

Helios 5+ PFIB-SEM and Helios Hydra 5+ PFIB-SEM

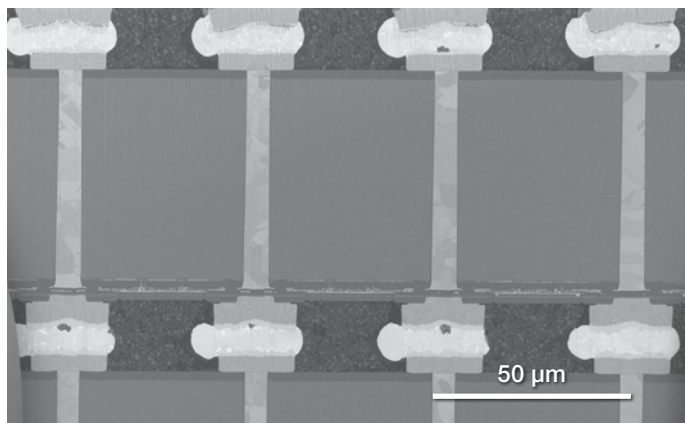
Introducing the Helios 5+ advanced capabilities for semiconductor applications

The Thermo Scientific™ Helios™ and Helios Hydra™ 5+ PFIB-SEMs share a turbocharged plasma-FIB platform for comprehensive sample preparation with advanced capabilities for semiconductors and dedicated applications enhancements for all failure analysis needs such as large-volume analysis, TEM sample preparation, and device deprocessing.

With high-performance packages, like Extreme Milling and Damage-Free Delayering, you can supercharge your Helios PFIB-SEM and Helios Hydra PFIB-SEM systems with customizable, application-based automation, robustness, and throughput enhancements.

The Helios 5+ PFIB-SEM provides a new generation of plasma-FIB applications technology, with increased ion beam performance for large-volume material removal at exceptional speed and quality to facilitate advanced automation performance for TEM lamella preparation. Experience stability and damage-free delayering capabilities for extended-run automation and acquisition.

For semiconductor manufacturers, designers, and researchers who have constantly evolving failure analysis demands, the Helios 5+ PFIB-SEM provides a complete sample preparation solution for a very broad range of devices. Unlike systems with narrow applications, it excels over all critical length scales and materials to find defects and identify root causes of faults.



200x200um cross-section in advanced packaging is now possible in approximately 30 minutes.

Key features

Ultra-boosted FIB performance for higher cross-section throughput with increased max currents for Xe+ and Ar+ with exceptional verticality for high-aspect ratio features

Optimized SEM stability with 100 eV imaging for delayering applications and fully automated beam alignments at <500 eV

Applications automation provides robustness for lamella preparation with PFIB and ensures reliable results over marathon delayering processes with image acquisition

System uptime is improved with fully automated PFIB alignments for all apertures and enhanced vacuum system designed for high-volume material removal



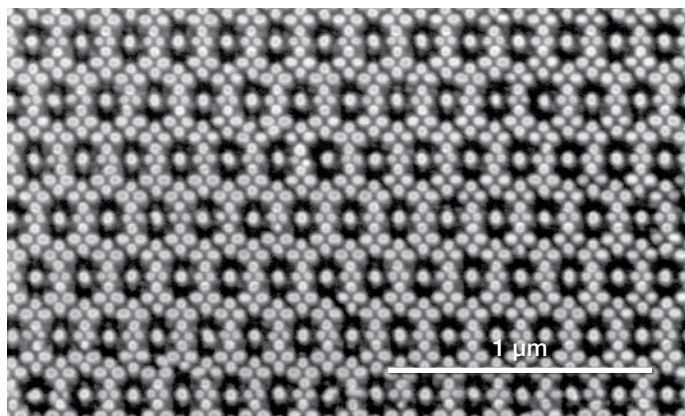
Extreme Milling Package

Significant enhancements for large-volume applications can be easily achieved, particularly those involving complex structures where precision is most important. This package features automated alignments for all PFIB apertures, allowing for a 50% increase in max currents to always be accessible, with Xe+ beam now up to 3.75 μA and Ar+ at 6 μA. The result is 500 μm depth milling capability with 30% faster cross-sectioning compared to Helios 5 Hydra PFIB-SEM and up to 4x faster compared to traditional PFIB. Additionally, the Extreme Milling Package with the Helios Hydra 5+ FIB-SEM excels in milling

heterogeneous materials, making it a versatile tool in various applications. These enhancements collectively improve productivity, reduce processing times, and ensure higher-quality outcomes.

Damage-Free Delayering Package

The “Damage Free Delayering Package” is designed to revolutionize SEM defect analysis by ensuring damage-free acquisition during PFIB deprocessing through advanced beam deceleration. This package enhances robustness during delayering automation, allowing for continuous 48-hour automated operation. Automation can also run with 100eV imaging over multi-hour acquisitions, with significantly improved imaging quality and reliability. Key features include automated alignments and a specialized delayering shutter, which together streamline the delayering process and protect sensitive devices. Additionally, the package integrates improved auto system maintenance, ensuring consistent performance and minimal downtime. This comprehensive solution ensures high-quality, reliable imaging and defect analysis for advanced semiconductor applications.



3nm device imaged at 100eV after delayering, using the automated workflow with Helios 5+ Hydra PFIB-SEM.

Ga+ Free TEM preparation with AutoTEM 5 Software for PFIB

The new generation of Thermo Scientific AutoTEM™ Software for the Helios 5+ PFIB-SEM and the Helios Hydra 5+ FIB-SEM features automated alignments to ensure consistent, high-quality data. Improvements in automated lamella preparation enhance efficiency, with robust grid attachment reducing failure rates, and precise thinning enabling detailed analysis of small features with minimized manual polishing time. Comprehensive flexibility across top-down, planar, and inverted lamella preparation is achieved through optimized automated workflows that even support large-volume chunking for package-level characterization and nanoprobe analysis. These integrated features collectively enhance productivity, precision, and reliability in TEM sample preparation across sample and analysis types.

System management and availability

The Helios 5+ PFIB-SEM's uptime and reliability are significantly enhanced through vacuum system improvements designed to handle large-volume milling and to maintain plasma source cleanliness and longevity. This drastically reduces maintenance needs and overall cost of ownership. Additionally, automated alignments for all beam currents and voltages ensure a remarkable uptime, further contributing to efficient and reliable operations.

Specification	Helios 5+PFIB-SEM	Helios Hydra 5+ FIB-SEM
Electron beam energy range	100 eV – 30 keV	100 eV – 30 keV
Ion species	Xe	Xe, Ar, O, N
Ion beam current range	1.5 pA – 2.5μA	1.5 pA – 6μA
Auto alignments	All beams, all currents	All beams, all currents

Learn more at thermofisher.com/HeliosHydra
thermofisher.com/HeliosPFIB