microPREP® L

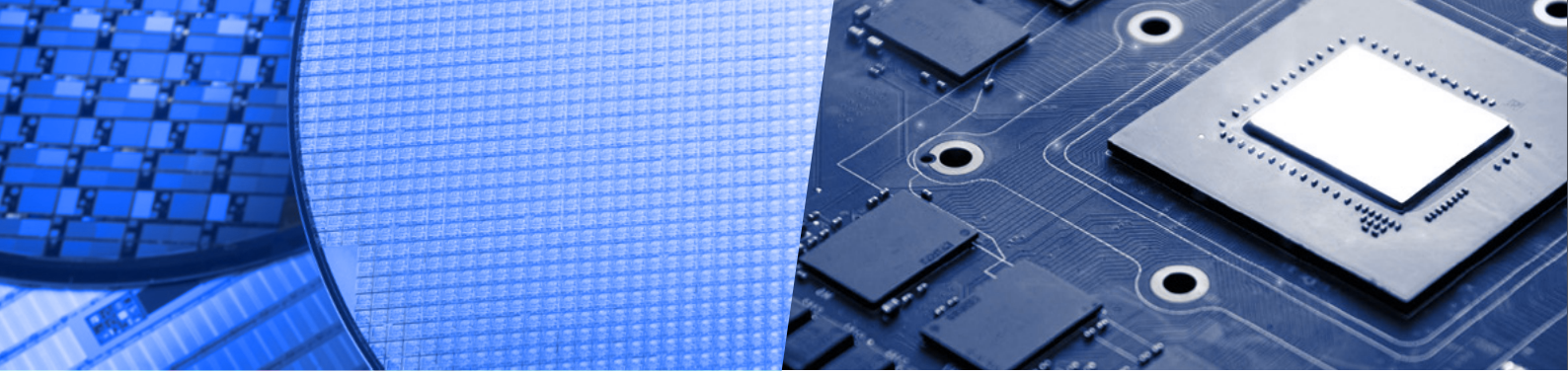
NEXT LEVEL OF FAILURE ANALYSIS & QUALITY ASSURANCE

The microPREP® L enables laser-based processing of large-area semiconductor and electronics substrates, including full wafers and system-level boards. Designed for advanced failure analysis, process development, and quality assurance, microPREP® L supports precise sample preparation as well as targeted removal of defective structures. With wafer-level handling and sophisticated laser workflows, microPREP® L helps users access, prepare, and process regions of interest directly on the substrate. This accelerates time-to-result by reducing mechanical preparation steps and handling effort.

HIGHLIGHTS

- Laser-based sample preparation for advanced failure analysis
- Targeted removal of defective structures
- Wafer- and board-level laser processing
- Multi-site preparation in one process run
- Reduced handling steps and faster time-to-result
- Sealed process chamber available – for processing under vacuum. inert atmosphere, or gas injection
- Prepared for automated semiconductor handling solutions

3D MICROMAC



Unique Workflows

Field-tested, sophisticated workflows meet the specific requirements of advanced semiconductor failure analysis, sample preparation, and localized laser processing. The microPREP® L supports efficient preparation and targeted defect removal directly on large substrates, replacing time-consuming mechanical preparation steps.

Laser

Laser radiation enables precise, localized material ablation across a wide range of semiconductor and electronic materials. Using ultra-short pulse lengths in the pico- or femtosecond range minimizes the heat-affected zone, allowing controlled processing of sensitive structures and complex material stacks.

Scalability

From small samples to full 300 mm wafers and system-level boards, the microPREP® L scales laser processing to the substrate formats required for today's semiconductor and electronics failure analysis. Users can process a range of substrate formats on a single platform, from individual specimens to large-area assemblies.

Handling

A multi-axis system provides flexible positioning, rotation, tilting, and sample movement without requiring dedicated handling setups for each task. This allows efficient access to regions of interest on large or complex substrates and supports integration into automated semiconductor fabrication environments.

Cleaning

For best results in terms of substrate cleanliness and an optimal start for post-processing steps, the microPREP® L can be equipped with different cleaning options. Contactless, non-abrasive cleaning removes debris efficiently and ensures substrates are ready for reliable downstream analysis, minimizing contamination risks.

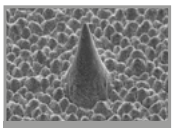
Efficiency

The microPREP® L enables multi-site processing directly on full wafers and large substrates, decreasing manual handling and accelerating the preparation of multiple regions of interest within a single workflow. By taking over time-consuming pre-preparation steps, one microPREP® system can support multiple analysis tools, like BIB and FIB systems, and help increase the utilization of downstream preparation and analysis tools.

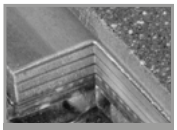
FIELDS OF APPLICATION

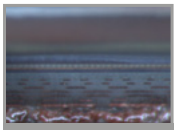

Device Opening

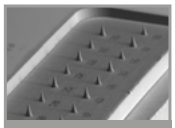

Micromechanical Testing


3D Analysis

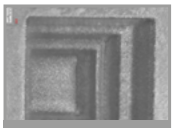

TEM


Cross-Sections


SEM

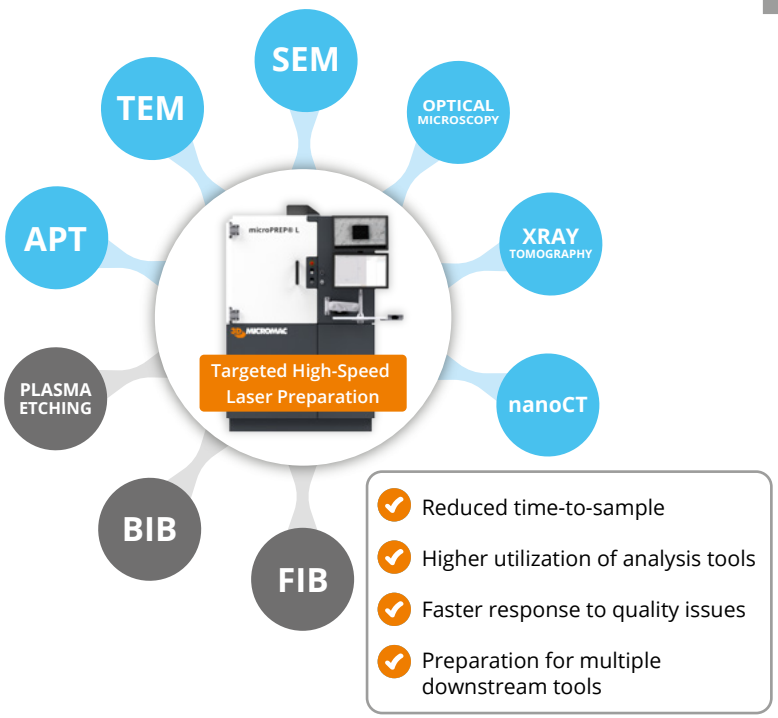

APT


Delayering


3D Manufacturing

Advanced Sample Preparation

The microPREP® L enables laser-based preparation of samples for SEM, TEM, 3D analysis, and micromechanical testing. Besides classical sample preparation, it can also support localized laser-processing applications, including 3D manufacturing, surface treatment, and related microstructuring tasks. Both hardware and software can be adapted to specific customer requirements, allowing workflows tailored to individual application goals.

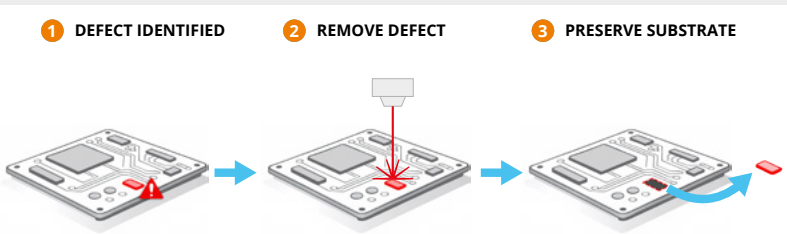


- Reduced time-to-sample
- Higher utilization of analysis tools
- Faster response to quality issues
- Preparation for multiple downstream tools

High-throughput QA Workflows

In high-throughput industries such as semi-conductor and electronics manufacturing, the microPREP® L can take over time-consuming coarse preparation steps before final processing or analysis. By preparing regions of interest in advance, it reduces processing times on downstream tools such as FIB systems and improves their utilization.

For many workflows, a single microPREP® L prepares samples for multiple analysis tools, e.g., microscopes, as well as FIB, BIB or plasma etching devices — allowing each tool to focus on its specialized task while the laser system handles the high-speed pre-preparation.



Selective laser processing enables precise removal of defective structures while preserving the rest of the wafer or board for futher production.

APPLICATION IDEA:
Targeted Removal of Defective Structures

The microPREP® L enables localized removal of individual defective structures and elements from wafers, boards, or devices. Identified faulty elements can be selectively separated from the substrate, preserving the remaining wafer or board for further use.

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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.

Laser Class 1

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