See while you mill.

Precision and clarity every time.

ZEISS Crossbeam 750

Your FIB-SEM for highest demands in TEM lamella preparation, 3D tomography, and nanofabrication.

When designing novel materials, scientists and engineers need to fully understand their samples. Imagine you have developed a valuable sample and want to characterize its properties at the micro- and nanometer scale, in 2D and 3D. Here, accuracy, repeatability, and throughput are crucial. You need a focused ion beam scanning electron microscope (FIB-SEM) enabling precise sample preparation and high-resolution imaging, full FIB milling control, and direct observation of FIB/sample interaction.

What if you had a FIB-SEM that lets you create optimal samples in an automated yet flexible way, rapidly adjust milling parameters, and confidently reach the endpoint exactly at the right location letting you achieve high yield and quality for every sample?

Maximize your FIB-SEM insights and control results in real-time

Gain efficiency and high-quality results by combining excellent imaging and processing performance. Enjoy electron optics that deliver a clear view under any imaging or milling condition and get immediate feedback when working with the FIB beam, which reduces the need for stops and checks. Obtain highly reproducible, precise samples such as cross-sections, patterns, 3D tomography, or consistent first-pass TEM lamellae. See smaller features in better quality while milling and gain confident real-time control of the milling process for greater efficiency in large area imaging.

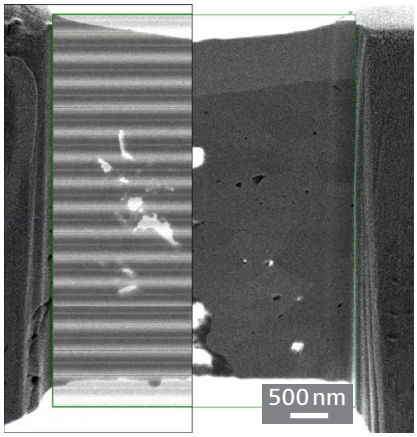
Highlights in ZEISS Crossbeam 750

- The scan generator enables you to see while you mill: The SEM/FIB mode High Dynamic Range (HDR) Mill + SEM maintains a clear SEM view during milling with any FIB probe by completely suppressing the FIB-generated secondary electron (SE) background. This allows you to observe fine details throughout the process.
- Crossbeam 750's ZEISS Gemini 4 electron optics deliver more information on your sample: Benefit from significantly increased low-kV resolution and signal-to-noise ratio (SNR), even in tilted samples. The optics reduce the lens field influence on low-energy FIB probes under high-resolution SEM conditions.
- Gemini 4 electron optics increases the usable field of view (FOV): Especially benefit for tiled image acquisition using bigger tiles and faster image acquisition.

Crossbeam 750 is your ultimate tool for TEM lamella preparation, 3D tomography, and nanofabrication. Whether you need to prepare pillars, atom probe tomography samples, or cross-sections, Crossbeam 750 has you covered.

ZEISS

Seeing beyond

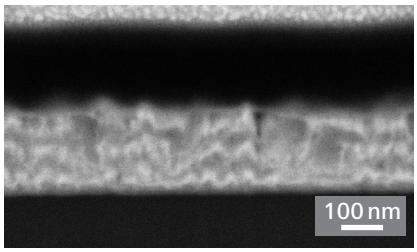


NMC cathode, TEM lamella, standard Mill + SEM imaging (left), HDR Mill + SEM (right).

See while you mill easily prepare TEM lamellae and other samples

Novel material analysis requires site-specific preparation, but defining a FIB recipe for an unknown sample is difficult and you risk damaging essential features. With the HDR Mill + SEM mode, however, you immediately see how the FIB beam interacts with your sample. Stop the beam, adjust parameters, and restart within seconds. The excellent image quality during milling enables the preparation of TEM lamellae, atom probe tomography samples, pillar samples, and cross-sections easily. See smaller features while milling and make earlier decisions about stopping or continuing with FIB milling. HDR Mill + SEM is available across the full range of kV and beam currents, providing high flexibility for different materials.

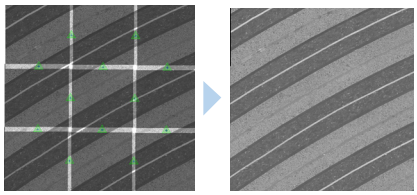
For TEM lamella preparation, first-pass lamella quality no longer depends on highly skilled FIB experts. You can judge the thickness of the lamella, its surface quality, and the milling endpoint using different detectors. Nudge the beam with precise translational and rotational movements. In your lab, operators at any experience level can achieve deterministic endpoints and reproduce perfect sample quality.



Thin film, heterostack, materials contrast of molybdenum disulfide and tungsten disulfide.

Confidently perform high resolution imaging, even on challenging materials

Exceptional image quality, enabled by high-resolution imaging and excellent SNR, is needed to truly understand your material. Crossbeam 750, equipped with Gemini 4 electron optics and Inlens SE and EsB detectors, delivers a significantly improved SNR. This leads to clear contrasts and the visualization of fine details or different material compositions, even at milling conditions of 54° stage tilt – here resolution truly matters in a FIB-SEM. Benefit from reduced acquisition time while maintaining the same SNR.



Large area imaging, battery, cross-section, each tile 400 µm × 400 µm (left), stitched mosaic (right), 1.21 mm², entire image in focus.

Obtain the overview of your entire sample effortlessly

Large area imaging involves acquiring multiple images, called tiles, which are stitched together to create one mosaic. It serves to visualize fine details over a large field of view (FoV) without compromising resolution, usually limited by distortion at the edges of the FoV. The Gemini 4 optics provides high resolution over a larger, distortion-free FoV within a single tile. This reduces the number of tiles needed for a mosaic which will significantly shorten acquisition time while maintaining excellent image quality across the entire area. You will benefit from faster workflows and a comprehensive, high-quality overview of your complete region of interest.

Technical specifications

	ZEISS Crossbeam 750 with Gemini 4	ZEISS Crossbeam 550 with Gemini 2	ZEISS Crossbeam 350 with Gemini 1
SEM working distance at coincidence point	4 mm	5 mm	5 mm
Resolution at coincidence point	0.9 nm @ 15 kV 1.5 nm @ 1 kV 1.2 nm @ 1 kV (DCV)* 1.3 nm @ 1 kV TD**	0.9 nm @ 15 kV 1.8 nm @ 1 kV — 1.3 nm @ 1 kV TD	1.1 nm @ 15 kV 2.3 nm @ 1 kV — 1.6 nm @ 1 kV TD
Resolution at cross-section (at coincidence & tilt)***	0.9 nm @ 15 kV 1.5 nm @ 1 kV	—	—
High Dynamic Range Mill + SEM	Available at any SEM and FIB parameters		

* Digital resolution (deconvoluted) ** Tandem deceleration (TD) – stage biasing *** 36° tilt to SEM

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