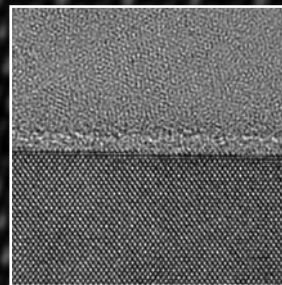
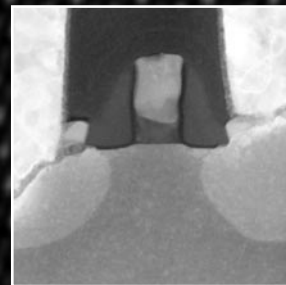
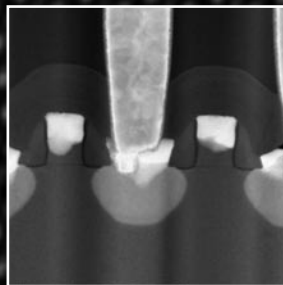
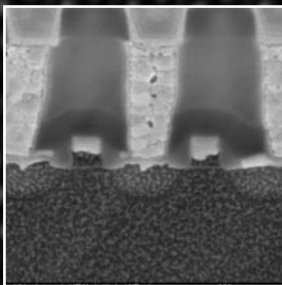


Get to data. Faster.

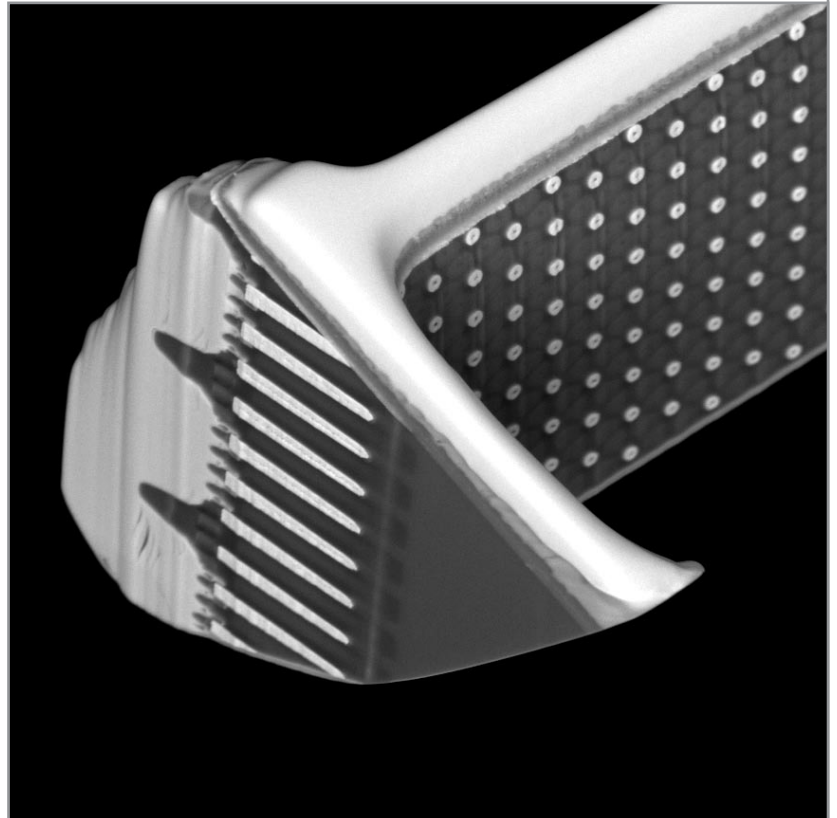
Get to market and ramp to volume,
with higher yields. Faster.

The world's finest, most flexible suite of integrated
semiconductor imaging and analysis tools.



FEI is well known as the world's premier provider of ultra-high resolution tools for imaging and analysis at the nanoscale. Our tools are used in numerous research and industrial applications worldwide. For the semiconductor industry, FEI tools deliver the data you need, when you need it. As a result, you'll get to market faster and ramp to volume faster with higher yields.

FEI's solutions are uniquely integrated for the semiconductor lab. A pioneer in sub-surface imaging, FEI is the leader in DualBeam™ systems, a technology we invented. FEI also developed the world's most powerful, commercially available transmission electron microscope (TEM). Today, FEI offers the broadest range of products, along with ease of use, automation and innovative application support. FEI delivers superior images, faster sample preparation, more precise circuit editing and analysis—resulting in faster design validation and higher throughput process development and control.



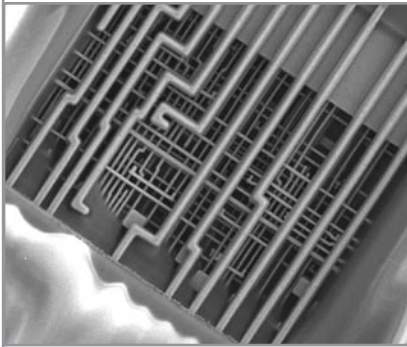
Plan view STEM imaging is a powerful technique to investigate the interfaces around many contacts. Here is a plan view STEM sample preparation of a DRAM structure before final thinning.

Your equipment investment is safe and secure with stable, long-life solutions that are extensible through several new technology nodes. Your yield and time-to-volume can improve dramatically when you have the finest analytic and metrology data in the shortest possible time. With FEI, you have a partner who is fully committed to helping you get to data faster.

Semiconductor design validation and performance optimization.

Today, leading semiconductor companies employ focused ion beam (FIB) circuit editing to speed up design validation and performance optimization. FIBs can remove and deposit insulator and conductor materials to “re-wire” around flaws or to make circuit performance improvements. The material removal and deposition is done with high precision using an ion beam together with a variety of chemical gases.

FIB circuit editing eliminates iterative cycles of prototype testing and mask modification. FIB-edited device



Shown here, a V600CE image of a deprocessed device showing the remaining skeleton of metal interconnections.

prototypes are used to guide modifications to masks one time — no more trial and error with successive versions of masks. However, as geometries shrink, editing smaller circuits requires more precise FIB imaging and machining. The

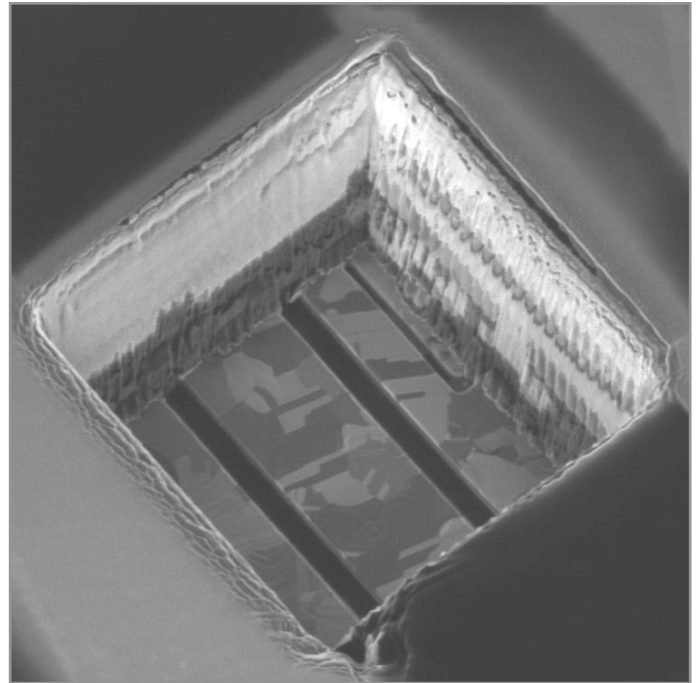
risk of damaging surrounding circuitry also increases. In addition, new materials present new circuit edit challenges.

FEI FIB Solutions

To meet those challenges, FEI’s V600 family offers the high-precision FIB technology and application innovation you need to get the job done. Editing advanced prototypes can be accomplished in hours instead of days.

The V600CE features the NanoChemix™ gas delivery system for greater circuit editing precision and control. Its Tri-nozzle™ technology enables the FIB operator to apply variable pressures of a wide variety of gases,

injecting them through opposing nozzles to get the best quality dielectric deposition material for insulating critical regions of an edit. Tri-Nozzle technology is also invaluable for maintaining floor uniformity or planarity while accessing lower metal layers of a device. In addition, the V600 family includes advanced frame-jump navigation software to minimize sample damage; its new end-pointing software also improves editing precision. Back-side circuit editing will be supported starting in 2008 with a field-upgradeable option.



The V600CE improves etching planarity with its unique NanoChemix gas delivery system.

Semiconductor process development and control.

Finding and fixing semiconductor process problems is a forensics challenge. To get to market quickly and ramp to volume with higher yields, you need images and data, fast. For advanced process technologies, the lab must image and analyze devices at resolutions and contrasts beyond the capabilities of scanning electron microscopes (SEMs).

Scanning transmission electron microscopes (STEMs) and transmission electron microscopes (TEMs) have the capabilities you need, but they require special sample preparation. Until recently, that was a slow process. Now you can move to higher resolution and faster sample preparation with the finest in STEM and TEM systems from FEI.

FEI DualBeam/STEM systems integrate sample preparation with low-voltage STEM imaging to cut, look and measure within one integrated system. If your resolution and contrast requirements are extreme, you can use the STEM to enable more precise TEM sample thinning, ensuring that every lamella captures the data you need. The systems also feature software that automates preparation of TEM samples for faster throughput, based on pre-defined and user-defined recipes.

For the most demanding process development and control applications, FEI TEM systems deliver resolution and contrast beyond low-voltage STEM systems. At the top of the range, the FEI Titan™ family delivers the highest resolution and contrast available on the market today.

Now you can have atomic-scale resolution together with the ease of use and automation that only FEI can provide.

Discover how FEI's broad portfolio of unique integrated solutions satisfy a wide range of application requirements in the lab. For product features by family, refer to our detailed product family descriptions on pages 6-7.

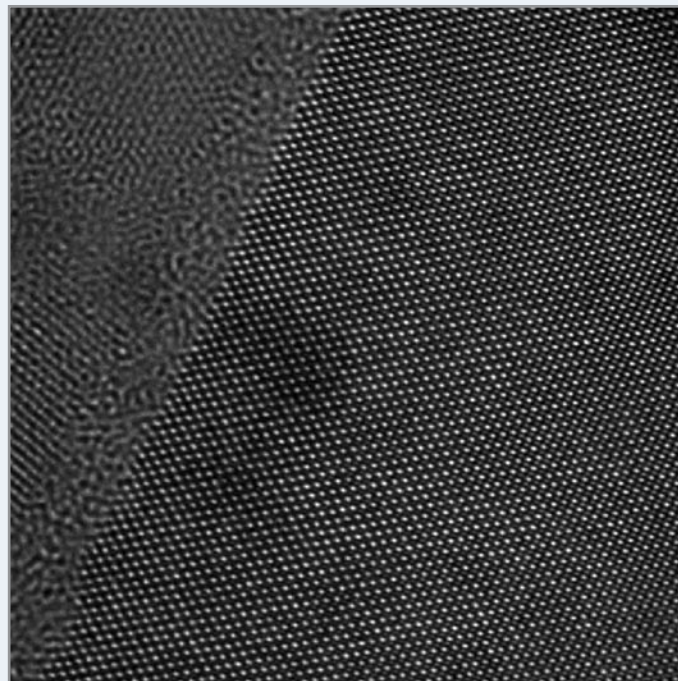
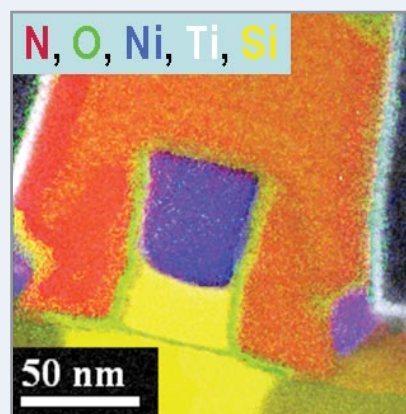


Image of a gate oxide in a semiconductor device—taken with a Titan with image Cs corrector on at 80 kV. This is particularly significant since this voltage is below the damage threshold in carbon. The information limit at this voltage was still below 1 nm.



Chemical mapping is shown with a combination of EDX (energy-dispersive x-ray) spectroscopy and EELS (electron energy loss spectroscopy) of a logic gate structure.

Product guide:

Focused Ion Beam (FIB) Tools:

V600 Family

Accelerating the design validation and performance optimization of complex ICs with advanced FIB and gas delivery technologies, the V600 family delivers high-precision circuit editing and debug capabilities to modify the most complex circuit prototypes in a matter of hours.

V600CE with NanoChemix gas delivery



Scanning Electron Microscope (SEM) and Small DualBeam™ Tools:

Quanta™ Family

For sectioning, imaging, analyzing and inspecting packaged parts, or other samples that may be wet or dirty, the Quanta 3D FEG is the most cost-effective DualBeam tool. It features FIB and Field Emission Gun (FEG) Environmental SEM (ESEM) technology. If DualBeam capabilities are not required, the Quanta SEM delivers affordable ESEM where an optical microscope fails to meet imaging requirements.

Quanta Family



Nova™ NanoSEM™ Family

For ultra-high resolution imaging using FEG SEM technology, the Nova NanoSEM family delivers the world's highest resolution ESEM low vacuum imaging capabilities for spectacular nanoscale characterization of charging and/or contaminating materials.

Nova NanoLab Family



Nova NanoLab™ Family

For preparing high-quality TEM samples at less than \$50/sample, or replacing your SEM as an imaging workhorse that also delivers 3-D data, the Nova NanoLab family delivers a versatile solution for your failure analysis lab.

Small DualBeam Tools With Scanning Transmission Electron Microscope (STEM) Capabilities:

Helios NanoLab™ Family

Combining advanced Elstar™ SEM and Sidewinder FIB technologies with innovative gas chemistries, detectors and manipulators, the Helios NanoLab family delivers unsurpassed SEM resolution and high-performance FIB milling to prepare TEM samples fast. The optional 30 kV STEM detector supports high-resolution/high-contrast STEM imaging for an integrated STEM sample preparation, imaging and analysis solution that makes no compromises.

Helios NanoLab Family



Wafer DualBeam Tools:

Altura™ 855 200 mm DualBeam FIB/SEM

Using advanced ion and electron columns and a powerful combination of defect navigation, cross-section sample preparation, and data collection capabilities, the Altura 855 delivers fast and accurate failure analysis on 200 mm wafers.

CLM-3D™ 300 mm DualBeam FIB/SEM

Providing fully automated, advanced cross-sectional metrology data, the CLM 3D is the tool for characterizing and optimizing your Front-End-Of-Line (FEOL) and Back-End-Of-Line (BEOL) manufacturing processes.

Defect Analyzer 300HP DualBeam FIB/SEM

With its fast, accurate 3-D defect characterization, the Defect Analyzer 300HP delivers automated root cause analysis and TEM sample prep on 200 mm and 300 mm wafers.

Expida™ Family of 300 mm DualBeam Tools

Supporting manufacturing with failure analysis and low-yield analysis, the Expida family provides failure information in the shortest time possible and is configured to support whole-wafer TEM sample prep. With the option of an integrated 30 kV STEM detector, you get high-throughput STEM sample preparation, imaging and analysis for multiple wafer samples, with single system simplicity.

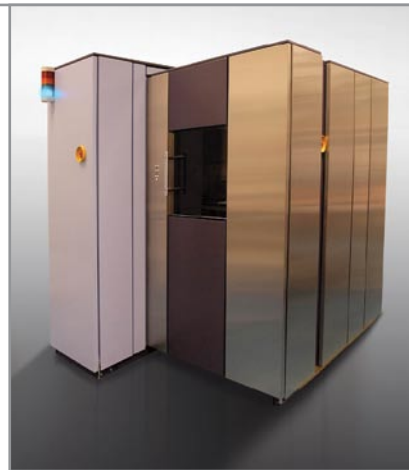
Transmission Electron Microscope Tools:

Tecnai™ Family

Focusing on sub-65 nm technologies, the Tecnai family is configured for high-throughput 200 kV imaging and analysis in S/TEM, TEM and EDS modes. Cost-per-sample is reduced without compromise in performance for faster, better process development and process control.

Titan™ Family

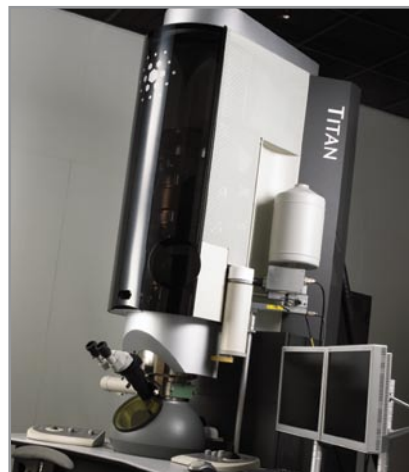
Delivering critical sub-Ångström data on a highly stable, easy to use platform, the Titan family excels in failure analysis for process development supporting 32 nm and smaller nodes. The Titan family includes the most powerful commercially available electron microscopes in the world.



Expida 1255S 300 mm Wafer DualBeam STEM



Tecnai Family



Titan Family

FEI Certified™ Tools

When capital equipment budgets can't keep pace with your desire for more resolution, more application power or more capacity, FEI can help. Designed to affordably meet your technology requirements, the FEI Certified program gives you the opportunity to purchase fully refurbished, factory-backed FEI Certified Tools or take advantage of the unique FEI Tool Buy Back program. These options deliver the performance, reliability and value you need, and you can enjoy the peace of mind that comes from working with the world's leading provider of semiconductor imaging, sample preparation and analysis tools.

Keeping you up and running.

FEI Service and Support

FEI's Technical Assistance Centers, Field Service Engineers, plus components and module inventories are strategically located around the globe. Your local FEI support team is integrated with a worldwide infrastructure, capable of providing you with complete lifecycle support and optimum system performance from your FEI equipment.

You Decide

Service contracts can be tailored to meet your specific needs. Additional services include:

- *Professional service and parts on a time and material basis*
- *Upgrade policies that ensure your equipment can meet evolving requirements*
- *On-site stocking of select replacement parts*
- *Daily Escalation Reports to ensure and document that appropriate resources are working together to resolve the problem*
- *Global standardization that allows for local variation of standardized processes and procedures as necessary*
- *FEI customer training*

Remote Access Program for Interactive Diagnosis

FEI's Remote Access Program for Interactive Diagnosis (RAPID), allows service engineers to connect remotely to an FEI system and instantly troubleshoot problems. This significantly reduces instrument downtime and accelerates repair times. Currently available in North America, participation in RAPID is open to customers under a standard FEI maintenance service contract or warranty for systems that can accommodate remote diagnostic technology. With multiple layers of security in its infrastructure to protect customers' proprietary and system information, FEI service engineers using RAPID can:

- *Diagnose and solve problems remotely, without an on-site service call*
- *Identify failed components and order replacements in advance of a service call*
- *Directly access your instrument so factory experts can provide on-the-spot support*

The front and back cover feature silicon atoms aligned in a lattice structure next to doped silicon. The original image, also shown on page 5, was taken with the FEI Titan STEM. Inset on the front cover is a succession of similar semiconductor circuit images taken as follows—SEM Cross Section, 30 kV STEM, 200 kV STEM, 200 kV TEM.

See more at fei.com

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