

ZEISS LIBRA® 200 MC

An exclusive monochromator (MC) technology for the field emission gun may be specified as a factory option or as a field upgrade to the standard LIBRA® 200 FE to create the LIBRA® 200 MC.

Symmetric hexapole shaped fields in the electrostatic omega-type imaging element MC cancel 2nd order aberrations to yield minimum loss of brightness while producing a non-dispersive image of the source at the MC exit plane. As a result of no source image dispersion the monochromator also maintains the original spot size and unlike other dispersive designs is ideal for both MC-STEM and EELS spectroscopy under all operating conditions.

A large energy dispersion of 12 $\mu\text{m}/\text{eV}$ allows a range of selectable energy widths from ~ 0.7 eV (non-monochromated) down to 0.2 eV. Energy width is controlled by a set of mechanically or electro-optically driven apertures in the energy dispersive plane of the element. The electrostatic gun lens control and MC is persistently powered and continuously ready for use with no significant alignments required over a wide range of operating conditions.

LIBRA® 200 MC

Attributes

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|----------------------------------|--|
| Magnification | 8 to 1000000 x TEM (for HR pole piece) |
| Electron Microscope Type | TEM |
| Microscope Type | Electron |
| Additional Specifications | <p>Field Emitter: Schottky Field Emission System with integrated OMEGA type monochromator</p> <p>Accelerating voltage: 200 kV</p> <p>Patented Koehler Illumination (parallel illumination):</p> <ul style="list-style-type: none"> *Three-lens condenser system for parallel and homogeneous *TEM wide-field illumination independent of illumination intensity *Quick and easy switching between TEM and Spot mode by push-button operation *Reproducible and controlled illumination conditions in TEM and Spot mode <p>Spatial resolution: Truly symmetrical objective lenses = two variants:</p> <p>Point resolution: 0.24 nm (HR) 0.29 nm (HT)</p> <p>Information Limit: 0.14 nm (HR) 0.19 nm (HT)</p> <p>STEM resolution: 0.30 nm (HR) 0.45 nm (HT)</p> <p>Energy resolution: = = 0.2 eV (Electrostatic OMEGA-shaped monochromator design, dispersion-free spot formation, 12$\mu\text{m}/\text{eV}$ dispersion at filter slit plane, selectable slits with various widths)</p> |

Attributes

Corrected OMEGA filter: Corrected for 2nd order and optimized for 3rd order aberrations

Alignment: Factory alignment

Dispersion: 1.85 $\mu\text{m}/\text{eV}$ @ 200 kV

Distortion: 100mrad @ $\Delta E = 10$ eV slit width and 200 kV
> 150mrad @ $\Delta E = 20$ eV slit width and 200 kV

Non-Isochromaticity: < 0.5 eV over $\varnothing 2.5$ μm field-of-view on sample

Specimen stage: 5-axes fully eucentric goniometer

Tilt range:

$\alpha / \beta \pm 30^\circ / \pm 30^\circ$ (HR pole piece)

$\alpha / \beta \pm 70^\circ / \pm 30^\circ$ (HT pole piece)

both with double-tilt analytical holder

$\alpha \pm 70^\circ$ (HR pole piece)

with special tomography holder

Imaging system: Two 3 lens projector groups in front and behind the energy filter

Magnification

STEM: 2,000 x - 5,000,000 x

EELS: 20 x - 315 x (spectrum magnification)

Vacuum system:

Oil-free and differentially pumped vacuum system

Pre-vacuum scroll pump with buffer tank

TMP for viewing chamber, filter and airlock

IGPs for the column

2 IGPs for the emitter area

System control: WinTEM™ Graphical User Interface (GUI) based on Windows® XP,

operated by mouse, keyboard and dedicated control panels