

Ultra-High-Resolution Schottky
Scanning Electron Microscope
SU7000

HITACHI
Inspire the Next

SU7000

SCANNING ELECTRON
MICROSCOPE



Science Ring

This logo symbolizes Scientific and Analytical instruments of Hitachi High-Tech Group. It is composed with an “S”, standing for “Science”, our technology core competency, and with a ring that represents close connection we make with our customers. This “Science Ring” shows how we are committed to create new values by strengthening ties between Science and Society.

Notice: For proper operation, follow the instruction manual when using the instrument.

Specifications in this catalog are subject to change with or without notice, as Hitachi High-Technologies Corporation continues to develop the latest technologies and products for our customers.

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The modern FE-SEM requires not only high performance but must also a multitude of functionalities including wide-area observation, in-situ analysis, variable pressure, high-resolution imaging at low accelerating voltages, and simultaneous multi-signal collection.

The SU7000 is designed to address these aspects and more by delivering Enhanced information for diversified needs in the field of electron microscopy. Experience the nano-world with the SU7000!



* Images on monitors are inset.
* The device photograph is in the state of an optional attachment.

1 Versatile Imaging Capability

The SU7000 excels in fast acquisition of multiple signals to address expansive SEM needs, from imaging a wide field of view to visualizing sub-nanometer structures and everything in between.

The incorporation of newly designed electron optics and detection systems allows for efficient simultaneous acquisition of multiple secondary electron and back-scattered electron signals.

2 Multi-Channel Imaging

The number of the detectors mounted on the SEM is ever increasing, along with the need to display all collected information effectively. The SU7000 is capable of processing, displaying, and saving up to 6 signals simultaneously to maximize information acquisition.

3 Wide Variety of Observation Techniques

The specimen chamber and the vacuum system are optimized for:

- Large specimen size
- Sample manipulation at various axes
- Variable pressure conditions
- Cryogenic conditions
- Heating and cooling in-situ observation

4 Microanalysis

The electron gun is equipped with a Schottky emitter that provides up to 200 nA beam current to accommodate various microanalysis applications.

The specimen chamber and port layout are designed to incorporate multiple analytical options including EDX, WDX, EBSD, cathodoluminescence, and more.

The SU7000 with the combination of numerous analytical accessories unifies multi-discipline techniques in a single platform.

Enhanced information Acquisition

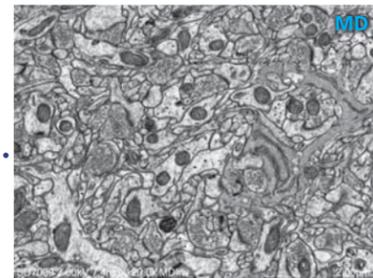
The advanced detection system of the SU7000 streamlines acquisition of structural, topographical, compositional, crystallographic, and other types of information by minimizing changes to microscope conditions, such as working distance or accelerating voltage.

Surface micro-structural information



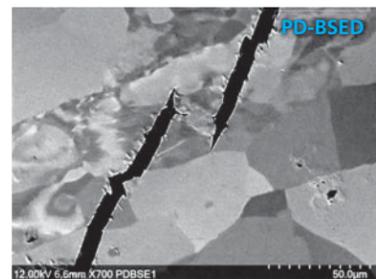
Evaporated metal particle with CNT composite material
UD /0.5 kV
specimen courtesy of: Mr. Smart and Ms. Je
Chemistry Dept., Vassar College

Compositional information



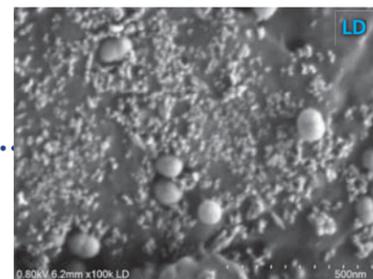
Sectioned mouse brain
MD/2 kV
specimen courtesy of: Dr. Yoshiyuki Kubota
Associate professor,
Natural Science Research Institute

Crystallographic information

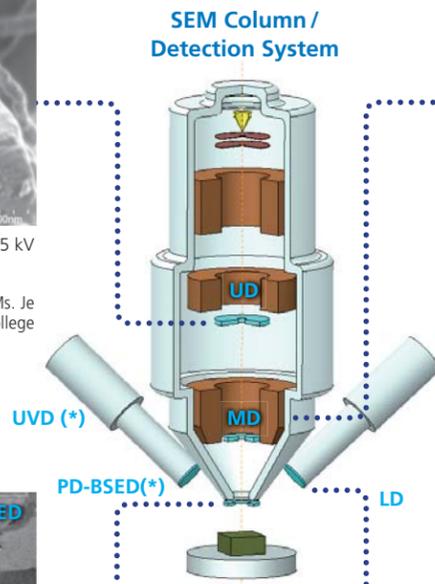


Heat resistant steel
PD-BSED(*)/12 kV

Topographical information



Toner
LD/0.8 kV



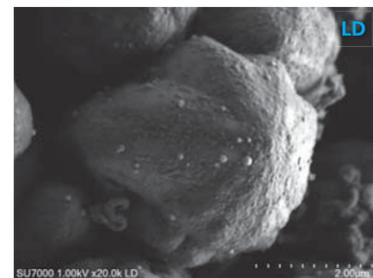
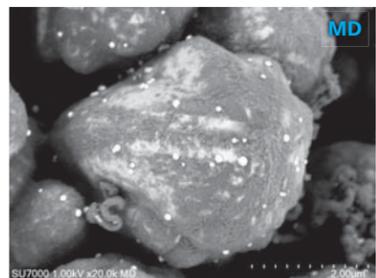
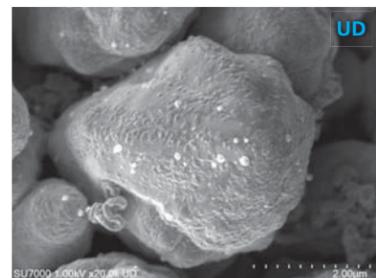
- UD :Upper detector
- MD: Middle detector
- LD: Lower detector
- PD-BSED(*) : Semiconductor type BSE detector
- UVD (*) : Ultra Variable Pressure detector

(*) PD-BSED and UVD are optional.

Single-Scan Multi-Signal Imaging

specimen: Organic-coated gold rods

specimen courtesy of: Mr. Smart and Ms. Je
Chemistry Dept., Vassar College



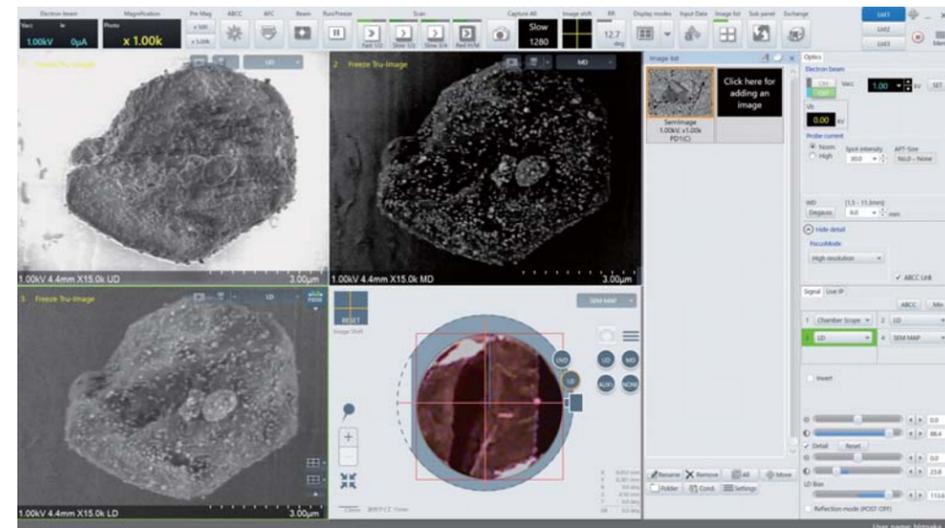
Simultaneous image acquisition for surface micro-structural information (UD), surface coating (MD), and overall topographic information (LD). Acceleration voltage: 1 kV

Enhanced Signal Display

- Customizable display modes.
- Single and Dual-monitor configurations.
- Simultaneous image display up to 4-ch (single) and 6-ch (dual).
- Chamber Scope and SEM MAP for optical stage navigation.

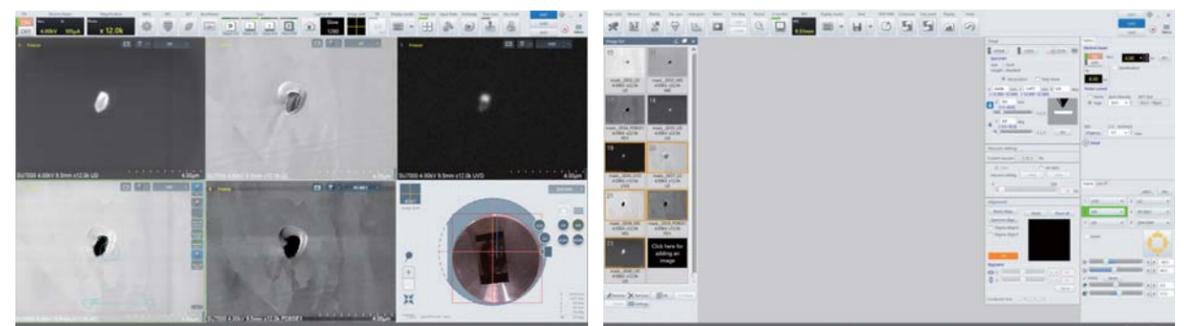
Highly Flexible Screen Layout

1, 2, or 4 signals including the chamber scope or SEM MAP can be displayed on a single monitor. Additionally, the operation panel can be customized to display submenus anywhere on the screen.



Dual Monitor

The 1st monitor can be used as a dedicated image display while the 2nd monitor is utilized for operation. Five detector images (UD, LD, UVD, MD, and PD-BSED) and SEM MAP of non-metallic inclusions in a steel specimen are displayed (left). The screen shows the operation panel menu and the thumbnail image window on one screen (right). The dual-monitor configuration supports increased productivity with expanded workspace.



Large specimen chamber and large stage

The specimen chamber can accommodate a ϕ 200 mm or 80 mm tall specimen and 18 accessory ports. The large stage travels 135 mm (X) x 100 mm (Y) and can accept maximum 2 kg heavy specimen. (*) Large specimen or variable type of sub-stages can be easily mounted on the front-opening large stage door.



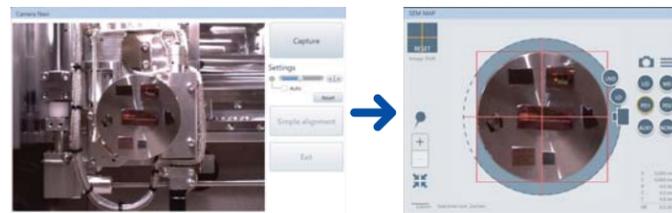
left: external view of the specimen chamber featuring 18 accessories ports



Right: external view of the stage. XY movable range: 135 x 100 mm

(*) at 0° tilt

Camera Navigation (*)



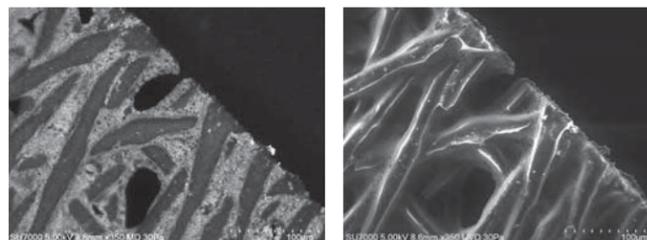
Left: Picture of the specimen captured by the camera equipped inside the chamber. Right: Camera image transferred to the SEM MAP screen for navigation.

The camera navigation feature correlates an optical image to the target observation area. The camera installed in the specimen chamber captures the specimen image at the time of specimen introduction. The image is transferred to the SEM MAP screen for a graphically driven navigation interface. Camera navigation supports a maximum ϕ 100 mm specimen.

(*) Camera navigation function is optional

Detection System Enabling Dynamic Observation

The SU7000 supports observation under various environmental conditions. A variety of detectors (*) such as UVD and MD are selectable in addition to the PD-BSED for observation under low-vacuum conditions.



Detector Selection Under Low-Vacuum Conditions

specimen: Fiber with metallic oxide
Left: MD (Backscattered electron) image

Right: UVD (SE image)
The oxide dispersion and fiber layering state are observed respectively.

Improved PD-BSED Response Speed

Left: Traditional PD-BSED response at the scan rate of 30 ms x 64 frames

Right: SU7000 PD-BSED image demonstrating improved response and image quality to expand in-situ observation capability

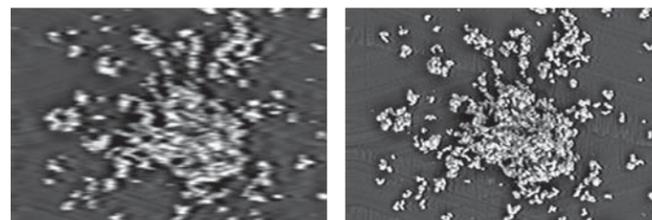


Image Resolution	Resolution SE	0.8 nm@15 kV
		0.9 nm@1 kV
Magnification		20~2,000,000 x
Electron Optics	Emitter	ZrO/W Schottky Emitter
	Accelerating Voltage	0.1~30 kV (0.01 kV step)
	Probe Current	Max. 200 nA
Detectors	Standard Detectors	UD (Upper Detector) MD (Middle Detector) LD (Lower Detector)
	Optional Detectors	PD-BSED (Semiconductor type) UVD (Ultra Variable Pressure Detector)
Variable Pressure(VP) Mode (Option)	Pressure Range	5~300 Pa
	Available Detectors in VP mode	PD-BSED, UVD, UD, MD, LD
Specimen Stage	Stage Control	5-axis Motor Drive
	Movable Range	
	X	0~135 mm
	Y	0~100 mm
	Z	1.5~40 mm
	T	-5~70°
R	360°	
Specimen Chamber	Specimen Size	Max. ϕ 200 mm, Max. 80mm Height
Monitor (Option)		23 inch LCD (1,920x1,080), supports dual monitors operation
Image Display Mode	Large Screen Display Mode	1,280x960 pixels
	Single Image Display Mode	800x600 pixels
	Dual Image Display Mode	800x600 pixels, 1,280x960 pixels with dual monitors
	Quad Image Display Mode	640x480 pixels
	Hex Image Display Mode w/dual monitors	640x480 pixels with dual monitors
Image Data Saving	Pixel Size	640x480, 1,280x960, 2,560x1,920, 5,120x3,840, 10,240x7,680
Dimension and Weight	Main Unit	890(W)x1,200(D)x1,650(H) mm 950 kg
	EO Control Unit	700(W)x700(D)x1,200(H) mm 280 kg
	Dry Pump (Option)	400(W)x260(D)x340(H) mm 28 kg
	Air Compressor (Option)	420(W)x240(D)x520(H) mm 18 kg
	Weight	200(W)x180(D)x160(H) mm 25 kg
	Cooling Water Recirculator (Option)	380x500x620 (mm) 45 kg
Optional Accessories	Energy Dispersive X-ray Spectrometer (EDX)	
	Wavelength Dispersive X-ray Spectrometer (WDX)	
	Electron Backscattered Diffraction Detector (EBSD)	
	Cathodoluminescence System (CL)	
	Cryogenic Transfer System	
	Compatible with various types of sub-stages	

Installation Diagram

