High-Resolution Field Emission SEM

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SU8700

SU7000

SU8600

SU9000 II

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High and Ultra-High Resolution Field Emission SEM

...with Schottky Field Emitter

Hitachi's high-resolution Schottky VP FE-SEMs are available in two versions. These differ in terms of the sample chamber and sample stage.

SU7000 and SU8700

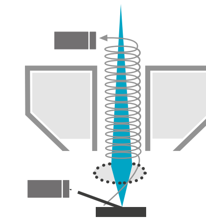
Both UHR SEMs use a Schottky emitter as the electron source, producing stable and high sample currents up to 200nA.

Beam boosting is employed within the optics to achieve high resolutions below 1nm at 1kV, without using a decelerating electric field at the sample. This is combined with an electrostatic-magnetic hybrid lens that doesn't magnetically interact with the sample chamber. Six parallel detector signaling channels provide a wide range of live information about the sample. EDX analyses can be performed quickly at the standard working distance of 6mm.

For analysis of non-electrically conductive samples, an optional low vacuum mode up to 300Pa is available. This mode can be switched on with a mouse click, without the need for additional pressure-reducing features. The same maximum fields of view and sample flows are available as in high vacuum mode.

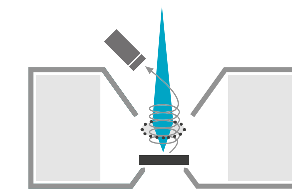
...with Cold Field Emitter

Hitachi's proven cold field emitter with its sharp tip, narrow band emission and long lifetime drives two SEMs optimised for maximum resolution and special analytics:



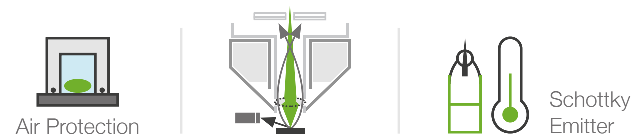
SU8600

Built on the same platform as the SU8700, the SU8600's electron optics combine a cold field emitter and a magnetic immersion lens. This combination provides the best conditions for high-quality imaging, where a wide range of sample details can be analysed at high throughput.



SU9000 II

SU9000 II is a combination of surface-imaging SEM and intrinsic structure-resolving scanning transmission microscope (STEM) optimised for extreme resolution. This can also be combined with windowless EDX and energy-loss spectroscopy (EELS).



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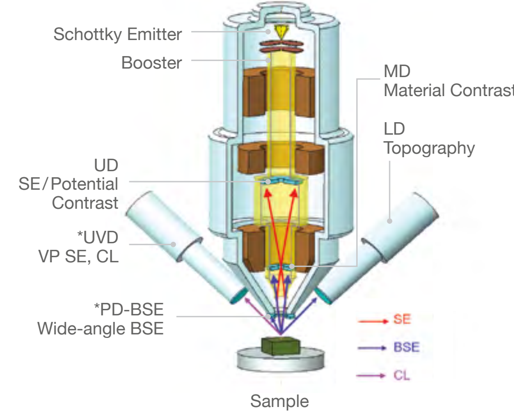
SU8700

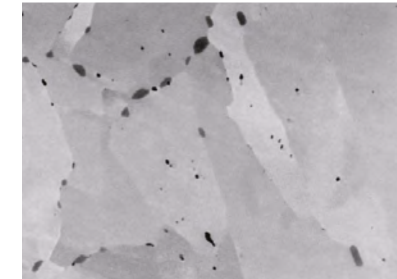
Performance, Throughput, Automation



High-Resolution Schottky VP FE-SEM

Equipped with a 150mm sample airlock as standard, the SU8700 offers high sample throughput even for larger samples and a constantly clean sample chamber environment for low-contamination, high-resolution imaging. In addition, the sample chamber can be opened and evacuated again in a matter of minutes to insert accessories. The sample stage can be moved 110mm in X and Y directions. An integrated colour camera enables image-based navigation. There are plenty of connection options for 2 x EDX, EBSD, STEM, inert gas sample transfer, plasma cleaner and other accessories are available.

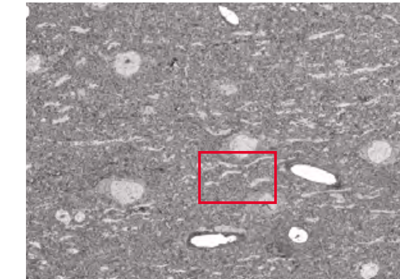
Materials

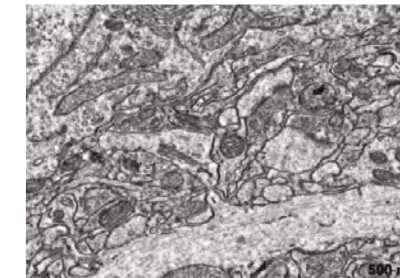


Tempered martensite in steel

Detection of various signals
The precipitates along the grain boundaries are clearly visible when capturing SE images with the UD (upper image), while grain size and deformation are easily recognisable when capturing the BSE channeling contrast (lower image).

Life Sciences

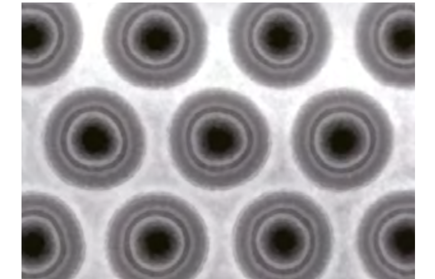




Rat cerebral cortex*

Hi-Pixel resolution
The red rectangular field in the upper image is shown in the lower image with a higher digital magnification. The structures of the original are clearly visible and the high quality is retained. Image with high pixel resolution up to 40 960 x 30 720.

Electronics



3D NAND flash memory

Material contrast in the SE image
An example of the high detection performance of the SU8700. This data clearly shows the structure of very thin (<10nm) nitrate, oxide and poly-Si layers in the SE image.

*Copy courtesy of Dr Yoshiyuki Kubota, National Institute of Physiological Sciences

Product Features

Durable and stable Hitachi Schottky field emitter with up to 200nA probe current

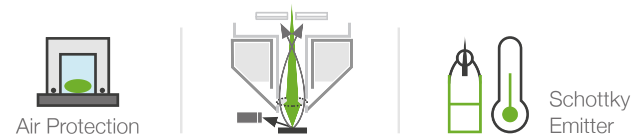
Brilliant imaging performance - without the need for a decelerating field on the sample - from 100V (10V option) up to 30kV acceleration voltage. EDX analysis and high-resolution imaging with all detectors are possible at 6mm working distance

Reliable automatic functions such as adaptation to user-defined optical conditions or 2D autofocus and autostigmator enable practical use of the superior equipment capabilities

A 150mm diameter sample airlock is supplied as standard. It enables fast specimen exchange while keeping the chamber vacuum clean

Optional Accessories

- Extensive range of detectors
- Flexible and effective automation of routine tasks via EM Flow Controller
- Variable chamber pressure up to 300Pa, switchable via a quick mouse click
- Analytical accessories (EDX, EBSD, µ-XRF, CL, ...)
- Inert gas transfer function for the sample lock
- Hitachi Map 3D packages for additional functions such as 3D reconstruction, roughness measurement, particle and pore analysis, image processing, colour segmentation, etc.



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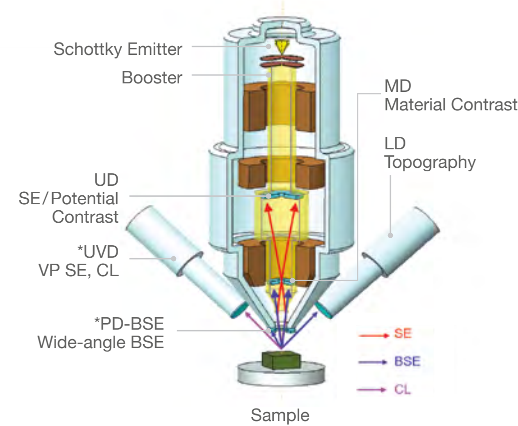
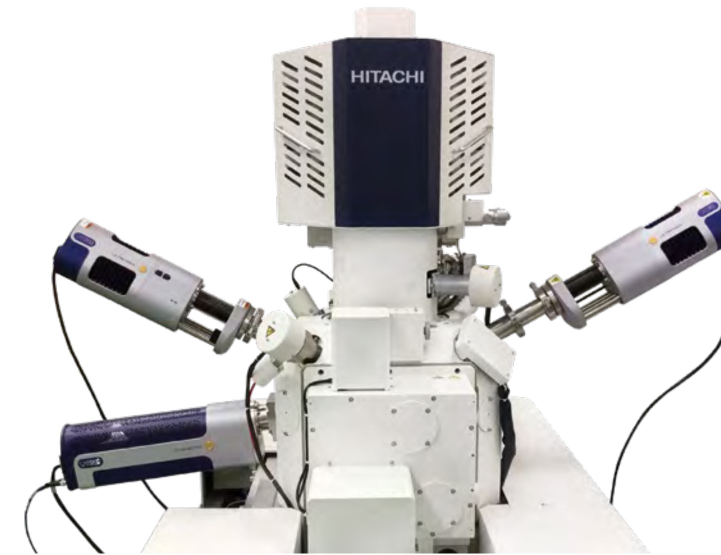
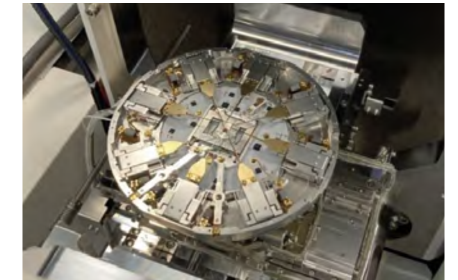
SU7000

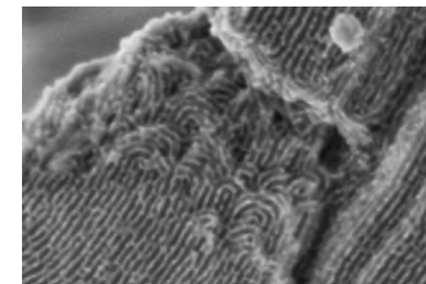
Perfect balance between imaging and analysis



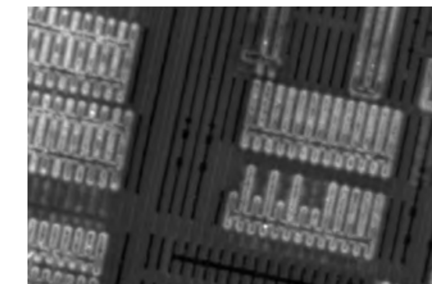




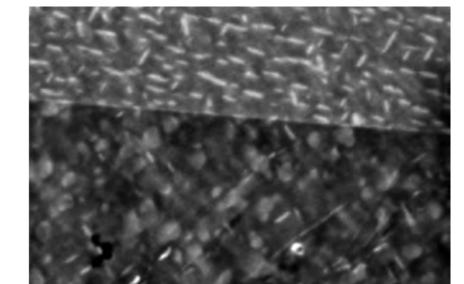
150mm Prober-Shuttle Kleindiek PS8e on the pulled-out SU7000 stage



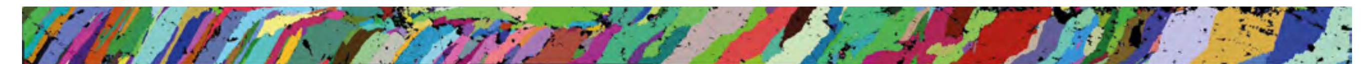
Mesoporous silica



Voltage contrast on a chip



Inconel718 γ Precipitates



Large-format EBSD card (9.3cm x 0.4cm) from Calzit (uncoated, recorded in a low vacuum) 1mm

High-Resolution and Analytical Schottky VP FE-SEM with Large Sample Chamber

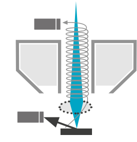
The SU7000 is ideal for large or heavy samples and for integrating a wide range of accessories. These accessories include analytical detectors or stage attachments for in-situ sample manipulation (stretching [tensile] / compression, heating/cooling, probing, microtome serial sections, etc.). Equipped like the SU8700 with Hitachi's universal high-resolution, field-free electron optics (consisting of Schottky emitter and beam booster), the SU7000 also has a large analytical sample chamber with fully retractable sample stage. The stage is suitable for samples up to 200mm diameter, 80mm height, 2kg mass. It comes with multiple chamber access points on the sample chamber and chamber door. Easy stage navigation is made possible by an integrated colour camera.

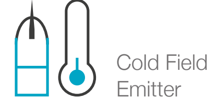
✓ Product Features

- Durable and stable Hitachi Schottky field emitter with up to 200nA probe current
- Brilliant imaging performance - without the need for an opposing field on the sample - from 100V (10V option) up to 30kV acceleration voltage
- Large analytical sample chamber with many access ports for accessories, and a eucentric sample stage for samples up to 80mm height and 200mm diameter
- Analytical EDX working distance of 6mm enables simultaneous or rapidly changing high-resolution and analytical work

+ Optional Accessories

- Extensive range of detectors
- Analytical accessories (EDX, EBSD, μ-XRF, CL, ...)
- Sample airlock also with inert gas transfer function
- Variable chamber pressure up to 300Pa switchable simply via mouse click
- Hitachi Map 3D packages for additional functions such as 3D reconstruction, roughness measurement, particle and pore analysis, image processing, colour segmentation, etc
- Plasma cleaner





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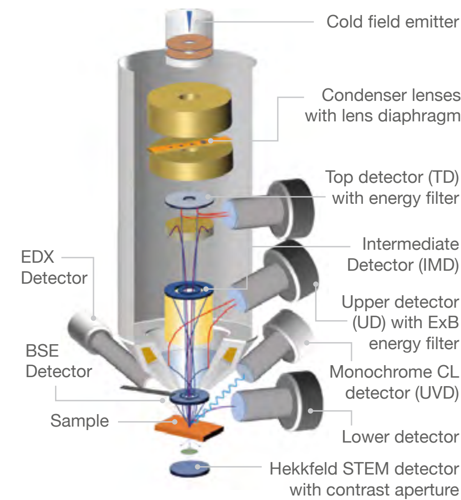
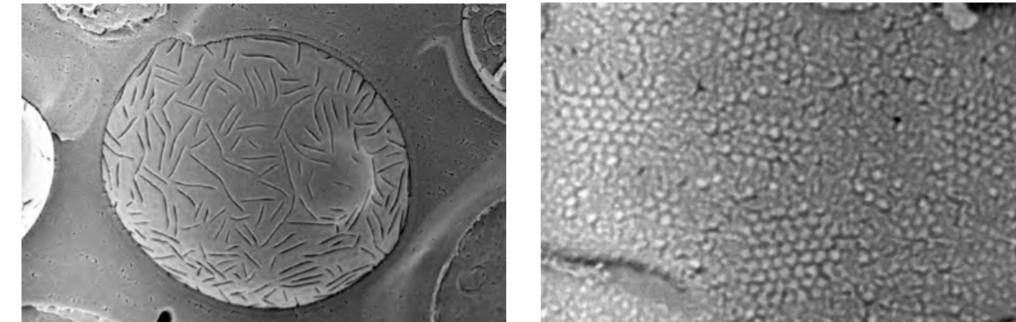
SU8600

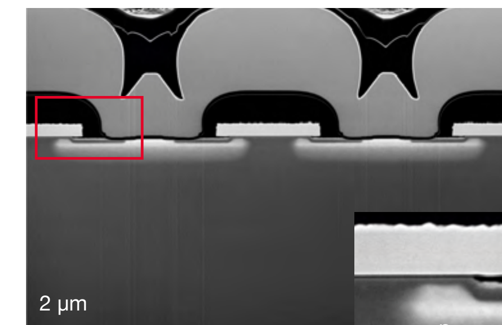
Imaging-oriented applications and special analytics

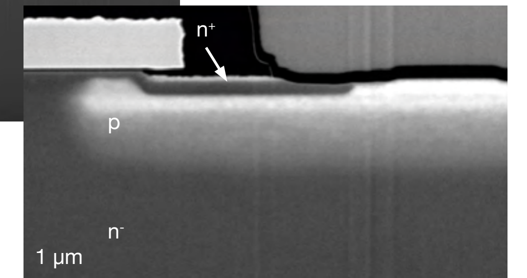




Freeze fracture of flash-frozen brewer's yeast. 2nm Pt coated. 15nm particles in hexagonal arrangement are recognisable. Quorum PP3010T cryo unit combined with SU8600

Block Copolymer





Doping regions in a SiC device cross-section

High-Resolution FE-SEM with Cold Field Emitter

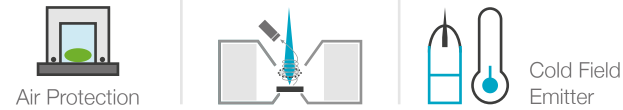
The SU8600 is the successor to the proven Regulus field emission SEM family and fulfills the highest requirements for imaging-oriented applications. The cold field emitter with its near monochromatic emission, combined with a magnetic immersion lens, eliminates the need for beam boosting. So it provides superior resolution even at low beam energies, together with accurate stable signal separation by beam angle and energy. The SU8600 CFE-SEM also delivers top performance in analytical work using specific detectors. For example, you can add windowless EDX detectors for optimum light element analysis. These can be used with the SU8600 in the entire beam energy range up to 30keV, and at the shortest working distances from 4 mm due to the magnetic immersion lens. Or you could combine the SEM with the Bruker FlatQuad EDX detector with over 1sr solid angle for maximum signal efficiency. Sample currents up to 20nA are available.

Product Features

- Very durable, almost monochromatic Hitachi field emitter combined with magnetic immersion lens
- Extensive, flexibly configurable detector system with fine energy filtering, together with the live 6-channel image display enables comprehensive sample assessment
- Harmonises well with windowless EDX detectors
- Reliable, automated functions mean an easy-to-use and high-performing SEM. These functions include the adjustment of user-defined observation conditions, excellent 2D Auto-Focus and Auto- Stigmator, etc.
- The specimen exchange chamber allows for fast, clean loading of samples up to 150mm in diameter. The 5-axis eucentric specimen stage has X,Y travel ranges of 110mm x 110mm.

Optional Accessories

- Extensive range of detectors
- Flexible and effective automation of routine tasks via EM Flow Controller
- Professional analysis accessories (EDX, EBSD, µ-XRF, CL, ...)
- Inert gas transfer function for the sample air lock
- Cryo specimen sub-stage
- Plasma cleaner
- High-accuracy Piezo stage



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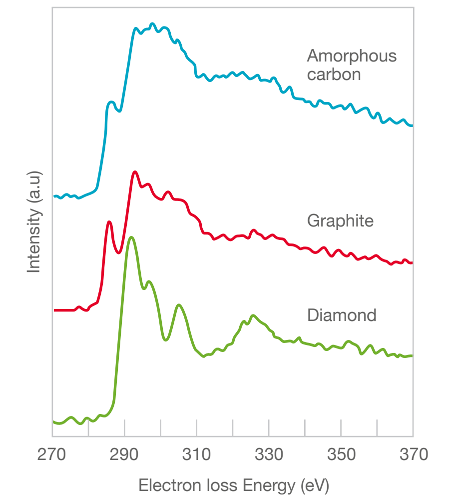
SU9000 II

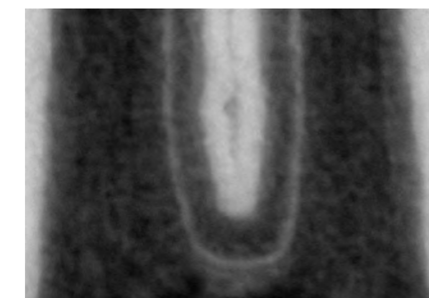
Extremely high resolution in incident and transmitted light

Special Element Analysis Option:

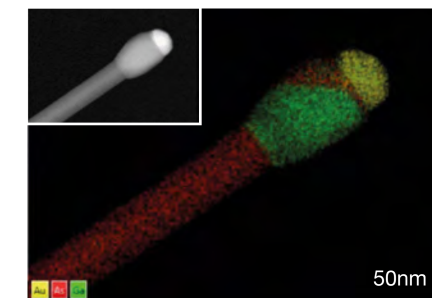
Energy loss spectrometer with spectrum and distribution sensors

Identification of light elements and analysis of the bonding states of allotropes, which are difficult to perform with EDX analysis, can be achieved using energy loss spectroscopy (EELS). Distributions of light elements can be created quickly using the 3-channel sensor.

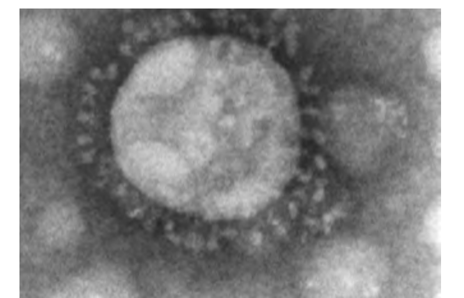




Semiconductor transistor contact structure, inlens SE signal, magnification 1.5 million



EDX analysis of a GaAs nanopin at 30kV (LUND University Sweden)



New coronavirus, BF-STEM at 30kV

SU9000 II Inlens FE-SEM and STEM

The SU9000 II is a combination of surface-imaging SEM and intrinsic structure-resolving scanning transmission microscope (STEM) optimised for extreme resolution. This is made possible by the unique electron optics of the SU9000 II, which combines a cold field emitter with almost monochromatic emission with an “inlens” objective lens. The sample is placed on a highly stable “side-entry” holder virtually inside the two-stage objective lens. Similar to the SU8600, a two-stage, energy-filtered detector system, expandable with a mobile backscatter detector, is available for SEM imaging. In transmission mode, TE signal can be detected simultaneously with SEM imaging selectively according to scattering angles (bright field, variable dark field) with a grating resolution of less than 3 Å. A large, windowless EDX detector with a solid angle of up to 0.7 sr can be mounted close to the sample for high-resolution elemental analysis in both SEM and STEM mode.

✓ Product Features

- SEM-STEM combination with ExB-filtered SEM signal and scattering angle-dependent transmission signal detection
- Cold field emitter combined with inlens electron optics guarantee 0.4nm SE resolution and 0.34nm TE resolution at 30k acceleration voltage
- Excellent light element analysis, due to optimal support of a windowless EDX detector by the magnetic immersion lens. Or the use of an energy loss spectrometer

+ Optional Accessories

- Extensive range of detectors
- Flexible and effective automation of routine tasks via EM Flow Controller
- Windowless EDX system
- Hitachi energy loss spectrometer (EELS) for light element distribution imaging and spectroscopy
- Inert gas sample transfer function

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Not sure which product aligns with your needs?

Our experts are here to provide guidance and help you make the best choice.

Follow us

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