

Metrios

High volume S/TEM imaging and metrology reimaged

Fast, accurate and precise data. The Metrios™ is a 200kV scanning/transmission electron microscope designed from the ground-up to deliver repeatable TEM and STEM-based imaging, analytics and gauge capable metrology results at an unprecedented throughput level. With a unique combination of proven FEI technology and innovative new features, Metrios is the platform of choice for semiconductor and data storage environments with a need for higher volumes of accurate and precise measurements on increasingly more complex structures and shrinking geometries.

Metrios has been designed to provide “first-time-right” data, at a much lower cost per sample when compared to conventional S/TEM systems. Significant improvement in time to first image and overall throughput is achieved with on-the-fly drift correction using a combination of a new piezo-stage to correct for large drift, and FEI’s drift corrected frame integration (DCFI) technology to compensate for small drift. These components make it possible to acquire a high quality image for metrology only a few minutes after sample loading. The piezo-stage also allows for precise sample navigation.

Metrios is designed with unprecedented ease of use, and is ideal for both experienced microscopists and new users. The flexible user interface allows for recipe-driven fully automated metrology, semi-automated operation, or manual data acquisition. The combination of automated image acquisition and automated metrology brings a significant improvement to data precision. Metrology can be performed either on-line or offline.

Fully automated metrology is undertaken using recipes created with a recipe editor based on iFAST™, an automation software product proven on FEI’s DualBeam (FIB/SEM) systems. This gives great cross-platform synergy, as current iFAST users will readily adapt to recipe creation on Metrios.

Semi-automated operation on Metrios takes the form of a “guided job”, walking the user through a well-documented step-by-step process that ensures that both new users and experts can acquire data of the same quality. This also allows a greater number of technician-level operators to fully utilize the system, and therefore drives down the overall operating cost and level of training required.

Both fully and semi-automated operation make use of advanced auto functions, including auto focus, stigmation, eucentric height, automated zone-axis alignment in TEM mode, and FEI’s inventive auto-orient function for STEM mode that allows samples to be correctly oriented even when a crystalline substrate is not present.

Metrios comes equipped with an extensive, highly customizable database utility as standard. All images and metrology data are stored, and can be searched, sorted and easily browsed using multiple criteria, both online and offline.

In addition to accepting a wide variety of TEM samples prepared by conventional techniques, Metrios is part of a fast, complete workflow that includes ExSolve wafer TEM prep (WTP) and TEMLink™.

KEY BENEFITS

Reduces leading edge lab TEM cost per sample by >20% for imaging and elemental analysis

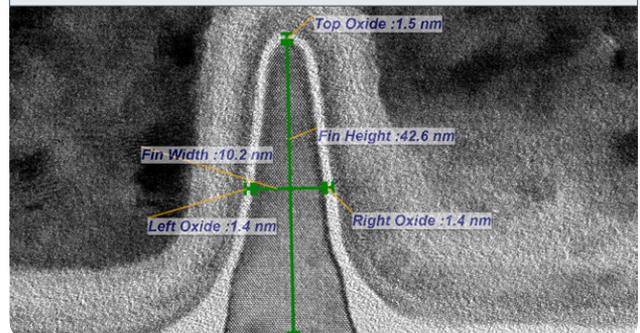
Integrated gauge capable metrology produces the most repeatable and accurate dimensional analysis

Patented Super-X technology (optional on Metrios) delivers the fastest, most sensitive EDX analysis on a TEM

Accuracy and repeatability enable high yielded throughput

Fully automated or technician guided operation drives down operating cost and level of training required

When combined with ExSolve and TEMLink, Metrios offers a complete workflow solution





Additional Features:

- Ultra-stable, high brightness Schottky field emission gun (X-FEG, for more details see separate product data sheet)
- Flexible high tension range: from 80 to 200kV (80, 120, 200kV)
- Environmental enclosure to relax the acoustic and room temperature variation requirements
 - ConstantPower™ lens design for ultimate thermal stability in mode switches
- Symmetric objective lens with 5.4mm wide pole-piece gap: “space to do more”
- Fully digital system with SmartCam for easy navigation and operation in a normally-lit room
- Automatic apertures for remote operation and reproducible recall of aperture positions during aperture change
- New computerized 5-axis specimen piezo-stage for accurate recall of stored positions, tracking of the areas visited during search, and low specimen drift
- The new piezo-stage allows for movements as fine as 20pm for centering of feature of interest in the field of view
- Tilt range ±40 degrees for standard Metrorios double tilt holder enables correct orientation of sample substrate
- New cold trap design for up to one week of operation to maximize up-time
- A single probe or image Cs-corrector can be added as a field-upgrade

EDX Microanalysis Option:

- Super-X™: High-sensitivity, windowless EDX detector system based on SDD technology (patented)
- Output count rate: up to 200 kcps
- Energy resolution:
 - ≤136 eV for Mn-Kα and 10 kcps (output)
 - ≤140 eV for Mn-Kα and 100 kcps (output)
- 0.7 srad solid angle and 120 mm² total detector area
- Fast mapping: pixel dwell times down to 10μs
- High P/B ratio (Fiori number) > 4000
- Excellent in-hole performance (<1% spurious peaks)
- Detection of all elements down to boron

Detectors:

- Fischione HAADF STEM Detector (Standard)
- FEI on-axis triple DF1/DF2/BF Detectors (Optional)
- Gatan US1000 CCD Camera (Standard)
- Gatan energy filter series (Optional)

Holders:

- Metrology-qualified double-tilt holder (Standard)
- Low-background double tilt holder (Optional)
- Please ask for a complete list of functional holders (e.g. NanoEx)

Installation Requirements:

Please contact your sales representative for a complete pre-installation requirement document

UNCORRECTED METRIOS

High Tension Range (kV)	80-200
TEM Point Resolution (nm)	0.24 @ 200kV
STEM HAADF Resolution (nm)	0.164 @ 200kV
Information Limit (nm)	0.11 @ 200kV
Metrology Precision on Metrocal wafer for horizontal and vertical CDs	≤ 0.45 nm 3σ
Metrology robustness on Metrocal wafer	≥ 90%
Electron Source	X-FEG
Ultra-stable electronics and High Tension	Included
Acoustic Enclosure	Included
Constant Power Lenses	Included
Piezo Stage	Included
Corrector Compatible	Yes

Specifications are subject to change

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