

Application Oriented Contract Research: Mechanics of Materials Expertise for Your Competitive Advantage

Whether you are in business or a public institution, we address your materials related research and development concerns in application-oriented projects – from damage analysis and process development to materials innovations.

We realize solutions for the optimized use of material properties to improve the reliability, life expectancy and safety of components and for the development of new materials as well as resource-efficient manufacturing processes.

Our research focuses upon material changes in processes and components. For this purpose, we are developing specific material models, characterization and simulation methodologies.

Fraunhofer Institute for Mechanics of Materials IWM

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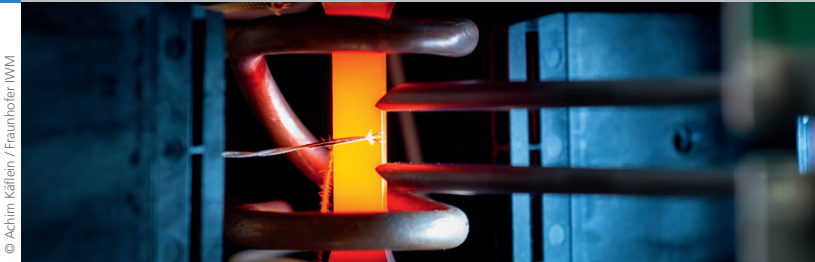
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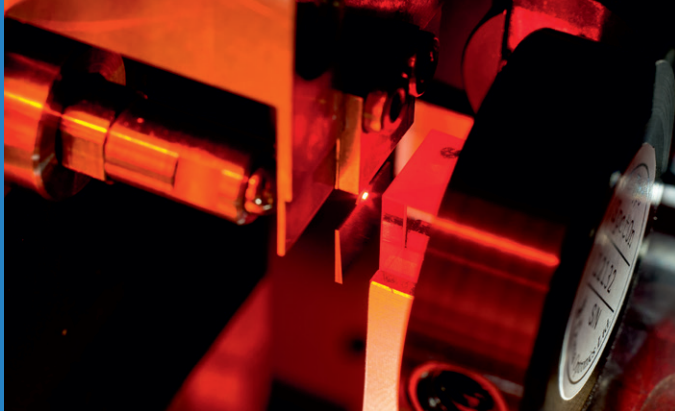
We investigate the operational behavior of materials from a practical and customer-oriented point of view and develop new components and processes. The latest findings in the fields of materials science and materials technology provide the basis for new insights and often quite remarkable models that describe the performance limits of components and systems. Allow us to convince you of our competencies and together we can find a customized solution for your issues.

Please get in touch!

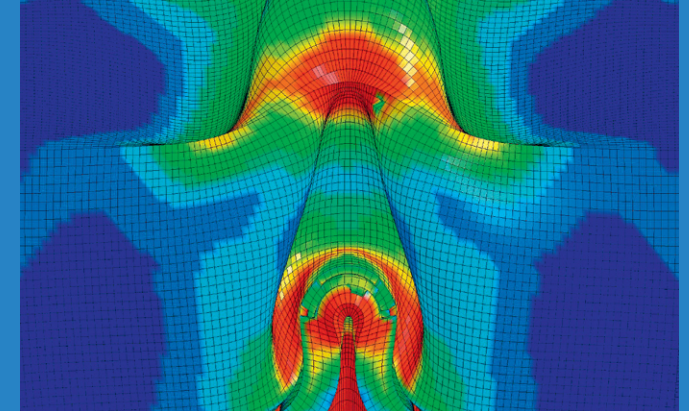
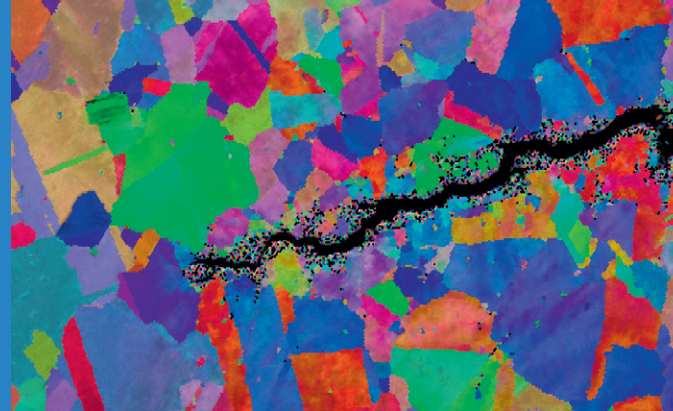
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THE OPTIMIZED USE OF MATERIAL PROPERTIES



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Fraunhofer IWM Business Units

We carry out specific tasks for our clients in our business units. In order to gain the greatest benefit from the scientific and technological expertise of our scientists and engineers, Fraunhofer IWM research and development activities are bundled thematically, enabling us to provide the best solutions to our clients on a project by project basis. The competence-based set-up of our business units positions us to supply materials related solutions along the entire product life cycle.

Materials Design

- Multiscale, experimental and computational design of materials for multifunctional tasks
- Development of material models, prediction of physical, chemical and mechanical properties, material substitution, material screening
- Development and production of functional layers and sustainable functional materials
- Determination of micromechanical local properties and lifetime assessment, high-throughput screening

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Manufacturing Processes

- Innovative manufacturing processes for precision contours and functional components with defined property profiles
- Simulation-assisted optimization of the energy and material efficiency of manufacturing processes
- Modeling and simulation of powder technology and fluid dynamic processing stages, simulation methods for generative manufacturing
- Forming process simulations including microstructure development and thermodynamics
- Forming, processing and damage analyses for brittle materials such as glass and silicon

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Tribology

- Solutions for reducing friction and for abrasion protection for bearings, seals and drive systems
- Development of DLC abrasion protection layers with customized properties
- Friction and wear analysis, mechanochemistry, lubricant assessment and development
- Friction, abrasion and coating process simulations
- Ceramic and biomedical material qualification

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Component Safety and Lightweight Construction

- Qualification of materials and components for mobility, energy, machinery and engineering
- Fatigue behavior, lifetime prediction, derivation of inspection intervals
- Experimental analysis of material and component behavior under impact and crash load, development of material models and crash simulations
- Characterization and modeling of welds, mechanical and adhesive bonds, development of substitute models
- Experimental and numerical analysis of composite materials and composites

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Assessment of Materials, Lifetime Concepts

- Reliable systems for energy conversion and energy storage, material qualification for power plant technology
- Microstructure analysis and fault characterization, residual stress analysis
- Microstructure development simulation
- Life expectancy prediction and optimization under thermomechanical loads
- Damage analysis

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