezocomposites for high-frequency ultrasonic transducers

Optics
54 Hermetically sealed ceramic LED package for lighting in harsh environments

Materials and Process Analysis
55 Characterization of temperature-dependent electrical resistance up to 1400 °C
56 Modeling of sintering processes
57 Monitoring of laser narrow-gap weldings of thick-walled components
58 Correlation of friction coefficient and crystallographic orientation
59 Characterization of organic thin films at the nanoscale with LVSEM

60 Cooperation in groups, alliances and networks

67 Names, dates, events
68 Events and trade fairs – prospects
70 How to reach us