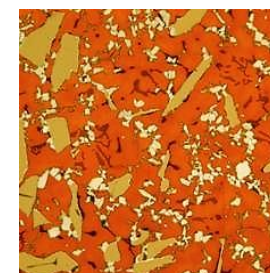
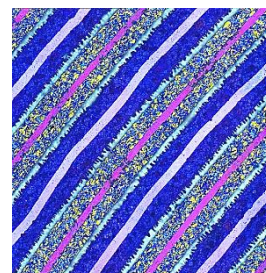
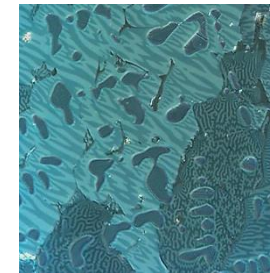
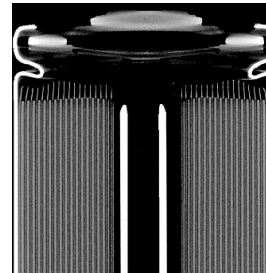


## Materials Analysis

The materials engineering and microscopy experts



**matworks**  
Materials Engineering Solutions

Matworks GmbH  
Gartenstraße 133  
73430 Aalen  
Germany

www.matworks.de  
Email: solutions@matworks.de  
Phone: + 49 7361 99904-0

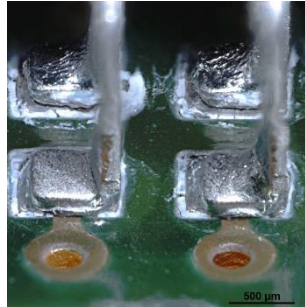
Management: Dr. Alwin Nagel  
Court of registry Ulm, HRB 729754

DIN EN ISO 9001 certified

## Projects

## Materials Analysis

- Structure / materials investigation
- Root cause failure analysis
- Corrosion and tribology test
- Mechanical properties
- Full magnetic properties for hard- and soft-magnets
- Benchmark analysis



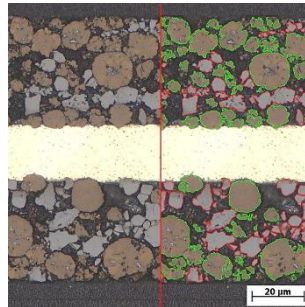
## New methods for quality inspection

- Lithium-ion cells and batteries
- Hard- and soft magnetic materials



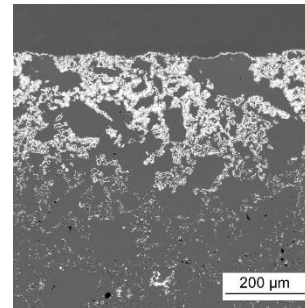
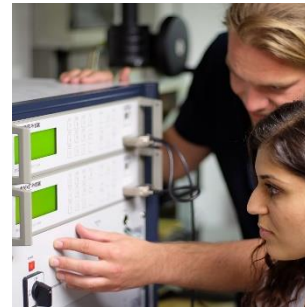
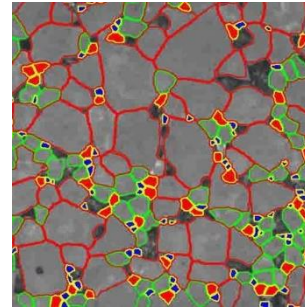
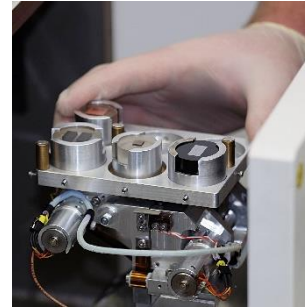
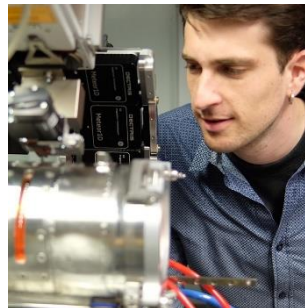
## Materialography

- 3D computed tomography
- Light- and electron microscopy
- Hardness testing
- Target preparation with electron beam via FIB
- Quantitative microstructure analysis according to Standards (e.g. DIN EN 10247 non metallic inclusions, VDG P202 porosity analysis)
- Porosity distribution of additive manufactured materials (AM)



## Component and System tests

- Magnetic materials and systems evaluation. Analysis of thermal and magnetic aging
- Li-Ion cells: electrical specification, specific charge and discharge profiles including long-term testing
- Analysis and evaluation of key factors of battery aging and safety



## Software Engineering

- Automated image acquisition for microscopy-scans of whole components
- Determination of defects, fine geometries, functional structures
- Integration of data input, e.g. barcode scanning and external cameras
- Data processing and statistical evaluation of specific features
- Customized report generation
- Consulting of software projects for regulated analysis (GxP compliance)

## Materials Synthesis Projects

- Powder technology processes
- Synthesis of hard-magnetic materials on lab-scale
- Electrode design of Li-ion-cells: development of high energy and power electrodes on lab-scale
- Additive Manufacturing of metals, ceramics and composites (SLM, ..)
- New metal ceramic composites and products with gas pressure melt infiltration with Al-, Cu-, Ni-alloys
- Recycling processes

## Technology Experts

- Future technology trends
- Patents research
- Benchmarking
- Cost engineering
- Training and consulting