

JSM-6490series

JSM-6490LA/JSM-6490A/JSM-6490LV/JSM-6490

Scanning Electron Microscopes

JEOL

Serving Advanced Technology

Large Specimen Handled Easily



JSM-6490LV (with the optional 900mm wide table)

Ease of operation based
on high quality optics

GUI for "Intuitive Operation"

Multi disciplinary large
specimen chamber and stage

Expandable to
analytical system

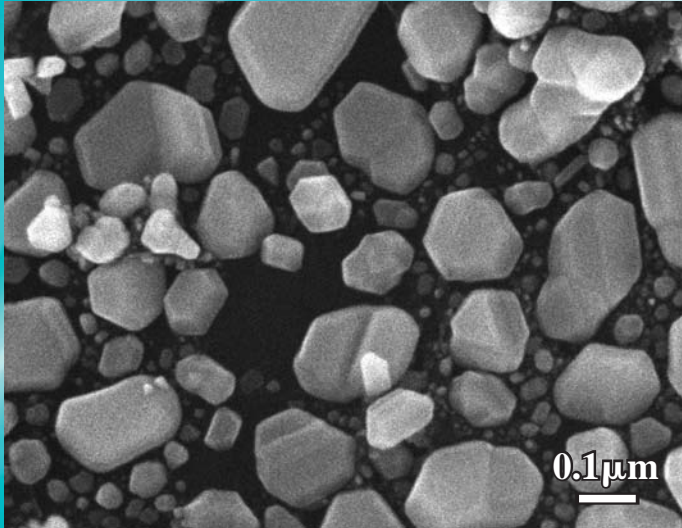
Space saving,
Energy saving



JSM-6490LA (with the optional 900mm wide table)

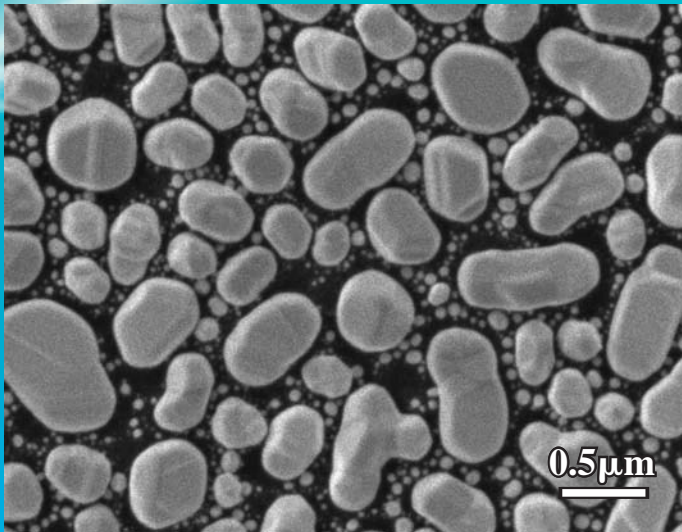
JSM-6490series

High Performance SEM for Large Specimen



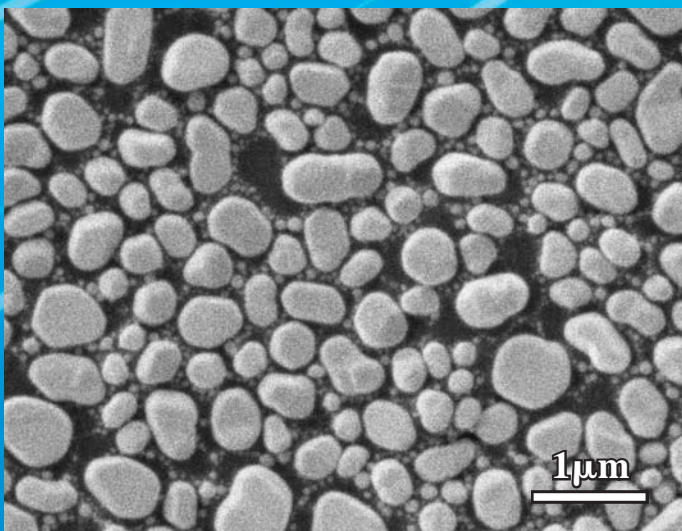
Gold evaporated particles

30kV (3nm)



Gold evaporated particles

3kV (8nm)



Gold evaporated particles

1kV (15nm)

Ease of Operation Based on High Quality Optics

JEOL has improved the electron optics based on a belief that high performance optics makes its operation easier.

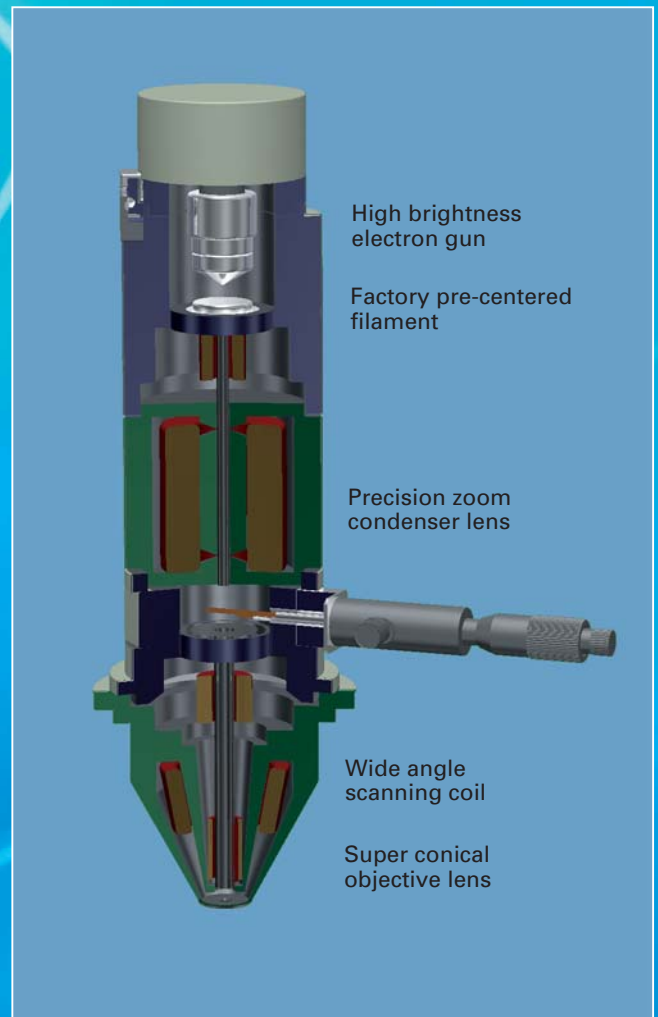
The new super conical objective lens guarantees 3 nm resolution at 30 kV. A sharp image with good contrast makes its operation comfortable.

The new scanning system lets you go down below 8 times magnification. This low magnification improves efficiency of specimen survey. The zoom condenser lens maintains focus and area of interest so that you can optimize probe current intuitively.

The new optics forms a small electron probe diameter with large probe current for elemental analysis on a micro area.

High Resolution

JSM-6490 series SEMs employ the newly developed super conical objective lens. The instrument produces superior resolution at the analytical working distance of 10mm, as the resolution is guaranteed at 8mm. The super conical shape of the lens allows a large specimen to be tilted at the analytical working distance.





Observation Started Quickly

Introduction of a Specimen

A specimen is introduced into the specimen chamber by opening the front door of the specimen chamber. The maximum specimen size is 200mm diameter × 80mm height. The specimen holders for a 32mm diameter and a 51mm diameter specimen, and the adapter for seven 12.5mm diameter specimens are provided as standard.

Easy Start with Smile Shot



A scanning electron microscope can be used to observe a variety of specimens. You can obtain the best results by setting the optimum operating conditions depending on the type of specimen and information desired. It is sometimes difficult to find the optimum operation condition for a new specimen. The newly developed Smile Shot software ensures that optimum operating conditions are used by simply selecting the kind and condition of the specimen.

Standard Recipes



The operating conditions recommended by JEOL application specialists are listed in the standard recipes in JSM-6490 series SEM. You can select one condition close to your specimen to initiate a new application.

Auto Functions for the Best Quality Image

The auto functions enable you to operate the SEM efficiently. Auto focus, auto stigmator, and auto brightness and contrast controls are provided.



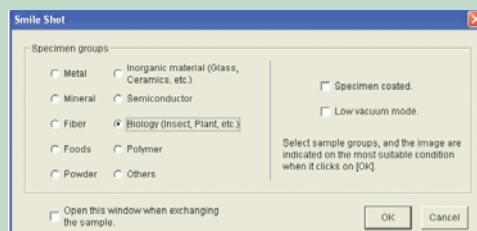
Operation GUI is Customized for You

Operation Steps with Smile Shot

- ① Set a specimen on the specimen stage.



- ② Select a kind and condition of specimen. Click OK button.



- ③ An image is displayed followed by automatically pumping and setting an optimum condition.



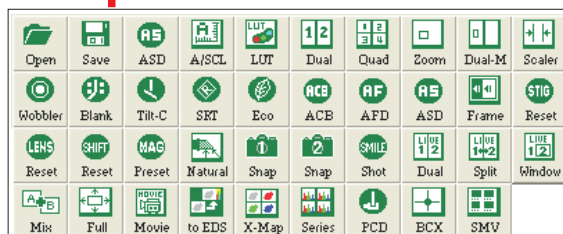
Analytical Scanning Electron Microscope

File Edit Image Tools Preset Mag Setup Analysis Help



Customized by the User Log-in

Users can customize the SEM by registering as users. When a registered user logs in, the previous operation conditions are recovered automatically. The operation GUI is customized with the user selected icons and preset parameters.



The operation GUI can be customized for each user

Operators can customize their personal GUI by placing icons for frequently-used functions in the space indicated with the red rectangle. A large number of icons are provided to choose from. Your customized GUI is displayed when you login.

Custom Recipes

You can save preferred operating conditions for specific applications. The number of recipe files per user is limited only by the available memory in the PC.



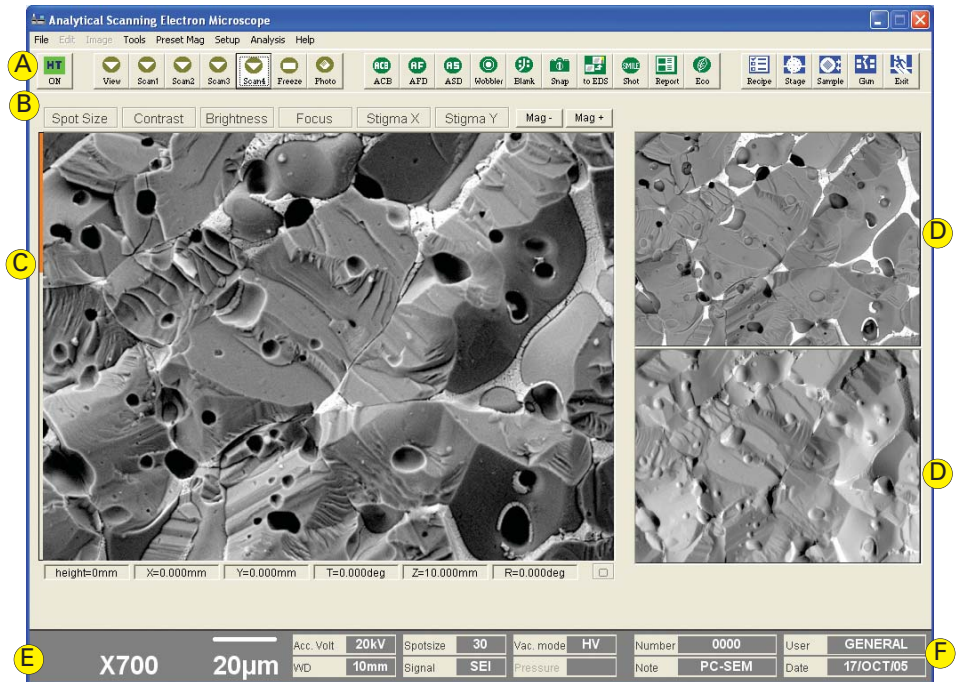
Custom Recipe

Easy to Understand Operation Menu

Easy to Understand GUI

The GUI has been developed for easy, intuitive operation. The default operation GUI displays the most often used functional icons for all level of users. Icons have texts to indicate functions. You can operate all the functions comfortably with a mouse.

- A** Main menu (possible to customize)
- B** Manual operation
- C** Live image
- D** Reference or Navigation
- E** Operation conditions
- F** User log-in



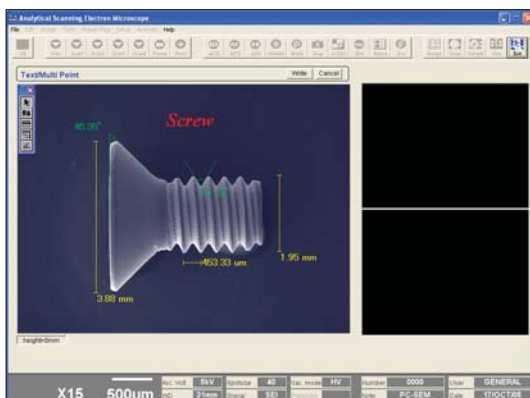
Full Live Image Display

The live image can be displayed at the full size of the monitor. The large live image may be convenient when more than one person observes the image together. The frozen image can also be displayed in the same way.



Measurement

Size and angle of detailed structures in the image can be measured on the display monitor.



Magnification

Magnification is changed with the preset magnifications and the magnification buttons for continuous control. Each user can set 5 preset magnifications. User login automatically retrieves the preset magnifications.



Image Shift

Electrical shift of the observation area is expanded to $\pm 50\mu\text{m}$. Finding features and defining analysis points are done efficiently.

Operation Knob Set (optional)

A mouse can be used to operate all SEM functions. The optional operation knob set provides manual knobs for the most frequently used functions. The joystick on the operation knob set operates the motor driven stage and provides electrical image shift at the higher magnifications.





Variety of Information Obtained

Secondary electrons are suitable for observation of surface structures. Backscattered electrons, which are generated simultaneously with secondary electrons, carry information on composition of specimen as well as surface morphology.

Information from a Specimen

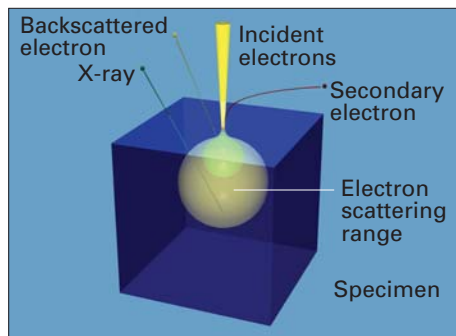
Irradiation of a specimen with electrons generates secondary electrons, backscattered electrons, and characteristic X-rays. Information from all of these can be detected simultaneously when appropriate detectors are mounted on an SEM.

Detection of Secondary Electrons

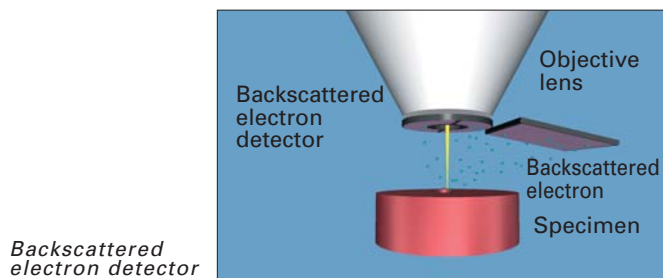
The Everhart-Thornley type secondary electron detector detects secondary electrons selectively since the energy of the secondary electrons is less than 50eV.

High Sensitivity Semiconductor Backscattered Electron Detector (JSM-6490/6490A : optional)

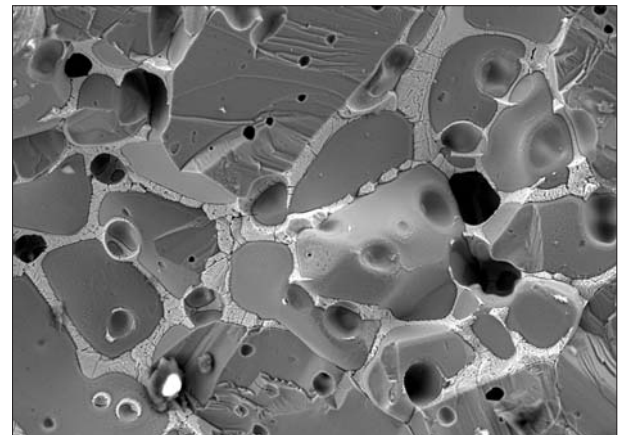
JEOL patented High sensitivity backscattered electron detector can generate composition, topography, and shadowed images simply with a selection on the operation menu. The detector is mounted on the bottom of the objective lens ready for observation. It is not necessary to mount and remove the detector by a user.



Signal generation from a specimen

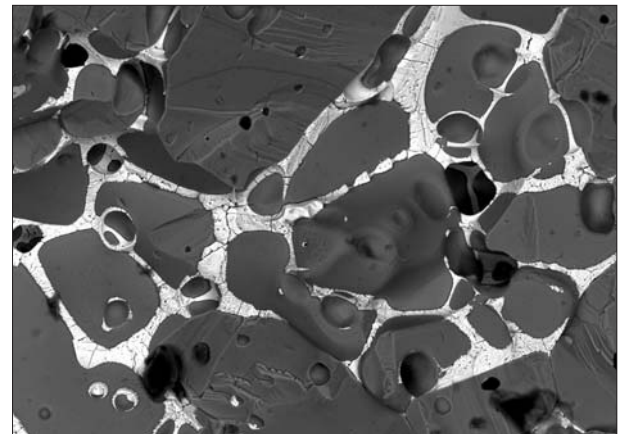


Backscattered electron detector

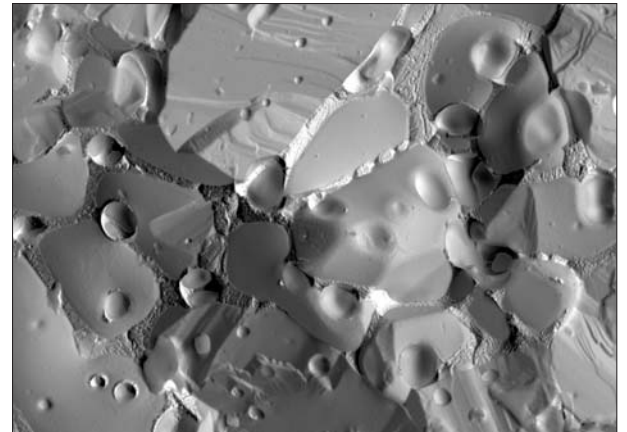


Secondary electron image

Varistor ×500



Composition image

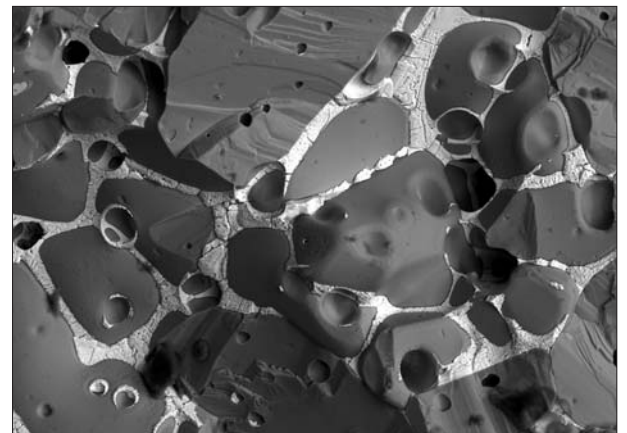


Topography image



Backscattered electron image

3kV Specimen: Diatom



Shadow image



Multi Live Image Display

Tow live images can be displayed simultaneously on the main image area. Live images can be displayed on the reference image areas as well. The live images on the reference image areas show the entire area. The secondary electron image and one of the backscattered electron image can be displayed when the appropriate detectors are functional.

The dual live display mode enables one to do comparative observation. One can survey a specimen by observing the surface structures and composition distribution of a specimen using two live images.

Two or three full size images are simultaneously acquired and saved with a click on the photo icon while two or three live images are observed in the multi image display mode.

Smile Movie

The Smile Movie records and plays live images. The format is AVI..



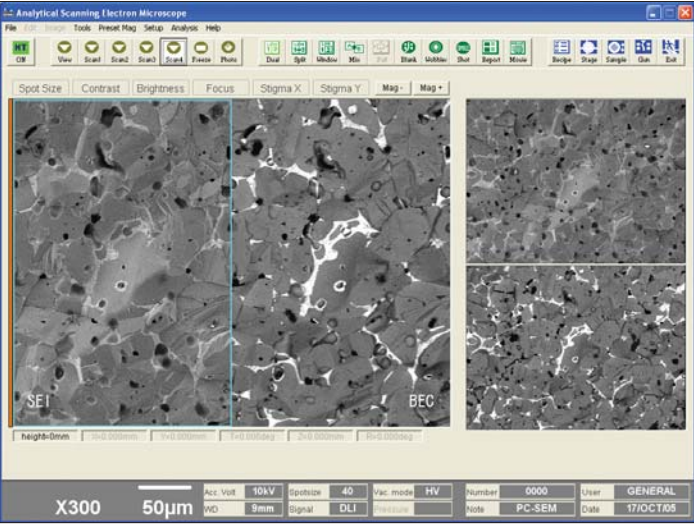
Split Live Image Display

One live image area is divided into two halves, side-by-side or top and bottom. Each half is displayed with a user selectable image. On the reference image areas, the full areas of selected images are displayed.



Dual Live Image Display

Two kinds of live images are displayed side-by-side or top and bottom on the main image display area. The contrast and brightness can be independently adjusted.



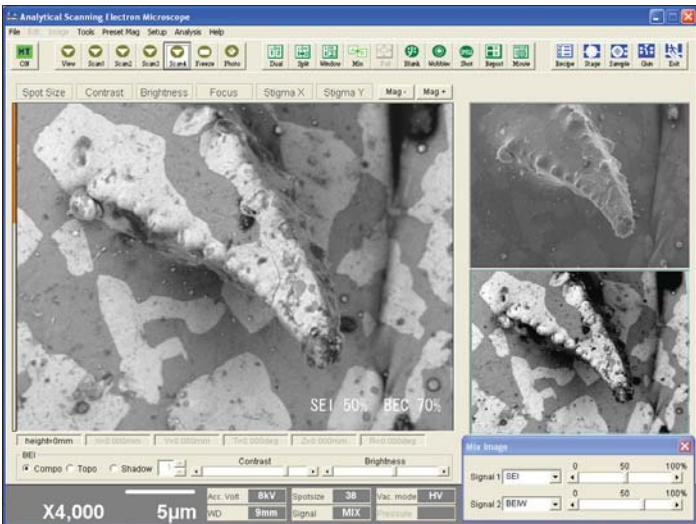
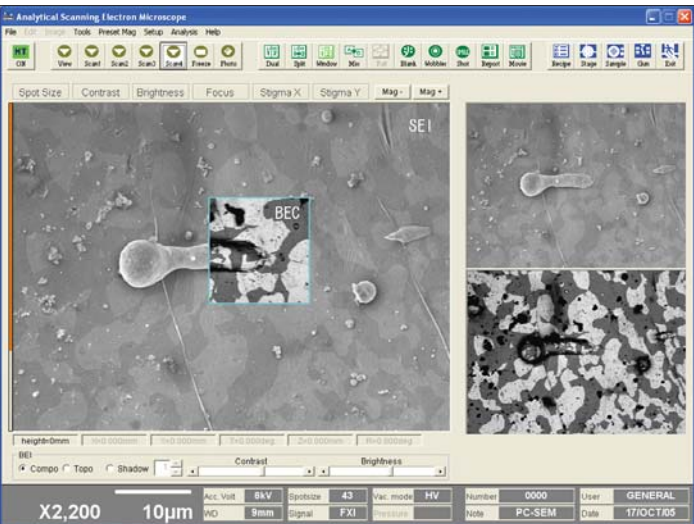
Flexible Window

A user selectable portion on the main image is displayed with an image other than the main image. The selected area can be moved on the main image area.



Signal Mixing

Two kinds of images are added and displayed on the main image area. The two original images are displayed on the reference image areas. The mixing ratio of each image can be adjusted. The example shows the mixing of SE and BE Compo images.





Fully Automated Electron Gun

The electron gun developed by JEOL is a micro focus gun producing a very small electron source. The operation of the electron gun is fully automated. You can quickly change the accelerating voltage suitable for your application including observation and analysis.

Fully Automated Electron Gun

The text on the HT icon displays "OFF" when the vacuum is ready for operation.

A click on the HT icon turns on the accelerating voltage and heats a filament at the optimum temperature and an image appears automatically. You do not have to make any adjustment on the electron gun.



Seamless Auto Bias Control

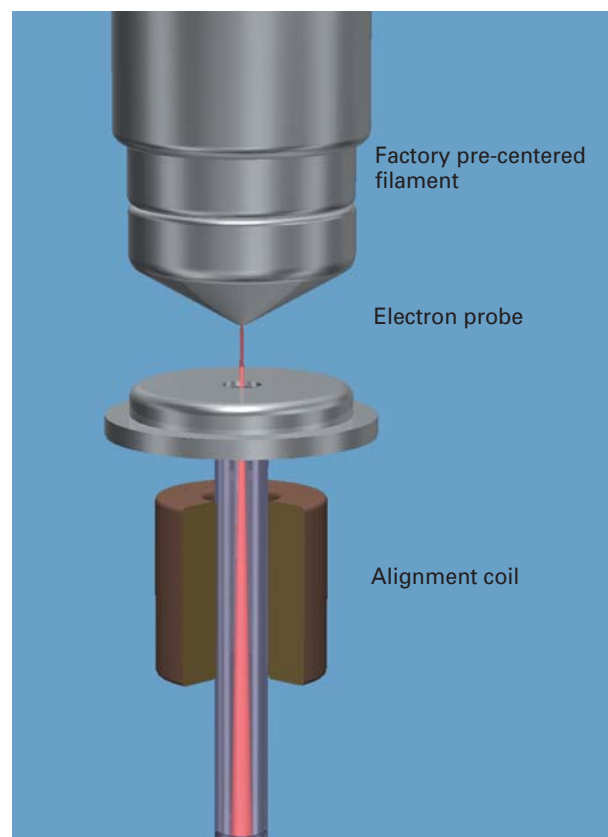
The gun bias adjusts the brightness of the electron gun. The seamless auto-bias by JEOL sets the optimum brightness over the entire range of the accelerating voltage from the lowest voltage to the highest voltage, with the possibility of manual override.

Stigma Memory

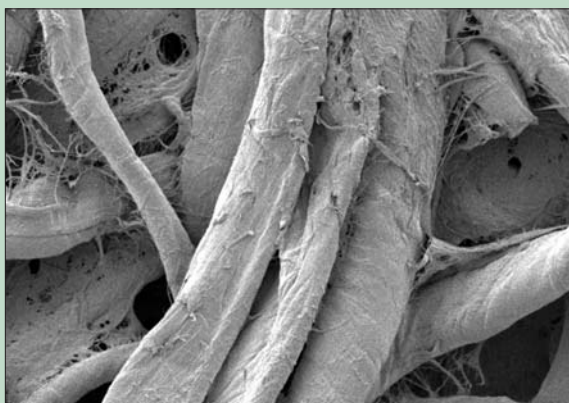
JEOL's unique stigma memory automatically corrects astigmatism caused by a change of accelerating voltage or working distance. It makes selection of optimum accelerating voltage for your application simple and quick.

Optimization of SEM Image by Accelerating Voltage

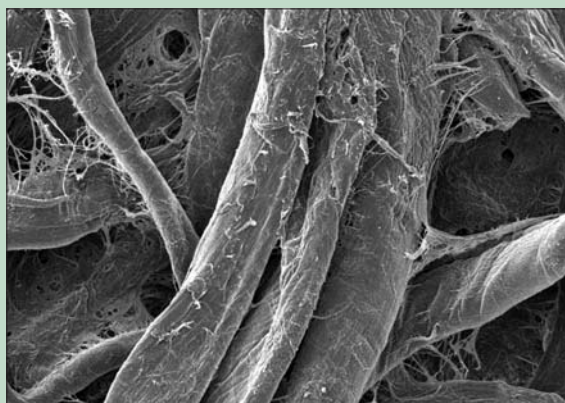
The contrast of the SEM image changes with accelerating voltage. A low-density specimen requires especially careful selection of accelerating voltage for the best result.



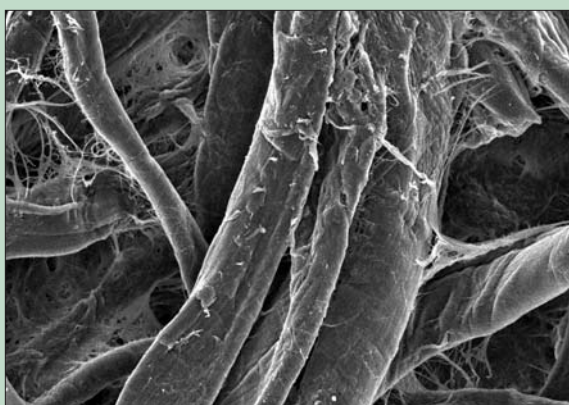
1kV



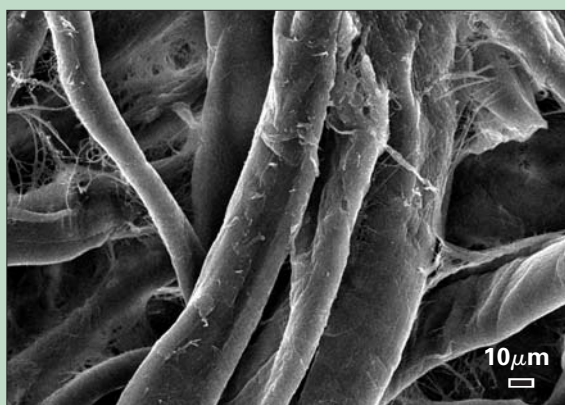
5kV



10kV



20kV



Specimen: Paper

The shift of the image area is small when accelerating voltage is changed. Optimization of accelerating voltage is simple and quick.



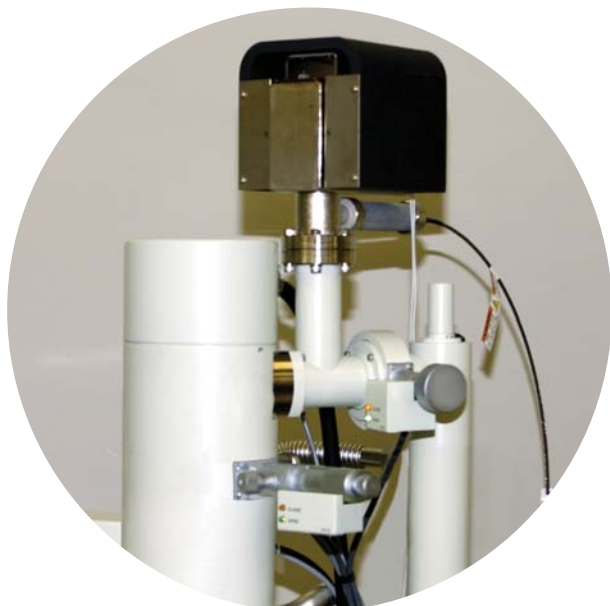
High Brightness LaB6 Gun (Optional)

LaB6 Gun

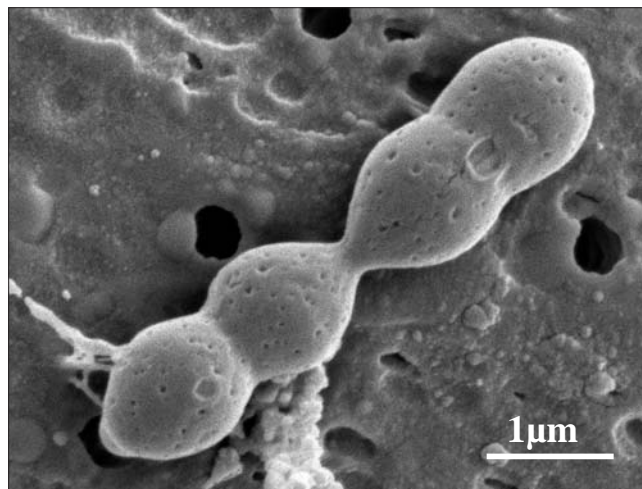
The LaB6 gun is brighter than the tungsten hairpin gun. The electron source of the LaB6 gun is smaller so that a higher quality image with better sharpness can be obtained. The improvement is more significant at the lower accelerating voltages. The LaB6 gun has an advantage in the observation of fine surface structures.

The expected life is around 500 hours, which is approximately 5 times longer than that of the tungsten hairpin gun. The LaB6 gun is suitable for a study such as the automated particle or gun shot residue analysis, which takes a long time.

The LaB6 requires higher vacuum than the tungsten hairpin gun for its stable operation. An ion pump is equipped on the gun chamber to create a higher vacuum for the LaB6 gun. The conventional tungsten hairpin gun can also be used in the gun chamber equipped with the ion pump.

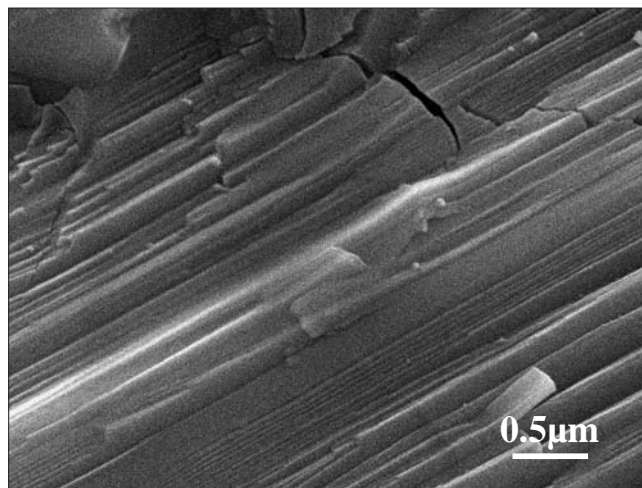


The ion pump and the gun valve for LaB6



Yogurt bacteria

3kV Original magnification ×25,000

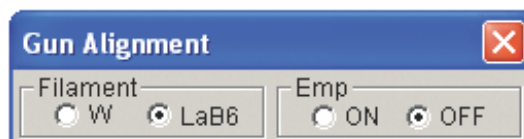


Ceramic

10kV Original magnification ×30,000

Operation of the LaB6 Gun

The LaB6 gun is easy to operate. Simply select the LaB6 on the Gun alignment window. The LaB6 filament is factory pre-centered in the same way as the tungsten hairpin filament so that a user does not have to center the filament.



The window for selecting the LaB6 Gun

Comparison of LaB6 gun and Tungsten hairpin gun

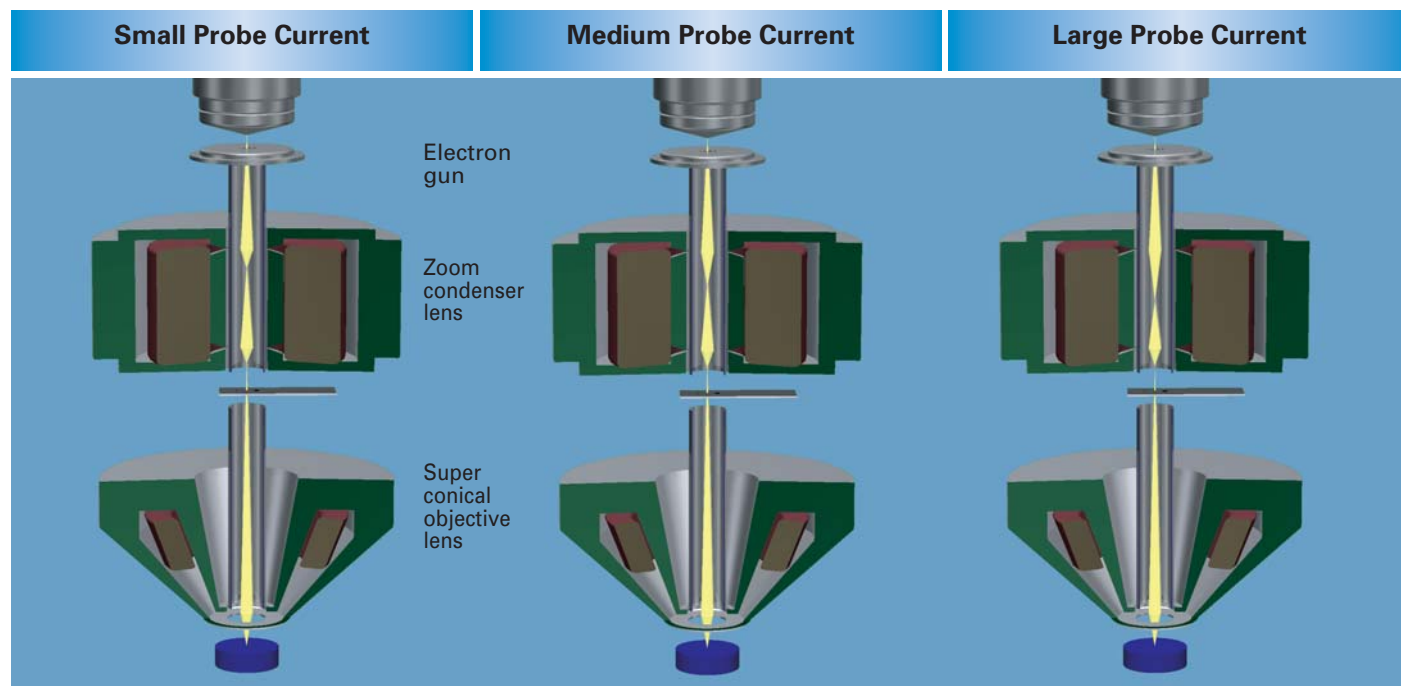
	LaB6 gun	Tungsten hairpin gun
Brightness	$3 \times 10^5 \text{ A/cm}^2 \text{sr}$	$5 \times 10^4 \text{ A/cm}^2 \text{sr}$
Size of electron source	10μm	20μm
Life of filament	300 to 500hours	50 to 100hours
Pressure in gun chamber	10^{-5} Pa	10^{-4} Pa

Principal specifications

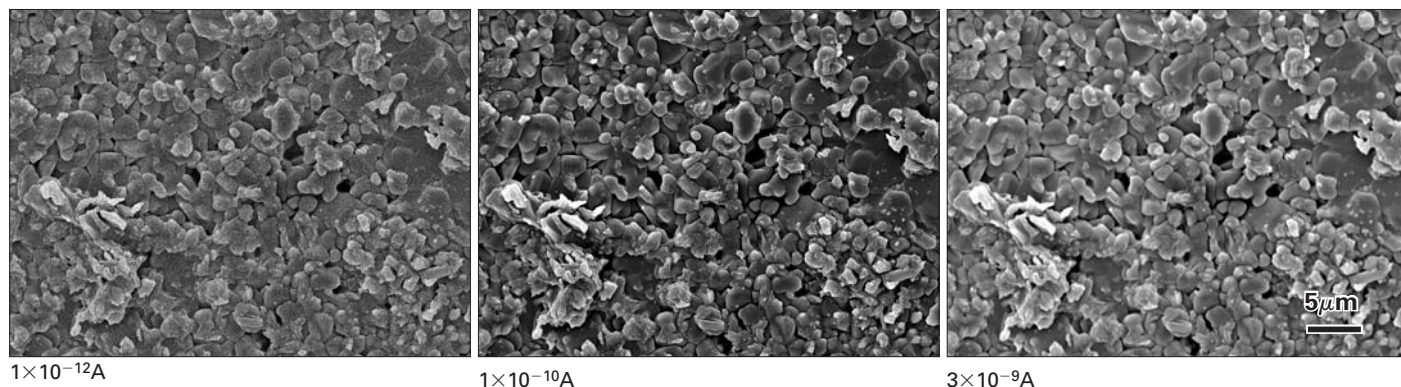
● Resolution	2.5nm (30kV) 7nm (3kV) 15nm (1kV)
● Evacuation of gun chamber	Ion pump
● Specimen exchange	Stage door open Specimen exchange chamber (option)
● LaB6 filament	Factory pre-centered

Zoom Condenser Lens Maintains Focus

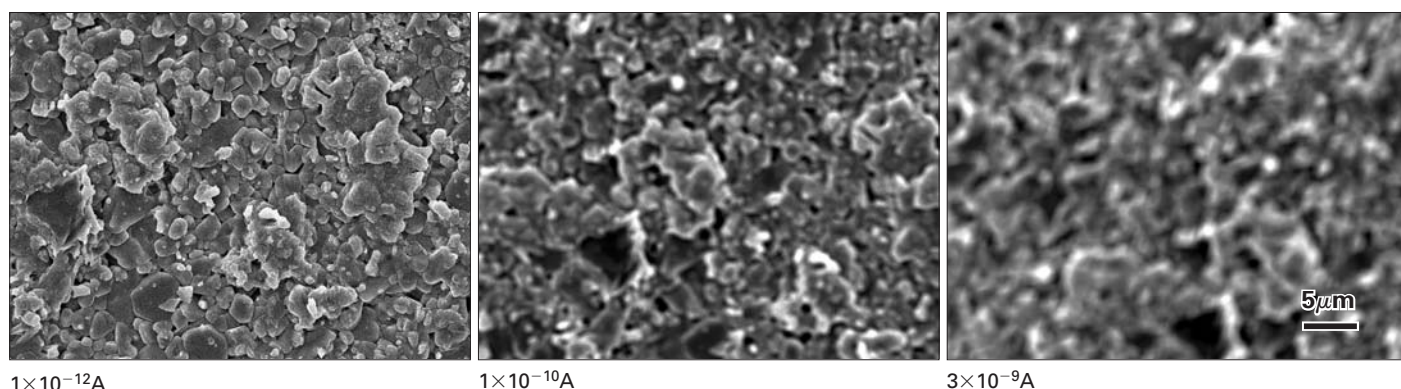
It is important to use the optimum probe current for each application such as surface observation or elemental analysis. The probe current is adjusted with the condenser lens. This adjustment would be easier if the change of observation area or focus during condenser lens adjustment is smaller. JEOL's unique zoom condenser lens closely maintains focus without image shift thus avoiding tedious readjustment.



Zoom condenser lens closely maintains focus.



A conventional non-zoom condenser lens causes large change of focus during adjustment of probe current.



Report Creation

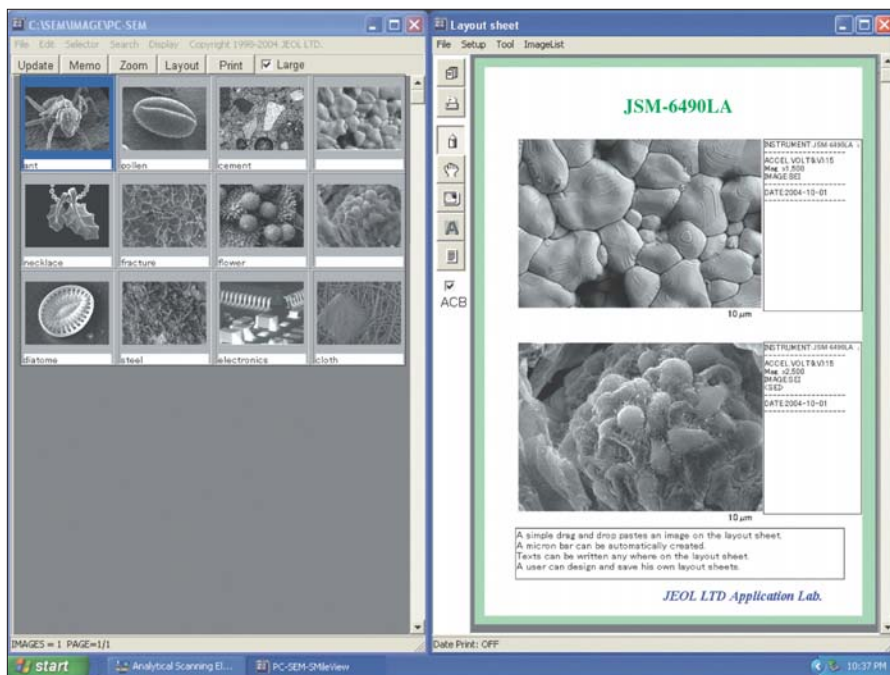
Image Archiving

You can specify a directory and a file name to automatically save acquired images with JSM-6490 series SEMs. A four digit sequential number is automatically added to a file name. BMP, TIFF, JPEG formats are selectable as an image format.

SMile View (JSM-6490/6490LV : Optional)



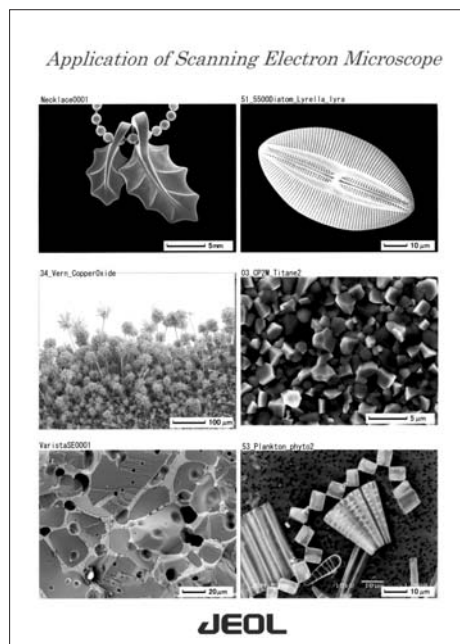
SMile View software displays SEM images and is used to edit reports. SMile View is filled with functions most SEM users will appreciate. Convenient functions such as a measurement with calibration capability, automated JPEG compression, and HTML editing of layout sheets are included. The edited SMile View layout sheet can be sent to Microsoft Word and edited as the Word document.



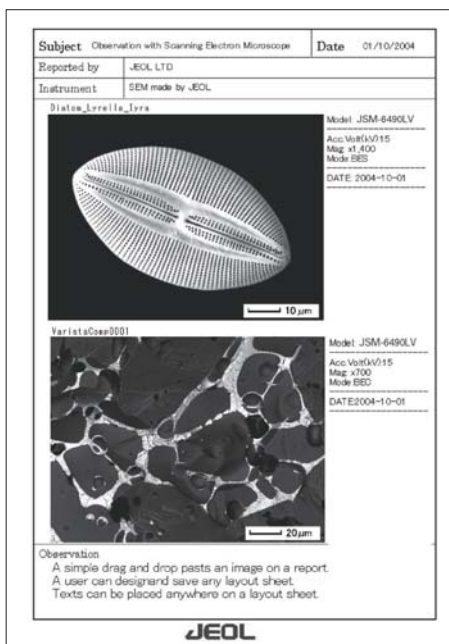
Index images display and a layout sheet (SMile View)

Report Editing

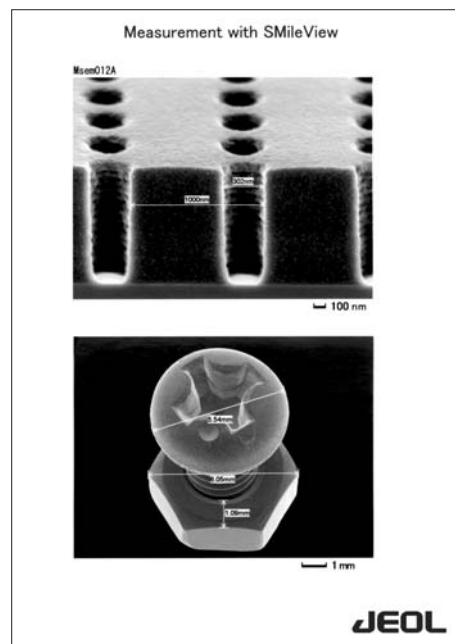
You can paste images simply by drag and drop of index images from the index display to a layout sheet. You can design your own layout as you like. The SMile View is very flexible. A micron bar can be pasted automatically calibrated to a size of image. Images in BMP, TIFF, JPEG, or Meta can be pasted. SEM operation conditions such as magnification are automatically pasted.



Micron bars are automatically adjusted to the printed image size.



Format edited with word can be pasted.



Measurement result.

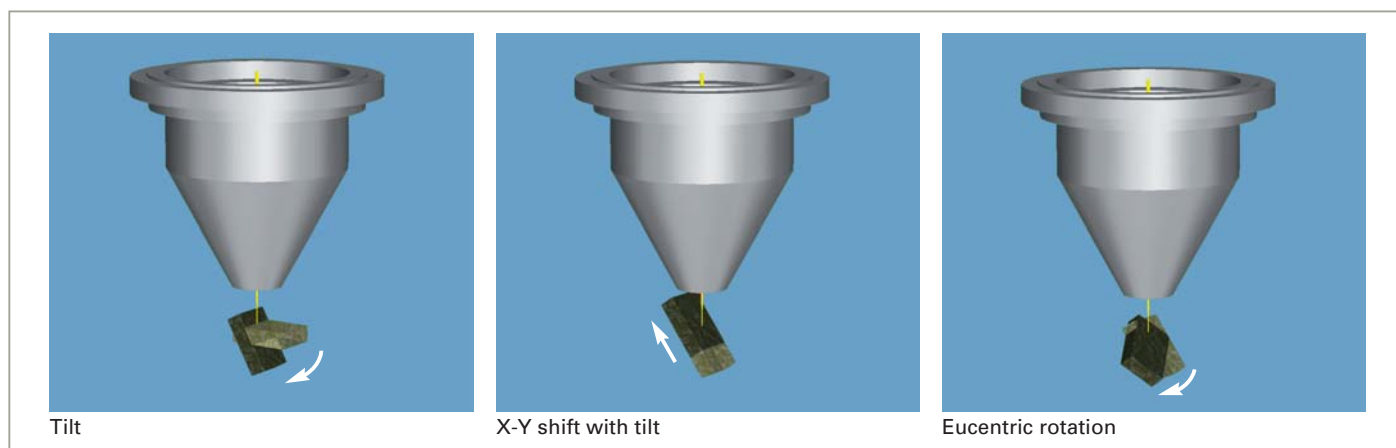
Eucentric Specimen Stage

The eucentric specimen stage has minimum shift of observation area and focus when tilting. The stage is suitable for observation of a rough surface from a variety of directions. You can observe depth by looking at a pair of stereo images taken with a few degrees of tilt angle difference through a stereo viewer. The eucentric specimen stage lets you take a set of stereo image easily since focus and area changes are small during tilting. Focus change during X, Y, or rotation shifting of a specimen with some tilt is small so that surveying a large specimen is done efficiently.



Stereo images (Copper oxide)

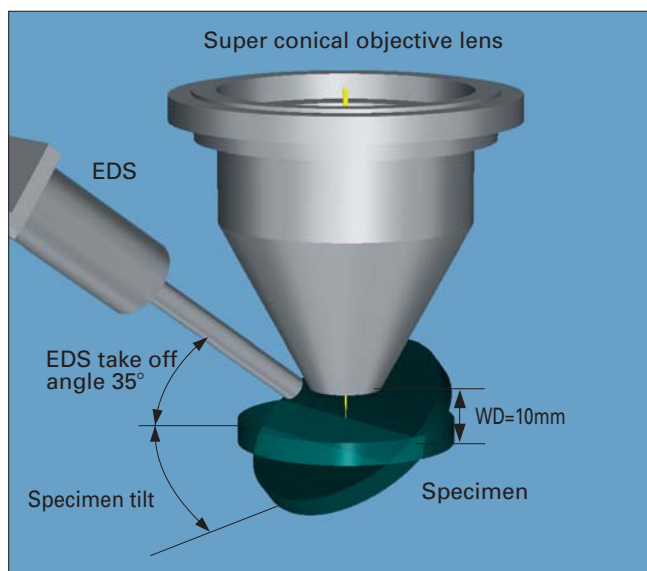
20kV ×6,000



Principle of eucentric specimen stage

Tilting a Large Specimen

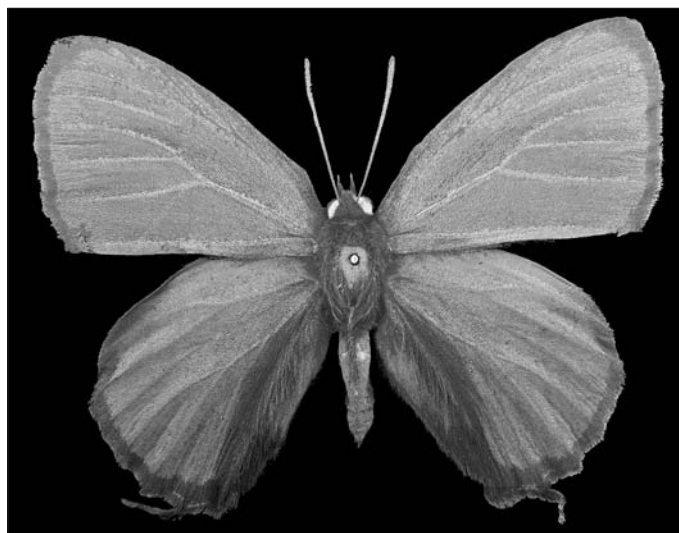
The high conical shape of the objective lens provides great flexibility in tilting a large specimen. Combination with the eucentric specimen stage makes tilting of a specimen quite easy.



Super conical objective lens

SMile Station (optional)

SMile station software shifts the specimen stage over a user specified region and automatically stitches these images to form a montage image.



Montage 10×9 images (512×384 pixels each) Specimen : Butterfly

Specimen courtesy of Prof. Matsuda, Kumamoto National College of Technology



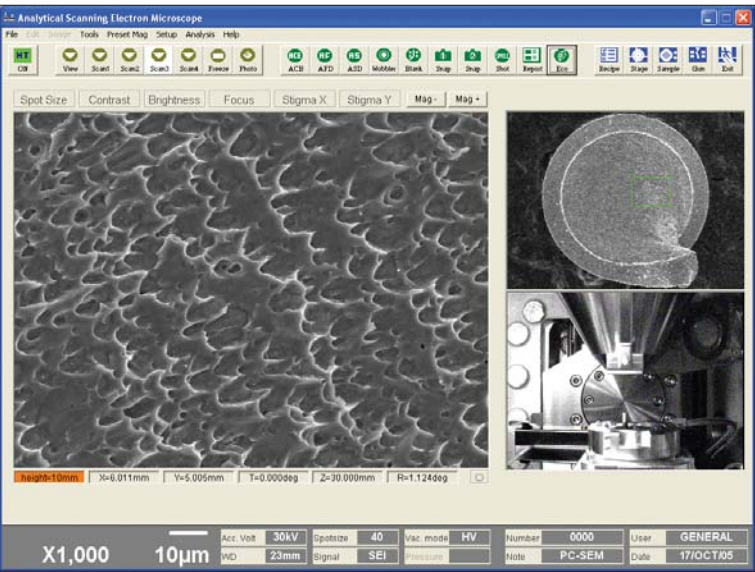
Efficient Specimen Survey by Motor Control

Motor Controlled Specimen Stages

All five axes on the specimen stage are motorized with the computer control.

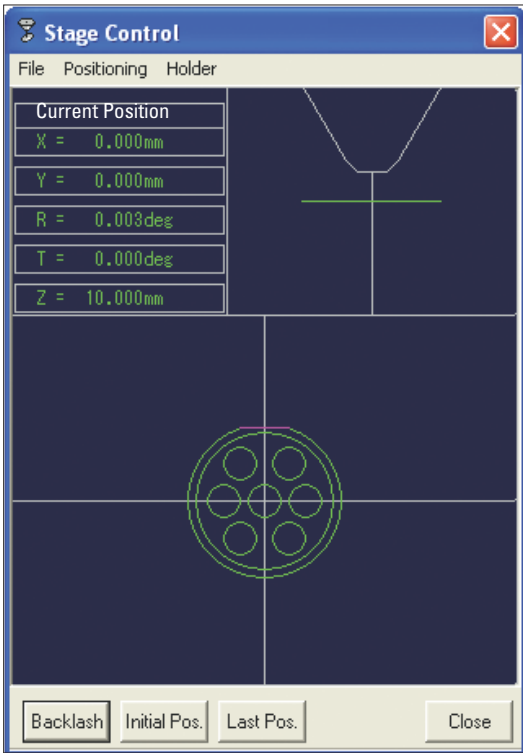
Navigator

The 2 small images next to the main live image can be used as navigators. These navigator images are large enough to see fine details for navigation. The 2 navigators are convenient for shifting between 2 specimens mounted on a specimen holder.



Graphic Display of Specimen Position

The graphic display visualizes the current location and the geometric relation between a specimen holder and the objective lens.



Continuous Shift

A click and hold on the shift icon moves the specimen continuously. Tilting the joy stick on the optional operation knob set does the same.

Click Center Zoom

A click on a feature on the live image moves the feature to the center of the live image. You can set to magnify an image after shift of a feature.

Eucentric Rotation

The eucentric rotation rotates a specimen around the current observation area.

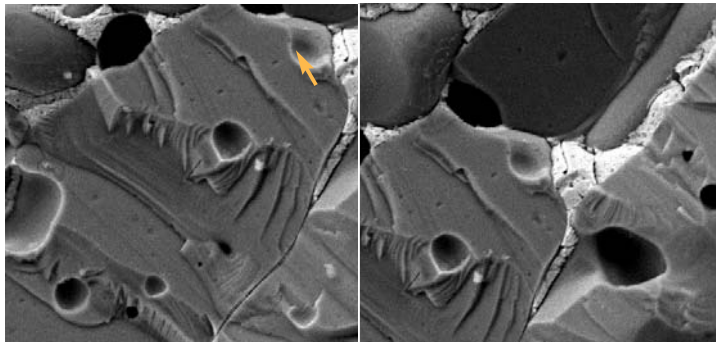
Frame Step Move

Each click on the frame-step-move icon shifts a specimen at a user preset interval to survey a large area efficiently .



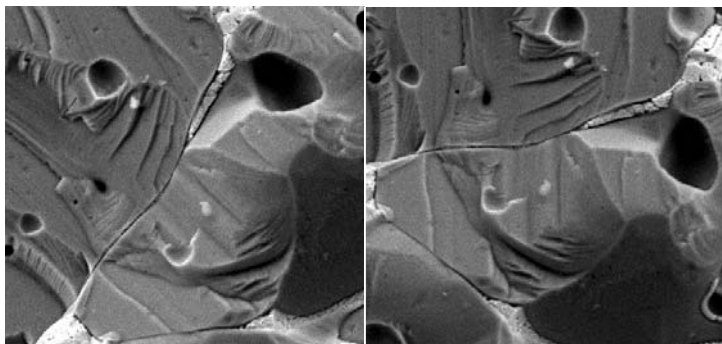
Saving Specimen Positions

Unlimited specimen positions can be saved to move to these areas later.



Before
Click center

After



Before
Eucentric rotation

After

From Non Conductive Specimens to Wet Specimens

The Low Vacuum SEM JSM-6490LA/JSM-6490LV

The low vacuum SEM, JSM-6490LA/JSM-6490LV, has the low vacuum SEM mode in addition to the conventional high vacuum SEM mode. The low vacuum SEM lets you observe a non-conductive specimen as is and then analyze with EDS. The low vacuum SEM easily handles a specimen with much outgassing. Wet specimens can be observed quickly with the freeze dry method in the LV SEM.

Principle of Charge Neutralization

A small amount of air is introduced into the specimen chamber. These air molecules, oxygen and nitrogen, are ionized with the incident electrons. These ions neutralize electrons on the surface of the specimen and eliminate charge up effect so that a non conductive specimen can be observed.

Backscattered Electron Detector

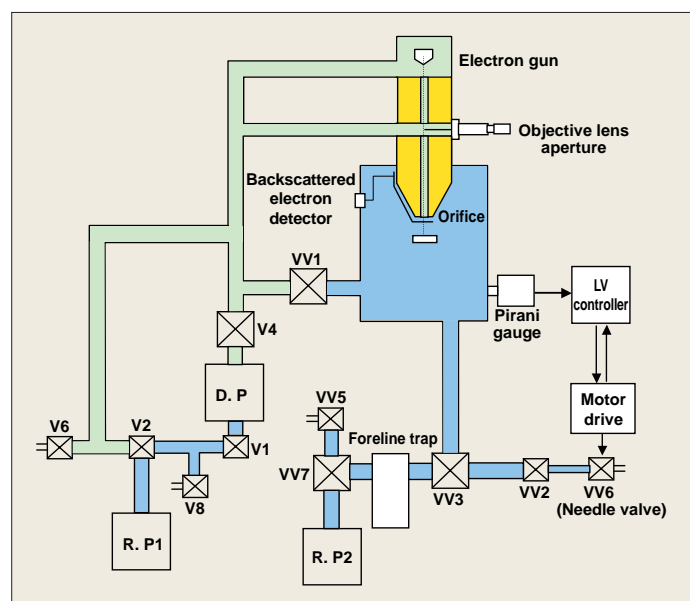
The conventional secondary electron detector, Everhart and Thornley detector, does not function in the low vacuum environment. A backscattered electron detector is widely used instead. JEOL has developed the high sensitivity semi-conductor backscattered electron detector, which produces the composition, the topography, and the shadowed contrast. This unique detector is patented to JEOL.

Secondary Electron Detector for the Low Vacuum SEM Mode

JEOL has developed a secondary electron detector, which works in the low vacuum environment. Secondary electron images are suitable for observation of surface morphology.

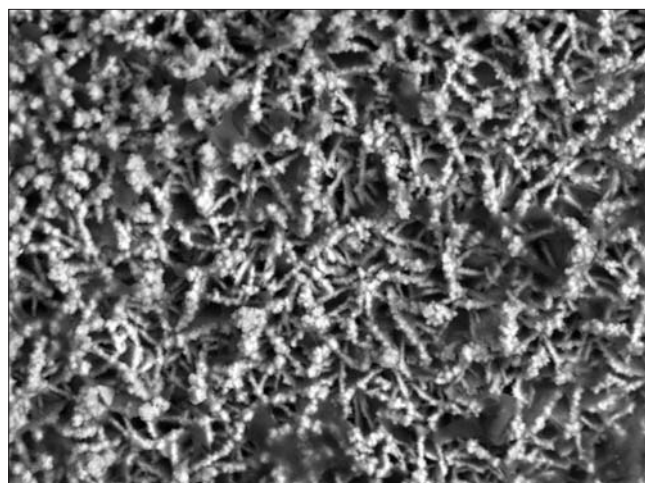
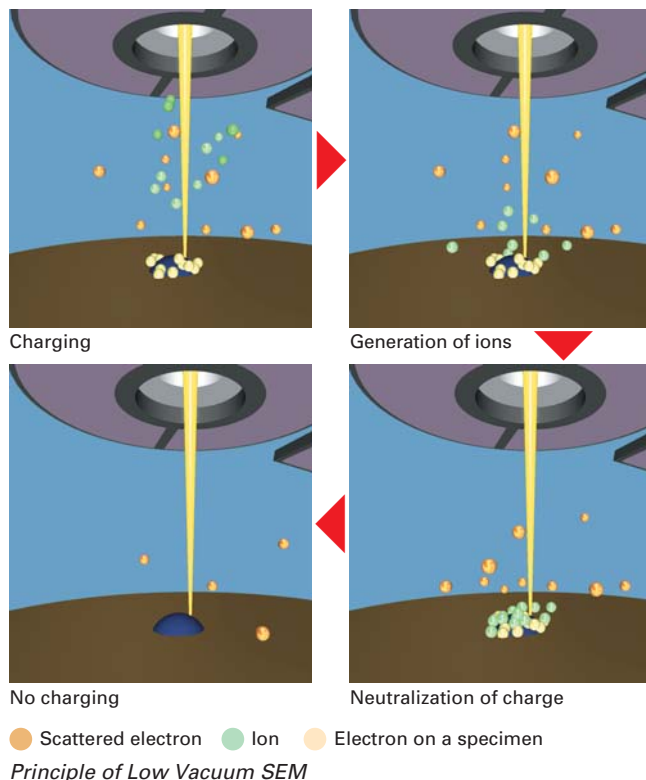
Vacuum System for the LV SEM

The pressure in the specimen chamber can be varied from 1 Pa to 270 Pa without changing the size of the orifice. JSM-6490LA/JSM-6490LV has 2 vacuum systems, one high vacuum system and one low vacuum system dedicated to the low vacuum specimen chamber. The gun chamber and the lenses are always kept in the high vacuum. The life of a filament is not affected with the use of the low vacuum SEM mode. The objective lens apertures are placed in the high vacuum and kept clean for a long period of time.

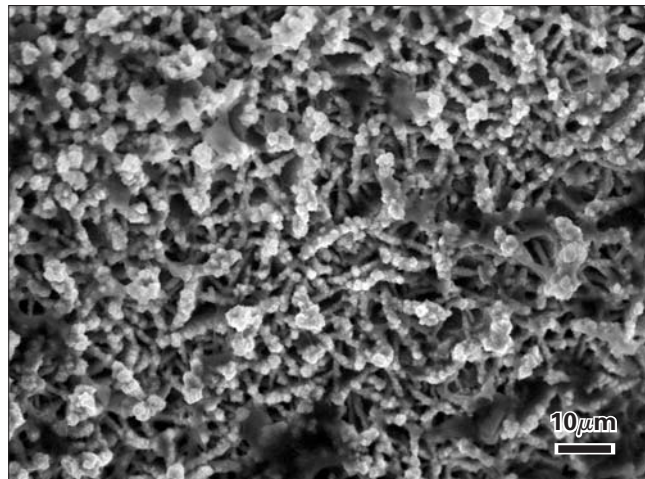


Evacuation system of Low Vacuum SEM

Low vacuum region
High vacuum region



Backscattered electron image in the low vacuum SEM mode



Secondary electron image in the low vacuum SEM mode

Specimen : Iron rust

Freeze Dry in the LV SEM

Observation of hydrated specimens

JEOL has developed a simple and quick method for observation of water-containing specimens. The freeze-dry method in the LV SEM removes water with minimal specimen deformation. This method is especially effective for specimens that are difficult to prepare with the conventional critical point drying method, such as fresh water plankton, sea water plankton, cryptosporidium, hair root of plant, and mite.

The Procedure is Simple and Quick.

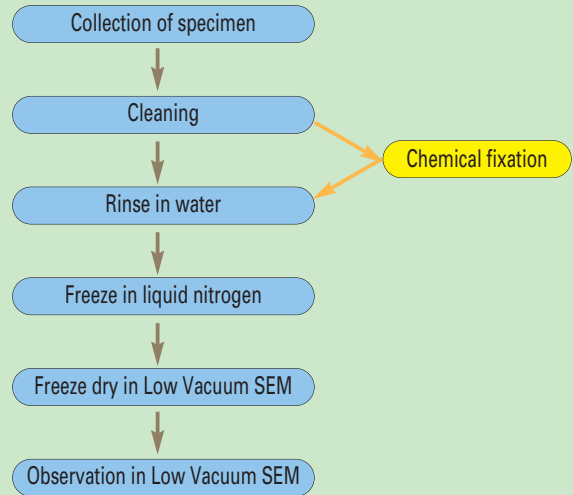
Pre-treatment of specimens — Many specimens can be observed without any pre-treatment. The conventional chemical fixation can be applied for specimens that deform in vacuum after the freeze dry preparation.

Freezing — Deformation of internal structures caused by freezing has little effect on surface structures observed by an SEM. Specimens are frozen for approximately one minute in liquid nitrogen.

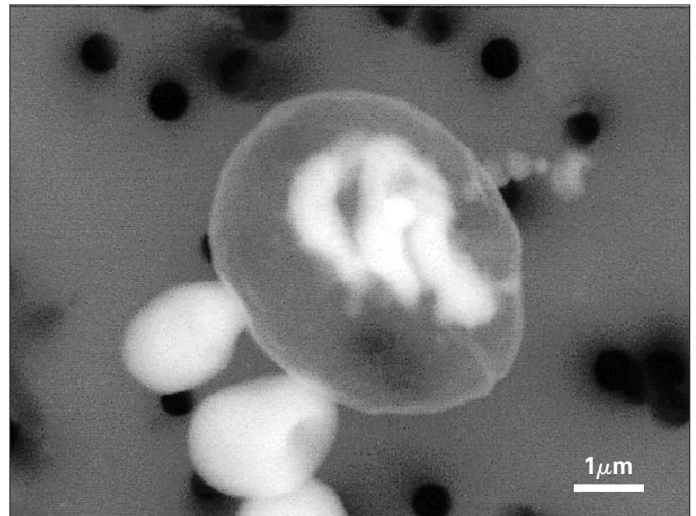
Freeze dry — A frozen specimen is observed using the low vacuum mode. The pressure in the specimen chamber reaches low vacuum in one minute. Temperature of the frozen specimen rises and the ice is removed by sublimation. In general, a specimen is dried and ready for observation in a few minutes.

Observation — The dried specimen can be observed in the low vacuum mode.

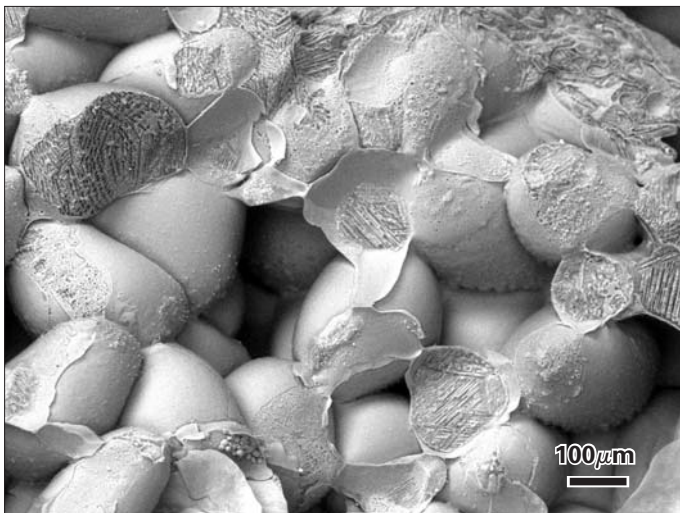
Freeze dry in Low Vacuum SEM



Nematode, Chemically fixed, dehydrated, replaced with t-butyl alcohol, freeze dried in LV SEM
Specimen courtesy of Prof. E. Kondo, Saga University, Japan.

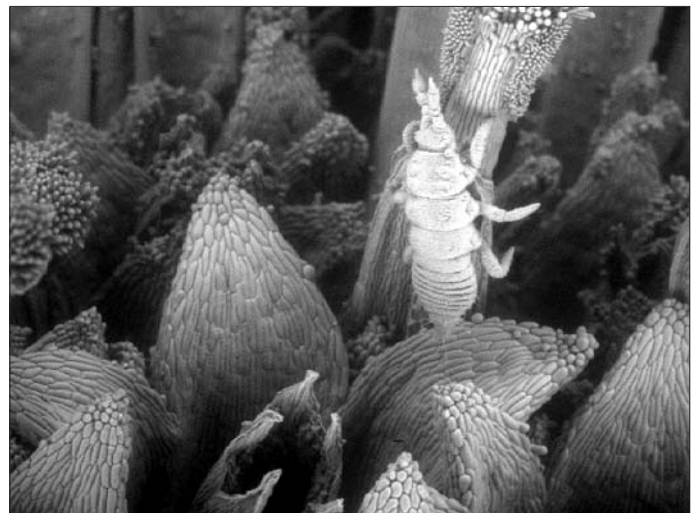


Cryptosporidium muris, Freeze dried in LV SEM
Specimen courtesy of Tokyo Metropolitan Institute of Public Health.



Cross section of an apple

15kV



Flower with a bug

Analysis Station Provides High Precision Analysis

JEOL EDS is Embedded in Analysis Station

The Analysis Station, the analytical SEM(JSM-6490A/JSM-6490LA), has the energy dispersive X-ray analyzer (EDS) developed by JEOL in the same footprint as the standard SEM. The SEM and the EDS are integrated as a single system. The observation and analysis can be done seamlessly since the EDS analysis can be initiated on the SEM operation menu. One mouse can run both the SEM and the EDS operation menus, which are displayed on 2 monitors.

Large General-purpose Specimen Chamber for High Precision Analysis

The specimen chamber is optimized for a variety of detectors including EDS, WDS, EBSD based on the concept of "seamless from observation to analysis". A 200mm diameter specimen can be inserted. A 80mm height specimen can be observed.

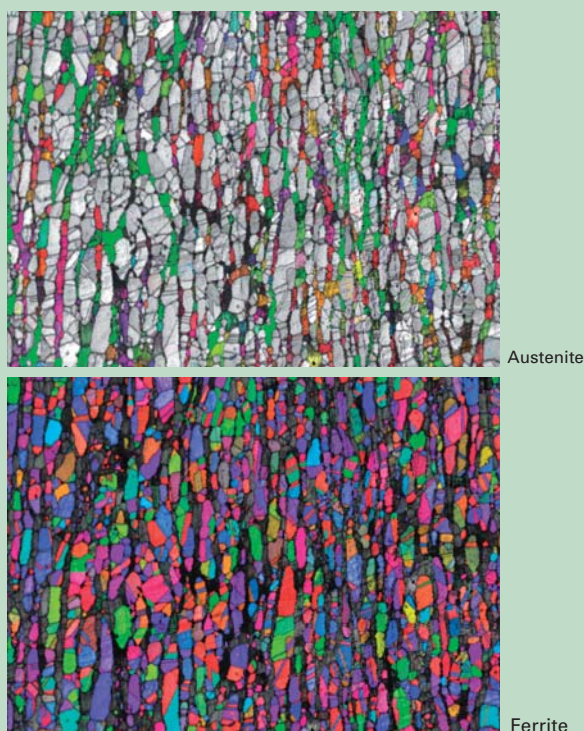
Specimen Exchange Airlock Chamber (optional)

A specimen is mounted by opening the front door of the specimen chamber. You can add the optional specimen exchange airlock chamber to shorten exchange time.



Crystal Orientation Analysis(EBSD : optional)

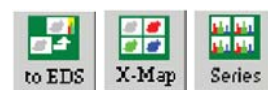
You can analyze crystal orientation on sub-micron areas with an optional Electron Back Scatter Diffraction (EBSD) detector. JSM-6490 series SEM provides the best location for this detector.



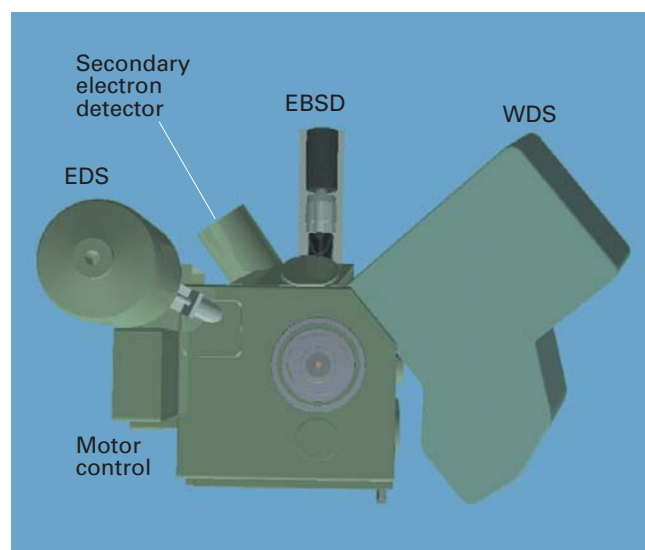
Specimen: Duplex steel

Oxford EBSD INCA Crystal

EDS (embedded in JSM-6490LA/JSM-6490A)



An EDS, which is capable of analyzing micro areas on a specimen, expands the SEM to a solution tool that performs problem-solving tasks from observation to analysis. The take-off angle of X-ray is 35 degrees at the analytical working distance of 10mm. Elemental analysis can be done with high-resolution observation.



JSM-6490 series specimen chamber with EDS, WDS and EBSD.

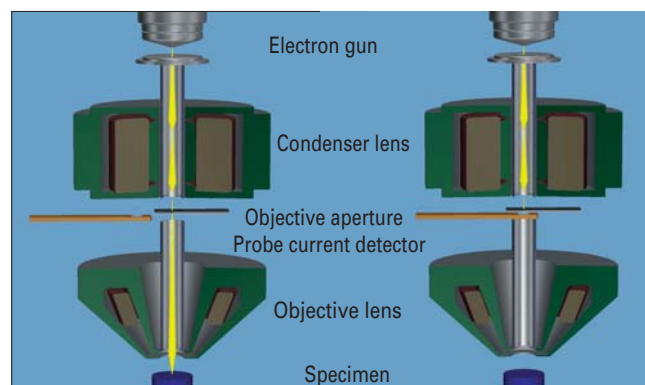
Chamber Scope (optional)

The Chamber scope can be mounted on the specimen chamber for monitoring the inside.



Probe Current Detector (optional)

The optional probe current detector can be mounted just below the objective lens aperture for monitoring probe current.



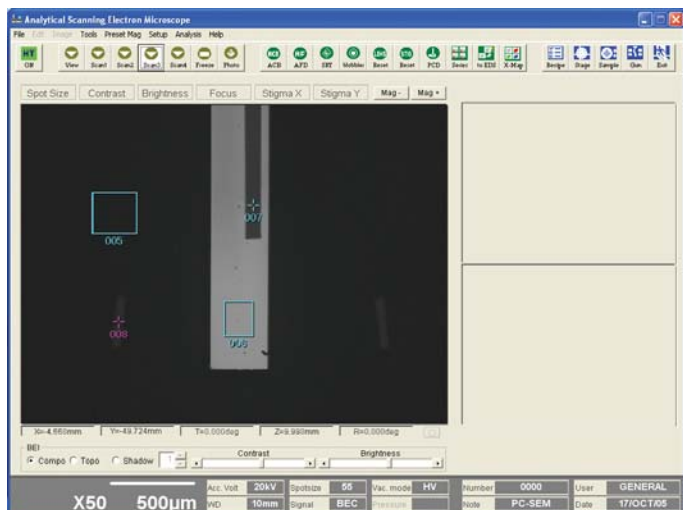
Out

Probe current detector

In

Analysis Station

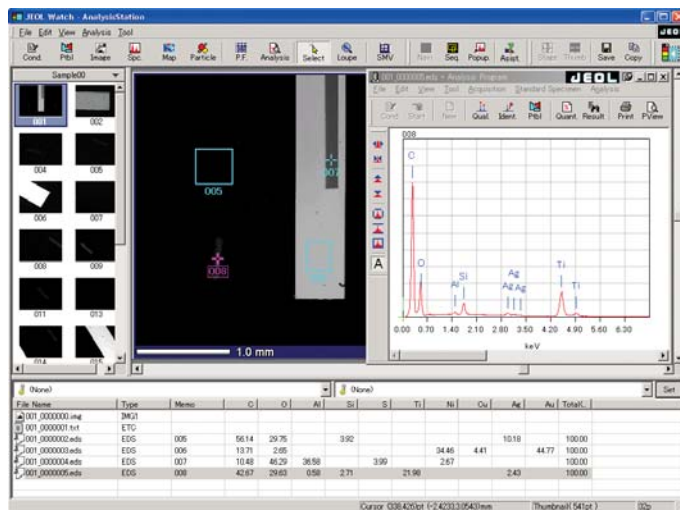
The Analysis Station is the new analysis system developed on the concept of “seamless from observation to analysis”. The results of analyses are always saved with SEM images of analysis areas.



SEM

Start an analysis on the SEM monitor

You simply select a spot or an area of interest on the SEM monitor. The EDS acquires an elemental spectrum followed by the acquisition of an SEM image showing the analysis area. You can set the sequence to do the qualitative and quantitative analyses automatically after the acquisition of a spectrum. The acquired data are automatically stored with the SEM image in a folder, which is created automatically for each analysis area.



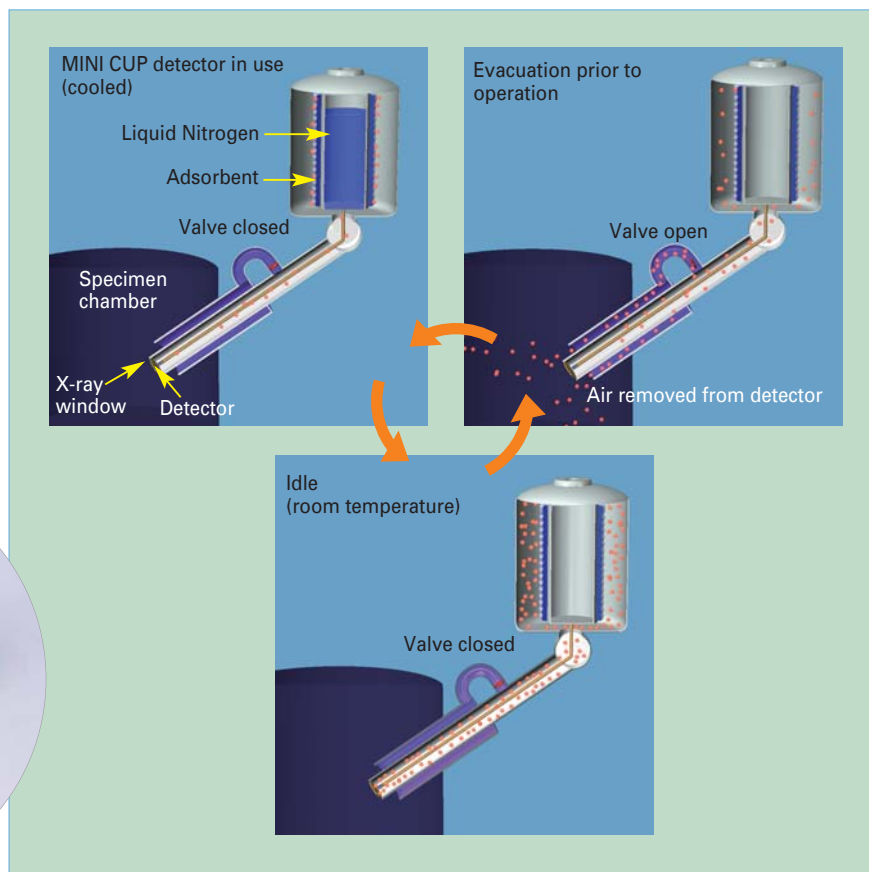
EDS

MINI CUP detector

The MINI CUP detector is a high-performance detector patented by JEOL. The Dewar of the detector is pumped by the vacuum system of an SEM prior to the filling of the detector with liquid nitrogen. An ice film on the detector element would absorb the low energy X-rays and lower the sensitivity for the light elements. The water vapor in the Dewar is also pumped out of the MINI CUP detector so that the condensation of ice on the detector is negligible. The MINI CUP detector keeps its original high sensitivity for many years. The detector requires liquid nitrogen only when the detector is in use. Therefore the maintenance of the detector is easier.



Hyper MINI CUP detector



Heat cycle of the MINI CUP detector

Turbo Molecular Pump (TMP) (Optional)

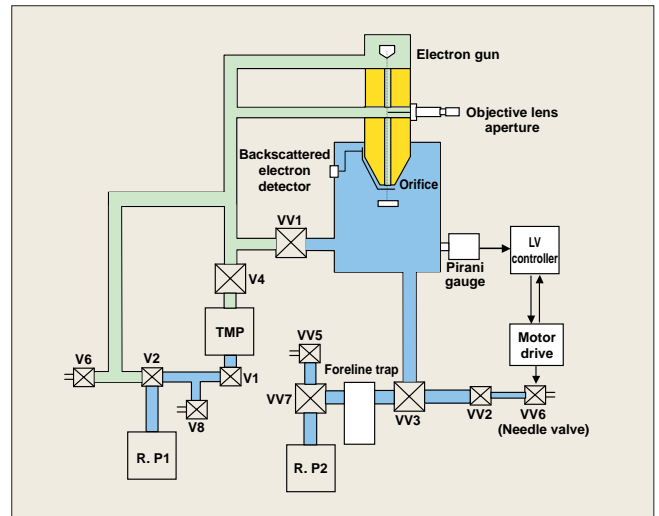
TMP Improves Mobility

JSM-6490 series SEM uses the high performance and reliable diffusion pump (DP). With the DP it is necessary to heat the heater for approximately 25 minutes before the DP is fully operational. The DP also requires cooling water so that an SEM with a DP is not convenient for moving.

An air-cooled TMP is available as an option for a user who wants to use the SEM immediately after turning it on or to change the layout of the laboratory frequently.

The vacuum system is completely identical except TMP being used in place of DP. The TMP is not exposed to the air during specimen exchange. The inside of the SEM is kept in vacuum while the SEM is turned off.

The specimen chamber of the low vacuum SEM is pumped by the dedicated rotary pump while the high vacuum region is pumped by the TMP.



Evacuation system of Low Vacuum SEM equipped with TMP

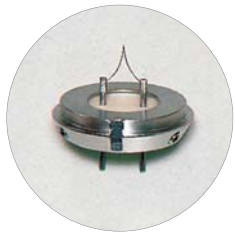
Low vacuum region
High vacuum region

High Performance is Maintained with Minimum Effort

Easy to Maintain Electron Optics

Factory Pre-centered Filament

It is important to center the filament tip to the small aperture on the gun Wehnelt to ensure the best performance. JEOL provides factory pre-centered filaments, which are centered by JEOL. A user does not have to center a filament. The proper heating of filament and alignment of electron probe are automatically done.



Factory pre-centered filament



Wehnelt

Optics with High Speed Pumping

The electron optics column is designed to maintain high vacuum during operation so that frequency of maintenance is kept low.

Objective Lens Apertures

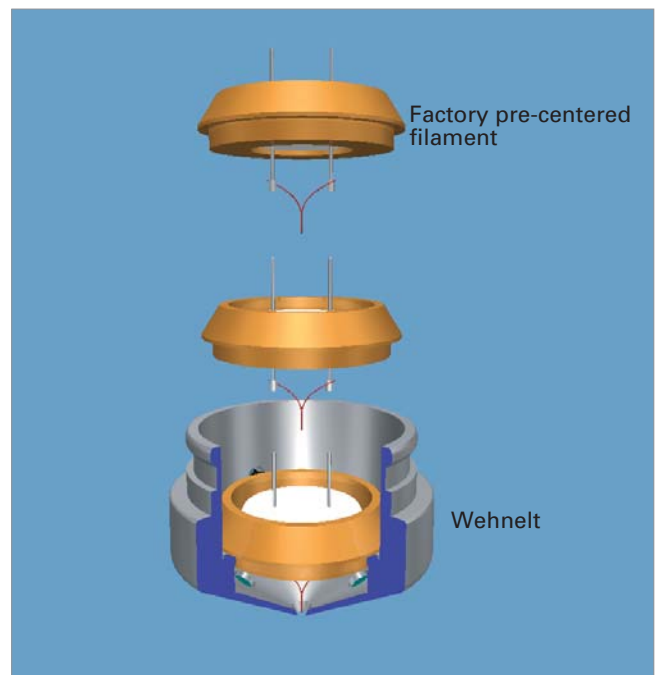
The objective lens aperture foil is easy to remove and to replace precisely.

Orifice (JSM-6490LA/JSM-6490LV)

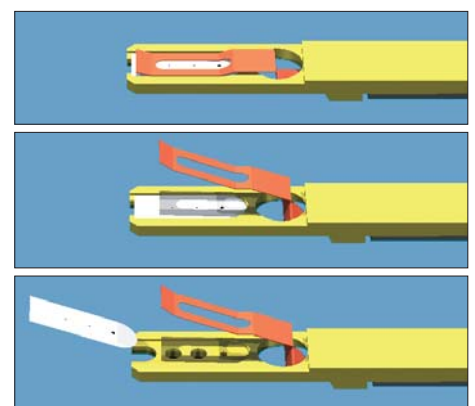
The orifice placed in the objective lens for differential pumping in the low vacuum SEM is easy to remove for maintenance.

Energy Saving

The entire electronics is enclosed in the main console to save materials. The SEM is compact for easy installation. The power to run the SEM is approximately 1.4kVA, which is quite small for the high performance SEM.



Objective lens aperture



Replacement of the objective lens apertures

JSM-6490series

Principal Specifications

Resolution	HV mode	3.0 nm (30kV), 8.0 nm (3kV), 15 nm (1kV)
	LV mode	4.0 nm (30kV)
Magnification		×8 to ×300,000 (at 11kV or higher) ×5 to ×300,000 (at 10kV or lower)
Preset magnifications		5 steps, user selectable
User operation recipe		Optics, Specimen stage, Image mode, LV pressure* ¹ , Standard recipe
Image mode		Secondary electron image, Composition* ¹ , Topography* ¹ , Shadowed* ¹
Accelerating voltage		0.3 kV to 30 kV
Filament		Factory pre-centered filament
Electron gun		Fully automated, manual override
Condenser lens		Zoom condenser lens
Objective lens		Super conical objective lens
Objective lens apertures		3 stages, XY fine adjustable
Stigmator memory		Built in
Electrical image shift		±50μm (WD=10mm)
Auto functions		Focus, brightness, contrast, stigmator
Specimen stage		Large eucentric type, X: 125mm, Y: 100mm, Z: 5mm to 80mm, Tilt: -10° to +90°, Rotation: 360°
Motor control		5 axes computer controlled
Navigator/Reference		2 images
Specimen exchange		Through the front door
Maximum specimen		200mm diameter
Computer		IBM PC/AT compatible
OS		Windows®XP
Monitor		15 inch LCD, 1 or 2* ²
Frame store		640 × 480, 1,280 × 960 pixels, 2,560 × 1,920 pixels
Full size image display		Built in
Pseudo color		Built in
Multi image display		2 images, 4 images
Digital zoom		Built in
Dual magnification		Built in
Network		Ethernet
Image format		BMP, TIFF, JPEG
Auto image archiving		Built in
Smile View		Built in* ²
Pumping system		Fully automated, DP: 1, RP: 1 or 2* ¹
Switching vacuum mode* ¹		Through the menu, less than 1 minute
LV Pressure* ¹		1 to 270 Pa
JED-2300 EDS* ²		Built in

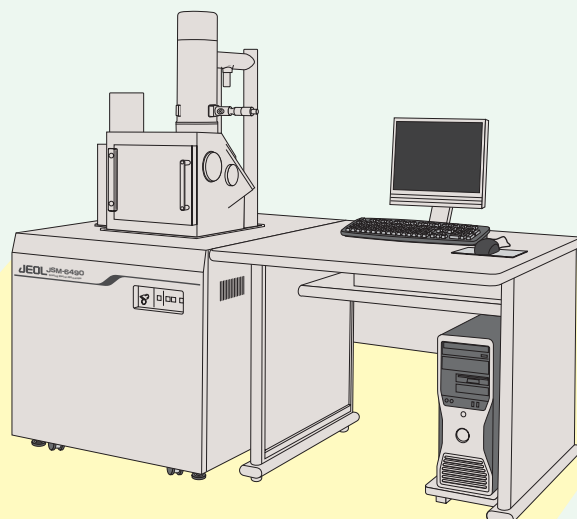
Windows is a registered trade mark of Microsoft

Principal Options

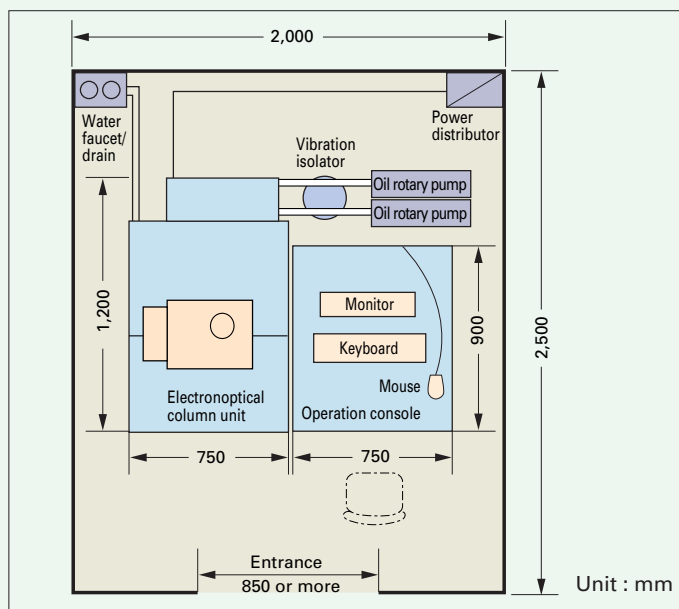
- Backscattered electron detector*¹
- Low vacuum secondary electron detector
- Energy dispersive X-ray analyzer (EDS)
- Wave length dispersive X-ray analyzer (WDS)
- Electron Back Scatter Diffraction (EBSD)
- Specimen exchange airlock chamber
- Chamber scope
- Operation knobs
- Specimen cooling unit
- LaB₆ electron gun
- Report creation software (SMile View)*²
- Operation console (750mm wide, 900mm wide, 1100mm wide)

*¹ Standard on JSM-6490LA and JSM-6490LV

*² Standard on JSM-6490LA/JSM-6490A



Installation Layout (JSM-6490LV)



Installation Requirements

Power:	Single-phase, 100V AC, 50/60Hz, 3.0kVA Voltage regulation within ±10% (voltage drop at 3.0kVA within 3%)
Grounding terminal:	One, 100 ohms or less
Cooling water:	
Faucet:	One, 14mm OD or ISO 7/1 Rc 1/4 internal thread
Drain:	One, 25mm or more ID, or ISO 7/1 Rc 1/4 internal thread
Flow rate:	2L/min.
Pressure:	0.05 to 0.2 MPa
Temperature:	20±5°C
Environment	
Temperature:	20±5°C
Humidity:	60% or less
Stay AC magnetic field:	0.3μT or less (50/60 Hz sine wave, WD:15mm, Acc.V.: 30kV)
Floor vibration:	2μm(p-p) or less at sine wave of over 5Hz frequency
Floor space:	2,000(W) × 2,500(D) × 1,800(H)mm or more
Weight	Approx. 550kg (JSM-6490), Approx. 575kg (JSM-6490LV)
Door width:	850mm or more

* Specifications subject to change without prior notice.



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