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3D-Micromac Highlights Laser-Based Sample Preparation for Advanced Packaging Failure Analysis at SEMICON West

microPREP® L combines high-productivity processing with precise, localized material removal for samples ranging from individual dies to full wafers and system-level boards

Chemnitz, Germany, Sep. 29, 2026 — 3D-Micromac AG, the industry leader in laser micromachining and roll-to-roll laser systems for the semiconductor, photovoltaic, medical device, and electronics markets, today announced that it will highlight its microPREP® L laser-based sample preparation system at SEMICON West, the premier microelectronics exhibition in North America, October 13-15, in San Francisco, Calif. Designed for advanced semiconductor failure analysis and quality assurance, microPREP® L supports sample sizes ranging from individual dies up to whole 12-inch (300-mm) wafers and system-level boards.

3D-Micromac will discuss microPREP® L's capabilities during the Test Vision Poster Session on Wednesday, October 14 from 3:10-5:00pm in its presentation "Large-Format Laser Processing for Targeted Defect Access and Removal Following System-Level Testing." The presentation will address how targeted laser access and defect removal meet emerging requirements in system-level failure analysis, including board-level preparation, wafer-level processing, multi-site workflows, reduced mechanical sample handling, and faster response to quality issues.

New Sample Preparation Requirements for Advanced Packaging

Driven by AI and other high-performance computing applications, semiconductor devices and systems are becoming increasingly complex as heterogeneous integration and advanced packaging bring more functionality into tightly integrated designs. At the same time, advanced packages and system-level boards are becoming larger and thicker, while the individual layers and structures within them are becoming thinner and more difficult to access selectively. This combination of increasing scale and complexity creates new challenges for conventional sample preparation methods. Mechanical techniques can affect specimen integrity, while focused ion beam (FIB) and broad ion beam (BIB) milling require significant time for coarse, large-volume material removal.

microPREP® L addresses these challenges with a dedicated laser-based sample preparation platform that bridges the gap between high-speed, large-volume material removal and precise, selective processing. Its large-format capability enables engineers to process regions of interest directly on full wafers and system-level boards without first cutting them into smaller pieces. Depending on the application, laser processing can provide sufficient access for inspection or serve as a high-speed front-end step, offloading material removal from costly analytical tools such as ion beam systems so they can focus on final polishing, imaging, and high-resolution analysis.

Since its introduction, microPREP® L has attracted interest across a diverse range of sample-preparation applications and requirements, including AI accelerator devices, quantum technology research, advanced displays, and applied microelectronics research. Another use case for the platform is isolating individual chips from full wafers while preserving the integrity of the remaining substrate. In addition, the platform's flexibility supports emerging board-level repair applications, where non-functioning components can be selectively removed for replacement rather than discarding the entire board.

"The growing complexity of advanced semiconductor devices and systems is changing what failure analysis and quality assurance teams need from sample preparation," stated Uwe Wagner, CEO of 3D-Micromac AG. "The range of applications we are seeing for microPREP® L shows that sample preparation increasingly needs to accommodate the scale and complexity of the device, package, and system, rather than forcing it to fit the limitations of the preparation tool. We collaborate closely with customers to understand their specific failure analysis requirements and help them develop and optimize the right preparation approach for their application. That combination of flexibility and expertise helps customers accelerate sample preparation and make more effective use of their downstream analytical resources."

microPREP® L further increases productivity through recipe-driven automation that enables multiple preparation tasks to run sequentially and unattended at different locations across the same wafer or board. Real-time in-situ depth sensing monitors material removal during processing, reducing iterative process-measure-reprocess cycles and helping speed time-to-sample. Integrated 3D imaging and measurement enables topographic mapping between processing steps, allowing users to precisely target areas for laser processing, verify resulting dimensions and geometries, and continue processing based on the measurement data. An optional sealed process chamber also supports processing under vacuum or an inert atmosphere for applications requiring controlled environmental conditions. Additional options include cryogenic processing for temperature-sensitive materials and chemically assisted laser processing aimed at improving surface quality and process efficiency.

Meet 3D-Micromac at SEMICON West 2026

To speak with a 3D-Micromac representative and learn more about the company's laser solutions for failure analysis and sample preparation, as well as other semiconductor applications, visit 3D-Micromac's booth 1245 (South Hall, Germany Pavilion) during exhibition hours.

For members of the media interested in learning more about 3D-Micromac's microPREP® L solution, please contact David Moreno, Open Sky Communications, at dmoreno@openskypr.com.

About 3D-Micromac

Founded in 2002, 3D-Micromac AG is the industry leader in laser micromachining, delivering powerful, user-friendly and leading-edge processes with superior production efficiency. We develop processes, machines and turnkey solutions at the highest technical and technological level. 3D-Micromac systems and services have been successfully implemented in various high-tech industries worldwide including photovoltaic, semiconductor, glass and display industries, micro diagnostics, and medical technology. For more information, visit the company's website at <http://www.3d-micromac.com>.

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