

# microPREP™ PRO

## NEW VISTAS FOR FAILURE ANALYSIS AND SAMPLE PREPARATION

The microPREP™ PRO enables laser-based sample preparation for a variety of specimen preparation applications. With its integrated ultrashort pulsed laser source, it complements existing approaches to sample preparation such as ion beam processing. microPREP™ PRO is suited to ablate metals, semiconductors, ceramics, polymers, and compound materials. It creates new vistas for material and process development as well as failure analysis.

### HIGHLIGHTS

- Free-form sample preparation
- Provides samples with micron-level precision
- Sophisticated workflows for automated tasks
- Reduces time-to-sample significantly
- Lower cost per sample





### Unique Workflows

Sophisticated workflows have been developed to meet the specific requirements of cutting-edge analytical techniques, such as TEM, SEM/FIB cross sectional analysis, atom probe as well as X-ray tomography or even micromechanical testing. Numerous patents ensure competitive advantages for users compared to existing approaches in the field of sample preparation.



### Laser

At sufficient power, laser radiation is able to ablate all kinds of materials. Lasers can be very precisely positioned on a given workpiece and straightforwardly focused using standard optical elements. By using ultra-short pulse lengths in the picosecond range, superficial surface heat influence from ablation is narrowed to depths of a few microns or less.



### Flexibility

The modular software design provides high flexibility for a broad range of microstructure diagnostic techniques. microPREP™ PRO allows to create complex 3D-shaped samples that enable comprehensive analysis of certain structures based on generic patterns or CAD-files.



### Handling

Samples are easy to handle and can be transferred to follow-up processes safely as microPREP™ PRO works with standard specimen stubs and mounts. The integrated overview and high-resolution process cameras ensure sample preparation with micrometer precision. Advanced features like the motorized stages together with the intuitive software enable users to execute preparation tasks conveniently and in very short time.



### Cleaning

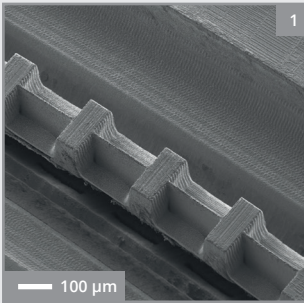
For best results in terms of specimen cleanliness and an optimal start for post-processing steps, microPREP™ PRO can be fitted with a CO<sub>2</sub> Snow Jet. This contactless nonabrasive cleaning system removes debris broadly within seconds. Cleaning with the CO<sub>2</sub> Snow Jet means no chemical or cross-contamination for the sample.



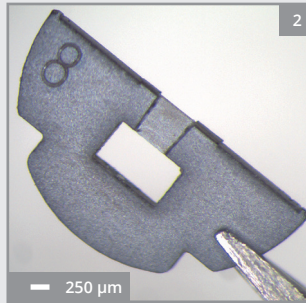
### Efficiency

microPREP™ PRO reduces time-to-sample significantly. In addition, microPREP™ PRO guarantees a higher utilization of other tools within the analysis chain while keeping the costs of ownership low.

# FIELDS OF APPLICATION



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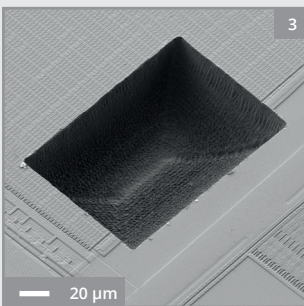
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## Transmission Electron Microscopy (TEM)

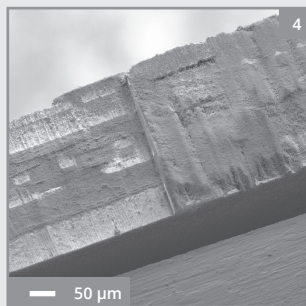
microPREP™ PRO provides specific sample geometries for in-plane TEM-investigations and H-bars for cross sectional analyses.

Fig. 1: XL-chunk (total length: 3.2 mm) with multiple lamellas from an IC-device (size of lamellas: 150 μm x 50 μm x 10 μm)

Fig. 2: Pre-thinned „halfgrid structure“ of a bulk sample



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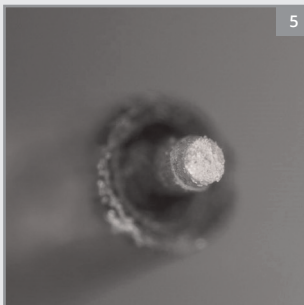
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## Focused Ion Beam and Scanning Electron Microscopy (FIB/SEM)

The high ablation rate of the laser can be used for time-efficient box milling as a starting point for FIB polishing at a target position. Thus, FIB-time can be reduced to a minimum.

Fig. 3: Box milling in an IC-structure

Fig. 4: Cross-section of an IC-structure prepared by microPREP™ PRO



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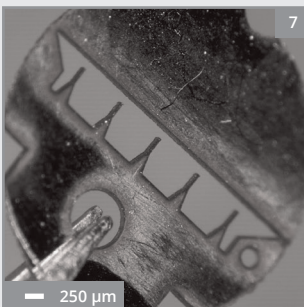
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## 3D-Analysis

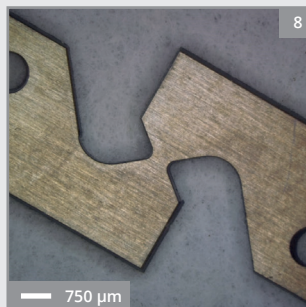
microPREP™ PRO can be operated as a lathe tool to prepare cylindrical samples with micrometer dimensions.

Fig. 5: Sample on a needle

Fig. 6: Specimen cut by microPREP™ PRO and glued to a carrier structure



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## Cutting

microPREP™ PRO can be used to generate samples of almost arbitrary shape exactly after users specifications.

Fig. 7: Multi-pillar sample shape cut out of steel

Fig. 8: Sample for micromechanical testing cut from Zirconium

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3D-Micromac AG is the industry leader in laser micromachining. We develop processes, machines and turnkey solutions at the highest technical and technological level. Our aim is to provide superb customer satisfaction even for the most complex projects.

3D-Micromac delivers powerful, user-friendly and leading-edge processes with superior production efficiency. These proprietary technology innovations are now readily available on a worldwide scale.



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