

We Innovate Materials

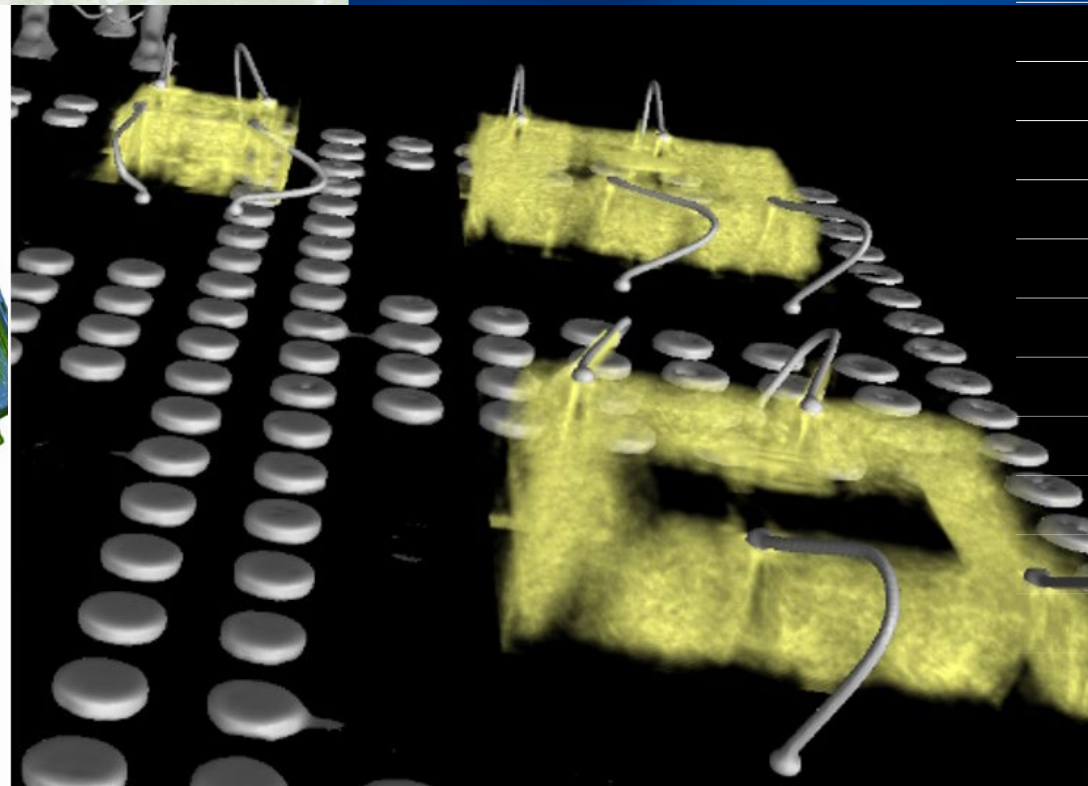
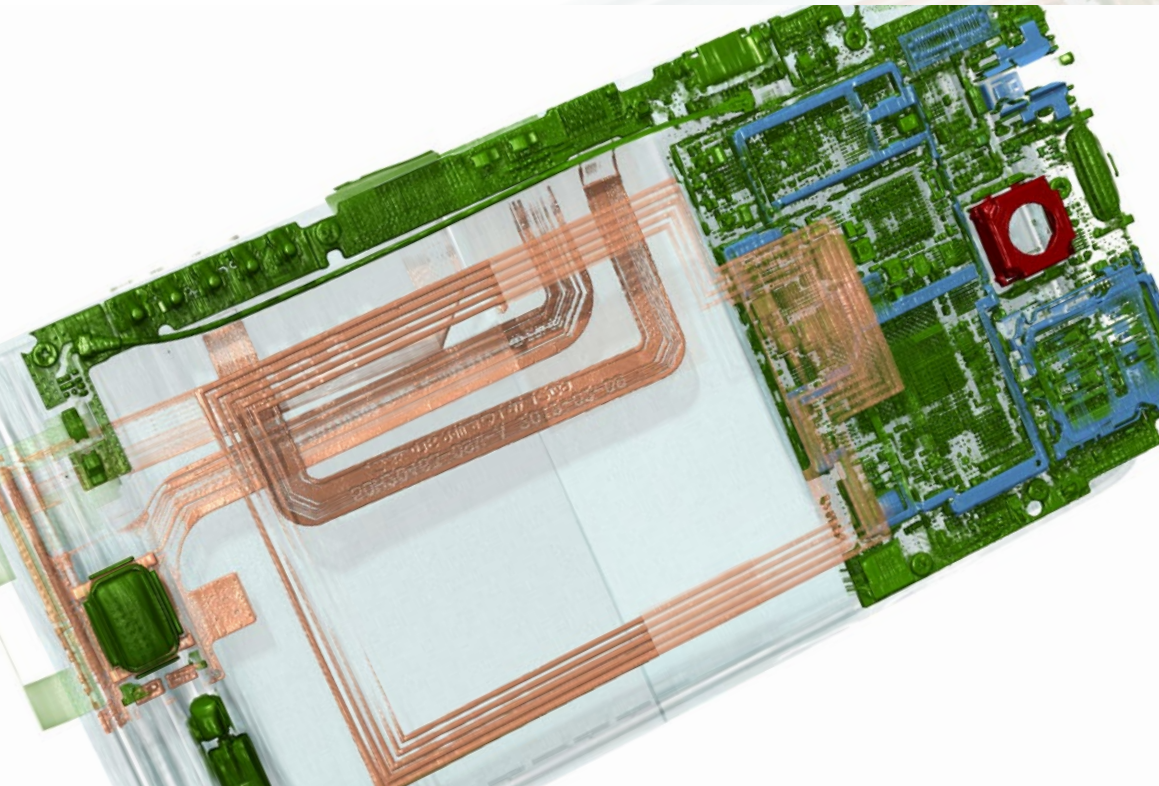
Microelectronic Test Methods

- Non-Destructive Analytics
- Destructive Physical Analysis
- Thermal Management
- Environmental Simulation Laboratory
- Thin Film Analysis
- Raman Characterization
- Electronic Laboratory
- Phase, Morphology and Residual Stress Analysis



COMPETENCE & RELIABILITY

Non-Destructive Analytics



Non-destructive quality assurance and failure analysis for microelectronic devices

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Contact:

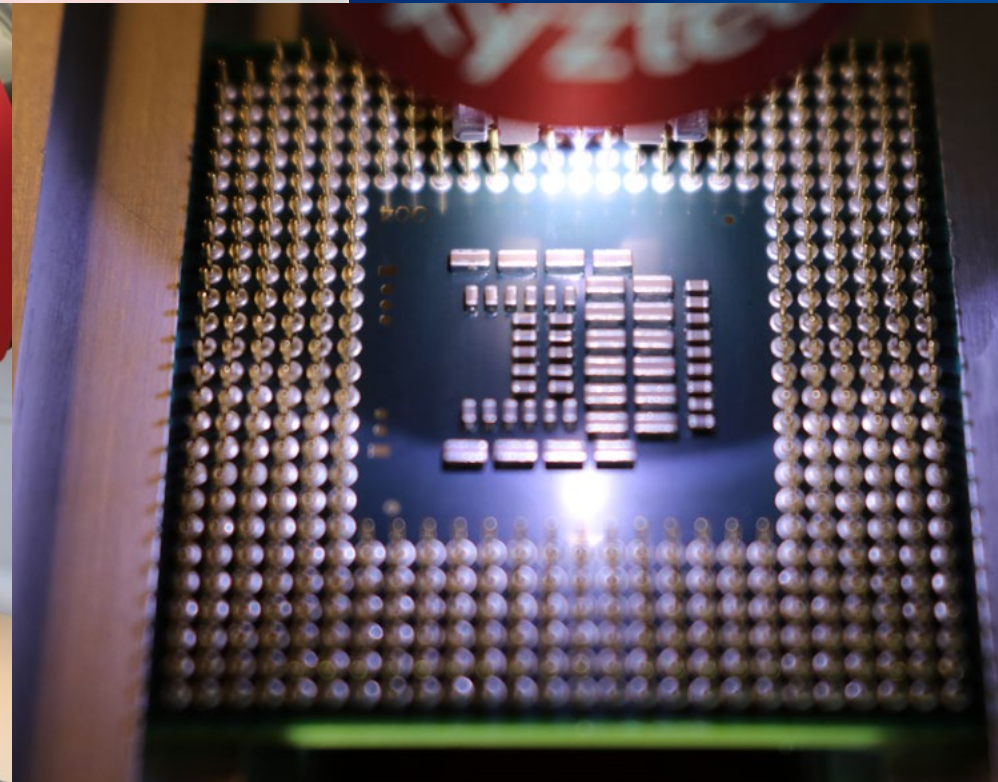


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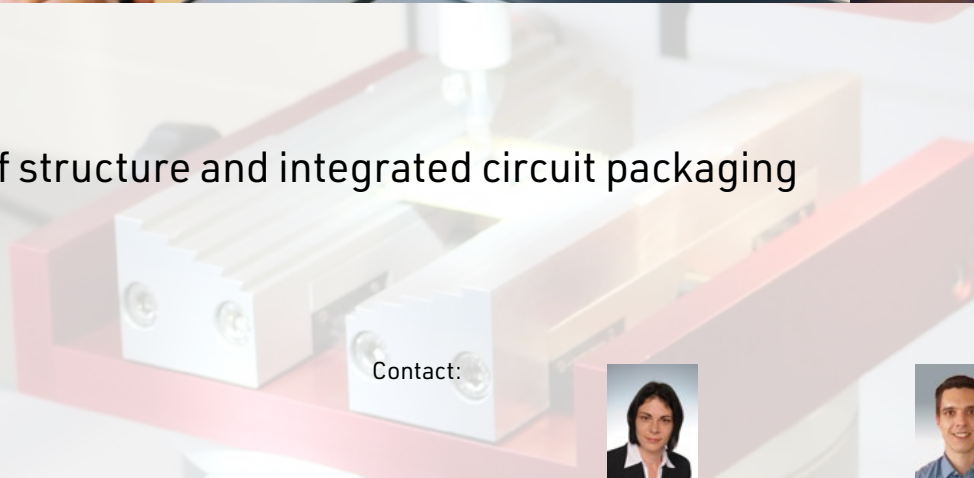
Our Focus / Competences:

- defect analysis - localization and evaluation of defects
- 2D and 3D porosity analysis
- acquisition of geometry data
- nominal/actual comparison
- texture analysis - phase segmentation
- in-situ testing with mechanical / thermal / electrical loading

Destructive Physical Analysis



Reliability of structure and integrated circuit packaging



Contact:



Dr. Barbara Kosednar-Legenstein
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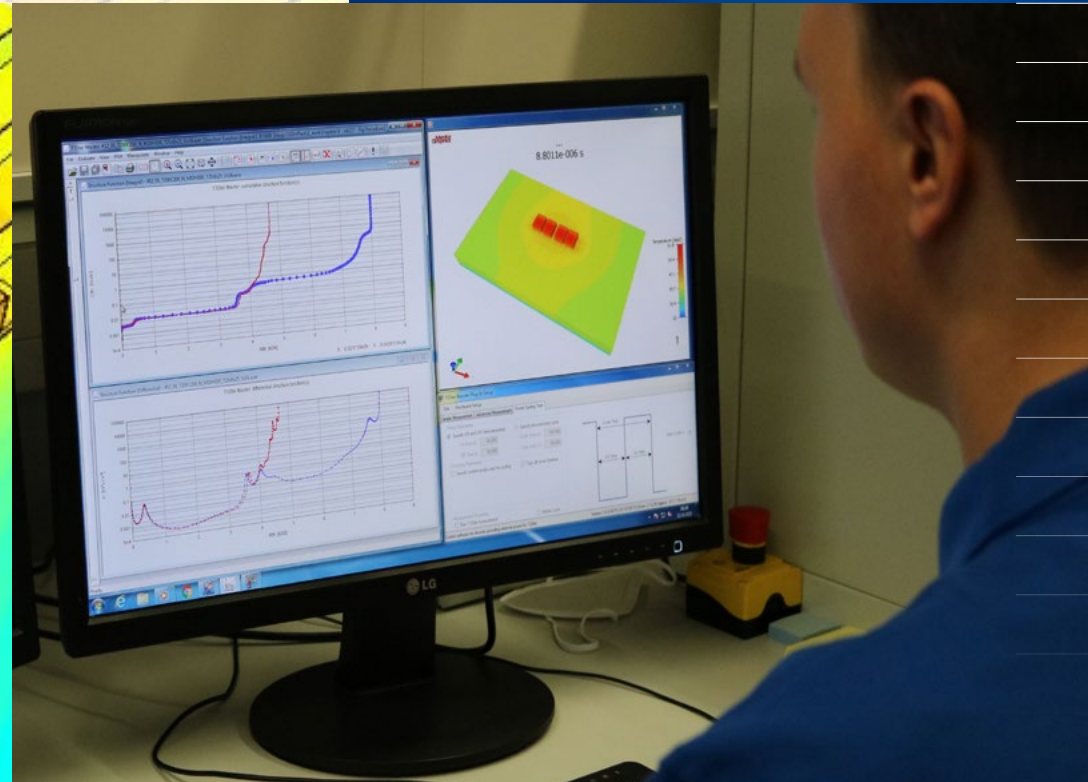
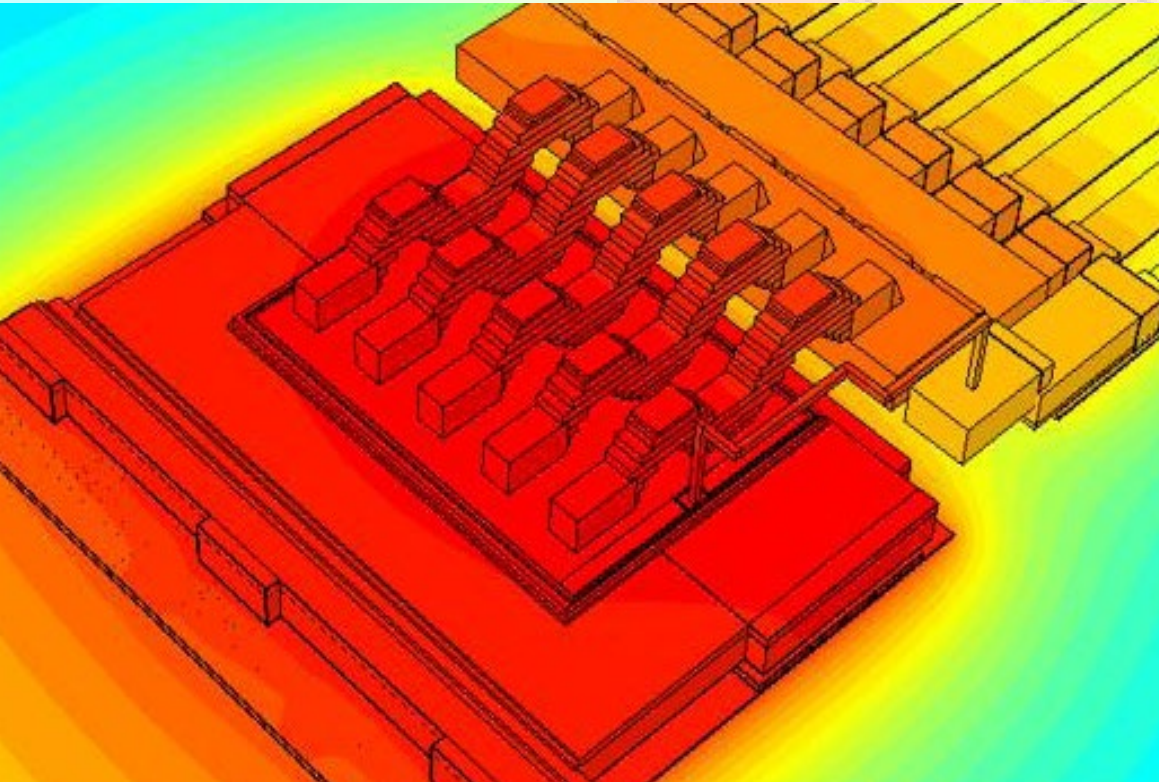
Dr. Julien Magnien
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Our Focus / Competences:

- visualization of surface structures
- detection of geometry and microstructure
- failure and root-cause analysis of electronic components (inclusions, cracks, aging processes)
- determination of deformation, damage and fracture behavior of different assembly and interconnection technologies
- evaluation of mechanical peel, shear and tensile stresses
- 3-point and 4-point bending test
- digital Image Correlation (DIC)

Thermal Management



Thermal analysis from material to electronic systems

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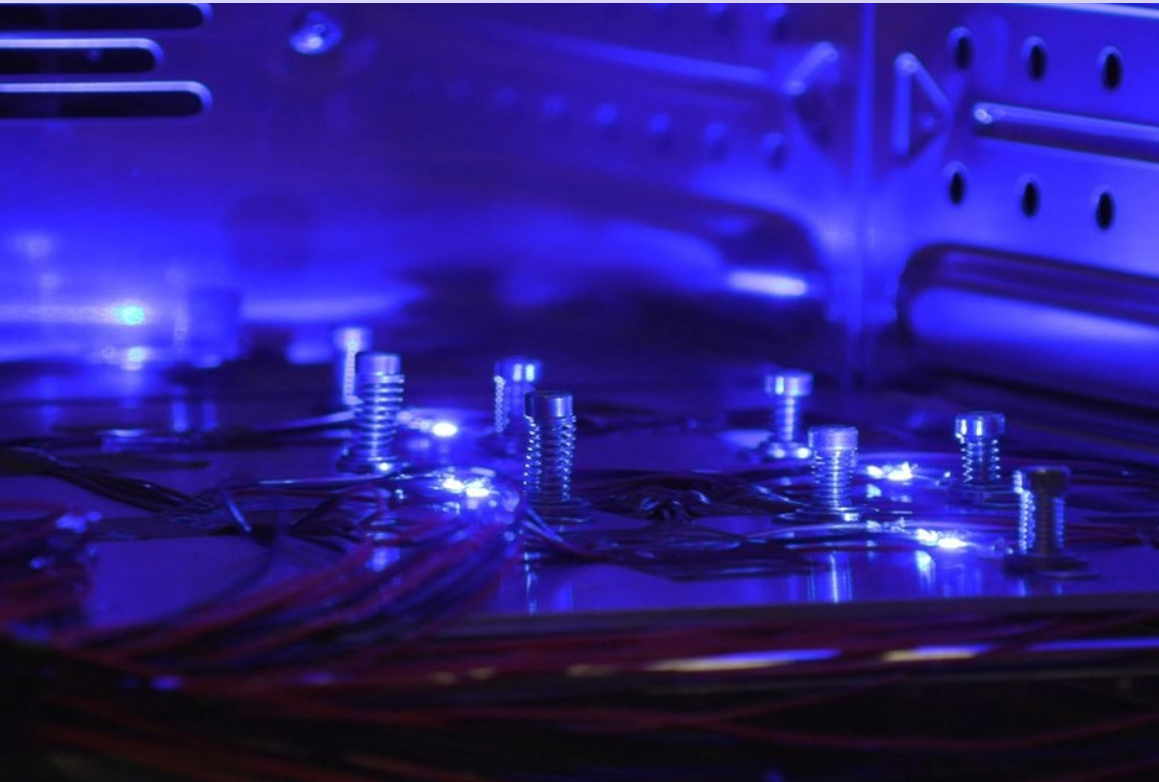
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Our focus / competences

- thermal resistance analysis of materials and systems (thermal impedance analysis)
- derating analysis up to $\leq 160^{\circ}\text{C}$
- heat path analysis of microelectronic packages and systems
- determination of thermal properties of thin films (temperature dependence) - temperature range: 20°C to 500°C
- determination of the thermal interface resistance
- validated thermal models for failure analysis and design guidelines

Environmental Simulation Laboratory



Active and passive thermal reliability testing

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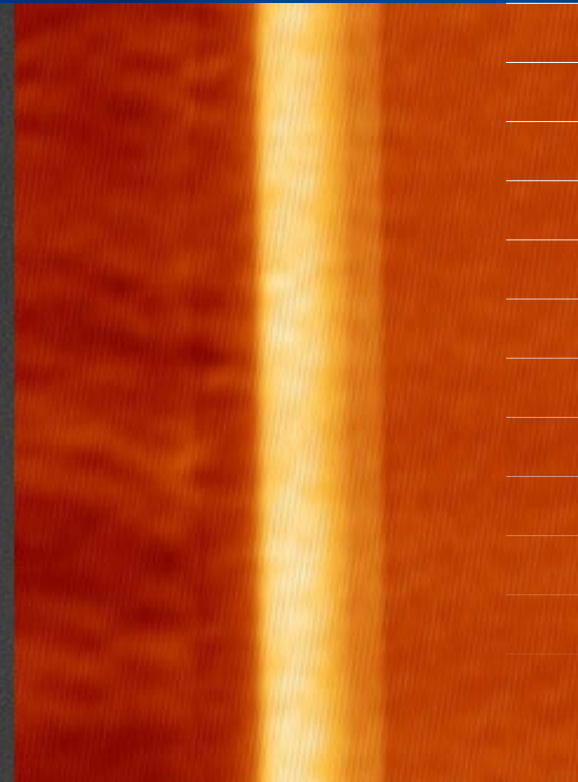
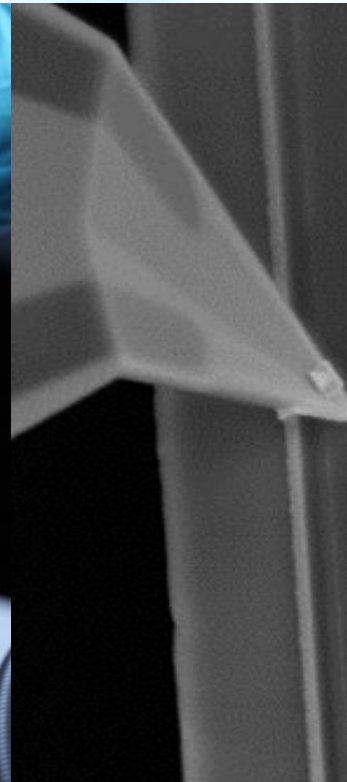
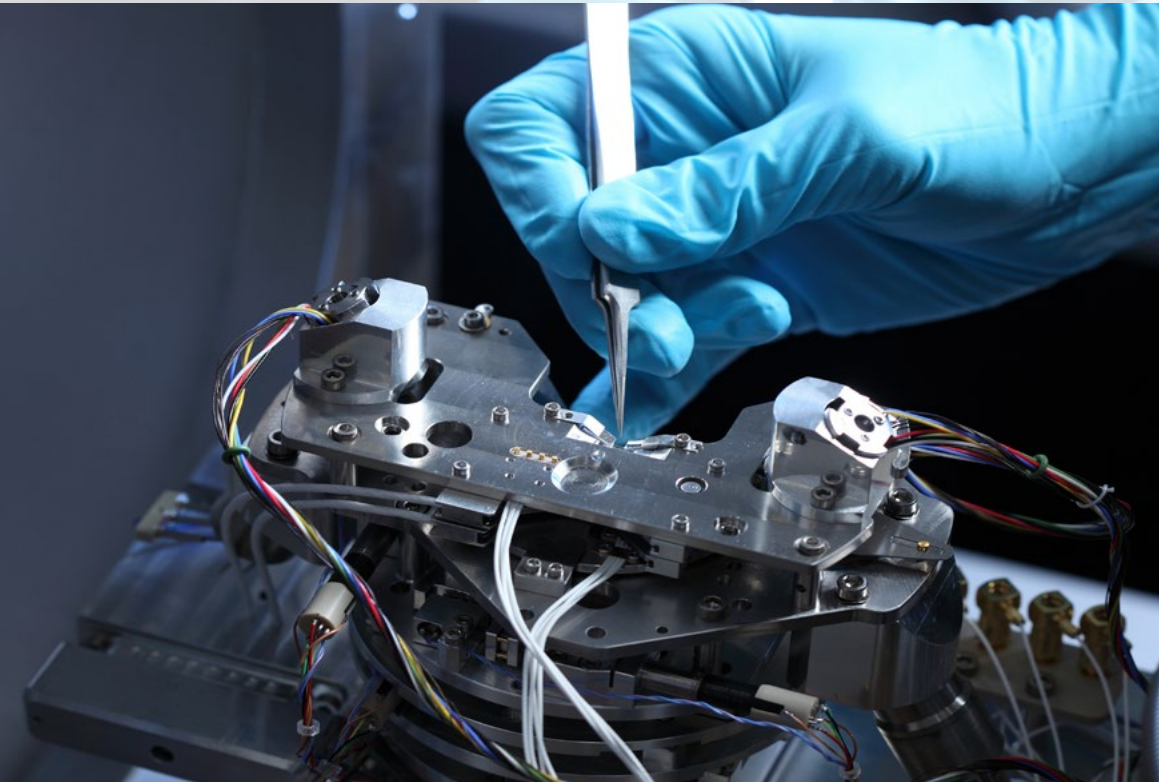


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Our Focus / Competences:

- temperature shock test -80°C to 220°C
- drying and heating oven up to 300°C
- alternating climate chamber -40°C to 180°C
- power cycle test up to 80 A
- condition monitoring by means of Temperature Tensitive Electrical Parameters (TSEP)
- data exploration and processing for early failure detection and lifetime modeling

Thin Film Analysis



Single and multilayer systems in the nm to μm range

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Our Focus / Competences:

- Scanning Probe Microscopy (SPM) analysis under different atmospheres (Ar, N, vacuum, air)
- topography and roughness analysis
- Kelvin Probe Force Microscopy (KPFM)
- Scanning Thermal Microscopy (SThM)
- EBAC (Electron Beam Absorbed Current) / EBIC (Electron Beam Induced Current)

Raman Characterization



Non-contact analysis method for material characterization

Contact:



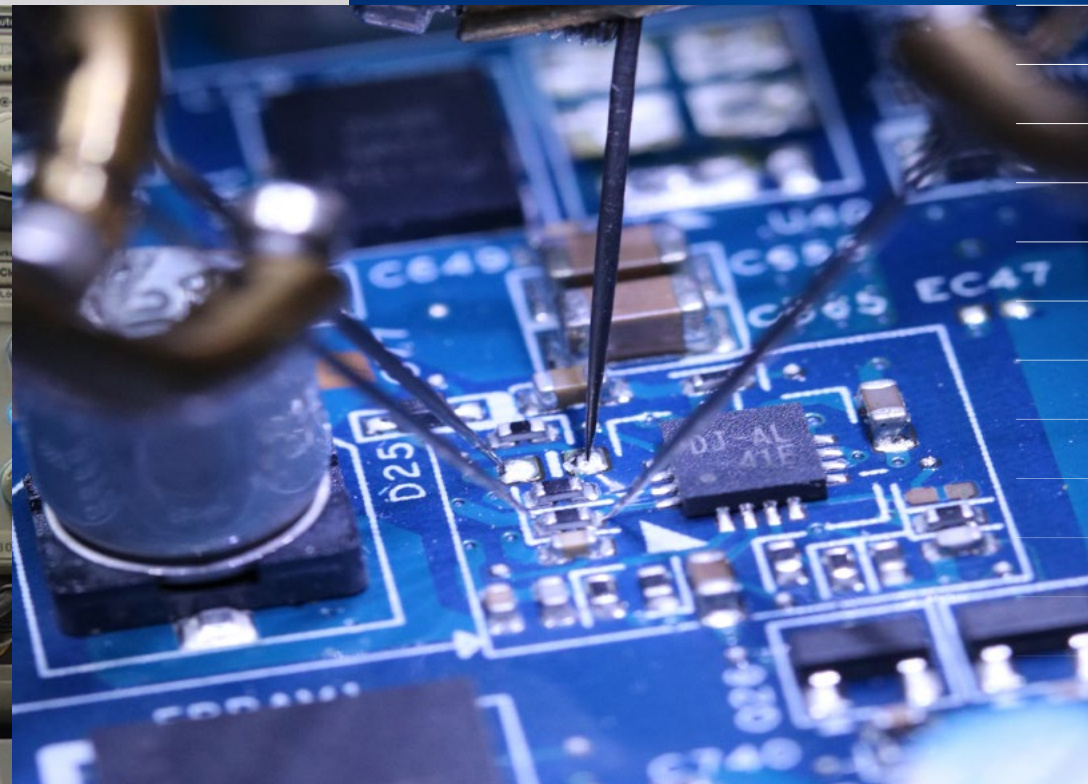
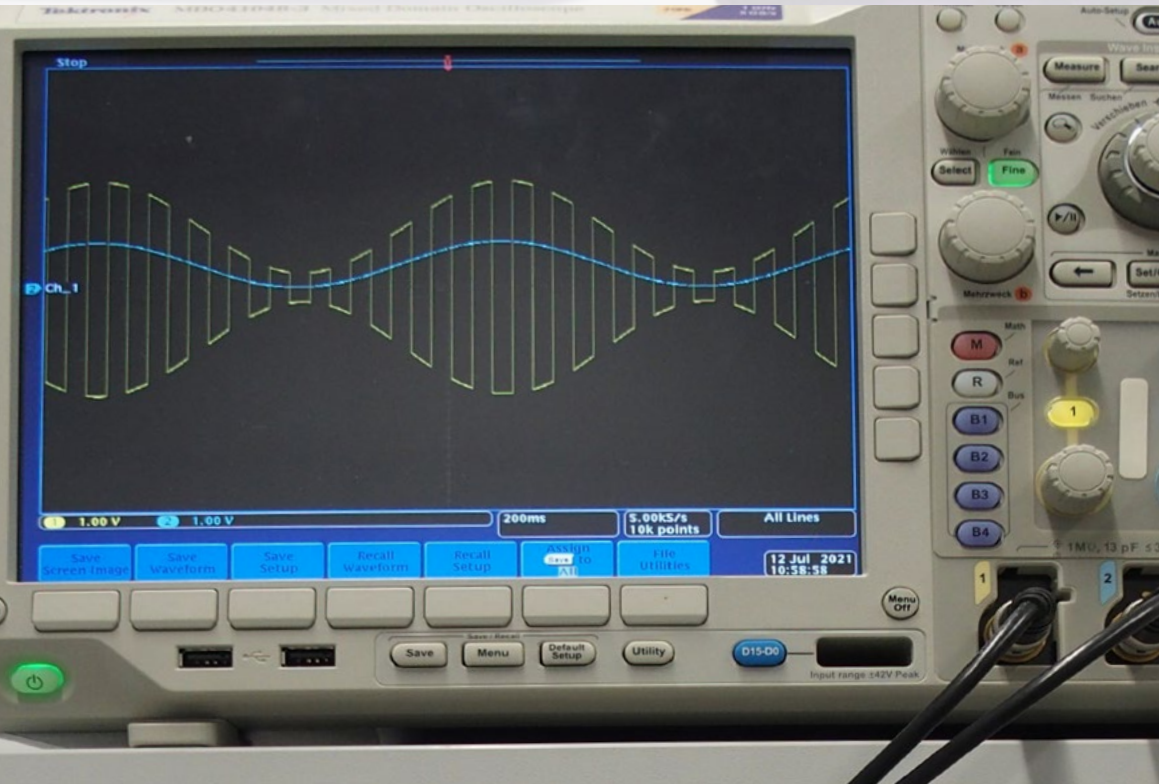
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Our Focus / Competences:

- chemical composition of materials
- crystallinity, phase transformations and phase compositions
- impurities and defects
- polarization analysis
- residual stress analysis
- texture analysis
- temperature range -196°C to 600°C

Electronic Laboratory



Analysis of functional materials up to electronic systems

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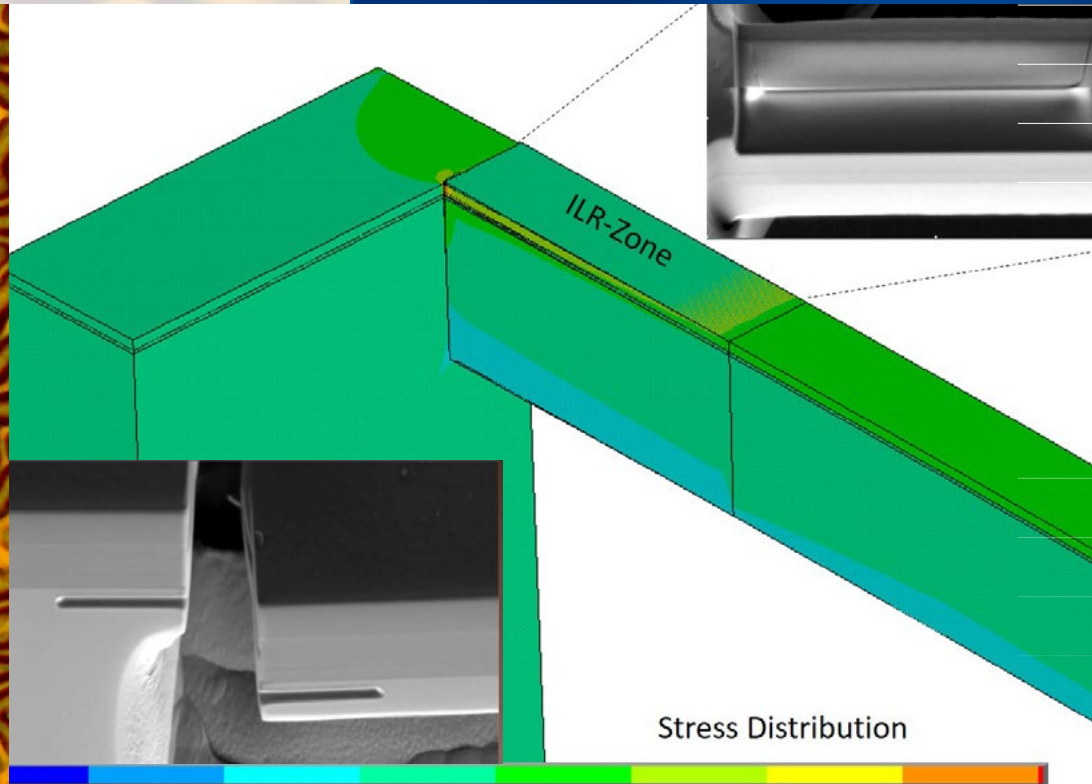
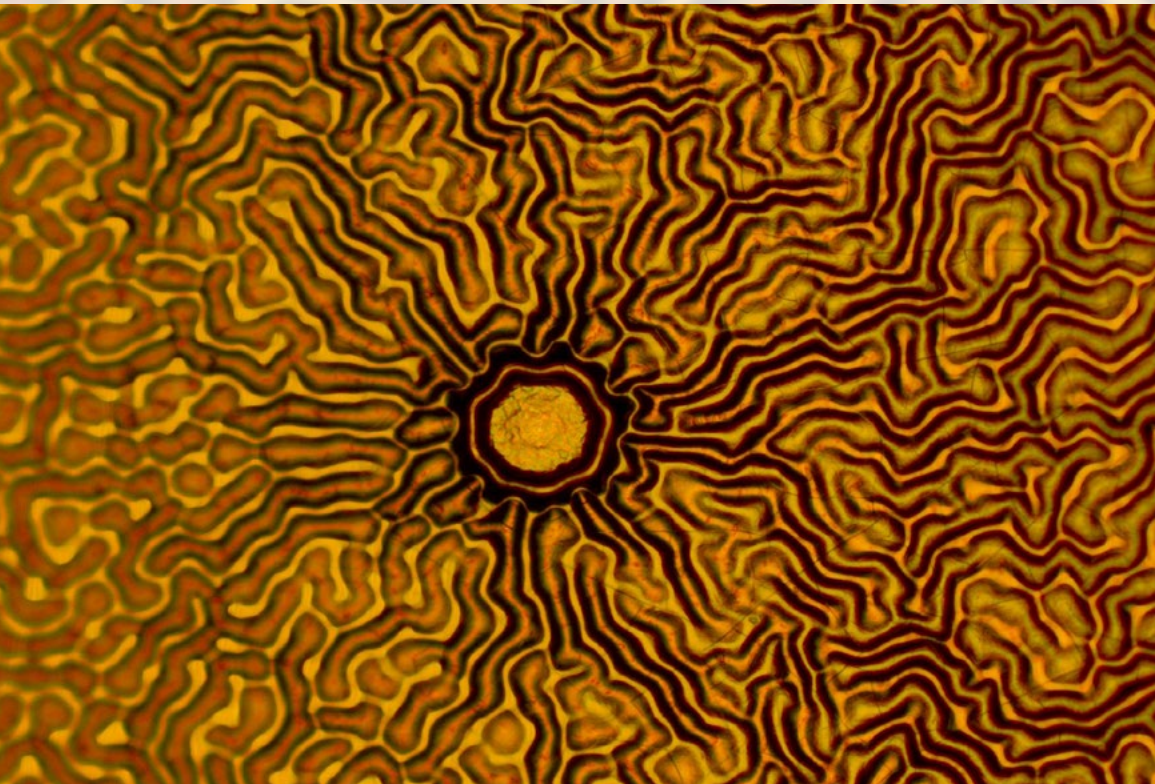


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Our Focus / Competences:

- analysis of static and dynamic hysteresis
- piezoelectric analysis
- breakdown voltage analysis ± 1 A (± 500 V)
- current/voltage characteristics
- frequency range 0.01 Hz to 150 MHz (2 GSa/s)
- temperature range -50°C to 400°C
- electrical impedance analysis
- 4-wire/point measurements

Phase, Morphology and Residual Stress Analysis



Structure and morphology influence on residual stresses in single and multilayer systems

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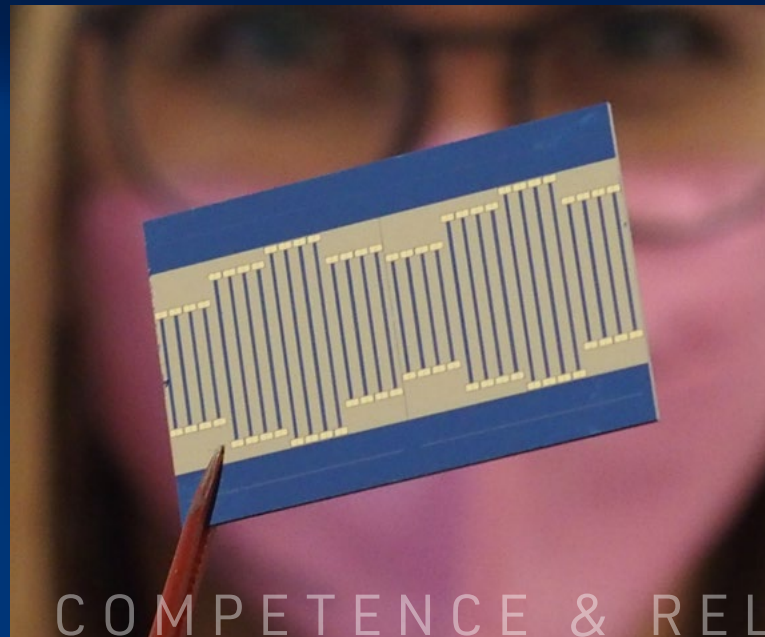


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Our Focus / Competences:

- high resolution EDX & EBSD analysis in the nm range
- high resolution morphology characterization by FE-SEM
- interface & phase analysis
- local residual stress analysis by IL-R (Ion Layer Removal) method



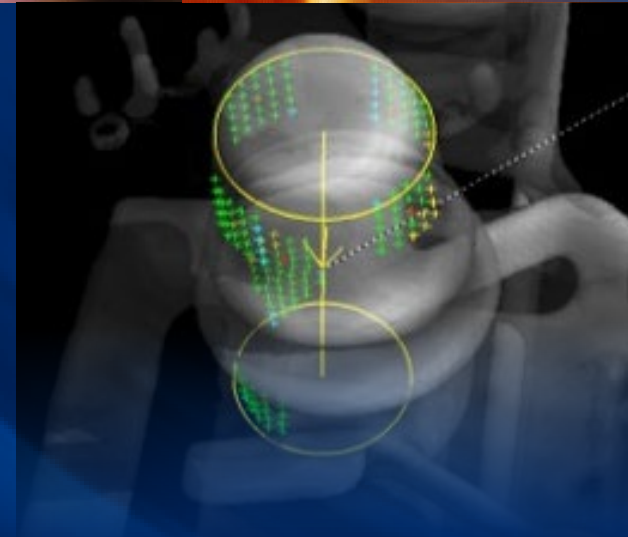
COMPETENCE & RELIABILITY

Service Offer

- analyses of materials, products, process defects, PCB defects and component failures
- thermal analysis on material and system level
- mechanical testing (tensile, shear test, nanoindentation, ...)
- determination of aging phenomena and processes
- localization and visualization of material and/or system failures
- environmental simulation (TS, TC, PTC, HTOL, ...)
- thin film analysis (material analysis and physical properties)
- phase, morphology and residual stress analysis
- system evaluation of new materials
- Physics of Failure (PoF)
- seminars and workshops

Equipment

- Computer tomograph - Nanotom
- SAM 400 (PVA TePla)
- Confocal UV Raman microscope - alpha300R (Witec)
- Bond tester - SigmaCondor (xyzTec)
- μ DMA - RSA-G2 (TA-Instruments)
- MK56 & 53 thermal cycling ovens (Binder)
- temperature shock - ShockEvent T/60/V2 (Weiss-technik)
- TF Analyzer 3000 (aixACCT Systems)
- TDTR - PicoTR (Netzsch)
- Scanning Probe Microscope (Semilab)
- PU / SMU / Frequency Generators
- Leica TXP EM



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