ryf ag
Ryf AG
Bettlachstrasse 2
2540 Grenchen
tel 032 654 21 00
fax 032 654 21 09
www.ryfag.ch

NeoScope

JCM-5000

Table Top SEM

Simple Operation to ×40,000

JEOL
Serving Advanced Technology

From ×10 to ×40,000

Table Top SEM

NeoScope

Notebook PC version

Just plug it to a wall outlet after placing it on a table

Desktop PC version

Option

Just a few suggestions
Application as wide as your imagination

Observation at higher magnification

Magnification ×0.5~×1,500

- Larger depth of focus
- High magnification
- High resolution

Magnification ×10~×40,000

Check a specimen before sending it out to analytical lab

Sampling inspection done with the ease of light microscope

Products

Good products

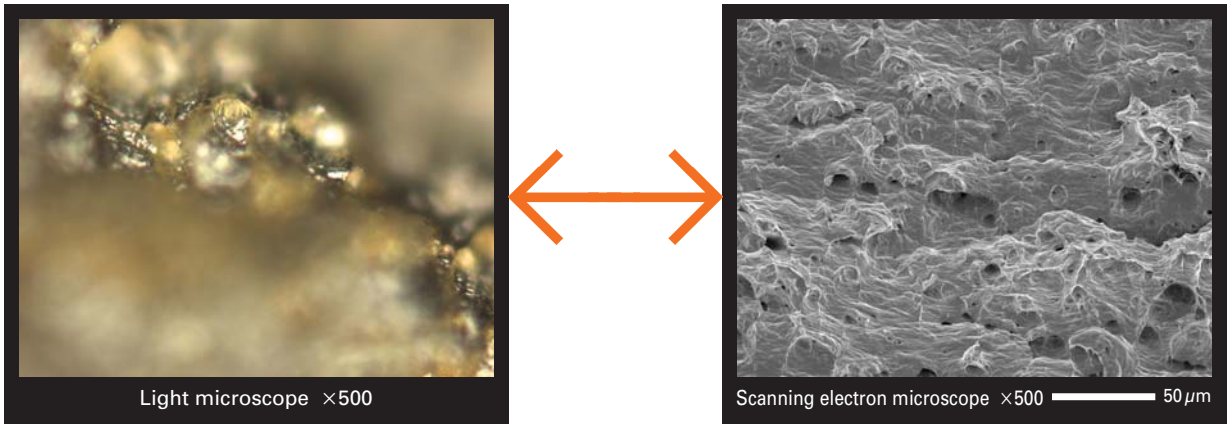
Rejected products

1 Operation is easy. You can learn it in a short time.
2 High quality image by secondary electrons
3 Up to 70mm diameter × 50mm height specimen
4 Measurement in nanometer
5 My recipe for reliable results
6 Smile View for quick report editing
7 Maintenance is easy

Sharp image at high magnification

Larger depth of focus

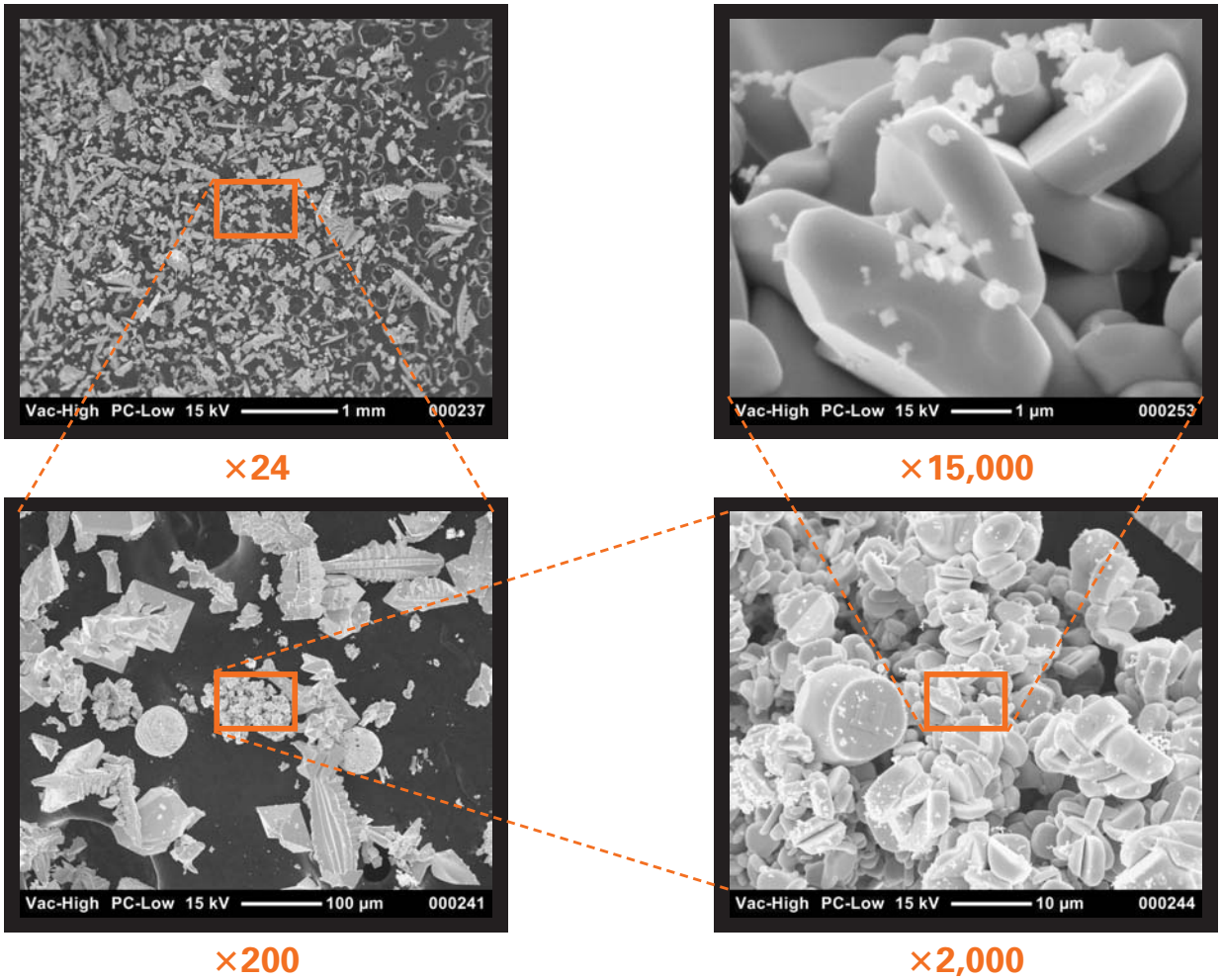
A scanning electron microscope (SEM) has about 10 times larger depth of focus so that you can focus even on an extremely rough specimen. You can understand complicated structures easily.



Specimen : Fracture surface of brass screw

Continuous zoom up from the lowest magnification High magnification image in no time

Mouse changes magnification continuously. No focus change when magnification is changed.

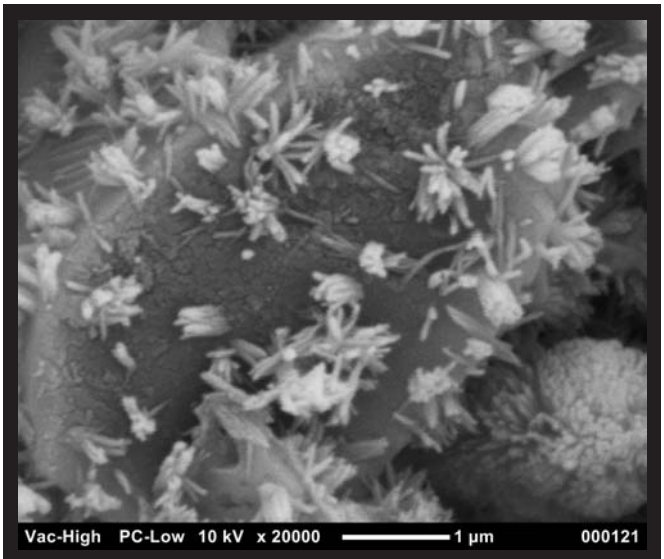


Specimen : Zinc oxide

Realistic high magnification

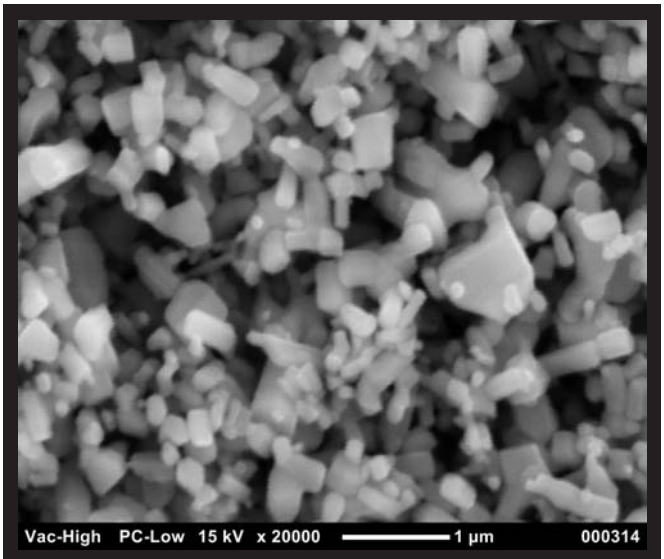
×20,000 by secondary electron (SE) image in high vacuum

JCM-5000 NeoScope goes up to ×20,000 and shows realistic surface image by secondary electron image at the high vacuum mode. The depth of focus is large enough to easily understand complicated morphology. The high vacuum mode keeps high performance for a long period of time.



Cement, Secondary electron image, original mag: ×20,000 (with coating)

This is cement mix for DIY mixed with water and set for 30 minutes. Cement crystals are growing on sand grains. Gold conductive coating has been applied by a sputter coater.

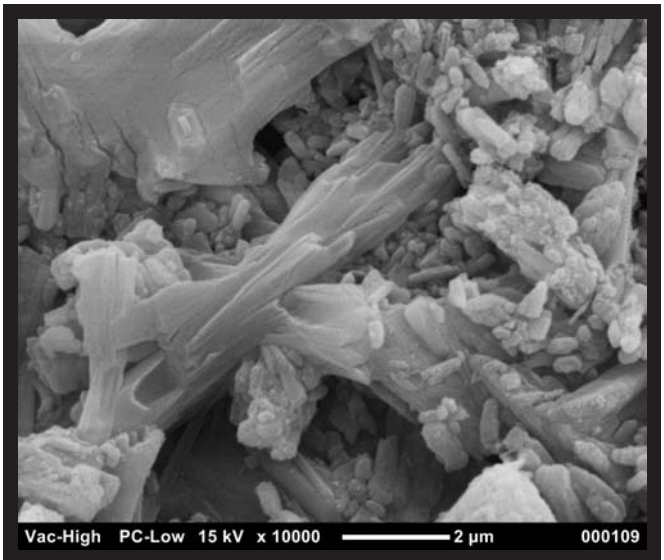


Zinc oxide, Secondary electron image, original mag: ×20,000 (no coating)

The specimen is conductive enough to be observed without conductive coating. You can observe particles smaller than 0.1micron (100nm).

Gypsum, Secondary electron image, original mag: ×20,000 (with coating)

Gypsum was mixed with water and set for a few minutes. Fine long crystals are observed. Gold conductive coating has been applied by a sputter coater.

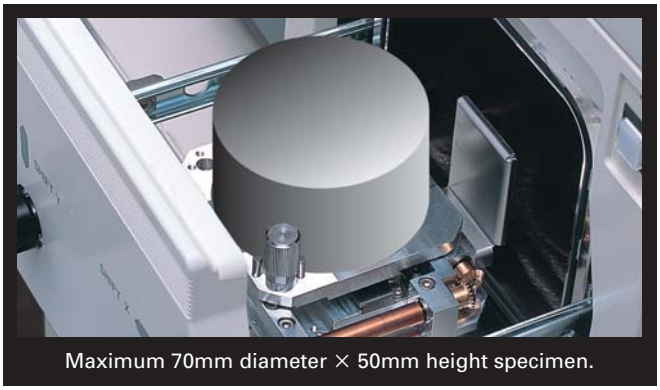


Gypsum, Secondary electron image, original mag: ×10,000 (with coating)

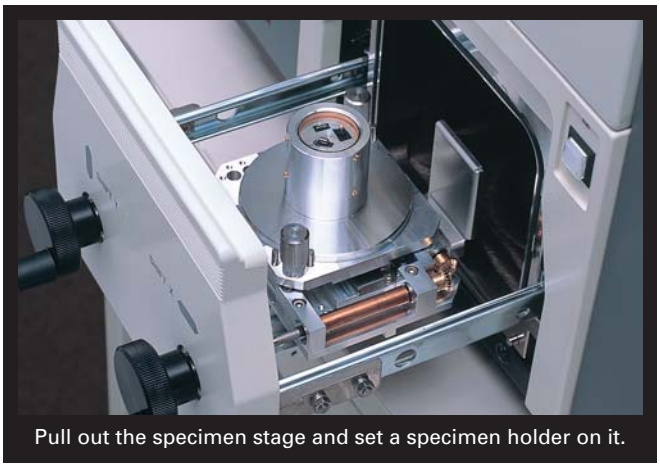
A wider view was observed at a slightly lower magnification. Small particles are observed with long crystals.

Large specimen can be observed

A small specimen is observed by putting it on a specimen mount.
A large specimen up to 70mm diameter and 50mm height can be set on the 70mm specimen holder.
You can use carbon double sticky tape to fix a specimen on a mounting block or a holder.
Then set the specimen holder on the specimen stage. Closing the specimen stage starts pumping automatically.
The specimen stage moves 35mm on both X and Y axes. The specimen stage is stable enough to show a clear image at ×20,000.



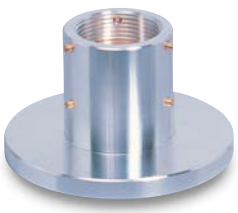
Maximum 70mm diameter × 50mm height specimen.



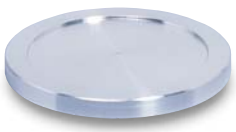
Pull out the specimen stage and set a specimen holder on it.

Close the specimen stage starts pumping automatically.

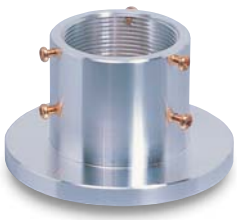
Specimen holder and specimen mount



25mm diameter specimen holder*

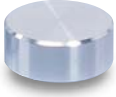


70mm diameter specimen holder*



35mm diameter specimen holder

25mmDia × 25mmH*



25mmDia × 10mmH*

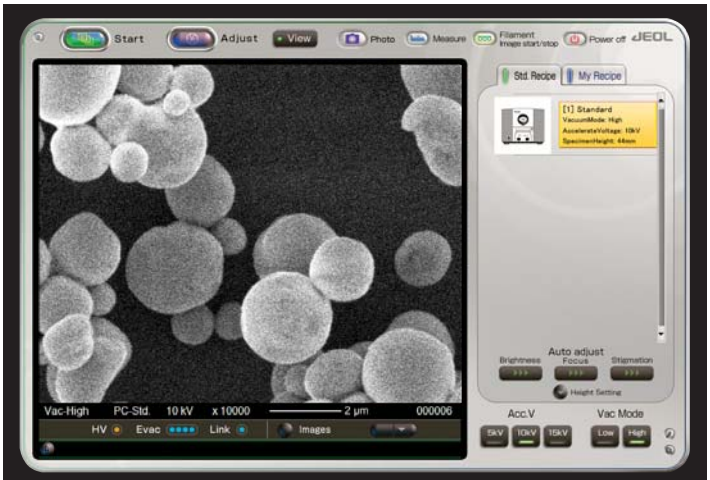
Calibration specimen*

Specimen holder	
Standard specimen holder	25mm diameter specimen holder
	70mm diameter specimen holder
Optional specimen holder	35mm diameter specimen holder
	Tilting specimen holder
Specimen mount	25mmDia × 10mmH
	25mmDia × 25mmH
	35mmDia × 10mmH
	Pre-tilt specimen mount (custom made)

*Standard

Observation Let's observe in the high vacuum mode

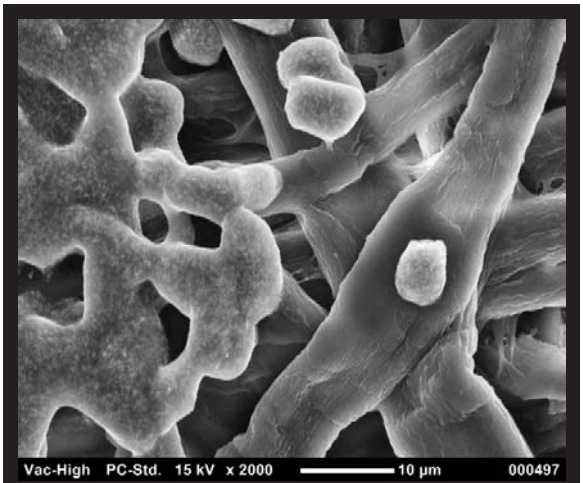
A secondary electron image appears automatically on the monitor when the specimen chamber is pumped to high vacuum. The operation condition is the Standard Recipe, which give good results for most of specimens at 10kV. This condition reveals fine surface structures of a specimen clearly.



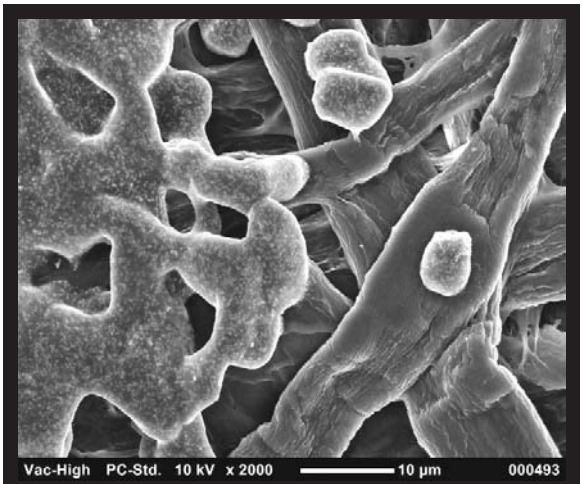
Observation monitor

Observation made easy by the recipe

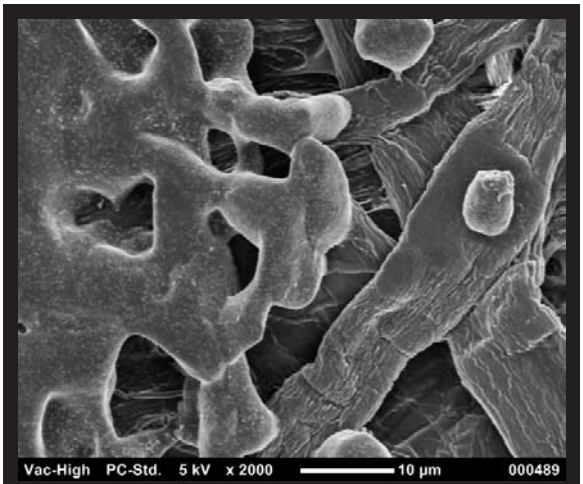
The optimum operation conditions may vary depending on the material or shape of a specimen, or magnification for observation. Some specimens may produce better results by using an accelerating voltage or probe current different from the Standard Recipe. When you find a better operation conditions for your specimen, you can store them in My Recipe and reuse it when you observe a similar specimen later.



15kV : Suitable for high magnification



10kV : Suitable for fine structures up to a few thousand times



5kV : Suitable for heat sensitive specimen

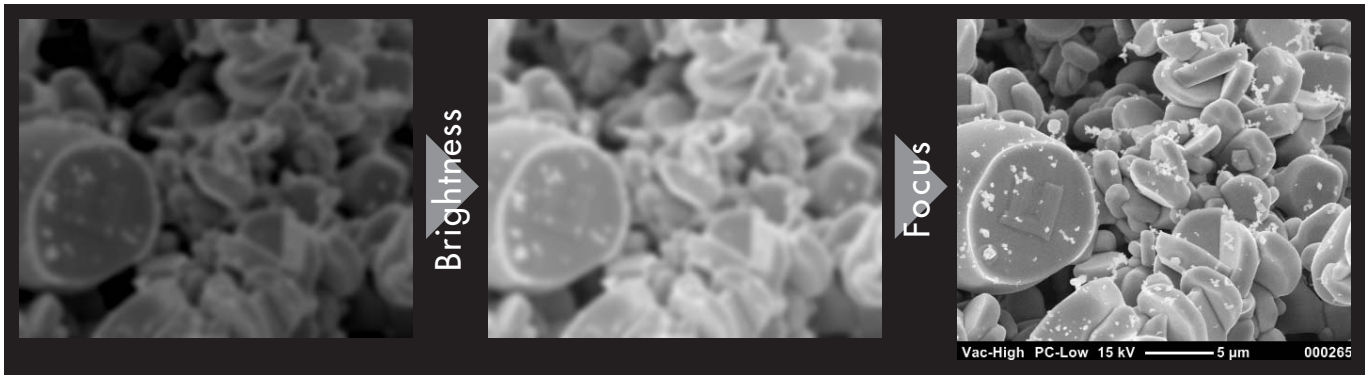
Specimens : Business card

Adjustment of image

The contrast and brightness of image can be controlled automatically or manually.

Automatic operation

First click on the Auto Contrast & Brightness for automated adjustment. You can adjust contrast and brightness manually as well.
Then click on the Auto Focus to focus the image.
At high magnifications you may need to compensate astigmatism.

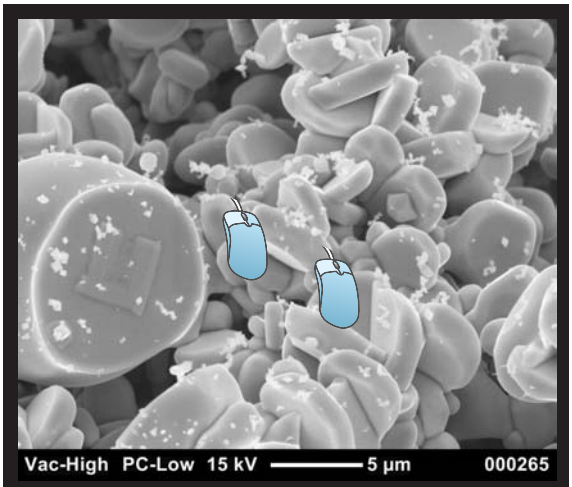


Manual operation

- **Image adjustment**
  You can adjust contrast and brightness manually as well.
- **Focus**
  Focus can be manually adjusted as well as automatically.
- **Astigmatism correction**
  Fine astigmatism adjustment is available in addition to the automatic correction.
- **Image shift**
  You can shift the image by a mouse drag. This is convenient at high magnification.
- **Image Rotation**
  You can rotate a live image on the monitor by 1 degree step or 90 degree step.

Measurement mode

You can measure a distance between two points just by a click on each point.
The result is pasted on the image.

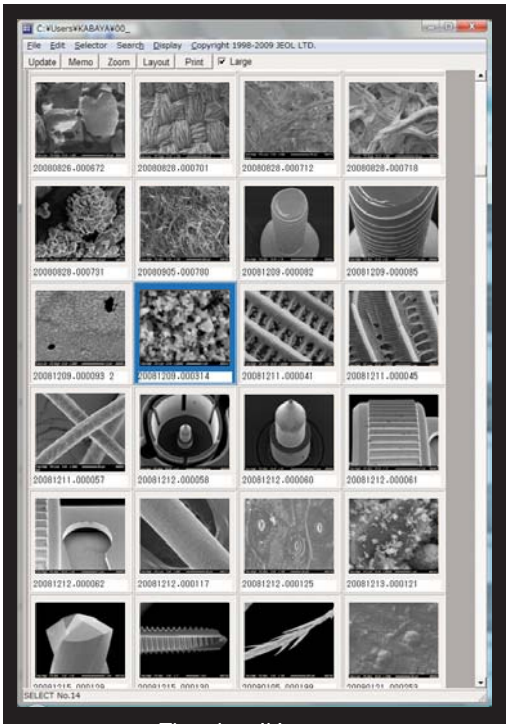


Click on two points on a image.

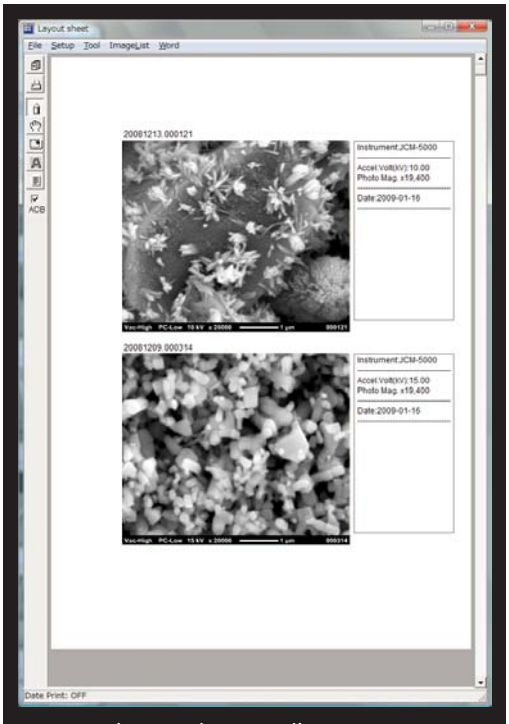
The result is pasted on the image.

Report Creation (Option)

Images obtained by the SEM are pasted on a layout sheet of Smile View (Option) to create a report.
The acquired images are displayed in small thumb nail images. Simply drag and drop these image onto a layout sheet.
You can freely edit your own layout by changing the size of each image and position.
Magnification is automatically calibrated and displayed as you change the size of image.
SMile View also has a measurement mode. You can measure on a layout sheet and result is pasted on the report.



Thumb nail images

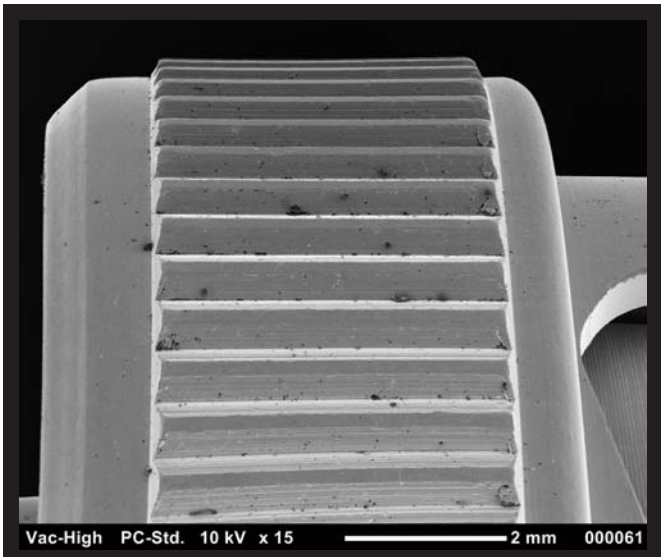


Layout sheet to edit a report

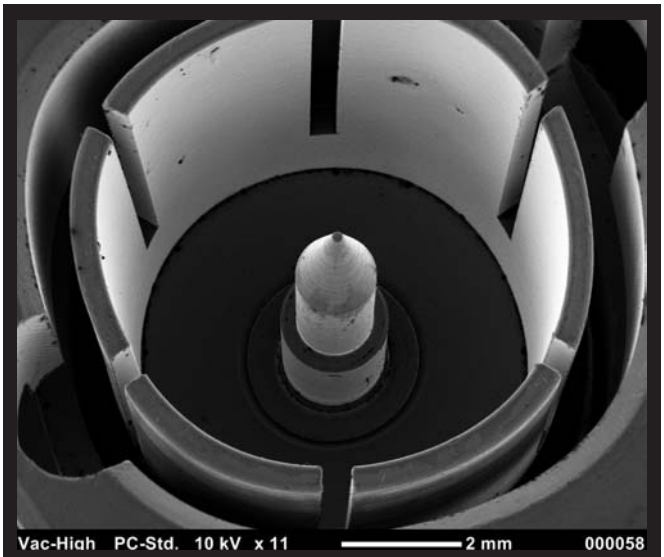
Large Depth of Focus

Complicated morphology observed by SE image in high vacuum

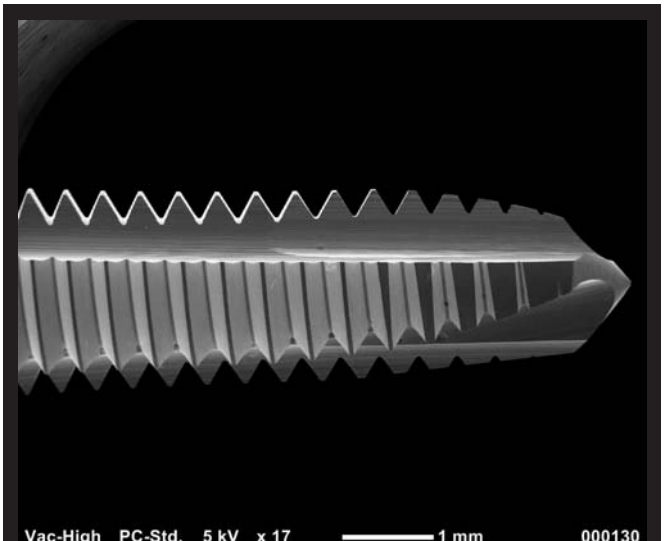
A scanning electron microscope (SEM) is unique due to its large depth of focus together with high resolution. You can observe clearly a rough specimen difficult for a light microscope to focus. The lowest magnification is ×10. You can find an area located by a light microscope easily.



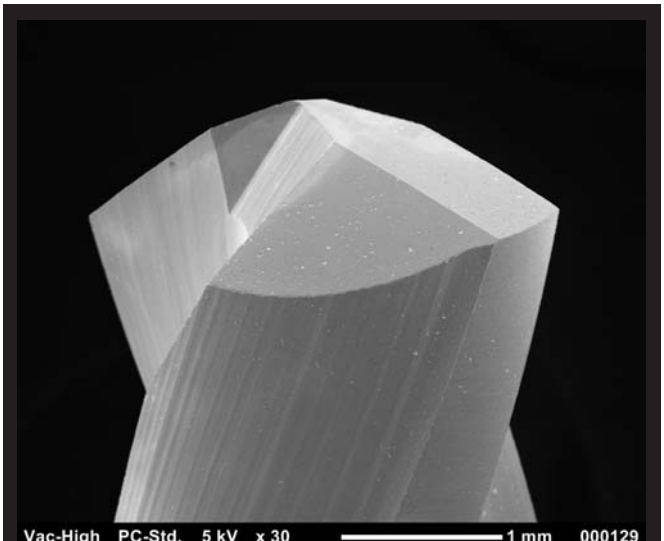
BNC connector, Secondary electron image,
original mag: ×15 (no coating)



BNC connector, Secondary electron image,
original mag: ×11 (no coating)



Tap, Secondary electron image,
original mag: ×17 (no coating)

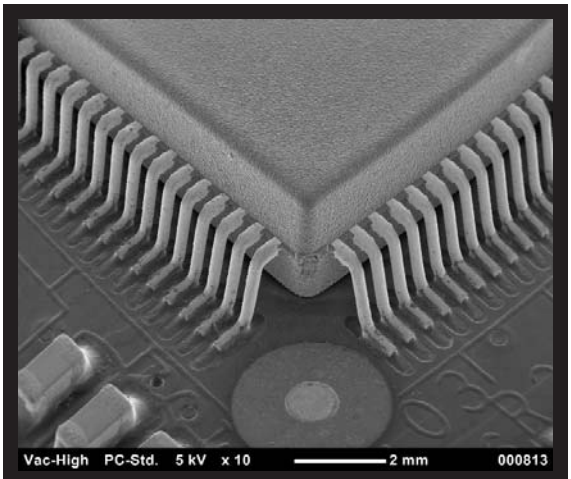


Drill, Secondary electron image,
original mag: ×30 (no coating)

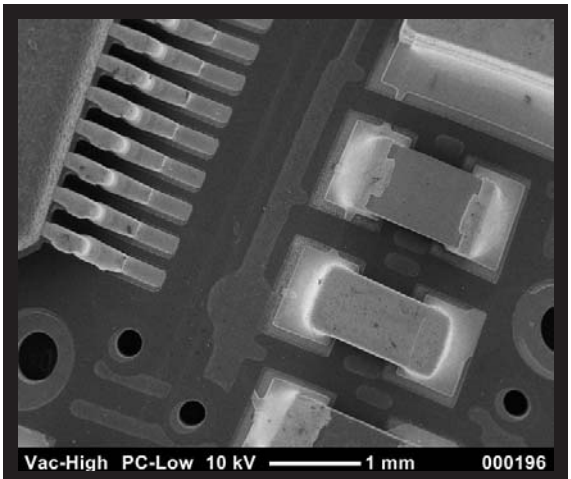
Industrial Products

Quality control by high quality SE and BSE images

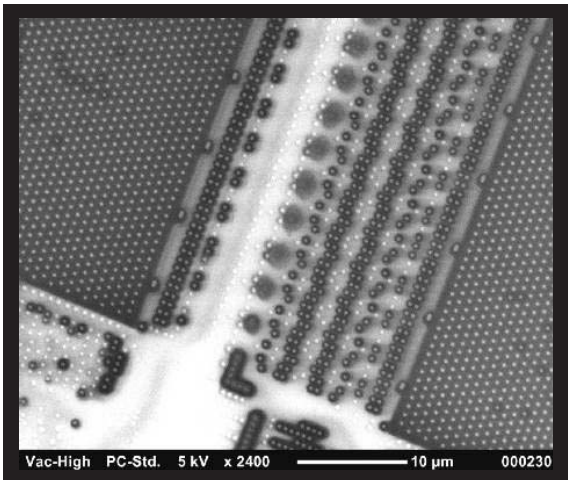
An SEM lets you observe complicated structures clearly in details with high resolution. This unique feature of an SEM is widely used in the industry from research to quality control.



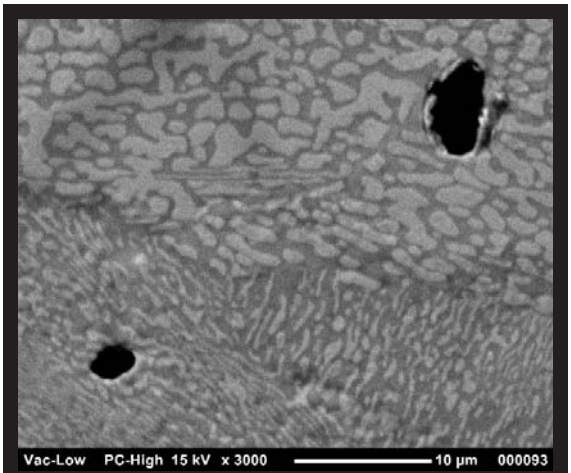
Electronic board, Secondary electron image,
original mag: ×10 (with coating)



Electronic board, Secondary electron image,
original mag: ×20 (with coating)



Integrated circuit, Secondary electron image,
original mag: ×2,400 (no coating)

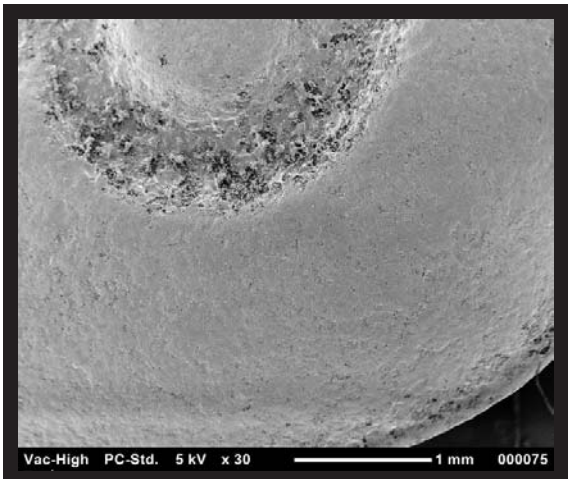


Solder, Backscattered electron image,
original mag: ×3,000 (no coating)

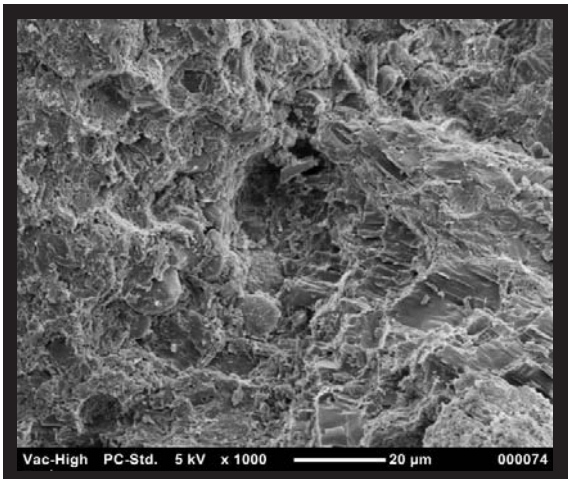
Contaminated contact surface, Secondary electron image,
original mag: ×100 (no coating)

Industrial Products Quality control by high quality SE image in high vacuum

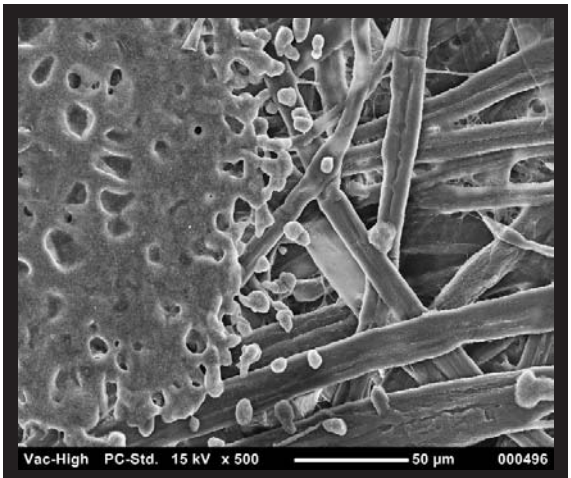
An SEM is widely used in the industry from research to quality control.



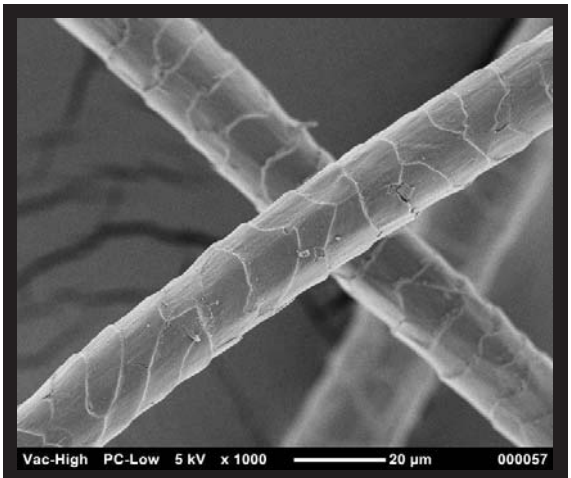
Medicine surface, Secondary electron image,
original mag: ×30 (with coating)



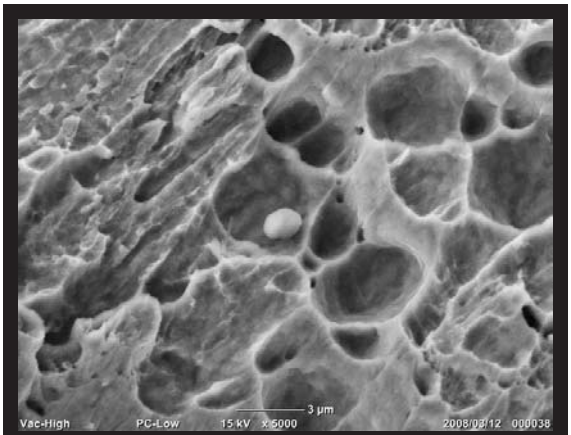
Medicine cross section, Secondary electron image,
original mag: ×1,000 (with coating)



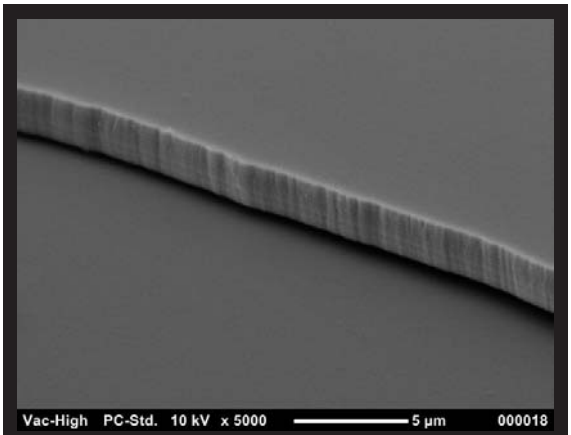
Business card (left: printed, right: paper), Secondary
electron image,original mag: ×500 (with coating)



Wool, Secondary electron image,
original mag: ×1,000 (with coating)



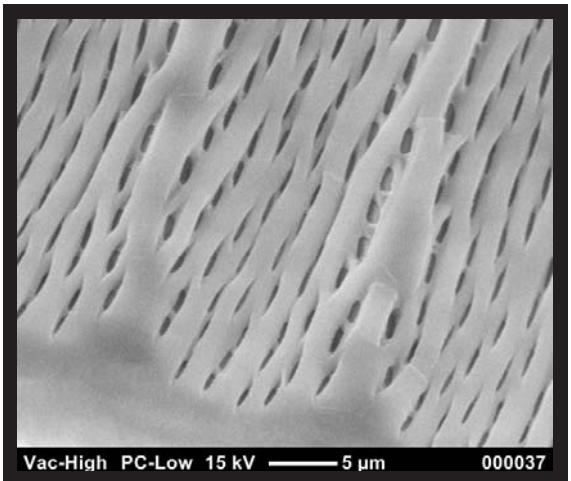
Metal fracture, Secondary electron image,
original mag: ×5,000 (with coating)



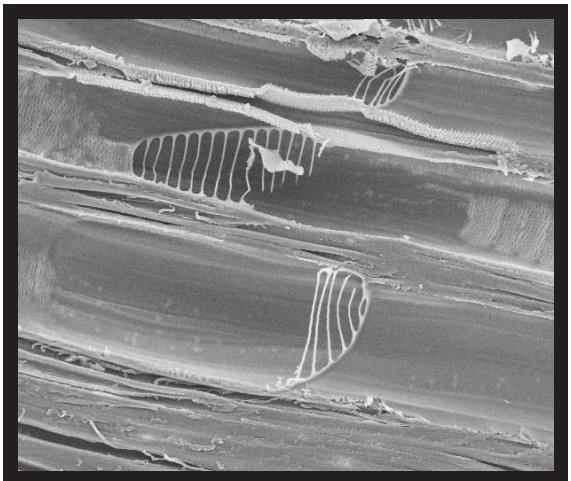
Optical film, Secondary electron image,
original mag: ×5,000 (with coating)

Plant Product High quality SE image with conductive coating

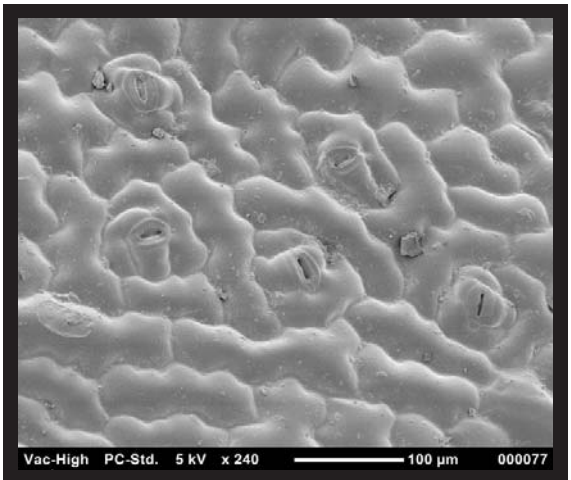
Plant products such as lumber do not have electric conductivity. You can observe the surface structures in high precision with secondary electron image in the high vacuum mode by applying conductive coating.



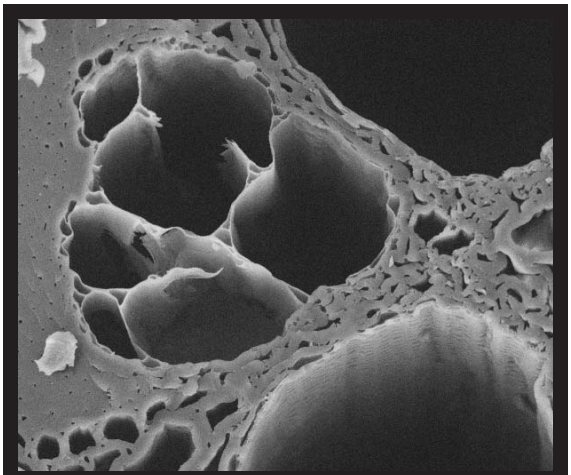
Dry wood cross section, Secondary electron image, original mag: ×3,000 (with coating)



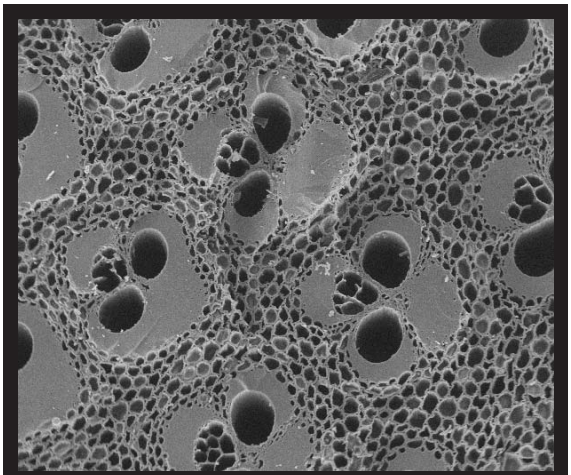
Dry wood cross section, Secondary electron image, original mag: ×270 (with coating)



Dried tobacco leaf, Secondary electron image, original mag: ×240 (with coating)



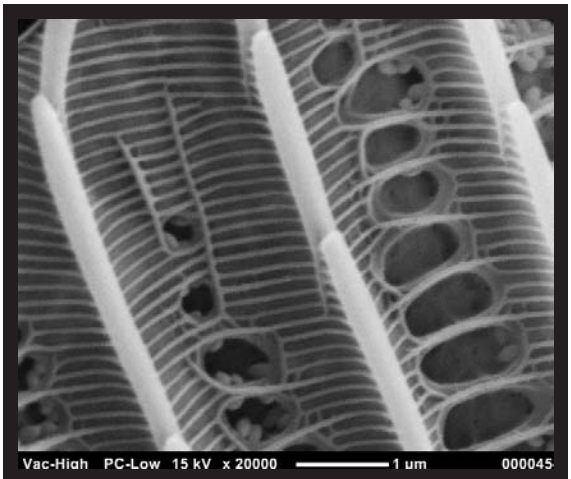
Bamboo charcoal, Secondary electron image, original mag: ×700 (with coating)



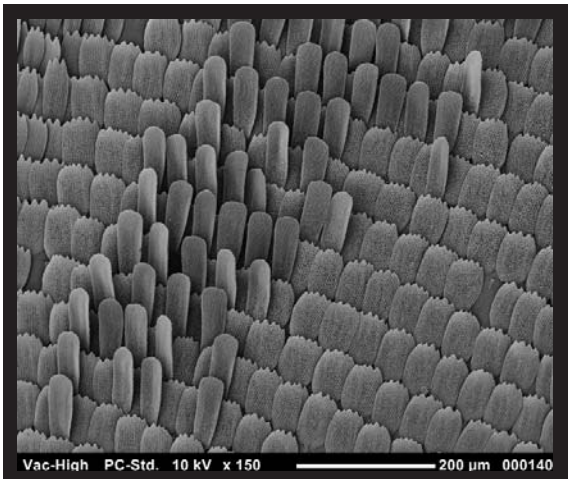
Bamboo charcoal, Secondary electron image, original mag: ×100 (with coating)

Insects Realistic image in SE image in high vacuum

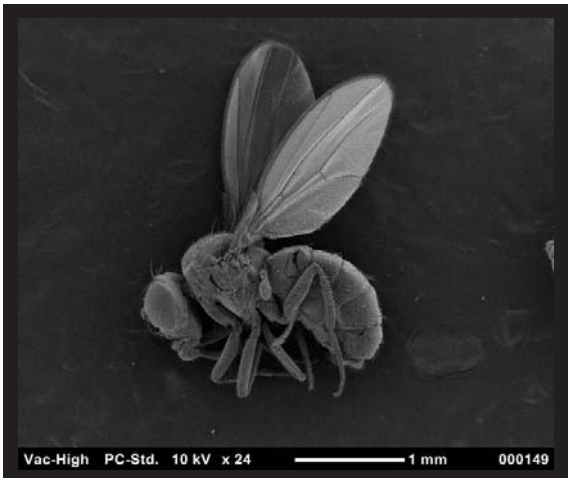
Fine structures of insects can be observed clearly in details at high magnification.
The SE image is most suitable for observation of insects.



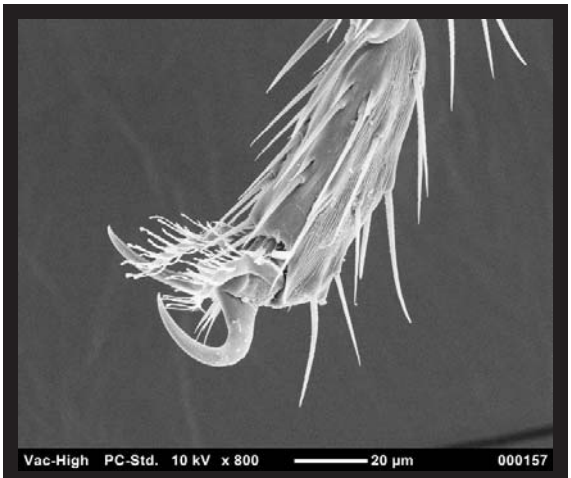
Butterfly scale, Secondary electron image,
original mag: ×20,000 (with coating)



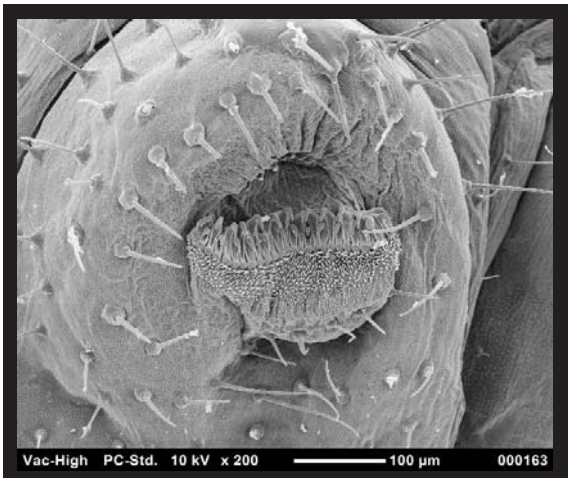
Butterfly scale, Secondary electron image,
original mag: ×150 (with coating)



Fruit fly, Secondary electron image,
original mag: ×24 (with coating)



Fruit fly, Secondary electron image,
original mag: ×800 (with coating)

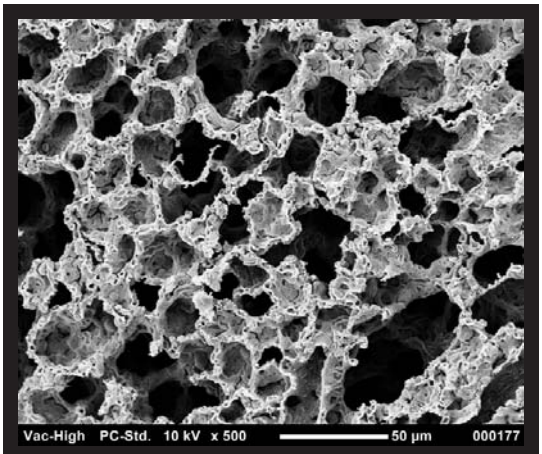


Larva of butterfly, Secondary electron image,
original mag: ×200 (with coating)

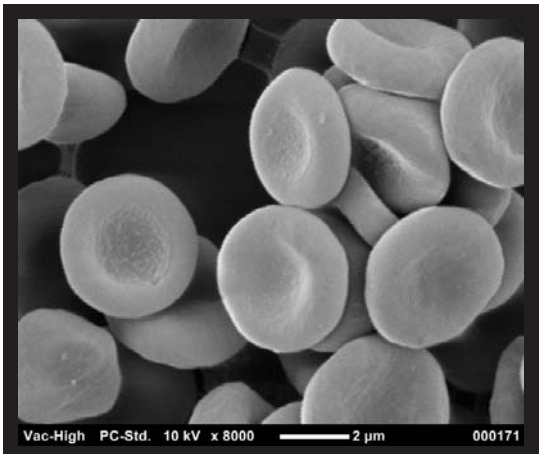
Animal Organism SE image in high vacuum

Animal organism contains water and not suitable for observation in SEM. These specimens are prepared by chemical fixation, dehydration, and drying by freeze dry or by critical point dry. A dried specimen is applied with conductive coating and observed with SE image in high vacuum.

Glomerulus, Secondary electron image,
original mag: ×5,000 (with coating)

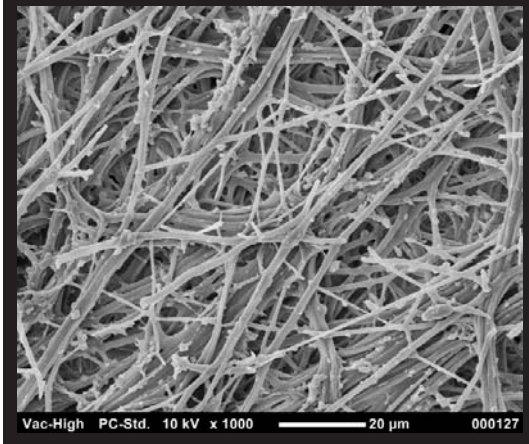


Lung alveolus of rat, Secondary electron image,
original mag: ×500 (with coating)

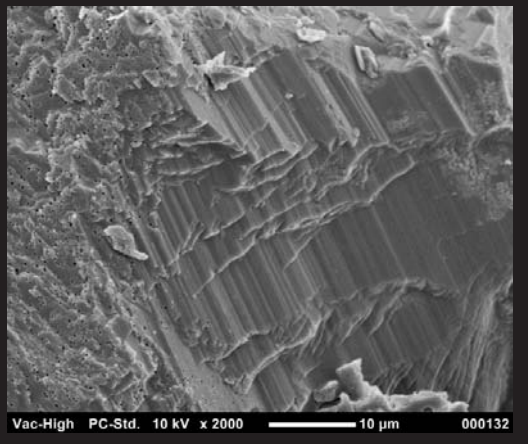


Red blood cell of rat, Secondary electron image,
original mag: ×8,000 (with coating)

Egg shell is observed. You can observe the fine inner network. You can observe fine holes on the crystal structures in the shell.



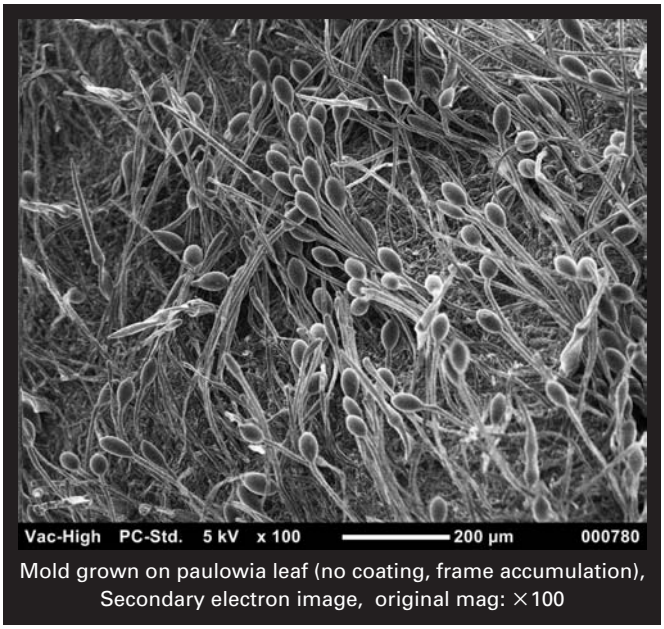
Inner film of egg shell, Secondary electron image,
original mag: ×1,000 (with coating)



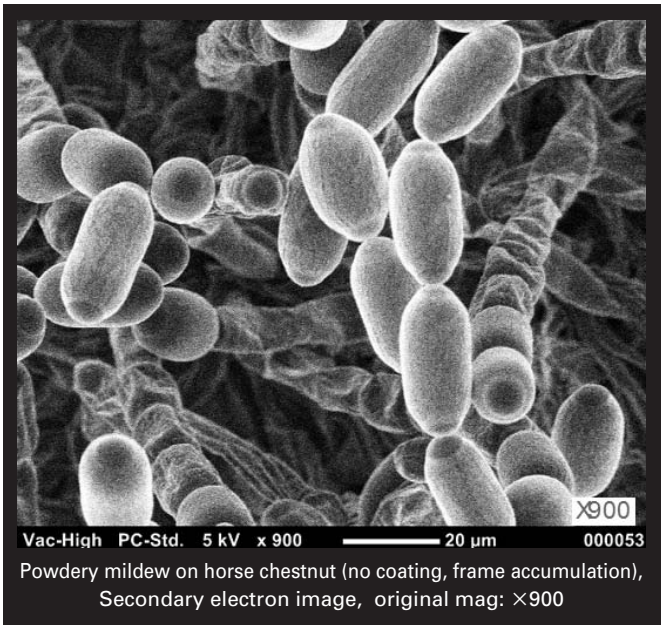
Egg shell cross section, Secondary electron image,
original mag: ×2,000 (with coating)

Non conductive specimens Observed with SE image in high vacuum

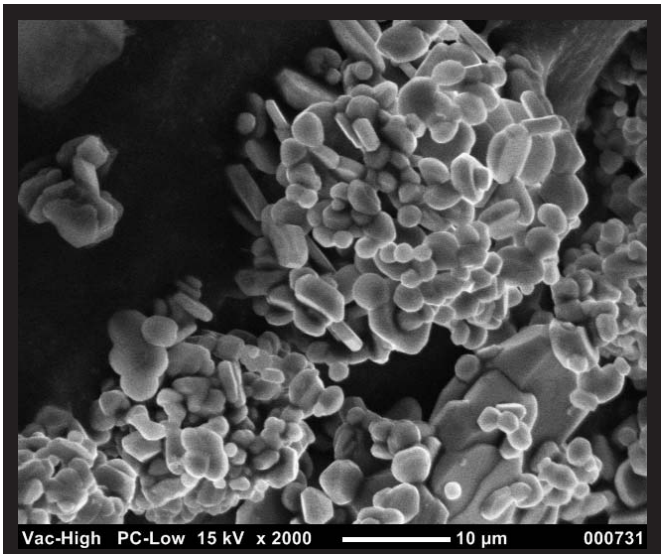
You can observe a non-conductive specimen by using low voltage where the numbers of incident electrons and emitted electrons from a specimen are close or in the low vacuum mode by introducing small amount of air in the specimen chamber. In the low vacuum mode gas molecules are ionized by the incident electrons and neutralize the electrons accumulated on the specimen surface.



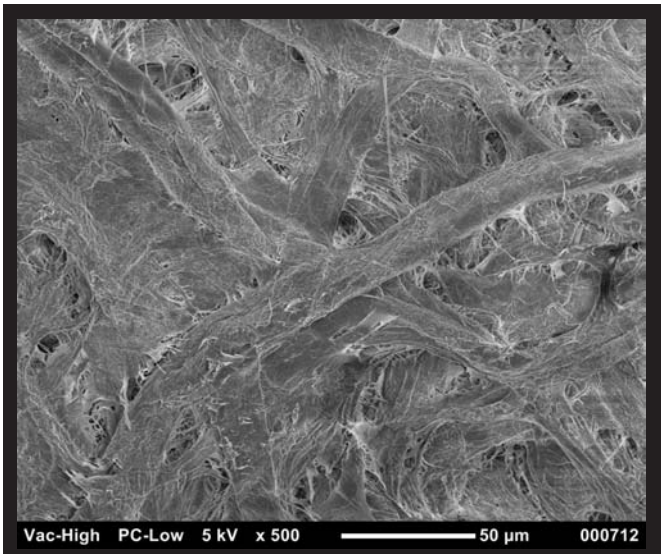
Mold grown on paulowia leaf (no coating, frame accumulation),
Secondary electron image, original mag: ×100



Powdery mildew on horse chestnut (no coating, frame accumulation),
Secondary electron image, original mag: ×900



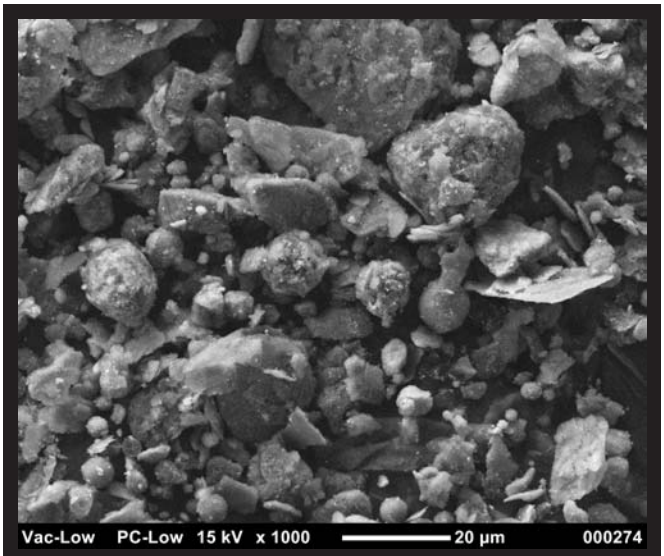
Alumina powder (no coating, frame accumulation),
Secondary electron image, original mag: ×2,000



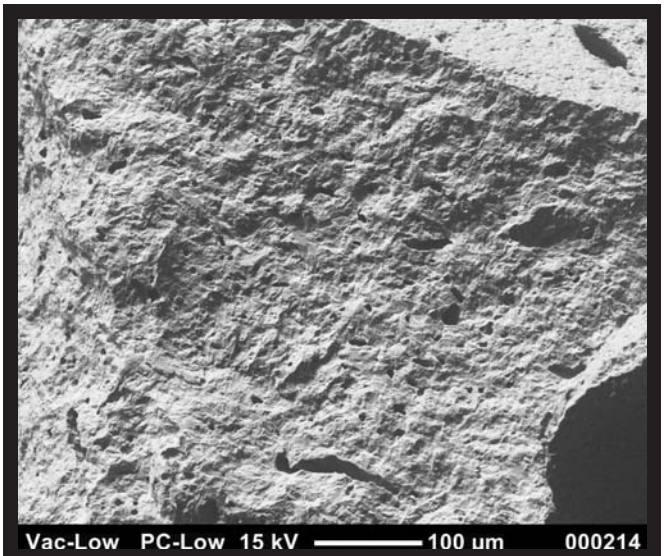
Paper (no coating),
Secondary electron image, original mag: ×500

Non conductive specimens Observed in low vacuum

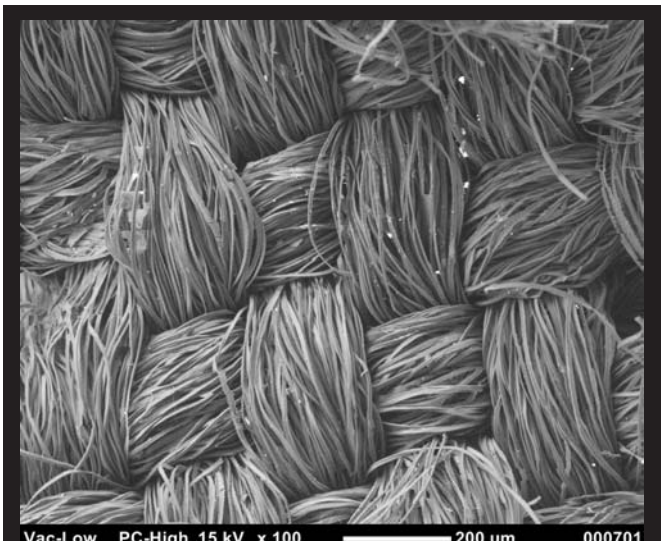
When you introduce small amount of air into the specimen chamber to increase the pressure to 30Pa, about 10% of the incident electrons collide with gas molecules and generate ions. The ions neutralize the electrons accumulated on a non-conductive specimen surface. The electrons collieded with gas molecules are scattered and reach over a wide area on the specimen.
You observe backscattered electron (BSE) image in the low vacuum mode. BSE images are of slightly poorer resolution due to larger generation volume of backscattered electrons.



Face powder (no coating),
BSE image in low vacuum, original mag: ×1,000



Concrete cross section (no coating),
BSE image in low vacuum, original mag: ×200

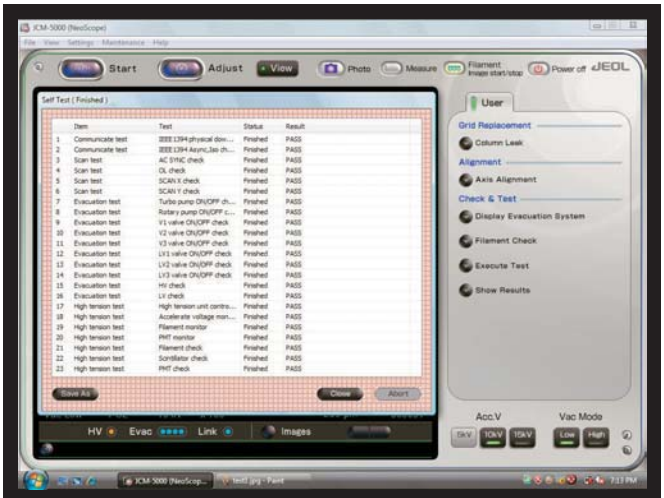


Cloth (no coating),
BSE image in low vacuum, original mag: ×100

Paper (no coating),
BSE image in low vacuum, original mag: ×500

Self Test and Simple Maintenance

Neo Scope can be easily maintained by a user.
When the SEM is not functioning properly, you can find the reason on the Self test window.

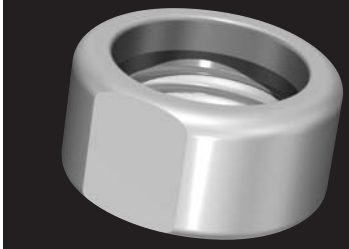


Self test

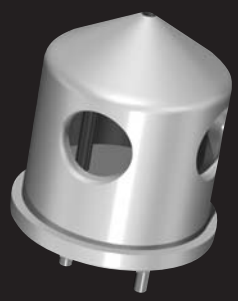
when a filament is burnt out, this window appears automatically.

Neo cartridge

It is simple to change a filament.
NeoScope uses cartridge electron source, which is composed of electron gun and filament.
Remove an old electron source and plug in a new one.
You can change filament by simple procedure in a short time.



Ring to hold electron gun

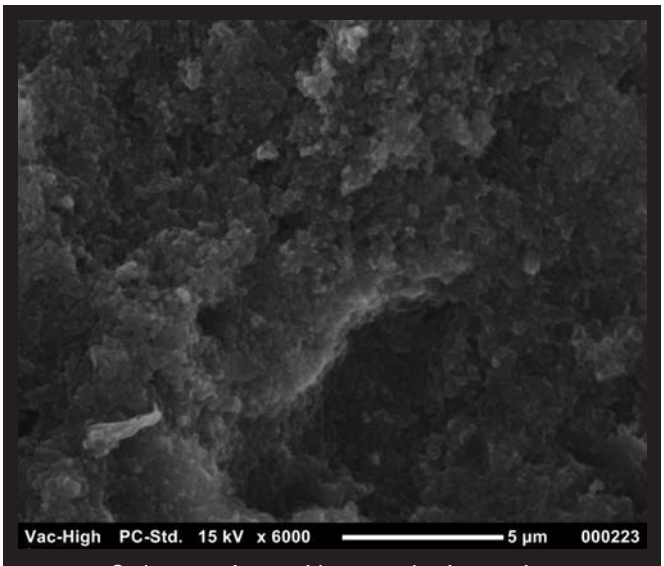


Electron gun with filament

NeoCoater (Option)

You can obtain a sharp and good quality image of a non-conductive specimen easily by applying conductive coating on a specimen.
The conductive coating is only a few nm thick so that fine surface structures are not hidden.
A sputter coater is used to apply conductive coating. You can form uniform coating film in a short time.

NeoCoater
- Compact
- Easy to use
- Affordable Price



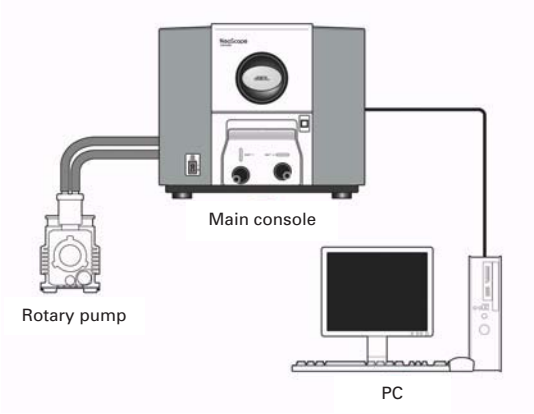
Carbon specimen without conductive coating

Carbon specimen with conductive coating of gold

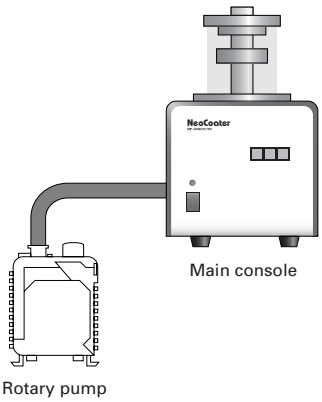
Principal Specifications

Specifications	NeoScope
Magnification	×10～×40,000
Observation mode	High vacuum mode, Low vacuum mode
Electron source	Small cartridge electron source
Accelerating voltage	15kV, 10kV, 5kV
Specimen stage	Manual, X 35mm, Y 35mm
Specimen exchange	Specimen stage draw out
Maximum specimen size	70mm Diameter × 50mm Height
Detector	Secondary electron detector, Backscattered electron detector
Computer	Portable PC
OS	Windows Vista, Windows 7
Digital image	1,280 × 1,024 pixels, bmp, tif, jpg
Data display	Accelerating voltage, magnification, micron bar, micron value
Automatic operation	Electron source, focus, brightness, contrast, and astigmatism
Evacuation time	Approximately 3 minutes
Evacuation system	TMP, RP
Main console dimensions	W492 × D458 × H434mm

NeoScope composition



NeoCoater composition



Installation requirement	
Electric power	Single phase AC100V (400VA) ～240V (1,100VA) 50Hz/60Hz
Power fluctuation	Less than ±10%
Grounding terminal	One, 100 Ω or less
Installation room	
Room temperature	15℃～30℃
Humidity	70% or less
Weight	
Main console	Approximately 69kg
PC	Approximately 11kg
RP	Approximately 16kg

Wagon to add mobility (Option)

Specifications	NeoCoater
Composition	Main console + RP (20L/min)
Specimen table size	70mm diameter
Specimen table height	32mm to 73mm to the target
Power	Single phase 100V 50/60Hz 440W
Weight	Main console 9.3kg + RP9kg
Operation vacuum	～4Pa
Sputter time	1 min (standard), 2 min, 3 min selectable
Target	Au
Target size	ø49 × 0.05mm
Main console dimension	W200 × D230 × H325mm

*Specifications subject to change without notice.

NeoScope

JCM-5000

Table Top SEM

⚠ WARNING	TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING THE EQUIPMENT.

NIKON CORPORATION
6-3, Nishiohi 1-chome, Shinagawa-ku,
Tokyo 140-8601, Japan
phone: +81-3-3773-9026 fax: +81-3-3773-9062
http://nikon.com/products/instruments/

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Instruments Company

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Yokohama Plant