

HITACHI
Inspire the Next

SCANNING ELECTRON
MICROSCOPE

SU3500

HITACHI

The New Dimension in Image Quality

SUB



4-axis Motor Drive Stage (55 mm x 55 mm)

Unparalleled Image Quality

Novel and innovative electron optics and image display rendering engine

▶ P3

Robustness & Versatility

Image observation and analysis without traditional specimen preparation techniques

▶ P7

Intuitive Operation

Delegation technology affords easy operation and increased throughput efficiency

▶ P11

5000



5-axis Motor Drive Stage (100 mm x 50 mm)

Screen shows simulated image

**Multi-Functional,
Automated Specimen Stage**

Enhanced navigation via new analytical chamber and automated stage functions

▶ P15

Live Stereoscopic Imaging

Point and click for seamless, real-time 3-D SEM image observation

▶ P19

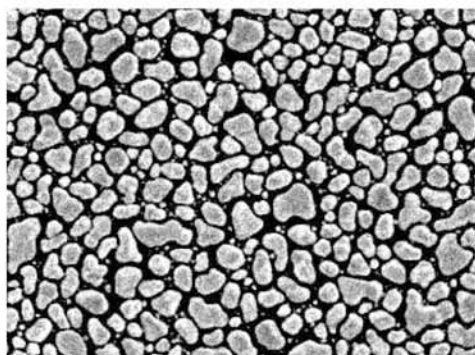
SU3500

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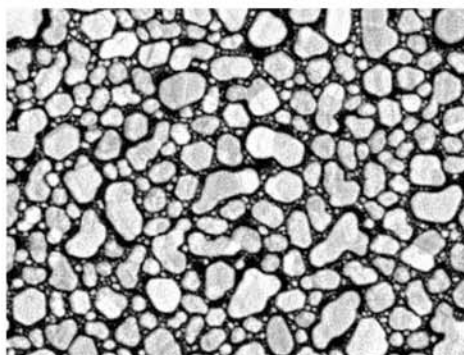
High Resolution at Low Accelerating Voltage

7 nm SE Image Resolution at 3 kV, 10 nm BSE Image Resolution at 5 kV

The electron optics design yields unmatched imaging performance. The SU3500 employs a new low-aberration objective lens and improved bias function that provides higher emission current at low kV. These improvement gains allow the SU3500 to achieve 7 nm SE image resolution at 3 kV accelerating voltage and 10 nm BSE image resolution at 5 kV accelerating voltage.



Accelerating Voltage: 3 kV, Secondary Electron (SE) Image Magnification: x 40,000, Resolution: 7 nm

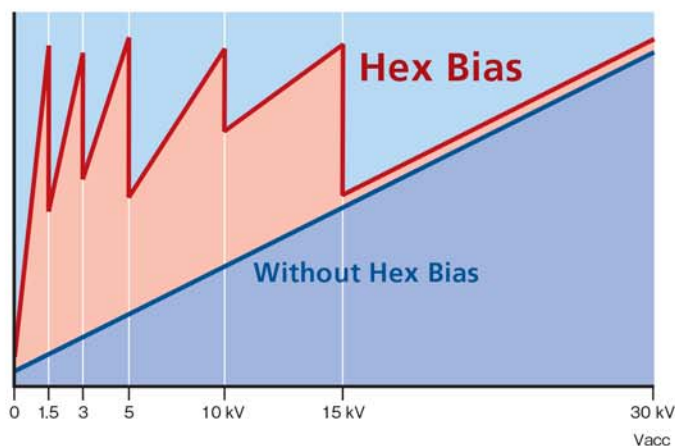


Accelerating Voltage: 5 kV, Backscattered Electron (BSE) Image Magnification: x 30,000, Resolution: 10 nm

Sample: Gold particles on Carbon

Maximizing Signal Intensity

High imaging performance at low accelerating voltage



The emission current extracted from a tungsten filament is proportionally reduced as the accelerating voltage is decreased; therefore, the image signal-to-noise ratio is typically compromised. The SU3500 employs a Hex Bias system that optimizes the emission current at 6 frequently used acceleration voltage levels for optimum brightness. The result is best-in-class image sharpness (S/N) at low accelerating voltages.



Previous model^{®1}



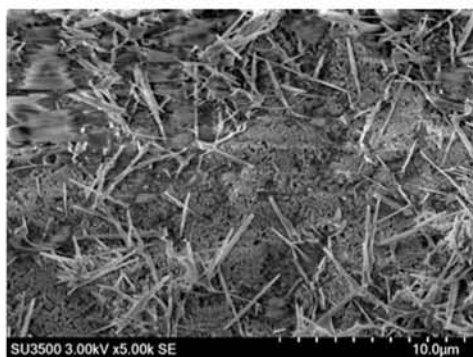
SU3500

20 sec Scan, Accelerating Voltage 1.5 kV Magnification: x 110 Sample: Copepod With Ionic liquid

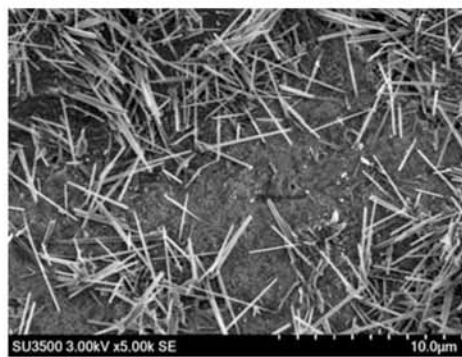
Charge Suppression Scan Function

CS^{**2} Scan minimizes beam irradiation surface damage

CS Scan mode decreases charging and enhances image quality by reducing the beam (primary electron) dwell time per pixel. This automated scanning process preserves sample imaging integrity by seamlessly integrating multi-horizontal line signals from high-speed scans.



Slow Scan

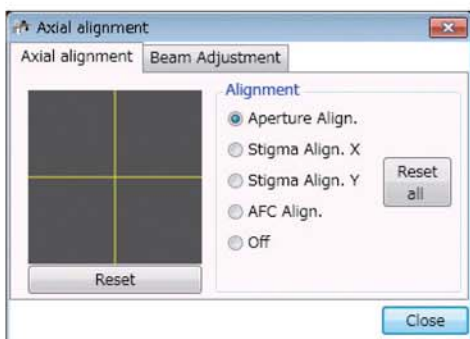


CS Scan

Specimen:
Tablet (Confectionery)
Accelerating Voltage: 3 kV
Magnification: x 5,000
Signal:
Secondary Electron (SE)
Without metal coating

Innovative Aperture Alignment System

Electromagnetic aperture alignment mechanism

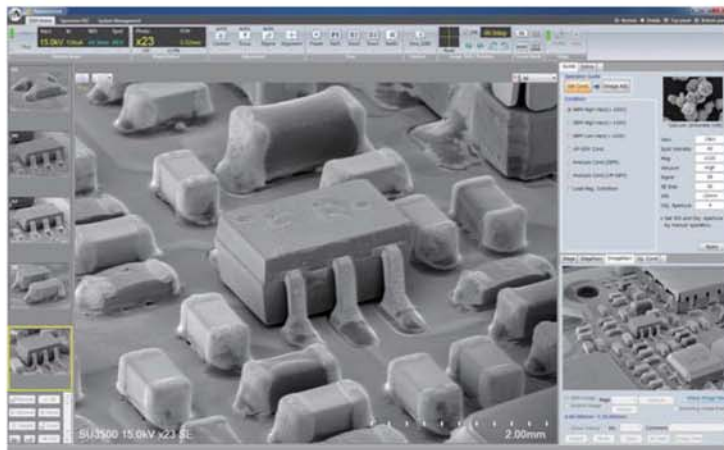


Alignment of the primary beam within the center of the movable objective aperture is critical for minimizing astigmatism and generating high quality SEM images. Traditionally, this alignment is performed by mechanically adjusting the objective aperture. The SU3500 employs an innovative electromagnetic beam alignment system offering easily controlled, precise fine-tuning for optimum positioning. A convenient "reset" function provides a quick course starting point, if needed.

Enhanced Image Signal Processing

Novel image display engine allows fast and easy focusing and astigmatism correction

The SU3500 incorporates a revolutionary Image Signal Processing function (25/30 frames/sec)^{**3} for image optimization on the fly. Focus and astigmatism correction can be easily accomplished during real-time image observation.



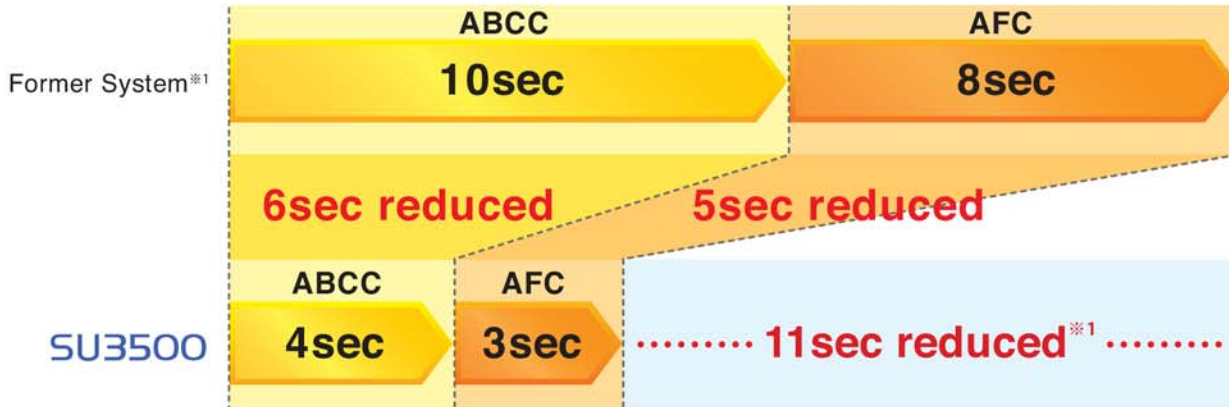
Live image at fast scan
Sample : Printed circuit board

※1 Comparison S-3400N manufactured in 2013. ※2 Charge Suppression ※3 25 frame:50 Hz, 30 frame:60 Hz

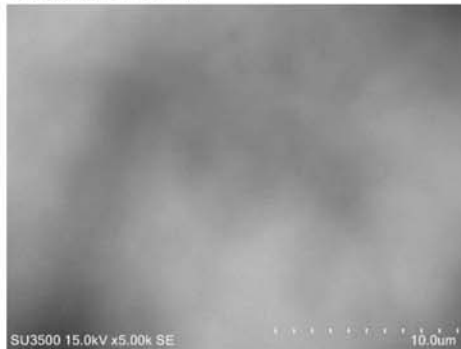
Improved Processing Speed and Accuracy

Highly efficient Automatic Focus Control (AFC) and Auto Brightness/Contrast Control (ABCC) functions

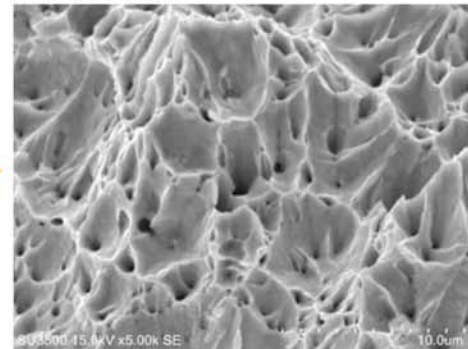
More accurate and faster AFC and ABCC algorithms enable optimized image observation and higher throughput^{*2}.



Before Auto Focus



After Auto Focus



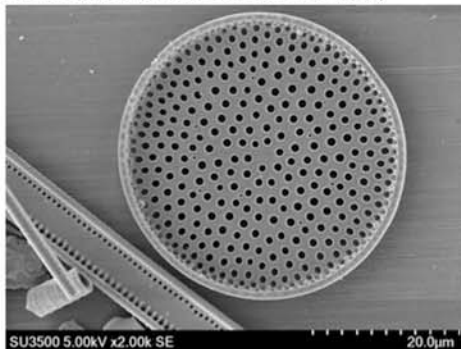
Sample : Broken section of metal clip

Robust Condenser Lens

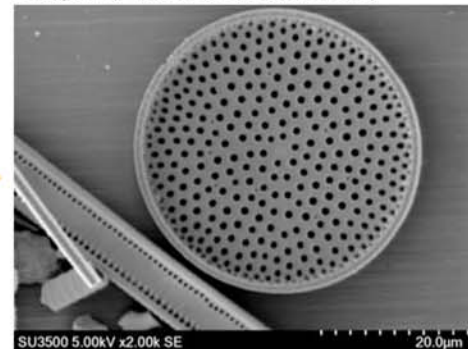
Increased condenser lens dynamic range offers improved imaging efficiency

The SU3500 utilizes a new, more robust condenser lens abating field of view or focus deviations during accelerating voltage and probe current condition adjustments. These imaging efficiency gains simplify the overall imaging optimization process and improve the user experience.

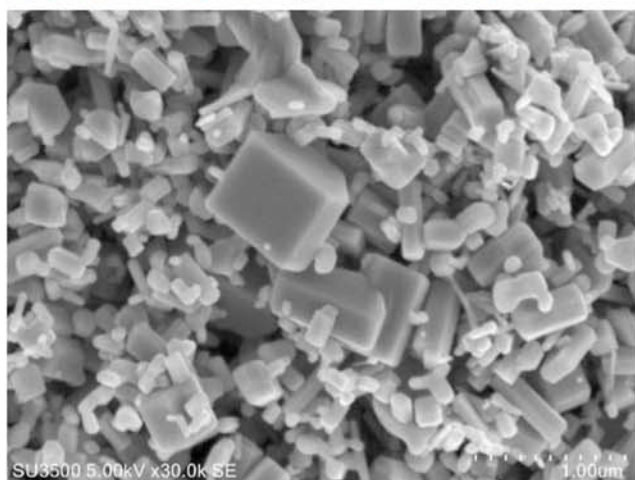
Observation (Probe current reduced)



Analysis (Probe current increased)



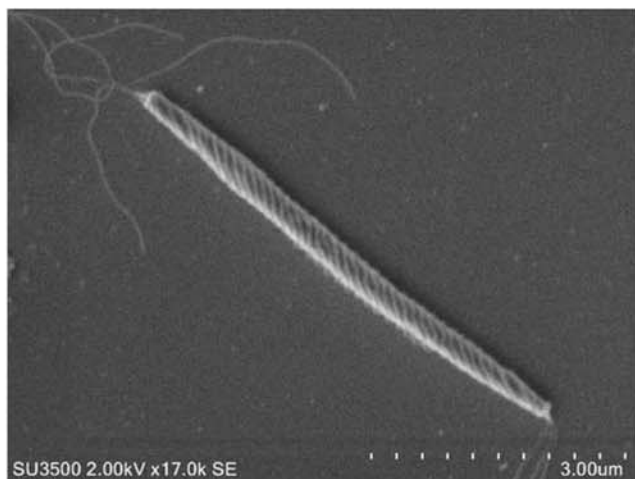
Application Data: High Vacuum Mode



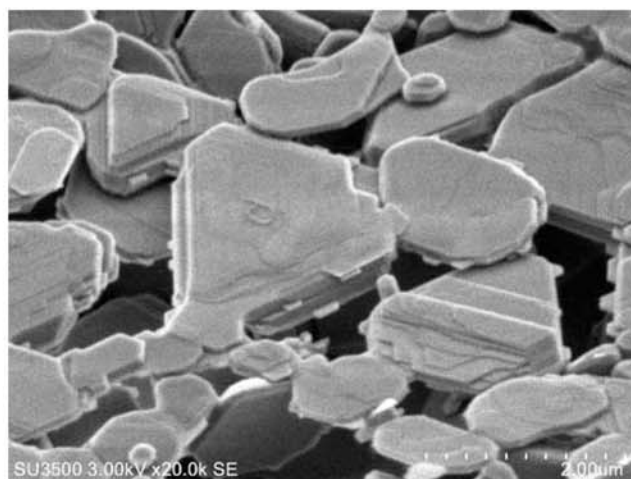
Sample : ZnO
Accelerating Voltage : 5 kV, Magnification : x 30,000,
Signal : Secondary Electron (SE), Without metal coating



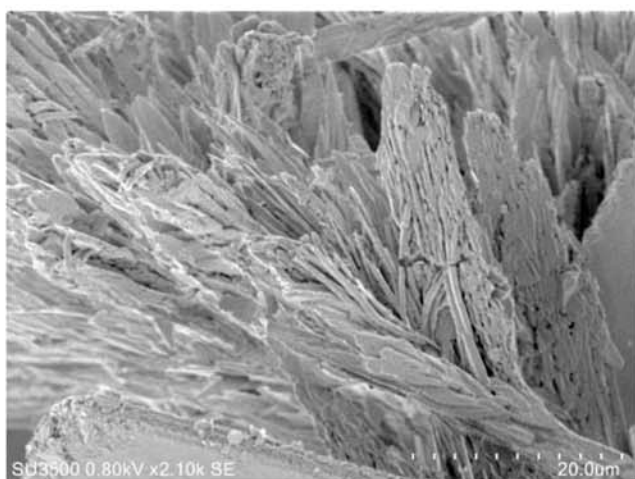
Sample : Titanium Oxide Particle, Accelerating Voltage : 3 kV,
Magnification : x 15,000, Signal : Secondary Electron (SE), Without metal coating
Sample courtesy : Prof. Masato Kakihana Tohoku University



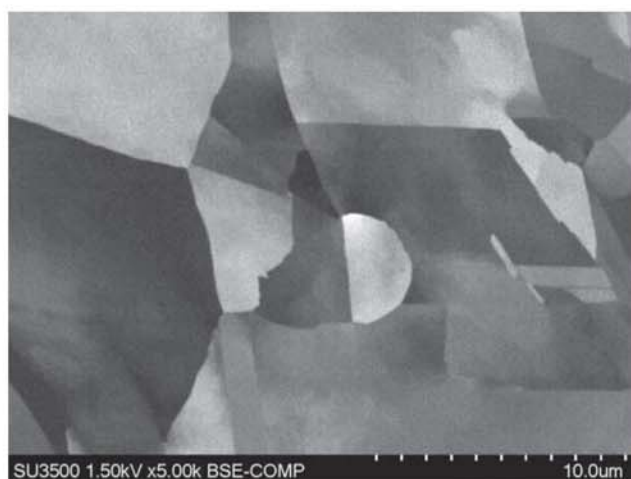
Sample : *Helicobacter bilis*, Accelerating Voltage : 2 kV,
Magnification : x 17,000, Signal : Secondary Electron (SE), With OsO₄ coating
Sample courtesy : Prof. Yoshiaki Kawamura,
Aichigakuin University



Sample : Al₂O₃/Fe₂O₃ sintered body, Accelerating Voltage : 3.0 kV,
Magnification : x 20,000, Signal : Secondary Electron (SE), Without metal coating
Sample courtesy : Prof. Minoru Fukuhara,
Okayama University of Science



Sample : Gold-Isocyanide Complex
Accelerating Voltage : 0.8 kV, Magnification : x 2,100,
Signal : Secondary Electron (SE), Without metal coating



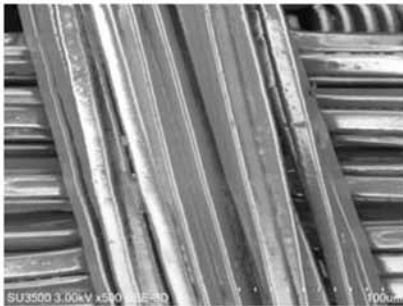
Sample : Copper gasket cross section
Accelerating Voltage : 1.5 kV, Magnification : x 5,000,
Signal : Backscattered Electron (BSE), Without metal coating

※1 Comparison S-3400N manufactured in 2013.
※2 AFC and ABCC throughput may vary depending on various factors.

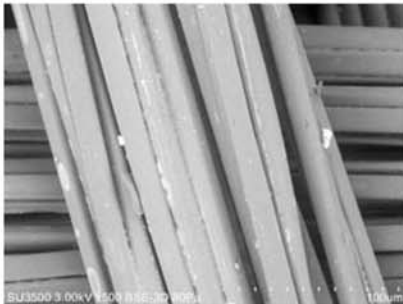
Low Vacuum Mode Advantages

The SU3500 incorporates variable pressure capability. The newly designed vacuum system enables low vacuum settings within the range of 6-650 Pa. The vacuum condition is actively monitored in real-time for maintaining stable vacuum levels at the selected pressure.

Charging is mitigated on non-conductive specimens without metal coating.

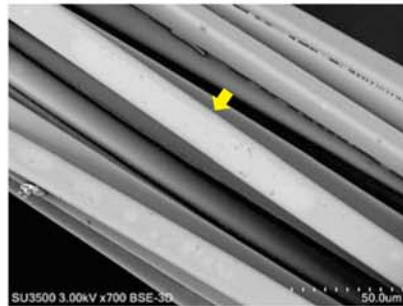


High Vacuum mode without metal coating : Image distortion due to surface charging.

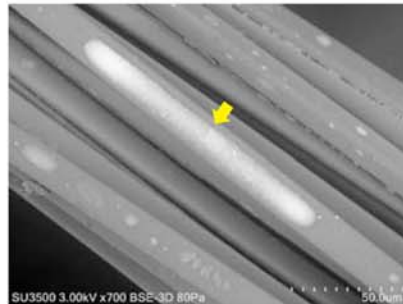


Low Vacuum mode without metal coating : Less specimen surface charging.

Metal coating, such as Au or Pd, absorbs SE, BSE, and X-ray signals from the specimen and weakens SEM detectable signals.



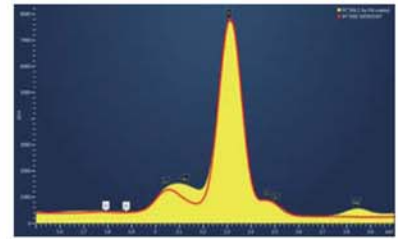
Observation with metal coating : Material contrast of Ti (arrowed) is reduced by metal coating.



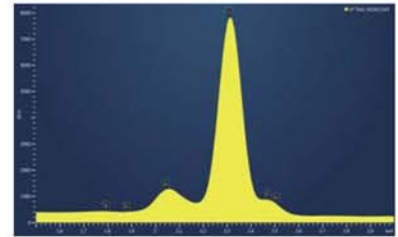
Observation without metal coating : Clearer material contrast of Ti (arrowed) at low vacuum mode.

Sample : Photocatalytic Fiber

X-ray analysis: Peak overlapping is minimized without metal coating.



EDS Spectrums with metal coating : Spectrums of Zr and Pt (coating material) are overlapped.



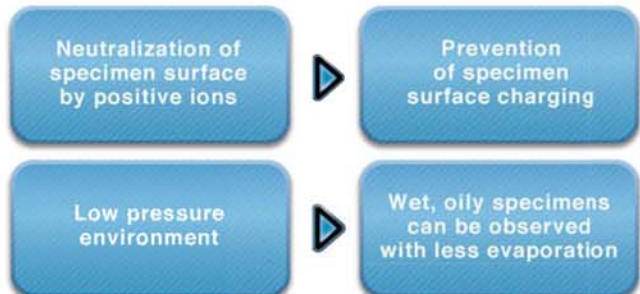
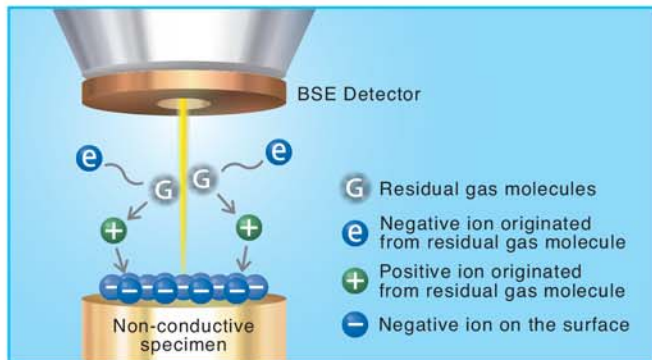
EDS Spectrums without metal coating : Spectrums of Zr can be clearly identified.

EDS : Aztec (Option), manufactured by Oxford Instruments plc.

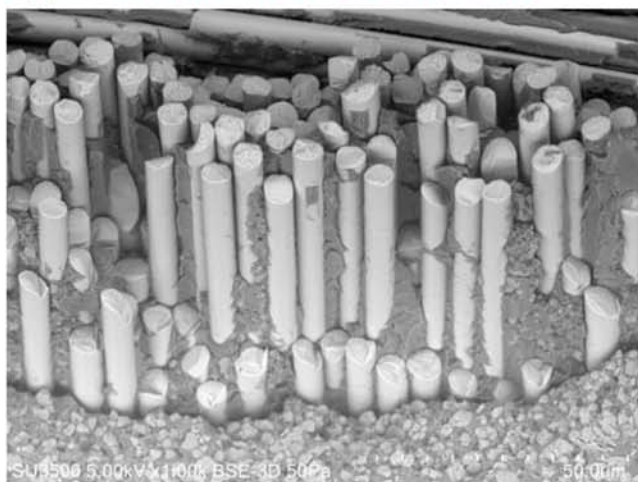
Sample : Zirconium Sulfide

Operating theory of Low Vacuum mode

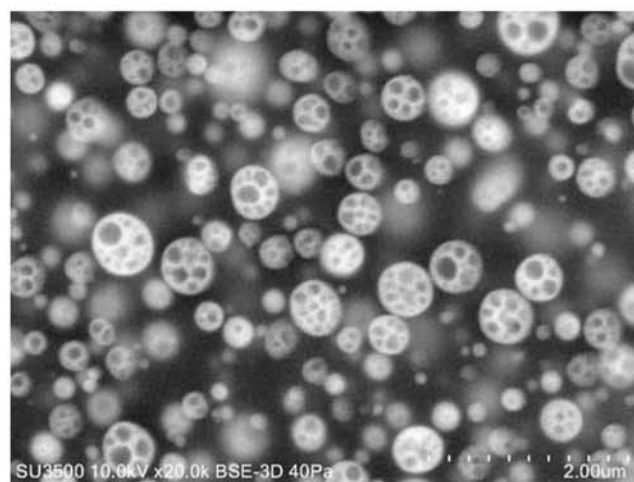
Utilizing a low vacuum environment can allow observation of water or oil based specimens in the natural state. The positively charged ions originated from the residual gas molecules generated by the electron beam neutralize the negatively charged electrons on the specimen surface. Low vacuum observation often eliminates traditional sample preparation requirements such as specimen dehydration or metal coating.



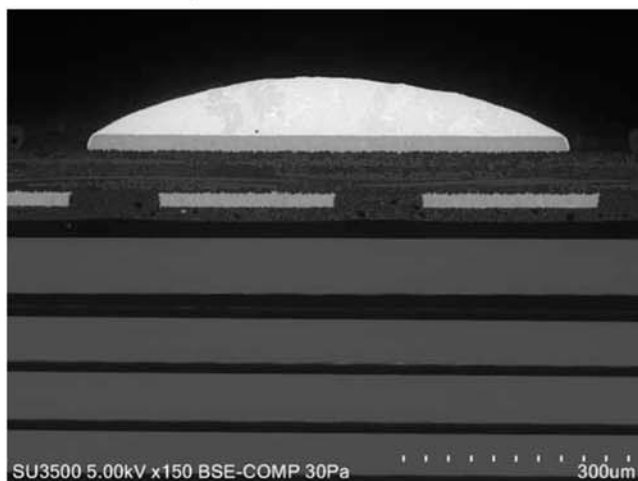
Application Data: Low Vacuum Mode



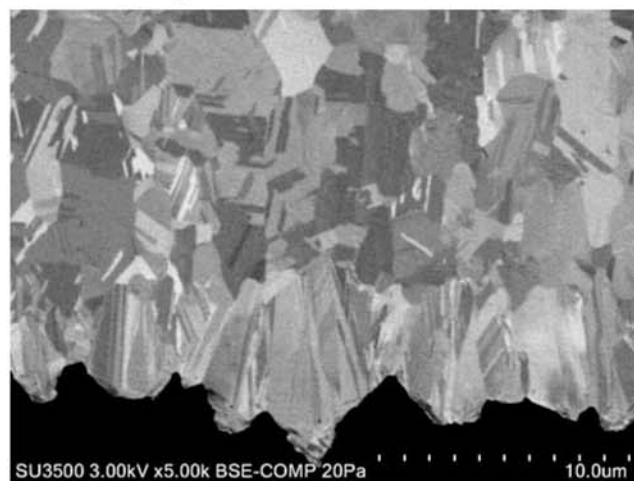
Sample : Filler (Glass fibers) in Resin
 Accelerating Voltage : 5 kV, Vacuum : 50 Pa,
 Magnification : x 1,000, Signal : Backscattered Electron (BSE),
 Without metal coating



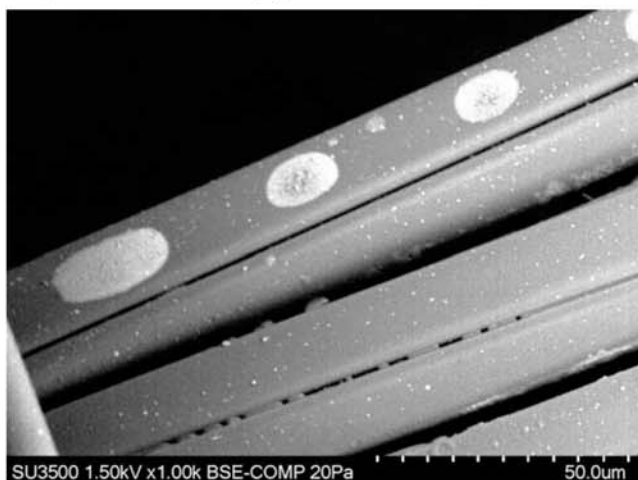
Sample : ABS Resin
 Accelerating Voltage : 10 kV, Vacuum 40 Pa,
 Magnification : x 20,000, Signal : Backscattered Electron (BSE),
 With OsO4 staining



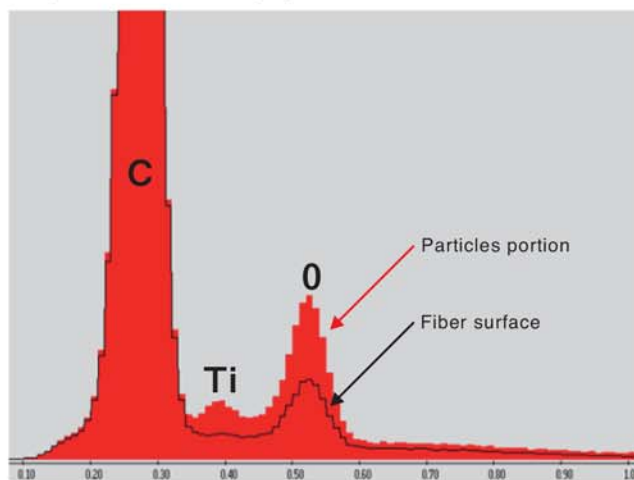
Sample : Cross section of Printed Circuit Board
 Accelerating Voltage : 5 kV, Vacuum : 30 Pa,
 Magnification : x 150, Signal: Backscattered Electron (BSE),
 Without metal coating
 Using the Hitachi Ion milling system IM4000



Sample : Cross section of Printed Circuit Board
 Accelerating Voltage : 3 kV, Vacuum : 20 Pa,
 Magnification : x 5,000, Signal: Backscattered Electron (BSE),
 Without metal coating
 Using the Hitachi Ion milling system IM4000



Sample : Photocatalytic Fiber
 Accelerating Voltage : 1.5 kV, Vacuum : 20 Pa,
 Magnification : x 1,000, Signal: Backscattered Electron (BSE),
 Without metal coating



Sample : Photocatalytic Fiber
 Accelerating Voltage : 1.5 kV, Vacuum : 20 Pa,
 Magnification : x 1,000
 EDS: APEX (Option), manufactured by EDAX from AMETEK, Inc.

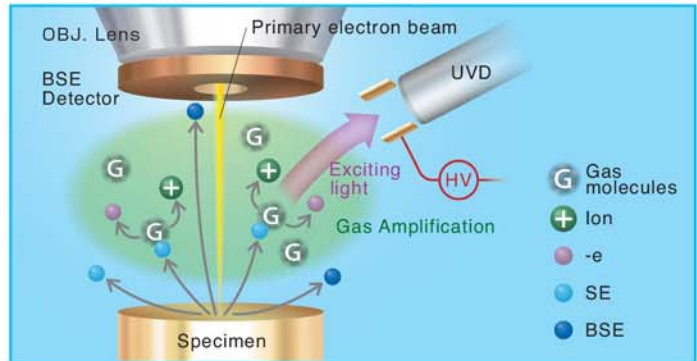
Novel Low Vacuum Imaging

The unmatched Ultra Variable-Pressure Detector (UVD, optional)

By detecting the excited light emitted from collisions between electrons and gas molecules, complementary secondary electron information can be obtained. The new, highly-sensitive Ultra Variable-Pressure Detector is optimized for imaging surface details at low acceleration voltages and low pressures.

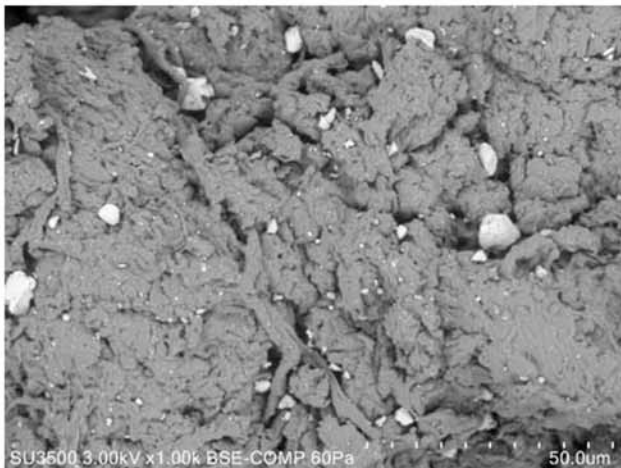


UVD External View

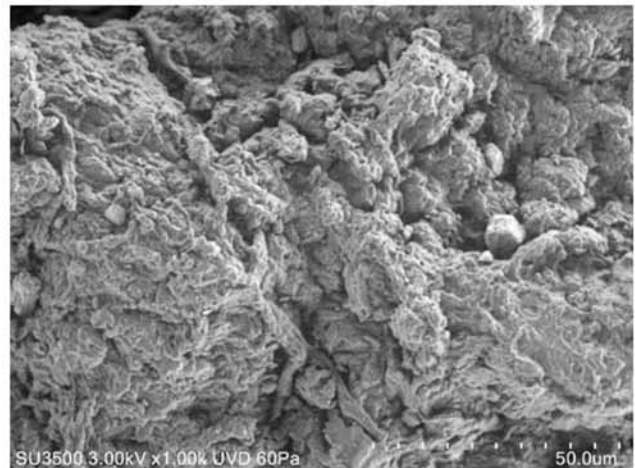


UVD Principle

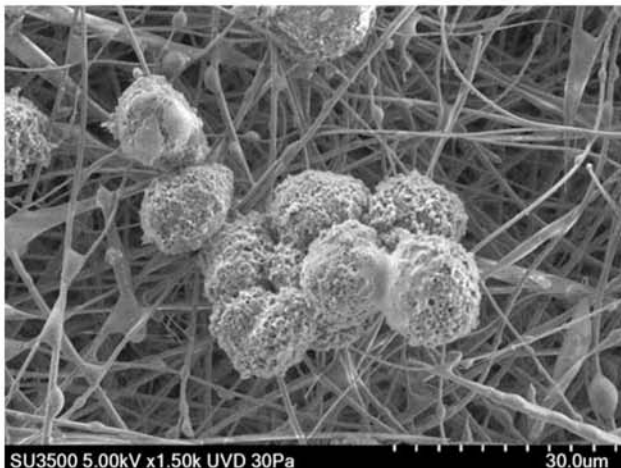
Application Data: UVD



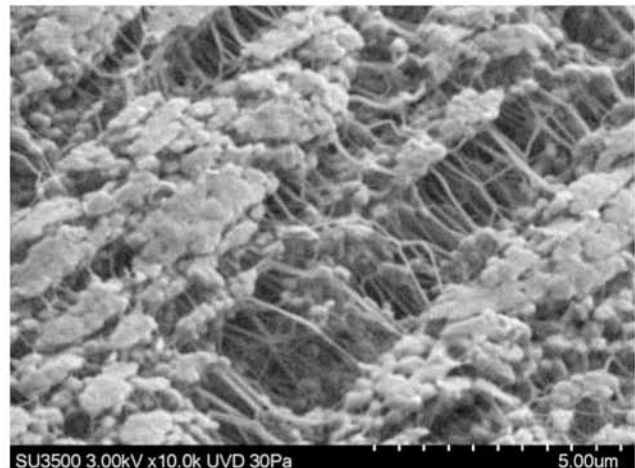
SU3500 3.00kV x1.00k BSE-COMP 60Pa
Sample : Polyvinyl Alcohol, Accelerating Voltage : 3 kV, Vacuum 60 Pa, Magnification : x 1,000, Signal : Backscattered Electron (BSE), Without metal coating



SU3500 3.00kV x1.00k UVD 60Pa
Sample : Polyvinyl Alcohol, Accelerating Voltage : 3 kV, Vacuum 60 Pa, Magnification : x 1,000, Signal : Ultra Variable-Pressure Detector (UVD), Without metal coating



SU3500 5.00kV x1.50k UVD 30Pa
Sample : Rat primary hepatocytes cultured on Silica fiber nonwoven fabrics, Accelerating Voltage : 5 kV, Vacuum : 30 Pa, Magnification : x 1,500, Signal : Ultra Variable-Pressure Detector (UVD), Without metal coating, Sample courtesy : Japan Vilene Co., Ltd.

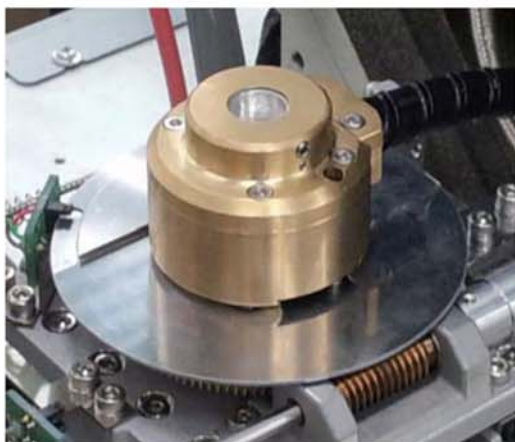


SU3500 3.00kV x10.0k UVD 30Pa
Sample : Thread sealing tape (extended), Accelerating Voltage : 3 kV, Vacuum : 30 Pa, Magnification : x 10,000, Signal : Ultra Variable-Pressure Detector (UVD), Without metal coating

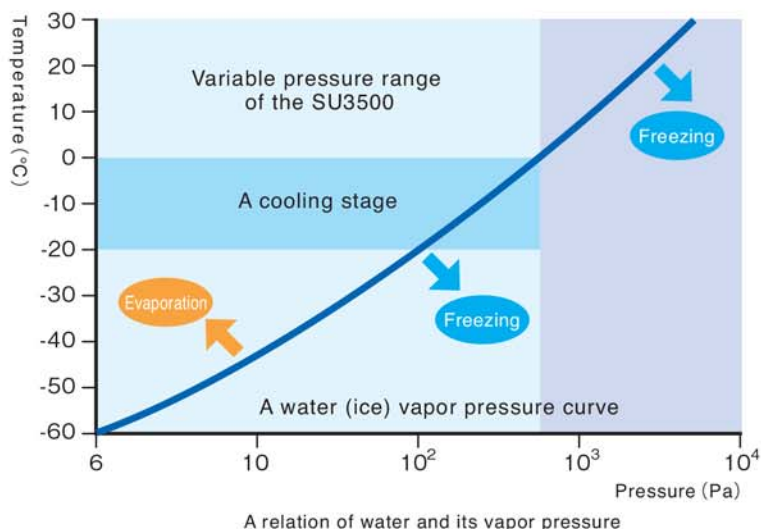
Cool Stage Low Vacuum Mode Advantage

Low Vacuum range extended to 650 Pa^{※1}

Cooling specimens (0 ~ -20 °C) is often utilized to minimize vaporization effects during imaging under vacuum. The SU3500, with a pressure range up to 650 Pa, offers the flexibility to image samples at 0 °C (vapor pressure of 0 °C region is 611 Pa, as shown below).

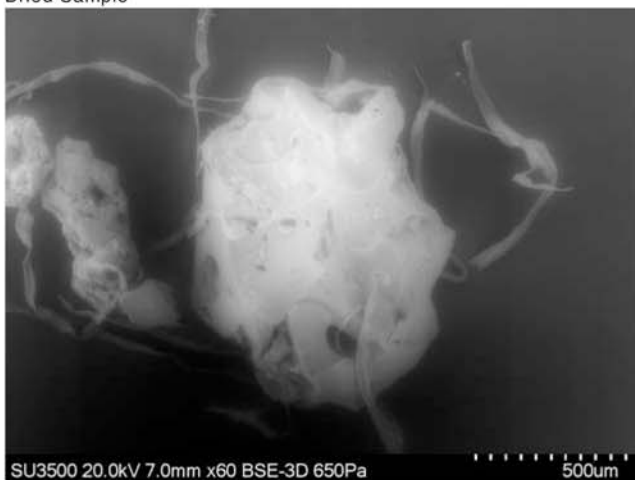


Example of cooling system equipped with SU3500
Coolstage : Manufactured by DEBEN UK, Ltd. (Option)

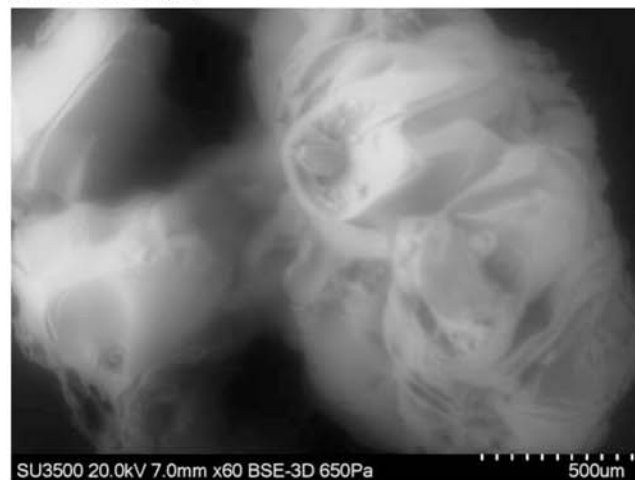


Application Data: Low Vacuum Cooling

Dried Sample



Hydrated Sample
(purified water, 5 μL)



Sample : Superabsorbent polymer
Accelerating Voltage : 20 kV, Vacuum : 650 Pa
Magnification : x 60, with cooled : -4 °C

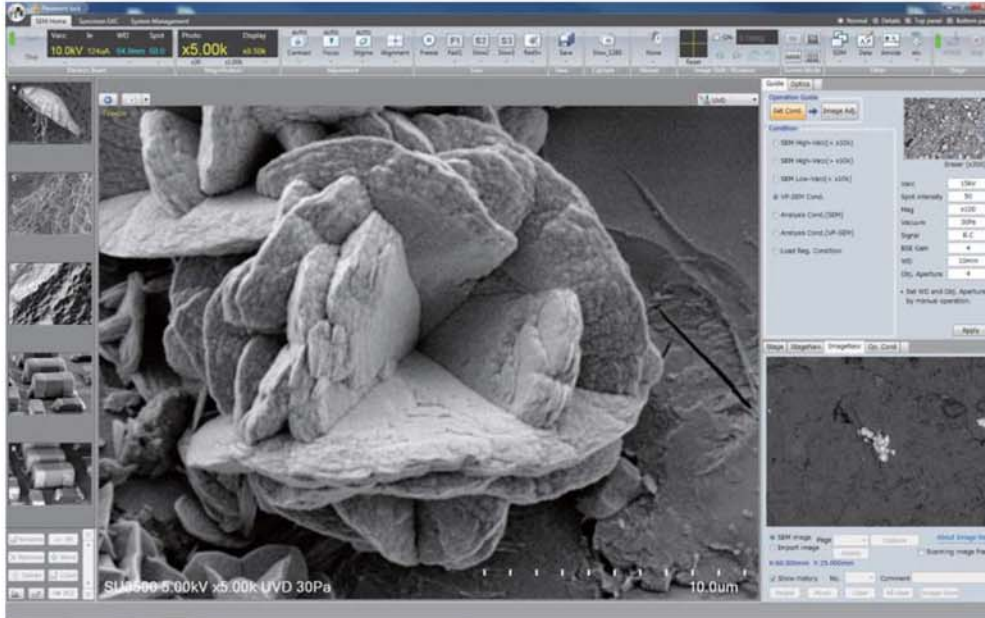
※1 Comparison S-3400N manufactured in 2013.



Max. Pixel Size
1,920 x 1,200

Improved Visibility and Operation with a 24 inch Wide Screen

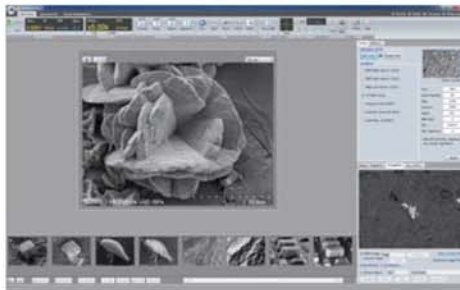
Wide screen display offers large, single image, or simultaneous multi-image observation.



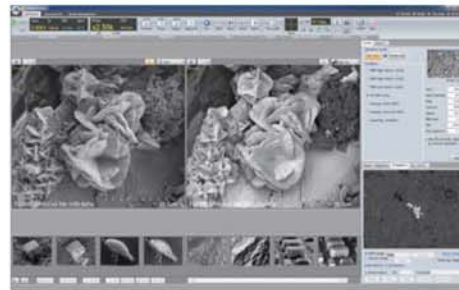
Versatile Image
Display Function

Real-time multi-signal processing and display

Single image, dual image, quadruple image, and full screen image display layouts are available. This allows multi-signal, simultaneous image observation for real-time image comparison.



Single image display (800 x 600 pixels) Good for finding observation target or focus adjustment.



Dual image display (800 x 600 pixels x 2)
Two different signal of live images are displayed simultaneously. This allows effective image comparison like the SE/UVD for surface info or BSE compositional image.



Quadruple image (640 x 480 pixels x 4) Real time 4 different image display for effective multiple image comparison, for example, SE image, BSE compositional image, BSE topographic image, and BSE 3D image.



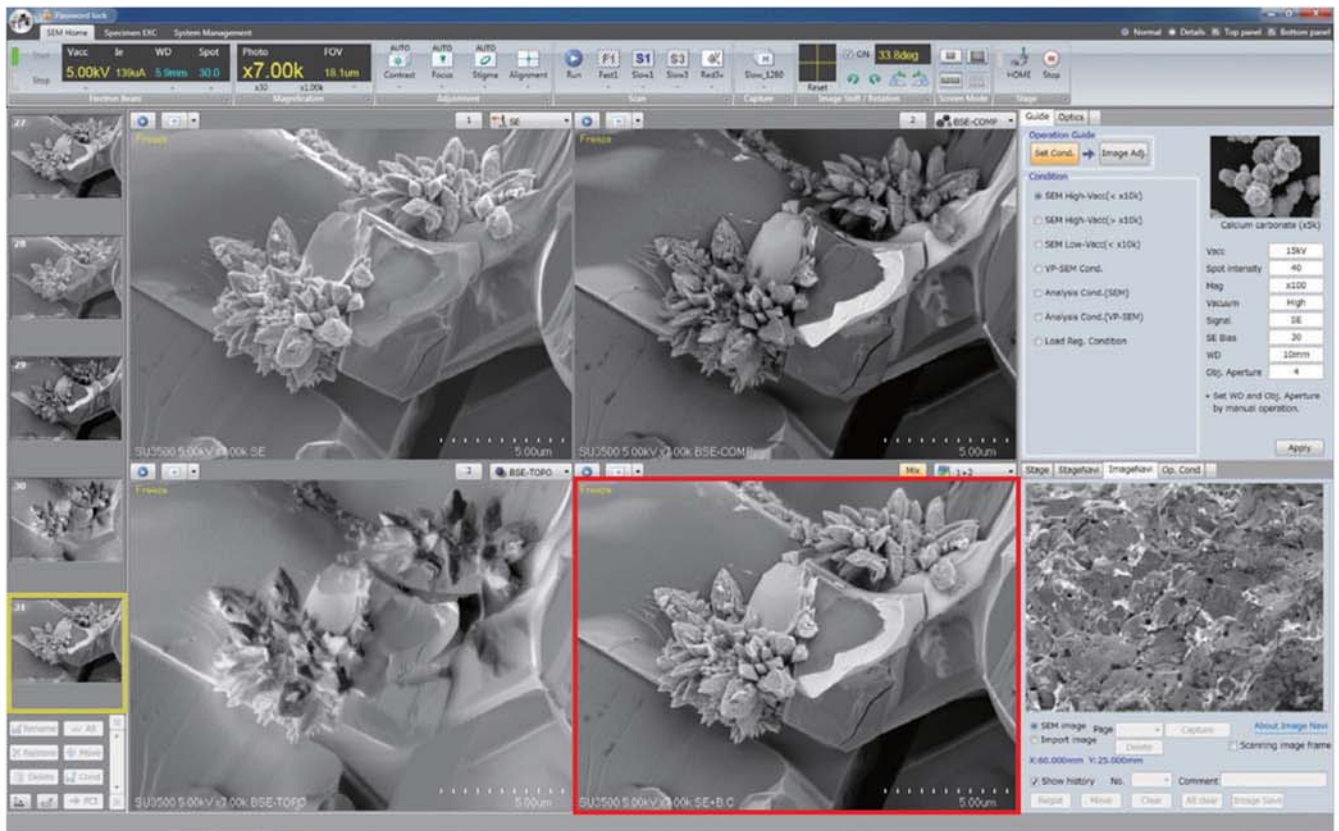
Full screen image (1,280 x 960 pixels)
Real time high resolution & large sized image display suitable for observing the image with multiple users.



Signal Mixing

Unique live signals can be mixed and displayed as a combined live image

Multiple live signals for the same view can be mixed and displayed as one combined live image. This allows effective image analysis with multiple signals in one image; for example, the secondary electron (SE) providing surface rich information, and the back scattered electron (BSE) signal for compositional information. (outlined picture in red: SE and BSE mixed image)



Two-way Selectable Mag. Display

Two-way selectable Magnification Display

Two selectable magnification displays available based on either the conventional Polaroid Size (127 mm x 95 mm) or the image size on the LCD screen.



Ease of Use

User customized icon setting

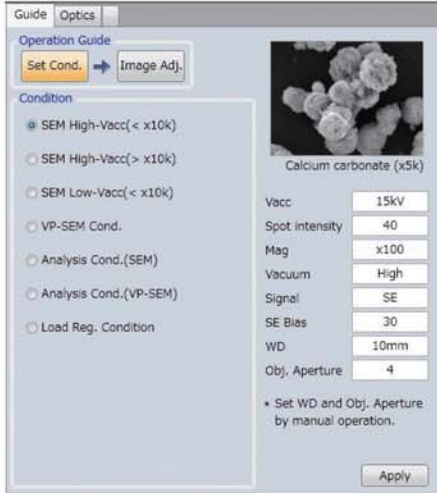
User customized icon selection and settings optimize operation efficiency based on need, preference, and frequency of use.



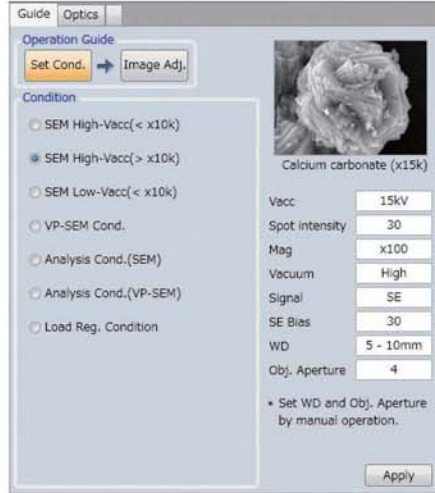


"Operation Guide" allows inexperienced users to easily select the optimum operating conditions

Six commonly used operating condition sets are pre-registered on the SU3500 by Hitachi. This allows users to quickly find basic operating conditions. The user defined conditions can then be registered and retrieved for quick, subsequent start-ups.

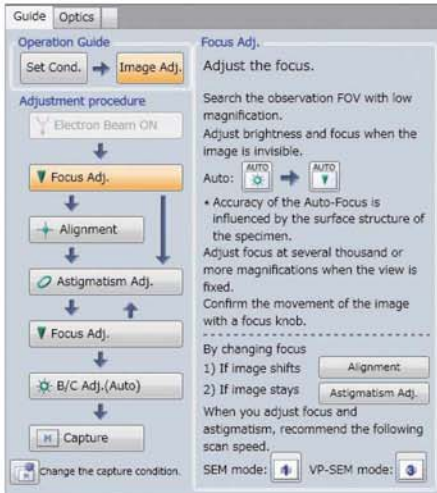


SEM High-Vacc(< x10 K)

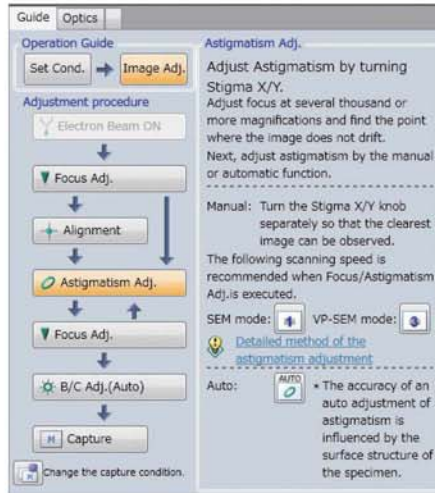


SEM High-Vacc(> x10 K)

The Operation Guide Wizard provides assistance as needed for effortless operation regardless of user experience.



Guide screen for focus adjustment

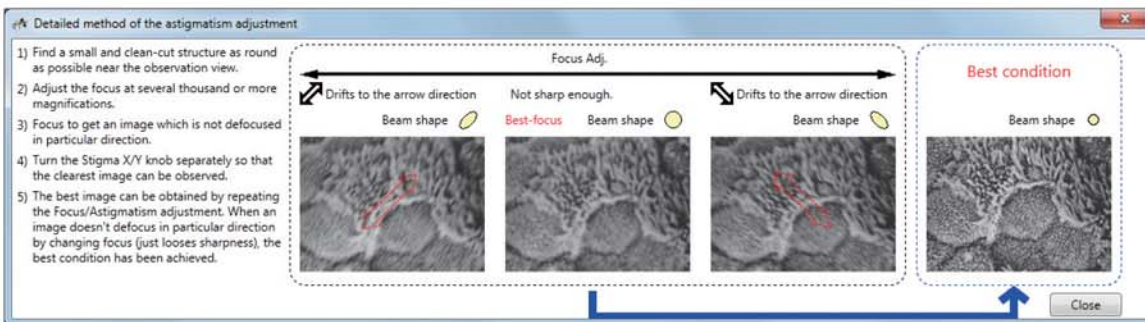


Guide screen for astigmatism correction



Operation Wizard

The SU3500 Operation Wizard provides helpful tips with illustrative guides for recommended focusing or astigmatism correction procedures, further improving the efficiency and overall user-experience for both expert and novice users.



Auto Start function

“Auto Start” executes electron beam irradiation, adjustment of focus, brightness, and contrast automatically at the selected accelerating voltage.

Acc.Voltage Split pull-down



Operation Panel is a standard component

The Operation Panel integrates all the necessary controls (scan speed, auto brightness and contrast, focus, magnification, and image capture and save) into one convenient location on the SEM console.



“Video Maintenance Wizard Guide” provides accurate and easy to understand maintenance instruction

User maintenance is easily accomplished by following the video instructions.

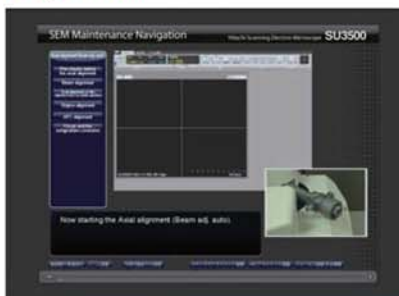
Filament exchange



Condenser lens aperture exchange



Alignment





Motorized
Stage Control

SU3500 offers 2 unique motorized stages

Eucentric 5-Axis Motorized Stage

X : 0 ~ 100 mm

Y : 0 ~ 50 mm

Z : 5 ~ 65 mm

R : 360°

T : -20 ~ 90°

Observation Area : 130 mm in diameter
(with rotation)

Maximum height : 80 mm (WD=10 mm)

Motor driven axis : 5-axis (X, Y, Z, R, T)



Eucentric 4 axis Motorized Stage

X : 0 ~ 55 mm

Y : 0 ~ 55 mm

Z : 5 ~ 55 mm

R : 360°

T : -20 ~ 90°

Observation Area : 77 mm in diameter
(with rotation)

Maximum height : 70 mm (WD=10 mm)

Motor Driven axis : 4-axis (X, Y, R, Z)





Multi-function Specimen Stage

The robust SU3500 analytical chamber accommodates EDS*¹, WDS*², and/or EBSD*³ simultaneously. The chamber is optimized for Analytical Position of WD=10 mm for EDS, WDS. A minimum magnification of 27 x is available at that WD; therefore, targeted analytical positions can be identified with the wide field of view.

EDS, WDS, and EBSD

EDS, WDS (offering an order of magnitude greater energy resolution), or the Kikuchi pattern attained via EBSD are utilized for micro detection of elements and crystal orientation.

EDS : X-MaxN, WDS : INCA Wave,
EBSD : NordlysNano,
manufactured by Oxford Instruments plc.



Dual EDS Detector

Taking advantage of the Dual EDS detector configuration offers an increase in the characteristic x-rays detected (signal) and mitigates any shadowing effects.

EDS : Octane,
manufactured by EDAX from AMETEK Inc.



Stage Control

Eucentric 5-Axis Motorized Stage

1 X-Y, Tilting(T), Rotation(R), Height(Z) Control

By track ball (joystick as an option), a mouse control or numerical data input.

2 X-Y Step Move control

Stage movement by specified step distance at each click. Effective for repeated pattern observation.

3 Z focus link

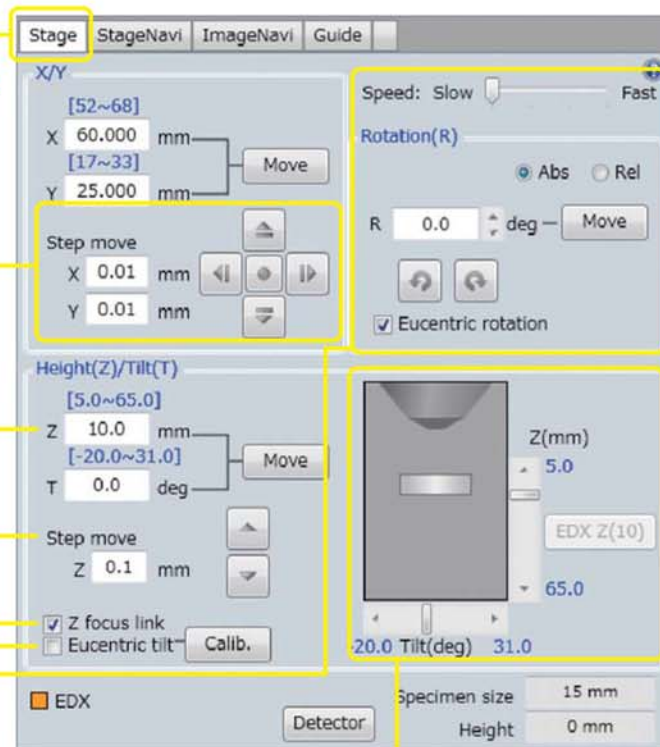
The image is kept in focus while Z position is changed.

4 Programmed Eucentric Tilt /Rotation^{※1}

The image field of view is maintained as the stage is tilted or rotated.

5 Graphic display of observation point

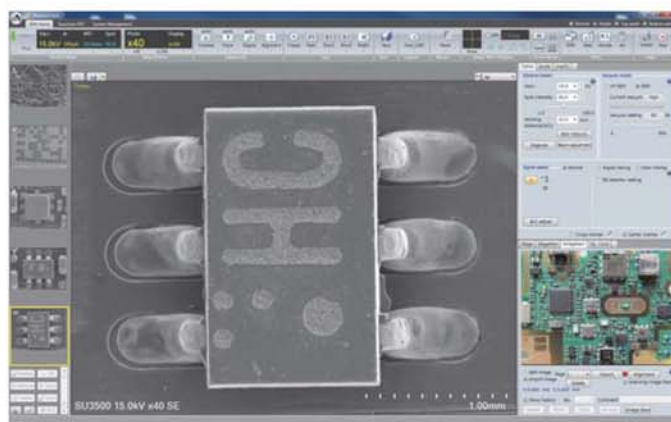
The relative position of the specimen and the objective lens is graphically displayed.



Locating area of interest

“Image Navigation Function”

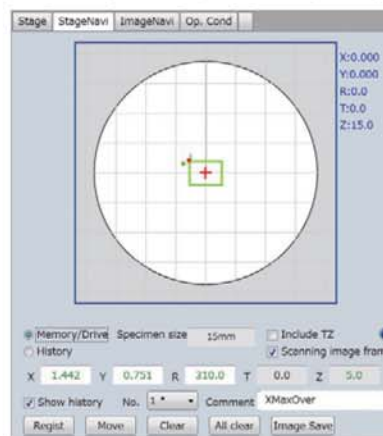
“Image Navigation Function” enables the operator to find the observation target quickly by navigating the stage based on low magnification optical scope or digital camera image. The available file formats are BMP, JPEG, and TIFF.



Tracking Stage Positions

“Stage Navigation Function”

The “Stage Navigation Function” keeps track of X/Y stage coordinates and displays the current stage coordinates and previously visited coordinates. “Stage Navigation Function” allows the user to revisit previously visited positions quickly and easily.



▶▶▶ Centering the Area of Interest

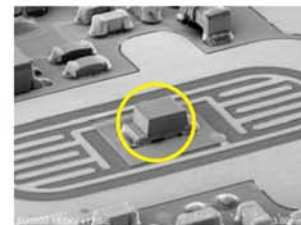
RISM and ZOOM Function

RISM (Rapid Image Shift Mode):

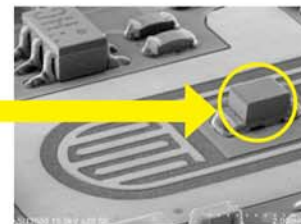
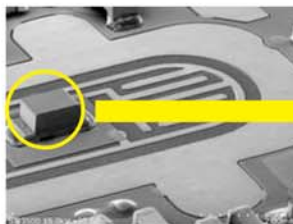
The area of interest is moved to the screen center by clicking the area of interest.



Click the area of interest to move it to the screen center



Drag the area of interest to move it to any screen position

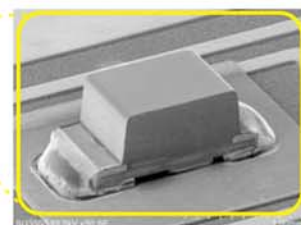


ZOOM:

The area of interest enclosed by mouse dragging is automatically centered and enlarged on the live image.



Dragged area is moved to the screen center and enlarged



Retrieving Stage Positions

Returning the stage to the previously image captured positions

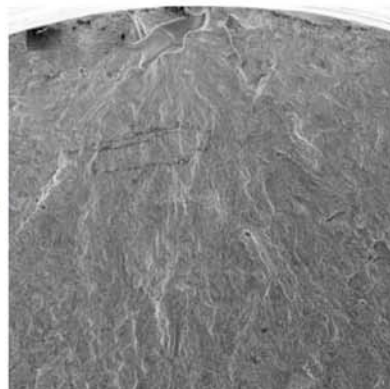
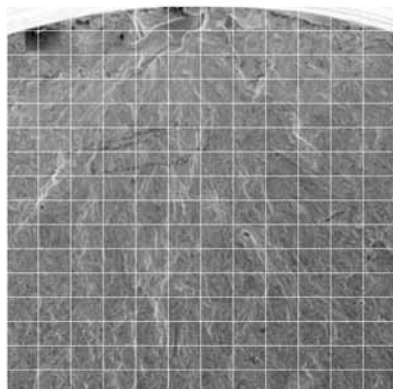
The last 100 images captured are automatically saved with the stage coordinates. The stage is able to move to the coordinates previously visited once the image of interest is selected. (ex. The image outlined in yellow from the images outlined in red is selected to move the stage to the previous coordinates)



Image Stitching

Wide area SEM images (optional)

Smaller area SEM images are automatically and continuously stored. Subsequent wide area SEM images are created by "stitching" together the stored smaller images.



Metal cross section
Accelerating Voltage : 15 kV,
Magnification : x 700

Total 192 images (16 x 12) automatically stored.

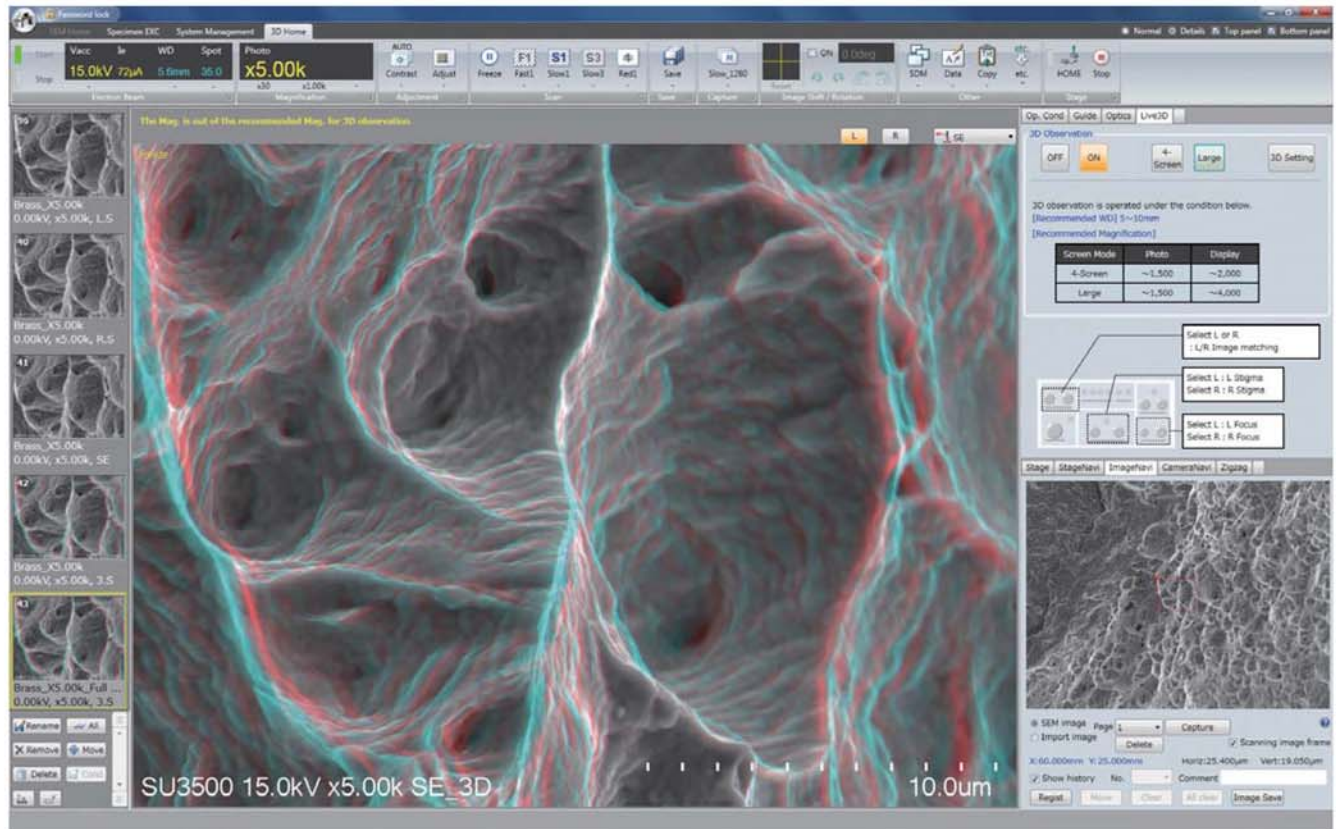
Wide area SEM image can be created after stitching 192 images.

※1 The 4-Axis Motorized stage : Tilting angle is manually set.

Live Stereoscopic Image Function (Optional)

Live stereoscopic image function enables real-time 3-D SEM imaging without tilting the specimen. This proprietary, rapid scanning technology was developed as a part of the national project of Japan Science and Technology Agency.

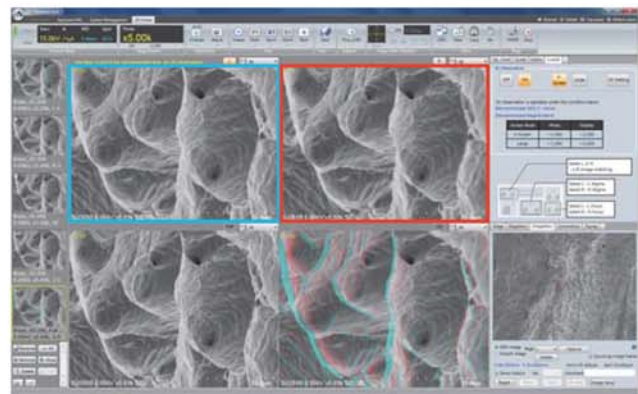
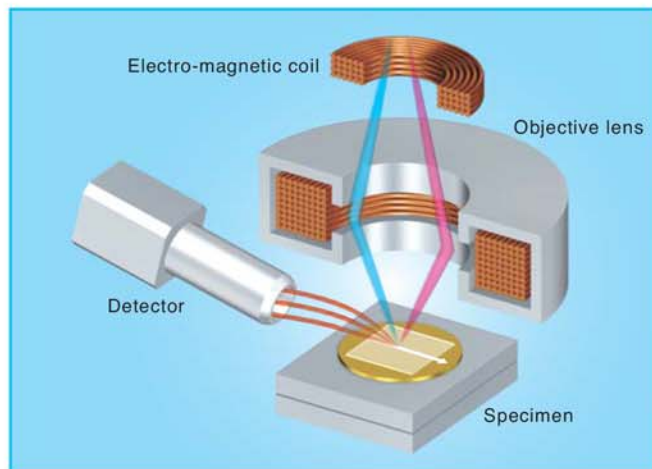
Patent: JP5183318, US8143573



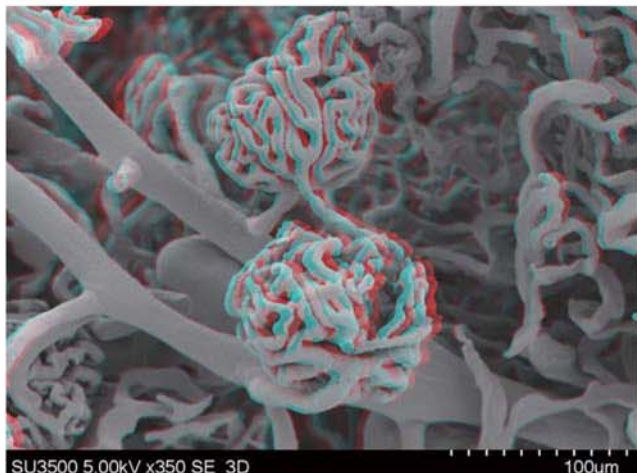
Sample : Brass fracture surface

3-D Scan Function Principle

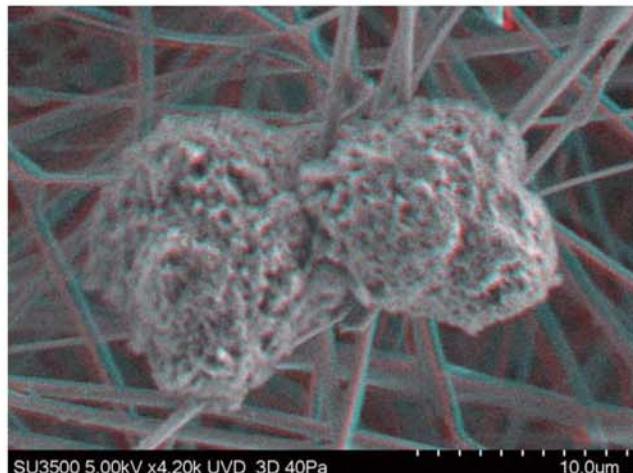
Live stereoscopic images are generated by rapidly alternating the electron beam tilt angle to yield left and right parallax images. The parallax images are then synchronized and observed directly with red and blue spectacles or a 3-D monitor. This instantaneous, automated scanning process is significantly faster and easier than manually tilting the specimen and re-imaging.



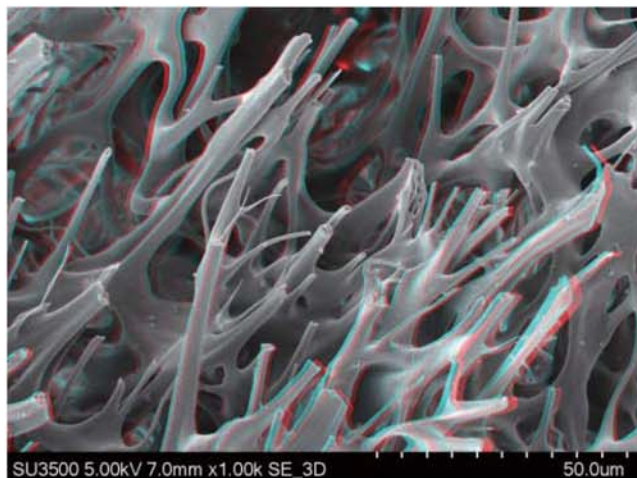
Application Data: Live Stereoscopic (3-D) Imaging



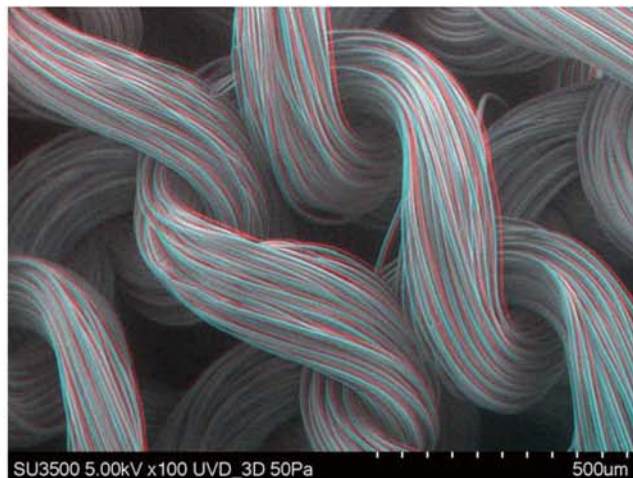
SU3500 5.00kV x350 SE_3D
 Sample : Rat intestine (Replica)
 Accelerating Voltage : 5 kV, Magnification : x 350, Signal: Secondary Electron (SE)
 Sample courtesy : Ms. Noriko Nemoto, Bio-imaging Center,
 Kitasato University



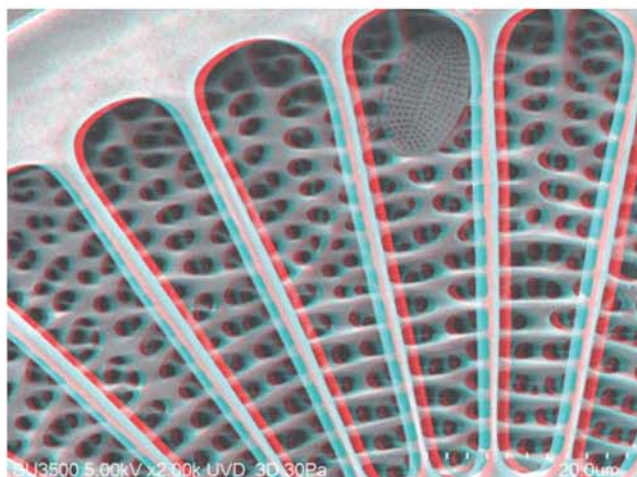
SU3500 5.00kV x4.20k UVD_3D 40Pa
 Sample : Rat primary hepatocytes cultured on Silica fiber nonwoven
 fabrics, Accelerating Voltage : 5 kV, Vacuum : 40 Pa, Magnification : x 4,200,
 Signal: Ultra Variable-Pressure Detector (UVD)
 Sample courtesy : Japan Vilene Company, Ltd.



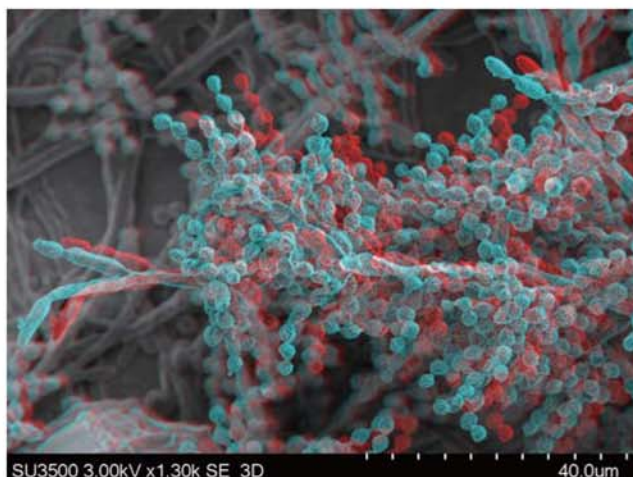
SU3500 5.00kV 7.0mm x1.00k SE_3D
 Sample : Modacrylic fiber porous
 Accelerating Voltage : 5 kV, Magnification : x 1,000,
 Signal: Secondary Electron (SE)



SU3500 5.00kV x100 UVD_3D 50Pa
 Sample : Textile
 Accelerating Voltage : 5 kV, Vacuum : 50 Pa,
 Magnification : x 100, Signal: Ultra Variable-Pressure Detector (UVD)

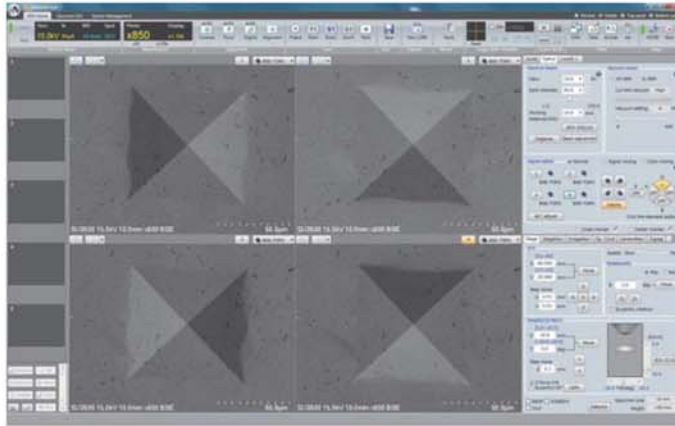


SU3500 5.00kV x2.00k UVD_3D 30Pa
 Sample : Diatom (Arachnoidiscus sp.)
 Accelerating Voltage : 5 kV, Vacuum : 30 Pa, Magnification : x 2,000,
 Signal: Ultra Variable-Pressure Detector (UVD)

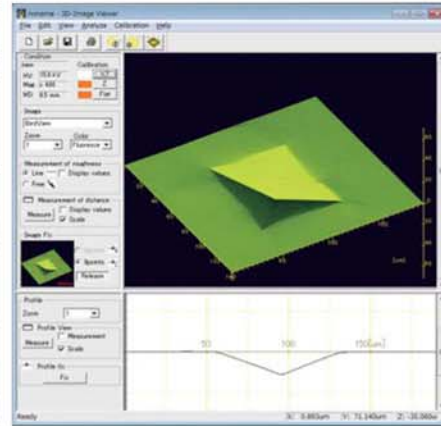


SU3500 3.00kV x1.30k SE_3D
 Sample : Green mold
 Accelerating Voltage : 3 kV, Magnification : x 1,300,
 Signal: Secondary Electron (SE) Ionic liquid treated

A 3-dimensional image is generated using 4 directional surface profiles from the signals acquired with each segment of the 4-segment backscattered electron detector. Positional misalignment compensation, as with mechanical specimen tilting, is not necessary with this function. Additionally, the SU3500 live signal mixing enables the capture of 4 images simultaneously (not sequentially)*1. The function can also be applied to higher magnifications.



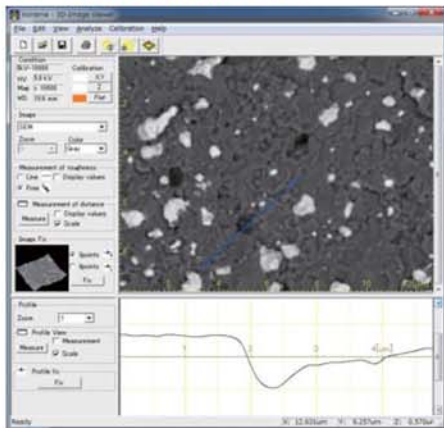
A single scanning can capture 4 different directional surface profiles.



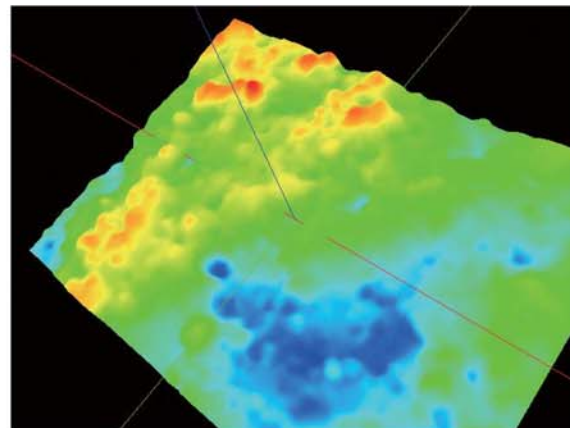
3D-Imaging Viewer main window

Sample : Vickers indentation

3D-VIEW Application



BSE Image and CD measurement profile



Bird' s-eye view

Sample : Al₂O₃-Ni Alloy

3D-VIEW main specifications

■ 3D-Image viewer function

Items	Description
Import function	Automatic select and read function of four elements image data (Equipped with automatic SEM condition acquisition function)
Measurement performance	Depth accuracy ± 20 % (Reference) Measurement performance is different depending on calibration accuracy, the condition of the kind of the specimen, the observation mode, and the observation condition. Detectable angle range : ±60 °(Reference)(Observation condition : Accelerating Voltage : 15 kV, Magnification : x 500, Sample : Vickers indentation)
Measurement function	Section profile display / Calibration function (X/Y, Z and Flat) / Distance of X and Y, length and angle measurement between two points specified on the image / Surface area measurement / Distance of X and Y, length and angle measurement between two points specified on section profile / Surface roughness measurement on section profile / Depth direction zoom-in function in section profile display / Base line correction function (straight line and curved line) / Bird' s-eye view display / Color contour line display
Three-dimensional display function	Rotation and zoom-in / Animation record function of observation screen (AVI file)
PC OS	Windows® 7 Professional

■ 3D-Image capture function

Items	Description
Capture function	Automatic image data acquisition by four elements of quad BSE detector
Capture pixel count	640 × 480 pixels (Quick Save), 1,280 × 960 pixels (Save)
Brightness adjustment	Automatic

*A steep topographical surface that exceed detectable angle might not be displayed accurately.

*Windows® is a registered trademark of Microsoft Corporation in the United States and/or other countries.

※1 Comparison S-3400N manufactured in 2013.

Specifications

Items	Description	
Resolution SE	3.0 nm at 30 kV (High vacuum mode)	
	7.0 nm at 3 kV (High vacuum mode)	
	15.0 nm at 1 kV (High vacuum mode) ^{※1}	
Resolution BSE	4.0 nm at 30 kV (Variable pressure mode)	
	10.0 nm at 5 kV (High vacuum mode)	
Magnification	x 5 ~ 300,000 (on photo ^{※2})	
	x 7 ~ 800,000 (on display ^{※3})	
Accelerating voltage	0.3 ~ 30 kV	
Variable pressure range	6 ~ 650 Pa	
Image shift	±50 μm (WD=10 mm)	
Maximum specimen size	200 mm in diameter	
Specimen stage	5-Axis Motorized stage	4-Axis Motorized stage
	X	0 ~ 100 mm
Y	0 ~ 50 mm	0 ~ 55 mm
Z	5 ~ 65 mm	5 ~ 55 mm
R	360 °	360 °
T	-20 ~ 90 °	-20 ~ 90 °
Observation area	130 mm in diameter (with rotation)	77 mm in diameter (with rotation)
Maximum height	80 mm (WD=10 mm)	70 mm (WD=10 mm)
Stage control	Computer eucentric	Computer eucentric
	5-axis motorization	4-axis motorization
Electron optics		
Electron gun	Pre-centered cartridge filament	
Objective aperture	5-position, click stop objective aperture	
Gun bias	Auto bias with variable bias control	
Detectors	Everhart Thornley secondary electron detector	
	High sensitivity semiconductor BSE detector	
Analytical position	10 mm (T.O.A=35 °)	
Display unit		
OS	Windows [®] 7 ^{※4} (subject to change without notice)	
Control	Mouse, Keyboard, Rotary knob, Track-ball	
Monitor	24 inch LCD or equivalent (subject to change without notice)	
Auto alignment	Auto beam alignment	
Auto image adjustment	Auto focus, auto stigmation/focus, Auto brightness & contrast Auto filament saturation, Auto start	
Image data saving	640x480 pixels, 1,280x960 pixels, 2,560x1,920 pixels, 5,120x3,840 pixels	
Filing format	BMP, TIFF, JPEG	
Image display mode	Full screen display (1,280x960 pixels)	
	Small screen display (800x600 pixels)	
	Dual screen display (800x600 pixels)	
	Quad screen display (640x480 pixels)	
	Signal mixing	
Evacuation system		
Operation	Fully automated vacuum sequence	
Turbo molecular pump	261 L / s x1	
Rotary pump	135 L / min (162 L / min with 60 Hz) x1	
Protection	Power failure and vacuum failure	
Auxiliary functions	Raster rotation, dynamic stigma-monitor	
	Dynamic focus/tilt compensation	
	Free layout print function, alphanumeric function	
	Operated navigation	
	Video maintenance	
	Easy measurement	

※1 : Reference value

※2 : at 127 mm x 95 mm (4 * 5 "Picture size)

※3 : at 345 mm x 259 mm (1,280 x 960 pixels)

※4 : Windows[®] is a registered trademark of U.S. Microsoft Corp. in U.S.A. and other countries.

※5 and 6 : Weight does not include supply cable and connector.

※7 : Weight includes PC.

Optional accessories

Detector and analytical tool
Ultra Variable pressure Detector (UVD)
Energy dispersive X-ray spectrometer (EDS)
Wavelength dispersive X-ray spectrometer (WDS)
Electro backscattered diffraction analyzer (EBSD)
Infrared chamber scope
Specimen stage and holder
Cool stage made by third party vendor
Specimen holders for resin embedded specimens
Specimen holders for EBSD
Software
Hi-Mouse (One keyboard, one mouse)
External communication interface, DBC
ZigZag capture
Stitch software
CD measurement function
Live stereo function

Dimensions & weight

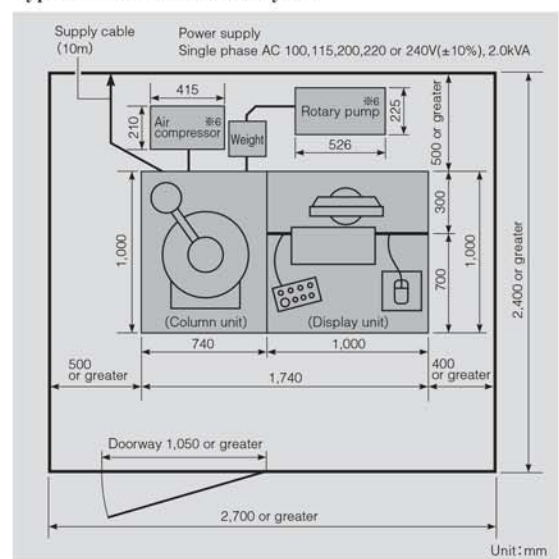
Items	Description
Column unit	740 (W) x 1,000 (D) x 1,550 (H) mm, 455 kg ^{※5}
	740 (W) x 1,000 (D) x 1,550 (H) mm, 450 kg ^{※6}
Display unit	1,000 (W) x 1,000 (D) x 730 (H) mm, 153 kg ^{※7}
Rotary pump	526 (W) x 225 (D) x 306 (H) mm, 28 kg
Air compressor	415 (W) x 210 (D) x 515 (H) mm, 18 kg
Weight	200 (W) x 180 (D) x 160 (H) mm, 40 kg

Rotary pump and Air compressor are not included with main unit depending on its destination.

Installation requirement

Items	Description
Room temperature	15 ~ 30 °C
Humidity	70 %RH or less
Power supply	Single phase AC 100, 115, 200, 220 or 240 V (± 10 %), 2.0 kVA
Power cable	10 meters long with M5 crimp-type terminal
Grounding	100 Ω or less

Typical installation room layout



SU3500

SCANNING ELECTRON
MICROSCOPE

Notice: For correct 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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