# How can we help you?

With our in-depth knowledge of material properties and behaviour, we enable effective development processes for our partners and support them y providing material and process expertise.

## Our Services

- Material and component characterisation throughout the development process and production
- Analysis of damage events, degradation mechanisms and failure risks
- Simulation and modeling of service life estimation
- Addressing the entire range of contact configurations on packaging level (wire bonding, soldering, adhesive bonding as well as mechanical contact like press fit and crimp)

## We support our partners in

- the development and selection process for materials (qualification, reliability testing and microstructure correlation)
- the creation of mission profile concepts (material and component design)
- fault and damage analysis up to the clarification of mechanisms
- the evaluation, adaptation, further and new development of test and analysis methods as well as their evaluation criteria

Further information can be found here:

www.imws.fraunhofer.de

Fraunhofer IMWS

Fraunhofer Institute for Microstructure of Materials and Systems IMWS


## Contact

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**We understand materials - the key to reliability and innovation.**

# Interconnection Technologies

09/ 2022

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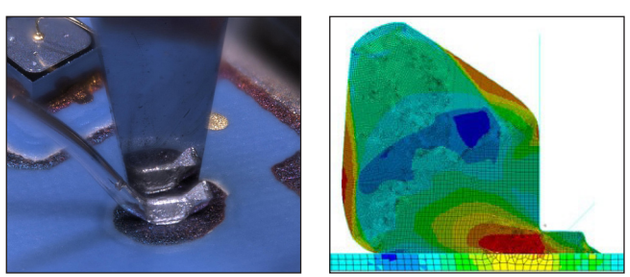
**Contact materials and connections are subject to special requirements in terms of effectiveness and reliability as key points with regard to functionality in components and systems. At the same time, increasing technology and economic demands require robust production processes and efficient material combinations. We support you with our know-how in your questions along the entire value chain.**

Understanding interactions and property changes inside a material or component as well as at its interfaces is the basic prerequisite for elucidating or even preventing failure mechanisms. This allows for optimising systems and processes in terms of their efficiency and reliability, and for developing and implementing innovative technological approaches.

We are committed to gaining this understanding and offering it to our clients in line with their needs. Our customers benefit from a better understanding of the product, increased reliability and robustness of their electronic systems, as well as improved cost efficiency and faster time to market.



*left: A shearing chisel positioned behind an aluminium heavy wire contact; the shear test is the standard method applied to test the bond quality of heavy wire contacts.*
*right: A shear test FEM simulation to determine the deformation and tension processes in the aluminium material of a heavy wire bond contact.*

We support our customers with our knowledge along the entire value chain from material to processing to the investigation of ageing and failure mechanisms.

### Material and component characterisation throughout the development process and during production

- Element- and trace analysis down to ppm range
- Determination of material properties in the temperature range -60° to +500° C
- Mechanical, electrical and microstructural analysis of the connection quality
- Evaluation of processability and reliability

### Analysis of damage events, degradation mechanisms and failure risks

- Non-destructive defect localisation and target preparation
- Microstructure analysis down to atomic dimension
- Identification of degradation mechanisms and root causes as well as the definition of corrective actions

### Simulation and service life estimation

- Simulation of specific load cases (mechanical/ thermal/ electrical) for degradation and service life estimation

### Development of adapted test and analysis methods

- Modification and new or further development of test and analysis methods according to individual requirements
- Verification of the validity of existing test and analysis methods as well as the associated evaluation criteria

»Our customers benefit the most from our comprehensive understanding of the processes that occur during the life cycle of a material or component.«

**Robert Klengel,**
**Team Manager**