PRODUCT DATA

FEI COMPANY™

Versatility and volume

Strata™ 400

Workhorse DualBeam™ for Semiconductor Laboratories

As process geometries shrink and materials change, the pressures to accelerate time to volume, increase yields and reduce costs are mounting. In the semiconductor lab, failure analysis simply can't fail. The Strata 400 combines high-performance ion column, electron column, stage and automation software into a potent system for device preparation, imaging, modification, analysis and characterization.

STEM and TEM sample preparation

The Strata 400 is ideal for scanning transmission electron microscopy (STEM) and transmission electron microscopy (TEM) sample preparation. For effective process development, process monitoring and defect characterization, the Strata 400 can be configured to automatically prepare multiple samples in a single session. The slice-and-view capability of the DualBeam can be used to obtain the thinnest possible sample without destroying the target area. In addition, enhanced low-kV milling with the ion beam can be used to improve sample quality. The ion beam for milling and electron beam for imaging intersect at your sample, providing unrivaled power to expose the exact feature of interest. Patented beam chemistries can be used to highlight interface layers for imaging in the system without the risk of contamination.

Key Benefits:

- *Fast and simple high-resolution, high-contrast imaging for complete structural analysis*
- *Rapidly characterize process and defect excursions using FEI's reliable and proven DualBeam products*
- *Speed your time to answer by performing material and defect analysis on a single tool that delivers high-resolution images and compositional data*
- *Versatile sample handling optimizes cost of ownership*
- *Hands-off operation using TEM and SEM sample preparation software*
- *Reduced training requirements and optimum system utilization with automated routines*
- *Your single source for complete sample management and ultimate sample quality*

See more

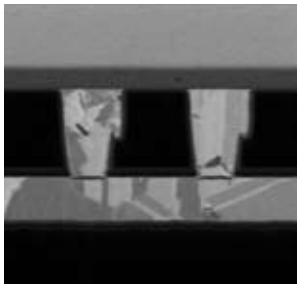
The Strata 400 imaging system was designed to optimize the imaging result for a wide variety of samples. The piezoelectric-driven stage, unique to lab-based tools, is mounted to the chamber providing a physical link to the electron column. You can enjoy fab-proven environmental resistance to support higher-resolution imaging and analysis. Multiple operation and detection modes provide greater sample versatility. See device features in three dimensions from images automatically collected during a cross-section. From the resulting stack of images you can look at the device features from different angles and orientations to locate failure locations and save the "smoking gun" image.

Deeper materials analysis

Once the defect is located and its morphology captured via high-resolution imaging, its composition is the next to be investigated. The Strata 400 can be configured with electron dispersive spectroscopy (EDS) for chemical composition analysis on bulk or thin samples. EDS analysis on bulk samples suffers from the huge excitation volume limiting the spatial resolution to 500 nm at best. Smaller dimensions and defects are driving the need for analytical techniques with better spatial resolution. The Strata 400, besides making conventional cross-sections, also overcomes traditional resolution limitations with its ability to prepare thin TEM-like sections with resolutions below 30 nm, more than an order of magnitude better than can be achieved on a bulk sample.

All-in-one device analysis

Use focused ion beam (FIB) voltage contrast to isolate a failing memory cell. The cell can then be imaged, cross-sectioned, prepared for TEM, or electrically probed without having to relocate the location in another system or expose the sample to air. Knights Technology™ Camelot CAD Navigation is also available for design-driven navigation with CAD polygon overlay on the FIB or scanning electron microscopy (SEM) image to locate or identify buried nodes. Circuitry can be re-wired on the device and then probed immediately or returned to the tester to validate design fixes.



Left: **A thinned section prepared by FIB automation for TEM is ready for ex-situ lift-out.** ***Right:*** **FIB images are more surface sensitive than SEM images and give stronger grain structure channeling contrast.**

Specifications:

- ***Electron source: Schottky thermal field emitter, over one-year lifetime***
- ***Ion source: Gallium liquid metal, 1000 hours guaranteed***
- ***Beam voltage: 200 V - 30 kV SEM, 2 kV - 30 kV FIB***
- ***Image resolution: < 0.8 nm achievable in SEM-STEM mode***
- ***EDS resolution: < 30 nm on thinned samples***
- ***Sample types: Wafer pieces, packaged parts, TEM half-grids***
- ***Max. sample size: 75 mm diameter through load lock***
- ***User interface: Windows® GUI with integrated SEM, FIB, GIS, imaging and patterning***
- ***Simultaneous patterning and imaging mode***

Key Options:

- ***Gas chemistry: Range of proprietary deposition and etch chemistries***
- ***Software: AutoFIB™, AutoTEM™, AutoSlice&View™, Knights Camelot, CAD Navigation***
- ***Hardware: EDS analysis, in-situ section extraction system, electrical prober***

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