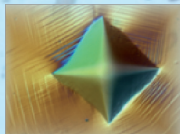
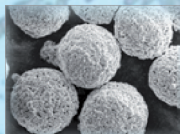
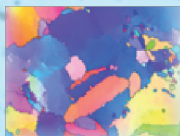




CHEMNITZ UNIVERSITY
OF TECHNOLOGY

Institute of Materials Science and Engineering

Composite Materials Group
Materials Engineering Group
Surface Technology/
Functional Materials Group





Chair of Composite Materials

Univ.-Prof. Dr.-Ing. habil. Bernhard Wielage
Phone: +49 (0) 371-531 36171



Chair of Materials Engineering

Univ.-Prof. Dr.-Ing. habil. Martin F.-X. Wagner
Phone: +49 (0) 371-531 36153



Chair of Surface Technology/ Functional Materials

Univ.-Prof. Dr.-Ing. habil. Thomas Lampke
Phone: +49 (0) 371-531 36171



Chief Engineer (Research)
Dr.-Ing. Thomas Grund
+49 (0) 371-531 35390



Chief Engineer (Teaching)
Team Leader Simulation
and Modelling of Materials
PD Dr.-Ing. habil.
Thorsten Halle
+49 (0) 371-531 31244



Team Leader
Brazing and Soldering
Dr.-Ing. Ina Hoyer
+49 (0) 371-531 35232



Team Leader
Composite Materials
Dr.-Ing. Daisy J. Nestler
+49 (0) 371-531 36564



Team Leader
Surface Properties and
Surface Analytics
Dr.-Ing. Dipl.-Arch.
Daniela Nickel
+49 (0) 371-531 35877



Team Leader
Microscopy and
Structural Analysis
Dr. rer. nat. Harry Podlesak
+49 (0) 371-531 35233



Team Leader
Thermal Spraying
Dr.-Ing. Christian
Rupprecht
+49 (0) 371-531 35220



Team Leader
Materials Optimisation and
Testing
Dr.-Ing. Matthias Hockauf
+49 (0) 371-531 35432



Team Leader
Electrolytic and Chemical
Coating Technology
Dr. rer. nat. Ingolf Scharf
+49 (0) 371-531 35189



Team Leader
Mechanical Testing
Dipl.-Ing. Sebastian Fritsch
+49 (0) 371-531 37441

Head of the Institute
Univ.-Prof. Dr.-Ing. habil.
Bernhard Wielage:



„Materials research is the driving force for technological progress. It forms the basis for the efficient use of resources and energy and ensures the high quality and longevity of all components in our modern world.“

Profile

Materials science and development

- Composite materials, materials compounds
- Sensor development
- Materials optimisation
- Functional surfaces
- Nanocrystalline materials
- Thermo-mechanics
- Analysis of deformation mechanisms
- Shape memory alloys

Materials behaviour and analysis

- Wear and corrosion research
- Simulation and modelling
- Microstructural characterisation
- Dynamic material behaviour
- Failure analysis
- Incremental forming
- Analysis of forming processes

Materials engineering

- Thermal spraying
- Electrolytic and chemical coating technology
- Anodic oxidation (EAO, PAO)
- Phosphating, burnishing
- Sol-gel coatings
- CVD and PVD
- Inkjet print
- Manufacture of nanocrystalline light metals by means of ECAP
- Joining technology

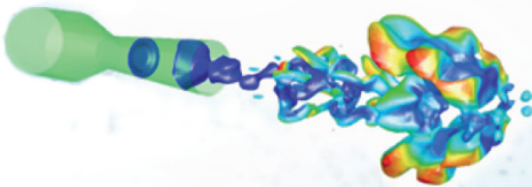
Thermal spraying

Main areas of research

- Optimisation of spray feedstock materials
- Spray torch development
- Processing of cored wires
- Thermo-mechanical post-treatment
- Sealing of sprayed coatings
- Spray particle and spray jet diagnostics
- Numerical modelling (CFD)

Services

- Coating of prototypes
- HVOF with powder and wire feedstocks
- APS and VPS
- Cold-gas spraying
- Arc spraying
- Flame spraying
- Synthesis in thermal plasmas
- Component repair
- Coating characterisation (adhesive strength, corrosion and wear resistance)



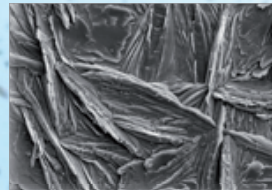
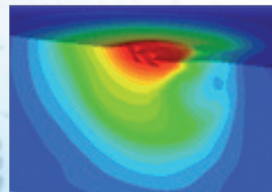
Electrolytic and chemical coating, wear and corrosion

Main areas of research

- Electrolytic metal and dispersion coatings
- Chemical Ni-P and Ni-P dispersion coatings
- Structuring of surfaces
- Development of anodic processes and coatings (electrolytic and plasma-electrolytic)
- Conversion coatings (phosphating, burnishing)
- Sol-gel coatings
- Interface engineering of materials compounds
- Coating of lightweight structures
- Wear and corrosion research
- Modelling and simulation of tribologically stressed materials

Services

- Contract coating
- Development of coating concepts and processes
- Characterisation of structure and properties of materials and coatings
- Wear and corrosion tests



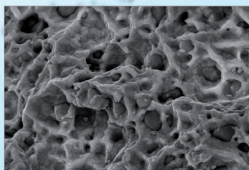
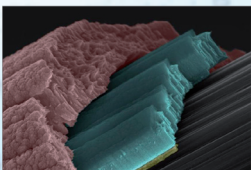
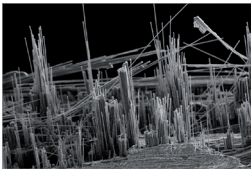
Composite materials

Main areas of research

- Development and tailoring of composite materials on the basis of polymer, ceramic and metal matrices (PMC, CMC, MMC)
- Hybrid composites and multimerial design
- Interface engineering
- Modelling and simulation of the properties of composite materials
- Development of physical-chemical coating processes, in particular for fibres and particles (CVD, PVD)
- Inkjet print and development of exothermally reacting coatings
- Development of fibre-based sensors and actuators

Services

- Autoclave technology
- Pyrolysis of PMCs
- Infiltration of preforms (siliconising, aluminising)
- Fibre-tensile tests, microbending and microtensile tests in combination with digital image correlation
- Interface characterisation



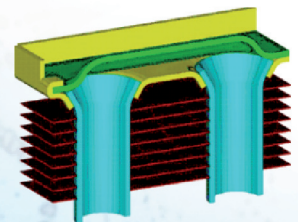
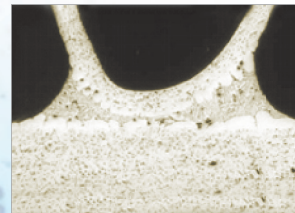
Brazing and soldering

Main areas of research

- Development and modification of solders and brazing filler metals
- Process development and optimisation
- Brazing of high-strength compounds
- Brazing of light metals
- Brazing of steel, titanium and copper alloys
- Active brazing of ceramic-metal compounds
- Brazing of cellular structures
- Joining of composite materials
- Simulation and modelling

Services

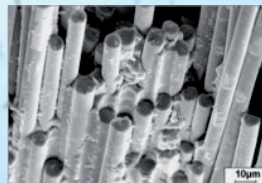
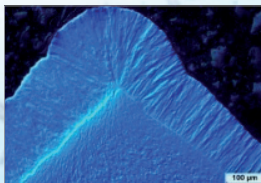
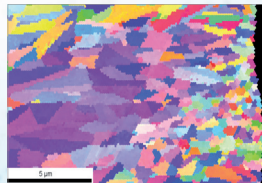
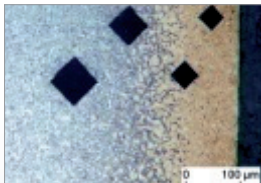
- Soldering, brazing and high-temperature brazing
- Damage analysis of industrial components
- Consulting service for industrial enterprises



Microstructural, structural and thermal analysis

Main areas of research and services

- Materialographic preparation of cross-sections
- Optical microscopy
- Microhardness testing
- Quantitative analysis of microstructural parameters
- Scanning and transmission electron microscopy and analysis
 - Energy-dispersive X-ray analysis (EDXS)
 - Orientation and phase analysis by electron backscatter diffraction (EBSD)
- Glow-discharge spectroscopy (GDOES)
- X-ray diffraction analysis (XRD)
 - Phase analysis
 - Texture measurements
 - Determination of residual stresses
 - Real-structure analysis
- Thermal analysis (TA)
 - Thermo-gravimetry (TG)
 - Differential thermal analysis (DTA)
 - Differential scanning calorimetry (DSC)
 - Dilatometry (DIL)
 - Thermal mechanical analysis (TMA)
 - Dynamic mechanical thermal analysis (DMTA)



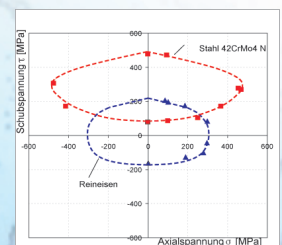
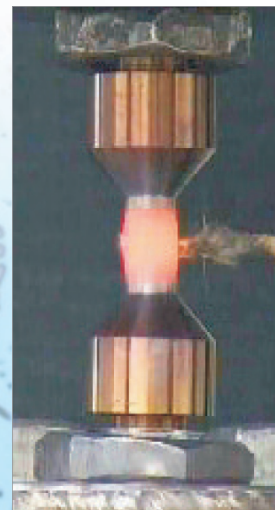
Materials testing and forming technology

Main areas of research

- Material behaviour under one- and multiaxial loading
- Fatigue and fracture
- Crack growth mechanisms
- Strain field analysis by digital image correlation
- Yield surfaces for sheet materials
- Development of constitutive equations
- Simulation of forming processes (cutting, rolling, die cutting)
- Damage analysis

Services

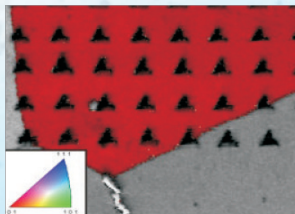
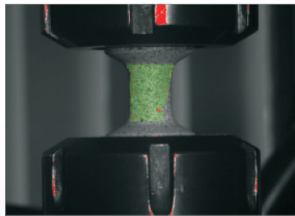
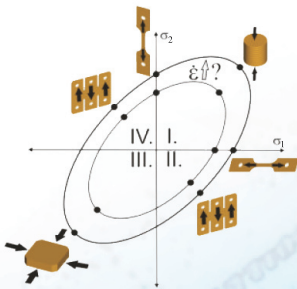
- Determination of TTT/CCT diagrams
- X-ray diffractometry
- Non-destructive materials testing



Materials optimisation, structure and properties

Main areas of research

- Dynamic testing
- ECAP of light metals
- Experiments and simulation on all length scales
- Heat treatment of metallic materials
- X-ray diffractometry
- Non-destructive testing
- Forming influence (history effect)
- Scaling effects
- Nanoindentation
- Thermo-mechanical simulation
- Localisation effects and shear bands



Collaborative Research Centre SFB 692



High-strength
Aluminium-based
Lightweight materials for
Safety components

The development, manufacture and characterisation of novel lightweight materials and their safety-relevant application are at the heart of the Collaborative Research Centre which was established in January 2006 by the German Research Foundation (DFG) and Chemnitz University of Technology.

The research activities subdivided into the three fields of activity

- **high-strength aluminium**
- **aluminium matrix composites (AMC)**
- **aluminium-coated magnesium**

are aimed at extending the application of aluminium-based high-strength lightweight materials for safety components with high integrity throughout the complete product life cycle.

Speaker: Prof. B. Wielage
Executive Director: Dr. G. Alisch



Contact



University Campus 3
Erfenschlager Str. 73
D-09125 Chemnitz

Composite Materials Group

Univ.-Prof. Dr.-Ing. habil. B. Wielage
bernhard.wielage@mb.tu-chemnitz.de
Phone: +49 (0) 371 531 36171
Fax: +49 (0) 371 531 23819

Materials Engineering Group

Univ.-Prof. Dr.-Ing. habil. M. F.-X. Wagner
martin.wagner@mb.tu-chemnitz.de
Phone: +49 (0) 371 531 36153
Fax: +49 (0) 371 531 23829

Surface Technology/ Functional Materials Group

Univ.-Prof. Dr.-Ing. habil. T. Lampke
thomas.lampke@mb.tu-chemnitz.de
Phone: +49 (0) 371 531 36171
Fax: +49 (0) 371 531 23819

How to get there:

- 1 Motorway exit (A72) Chemnitz-Süd
- 2 Take the B173 (towards the VW works)
- 3 Turn right into Südring (B169)
- 4 Turn right into Reichenhainer Str. (B180)
- 5 Arrive at Chemnitz University Campus 3, Erfenschlag.

