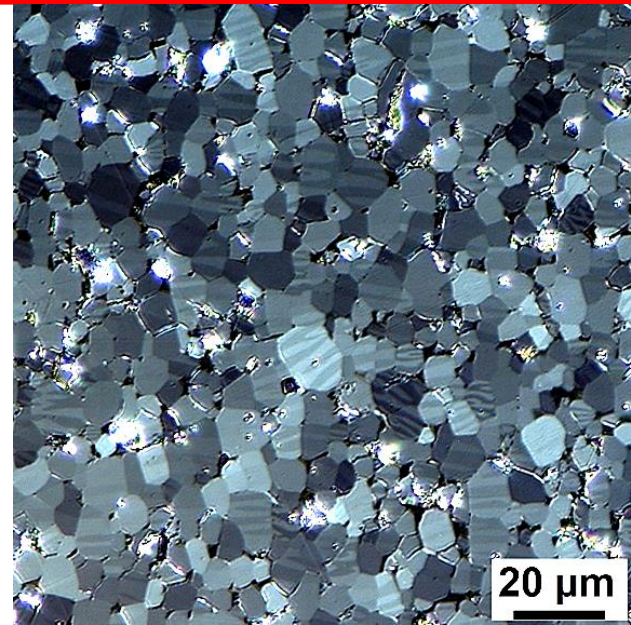


# Hard-magnetic materials

## Microstructural analysis

- materialographic preparation
- qualitative and quantitative microstructural analysis
- determination of homogeneity, phase composition, grain size, texture etc.
- visualisation of magnetic domains for qualitative assessment of texture
- quantitative texture analysis (EBSD)
- correlation of magnetic properties and microstructural features



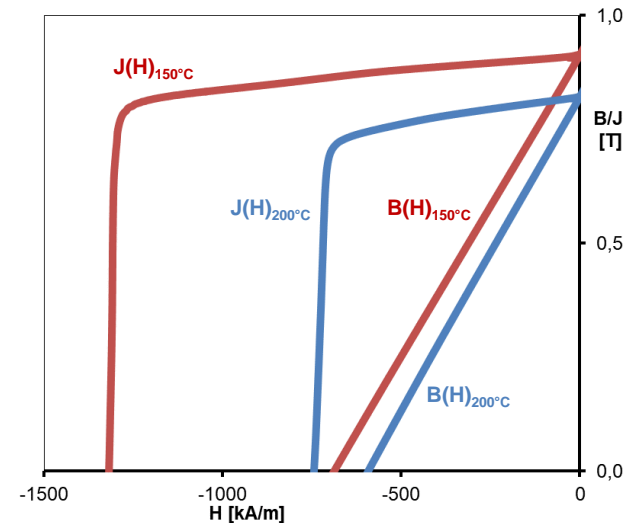
## Physical und chemical analysis

### Physical magnetometry

- measurement and evaluation of magnetic properties in accordance with technical application requirements
- determination of characteristic magnetic properties (hysteresis) under varying thermal conditions

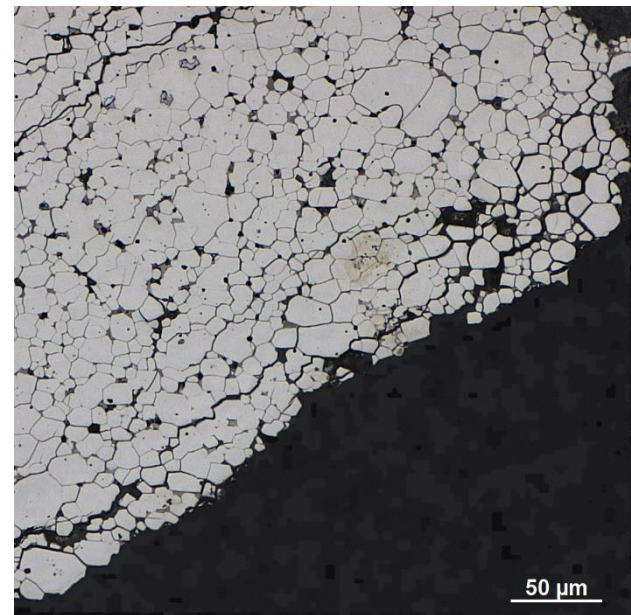
### Chemical analysis

- analysis of chemical composition and trace elements
- local phase composition
- evaluation of manufacturer information regarding Rare-Earth-percentage and usage of additives
- analysis of material prototypes



## Additional technical services

- scientific, technological studies and projects on hard-magnetic materials with respect to the value chain (research work, market analysis)
- Highly Accelerated Temperature/Humidity Stress Testing (HAST), Process-Cycle-Testing (PCT)
- correlation of corrosion behaviour with chemical composition and microstructural features
- analysis of anti-corrosion-layers



# Technical Equipment

## Materialography / Microscopy

### Materialographic laboratory

- devices for grinding and polishing
- ion-polishing machine

### Microscopy

- high-end optical microscopy
- polarised light microscopy
- standard- and high-resolution electron microscopes with energy-dispersive X-ray spectroscopy and electron backscatter diffraction
- quantification of microstructural composition using visual analysis algorithms

## Physical magnetometry

- permagraph
- magnetometer with in-situ microscopy unit
- impulse magnetiser
- Helmholtz-coil

## Chemical analysis / corrosion

- atom emission spectroscopy, atom absorption spectroscopy, mass spectrometry with induction-coupled plasma
- carrier gas hot-extraction (CGHE)
- corrosion testing:  
salt spray test (DIN EN ISO 9227),  
HAST (DIN EN 60068-2-66),  
PCT (DIN EN 60749-33)

## Further analytic methods

- processing technology of sintered materials (ceramics, composite materials, sintered magnets)
- battery testing
- X-ray diffractometer for phase analysis, stress measurement and in-situ high temperature measurement
- destructive material testing
- 3D-X-ray-computed tomography with micro- and nano-focus tube

In collaboration with Aalen University, Materials Research Institute

