JEOL

Scientific/Metrology Instruments
卓上走查電子顕微鏡

Solutions for Innovation

JCM–6000

JCM-6000 is a full-fledged benchtop SEM with versatile functions.
Operation via touch panel enables an easy execution from observation to analysis.
Stylish appearance and lightweight basic unit greatly reduces restriction on installation space and place.

JEOL Ltd.

The Most Advanced Benchtop SEM

NeoScope™ JCM-6000

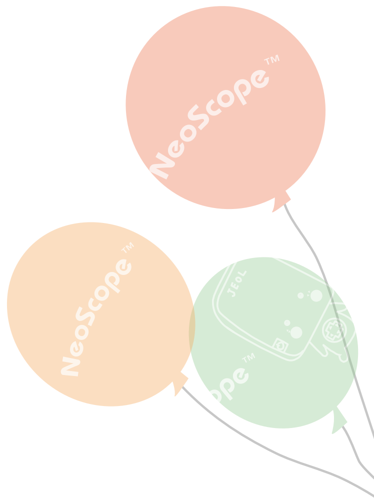
Advanced capabilities

High Vacuum or Low Vacuum mode selectable
Sample imaging at various angles using a tilt rotation motorized specimen holder*

※ *Optional accessory

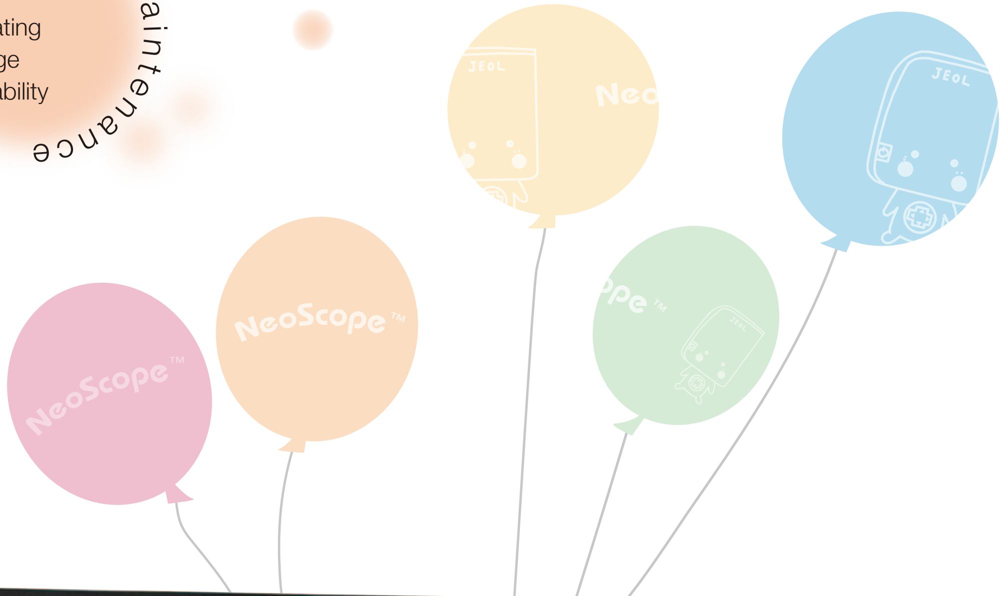
Intuitive operation

Utmost ease of operation through a touch panel system with intuitive GUI



Easy maintenance

Cartridge filament integrating
wehnelt for easy exchange
Auto gun alignment capability



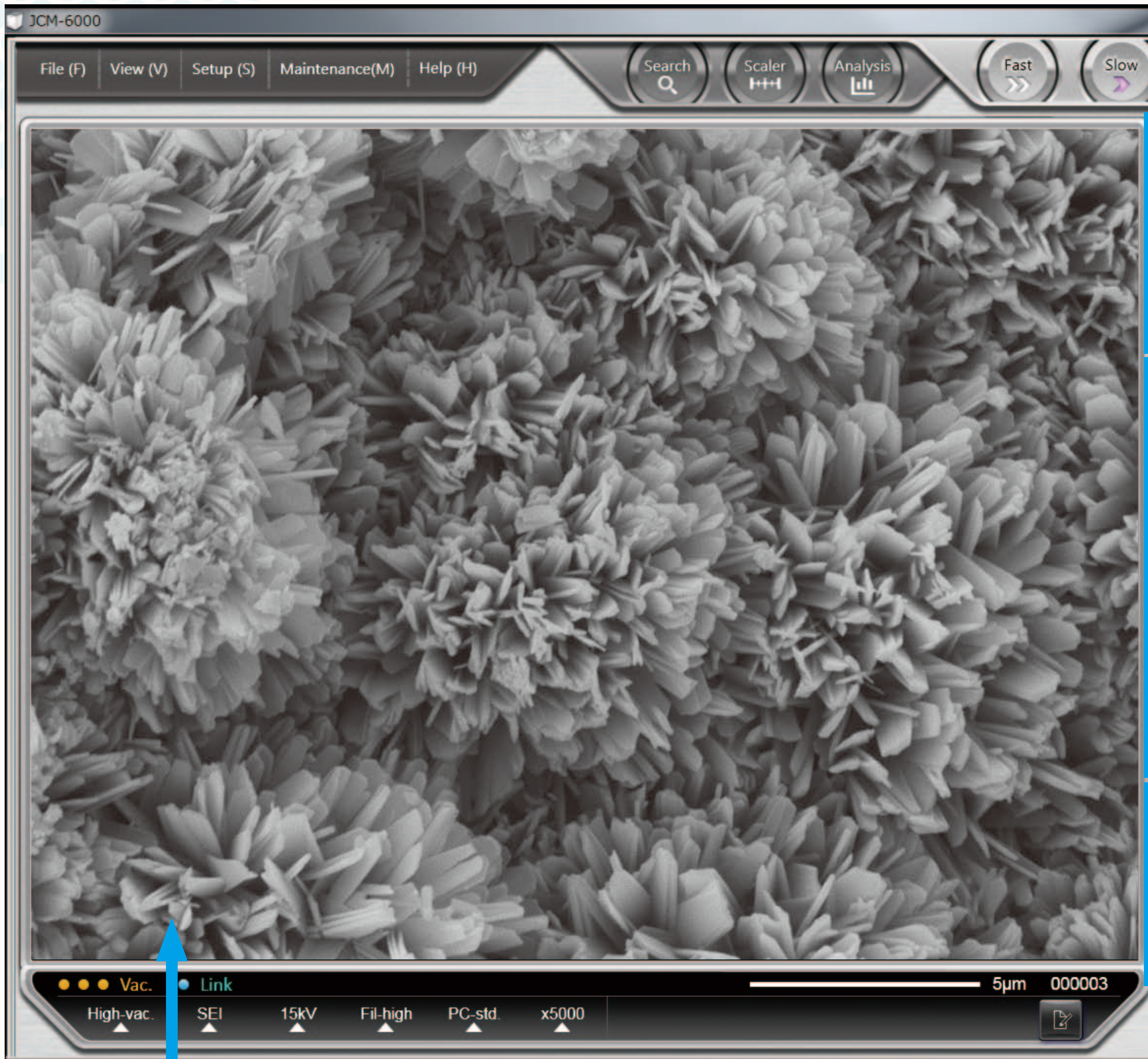
Quick response

Speedy system startup
A single touch to select
High Vacuum or Low Vacuum mode

Sample: Compound eye of an ant

Natural & Humanistic

Intuitive operation



Sample: Iron rust

Touch panel

JEOL's renowned image quality can be achieved with the utmost ease. A touch panel system with intuitive GUI will guide the operator through the imaging process with the level of ease equal to a smartphone.

Automated functions

Auto controls include alignment, focus, stigmator, contrast/brightness, and Full Auto. A single touch of Full Auto will initiate the entire imaging process to present an image instantly.

Manual control

An item touched and selected will turn green.
Hard, continued pressing of the buttons for coarse control. Light, intermittent tapping for fine control.
These control buttons combines the ease of operation from the touch panel and the familiar feel of the knobs.

Image search/ display

The Display image button is used to search a library of images for a specific image. Checking the Display image button after selecting a desired image will present a magnified view of the image for closer examination.

Minimum magnification image

Checking the Low Mag Image will allow the operator to view an image acquired at the lowest magnification immediately after the evacuation sequence was completed. This is a useful feature when examining the positioning of the sample.

Preset magnification

Up to 6 magnifications are presettable. Programming frequently used magnifications will increase operating efficiency. One of the buttons can be used to preset the current magnification.

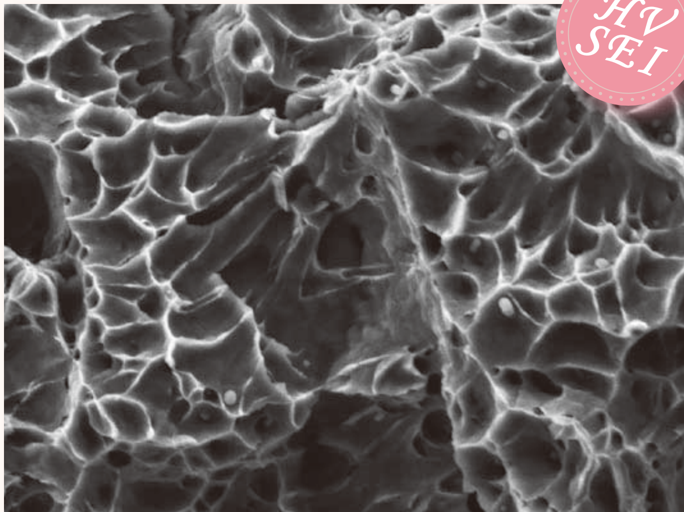
Advanced capabilities

01 Observe

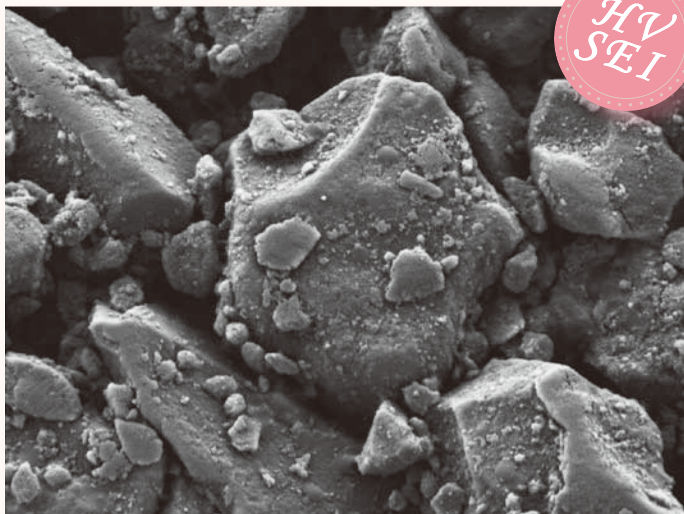
A single touch can switch the mode between High Vacuum and Low Vacuum, allowing the operator to acquire a variety of images.

High vacuum mode

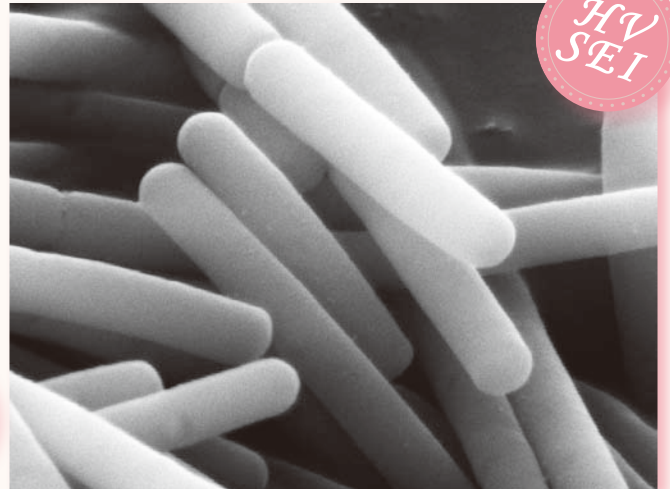
Secondary electron image in the High Vacuum mode can bring out clear images of samples that require high magnification image and samples with an uneven surface. Comparing SEI images with BEI images allows for closer examination of the surface structure.
The image mode may also be switched to backscattered electron image to examine compositional differences.



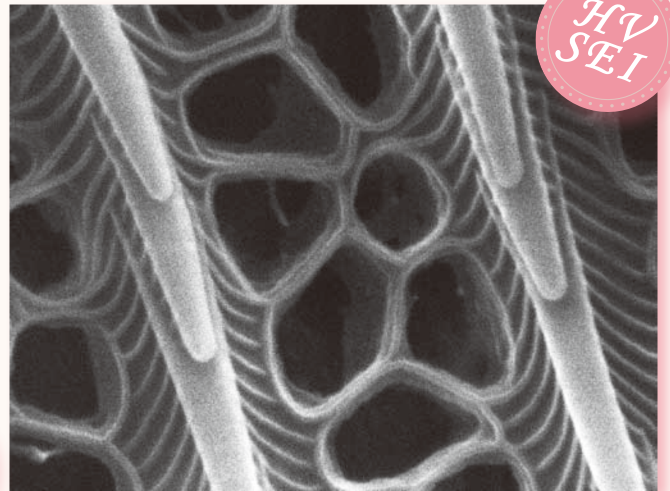
Sample: Metal fracture surface 5 μm
Accelerating voltage 15 kV, magnification 5,000×



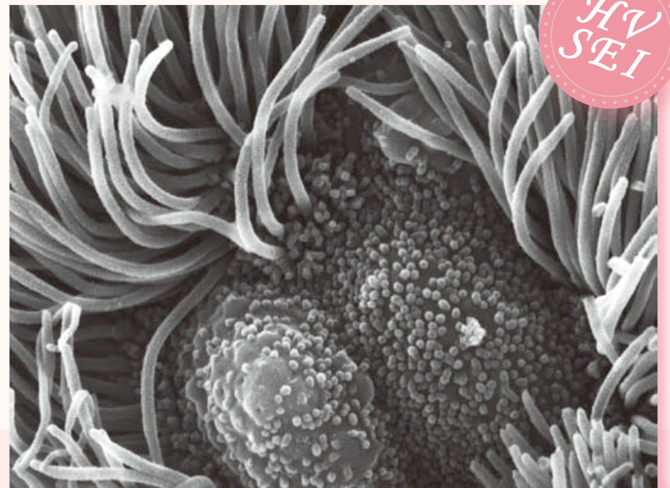
Sample: Coated paper 10 μm
Accelerating voltage 5 kV, magnification 3,000×



Sample: Yogurt culture 2 μm
Accelerating voltage 15 kV, magnification 20,000×

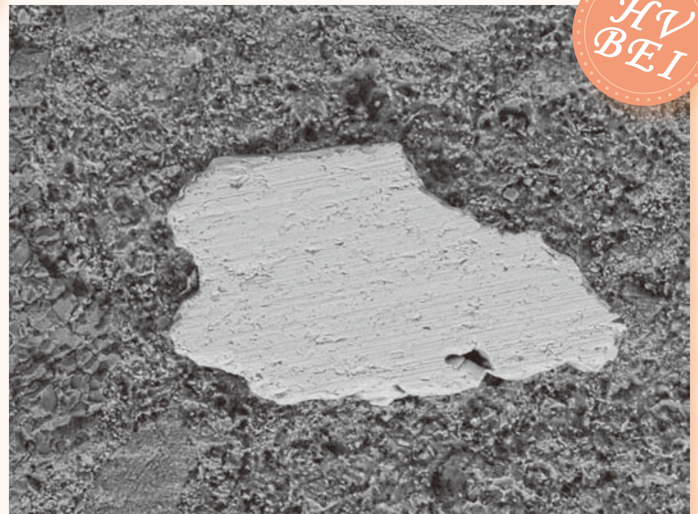


Sample: Butterfly scales 1 μm
Accelerating voltage 15 kV, magnification 30,000×



Sample: Mouse trachea 2 μm
Accelerating voltage 15 kV, magnification 10,000×

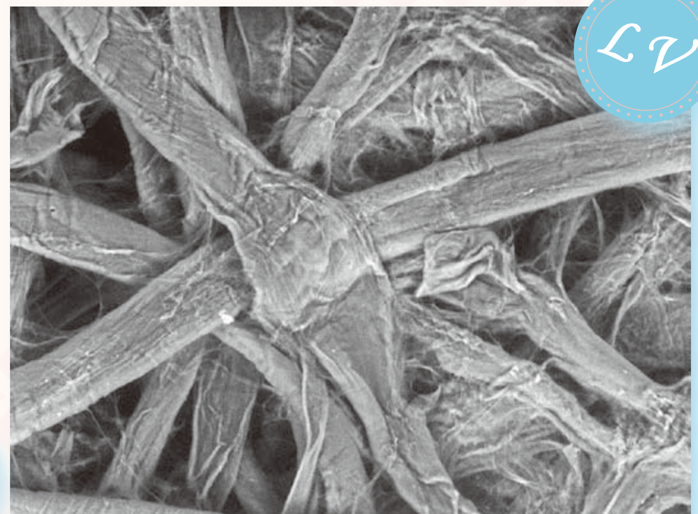
Sample: Aluminum alloy 10 µm — 10 μm
Backscattered electron image
Accelerating voltage 10 kV, magnification 3,000×



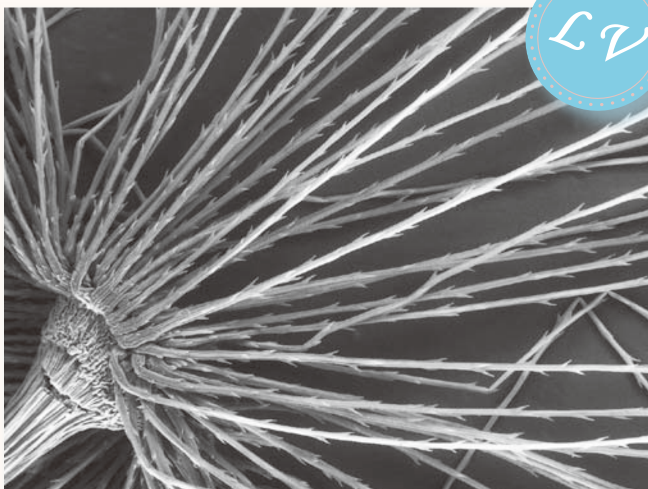
Sample: Concrete — 200 μm
Backscattered electron image
Accelerating voltage 15 kV, magnification 200×

Low vacuum mode

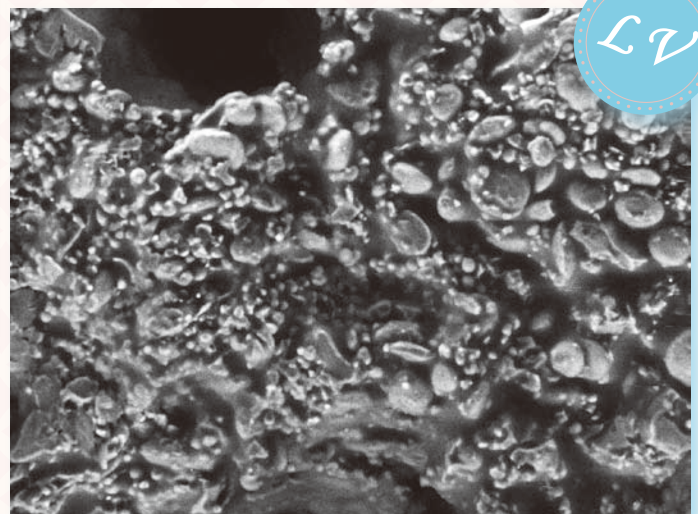
The Low Vacuum mode, a standard feature in NeoScope™, is designed to increase the pressure in the specimen chamber to neutralize the charges on the sample surface, allowing the operator to observe uncoated non conductive samples.
The Low Vacuum mode is also effective for samples containing a small amount of oil or water and gas-emitting samples that resist coating.



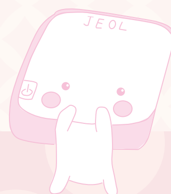
Sample: Filter paper — 50 μm
Accelerating voltage 15 kV, magnification 540×



Sample: Dandelion puff — 500 μm
Accelerating voltage 15 kV, magnification 80×



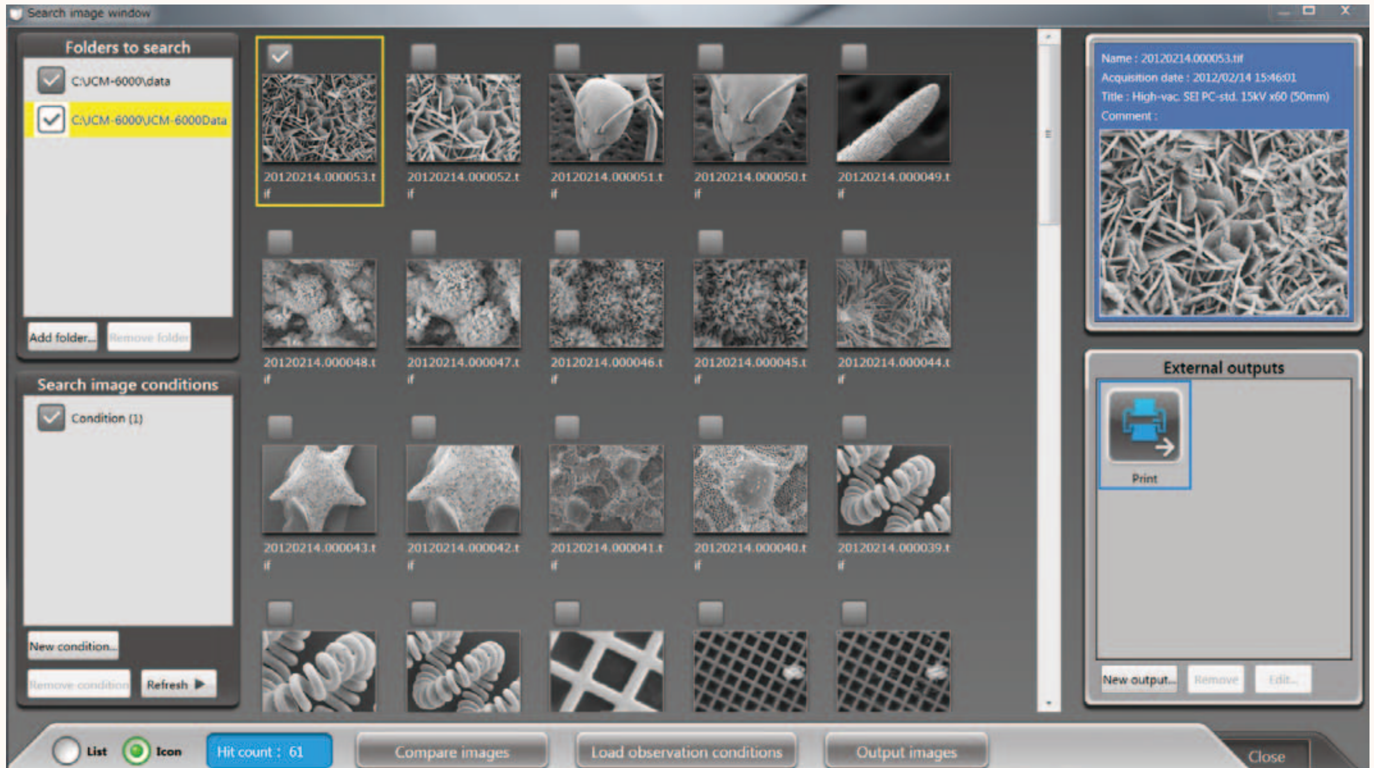
Sample: Cookie — 50 μm
Accelerating voltage 15 kV, magnification 500×



02 Search and print

Search image window

The Search image window allows the operator to select and print image data. The window also allows the operator to restore the photographing conditions (accelerating voltage. filament current, probe current, etc.) for any image.



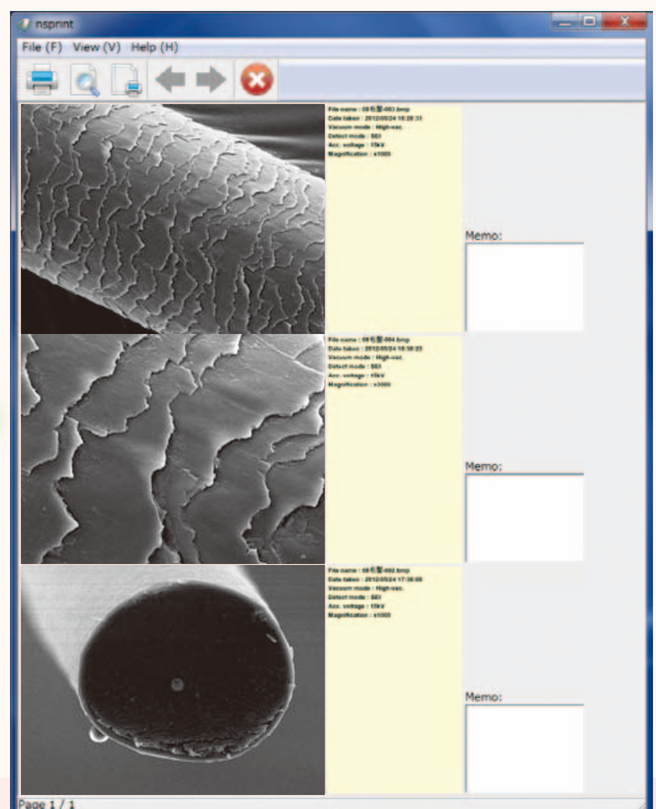
Search image window

Print

Checking a desired image and pressing the Output images button in the Search image window will display a preview image. If multiple images are selected, the system will automatically print 3 images per page.

Retrieve imaging conditions

NeoScope™ can retrieve the imaging conditions of any image that is saved in memory. The system will retrieve the data when an image is selected and the Load observation conditions button is pressed. It is a convenient feature for routine operation.



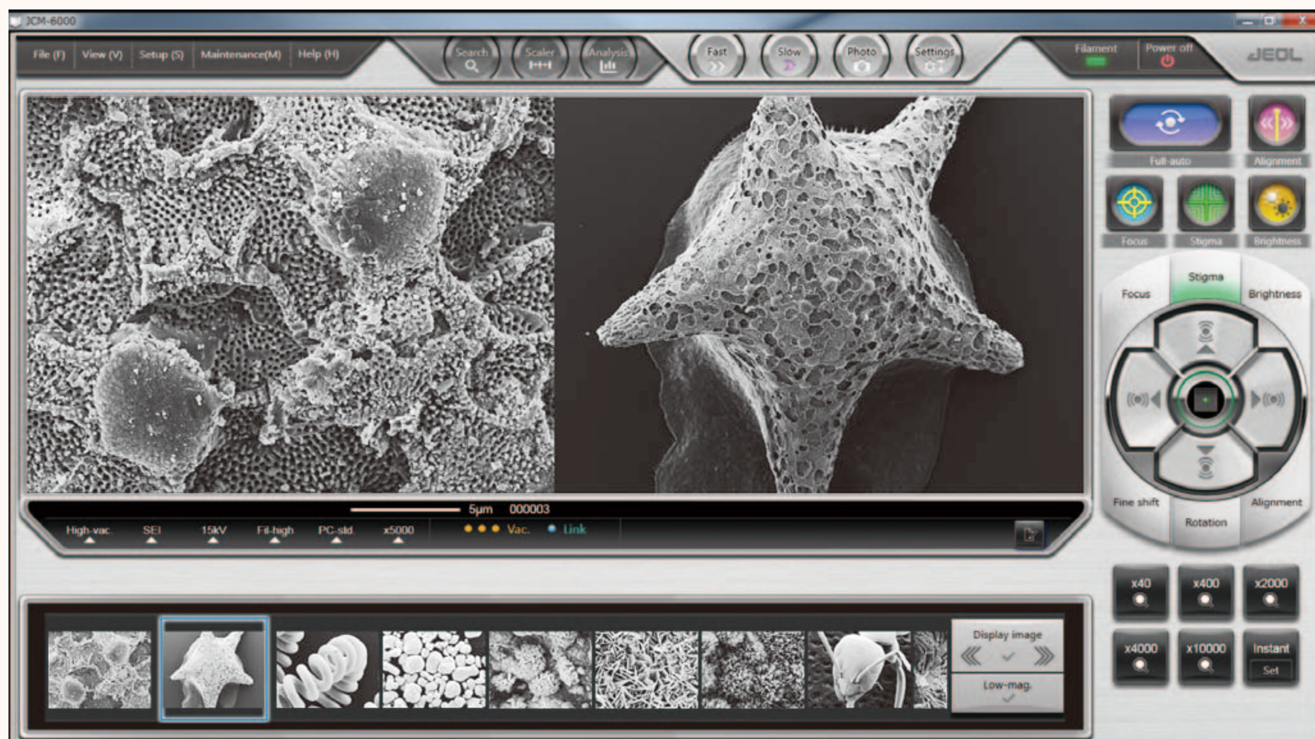
Sample: Human hair

Print view

03 Compare

Dual frame display

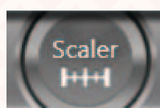
NeoScope™ can simultaneously display live and retrieved images. In the example below, a low magnification image is presented on the right while a magnified live image on the left. This allows the operator to compare a current image with another image retrieved from memory.



Sample: Star sand

04 Measure

EDS



NeoScope™ incorporates a feature to measure the distance between 2 points. When the Scaler button is selected, the functions needed for measurement will be assigned to the auto control buttons. The measured results can be saved in image and CSV data files.

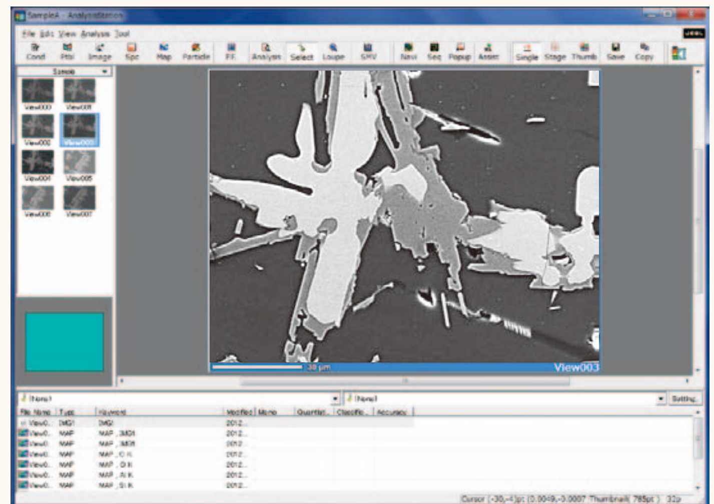
No.	Length	[unit]	Angle[deg]
1	5.79	um	44
2	5.47	um	12
3	6.12	um	89
4	5.54	um	41

Sample: Metal particles

05 Elemental analysis

EDS

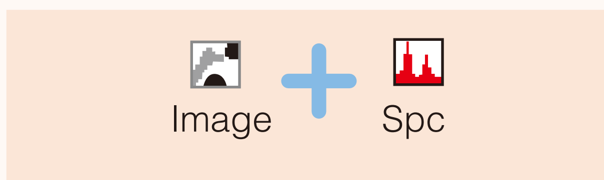
Pressing the Analysis button will open the EDS view. EDS supports qualitative/quantitative analysis, point analysis, and mapping (elemental distribution).

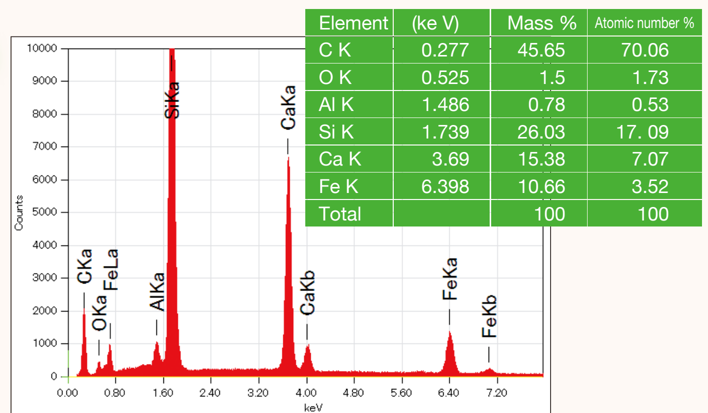


Sample: Black ore (mineral)

Qualitative/Quantitative analysis

Two buttons, Image and Spc, initiate analysis.
Pressing the Quantitative button after data acquisition will display quantitative results.

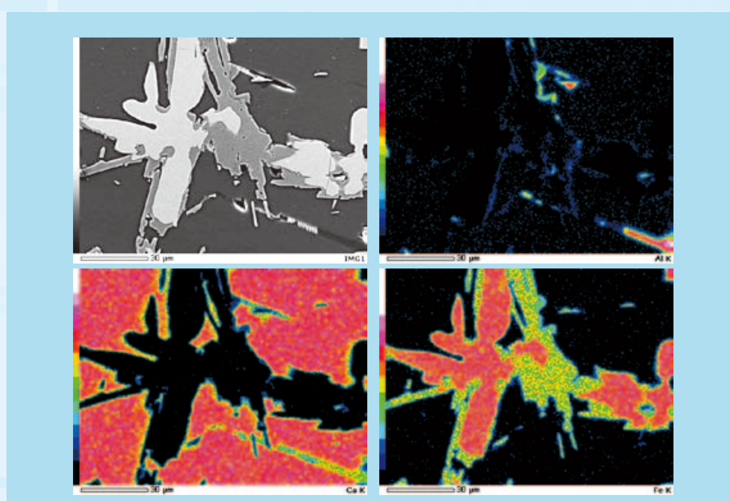




Element	(ke V)	Mass %	Atomic number %
C K	0.277	45.65	70.06
O K	0.525	1.5	1.73
Al K	1.486	0.78	0.53
Si K	1.739	26.03	17. 09
Ca K	3.69	15.38	7.07
Fe K	6.398	10.66	3.52
Total		100	100

Mapping (elemental distribution)

Pressing the Map button will initiate elemental mapping of the image. The mapped results will show 2 dimensional distribution of the constituent elements.



+α Using mapped results, the operator can:

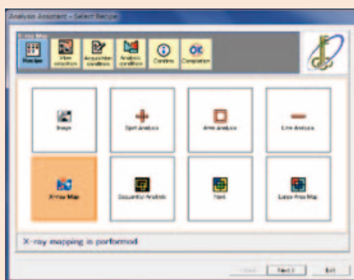
- Create quantitative maps in color where each color represents the quantitative value of an element.
- Reconstruct maps of additional elements by data processing alone after analysis.
- Select a specific area on the map and extract the spectrum
- Overlap elemental maps and identify where the elements of interest exist in the area of view or how they are overlapped.

Powerful aid in complicated analysis

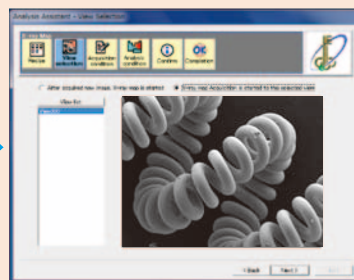
Analytical Assistance is one of the functions to help the operator navigate any data acquisition process, including mapping and line analysis.

When a type of analysis is selected from the Analytical Assistance view, the system will display a series of process steps needed for the analysis. The buttons shown in the view will guide the operator through any analytical procedure.

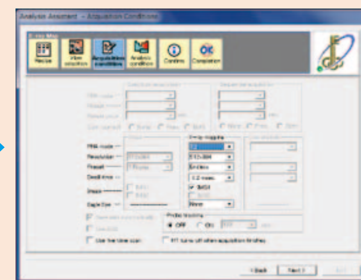
An example of mapping sequence



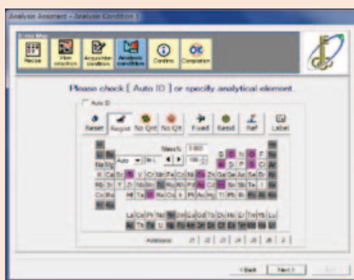
Select MAP.



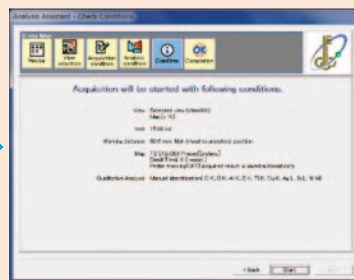
Select an image.



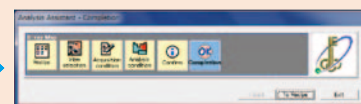
Select conditions.



Select elements.



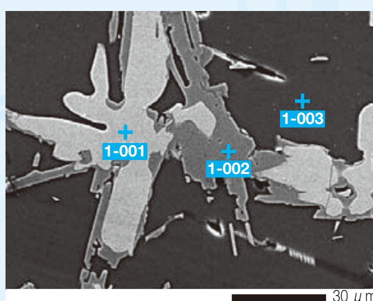
Verify conditions.

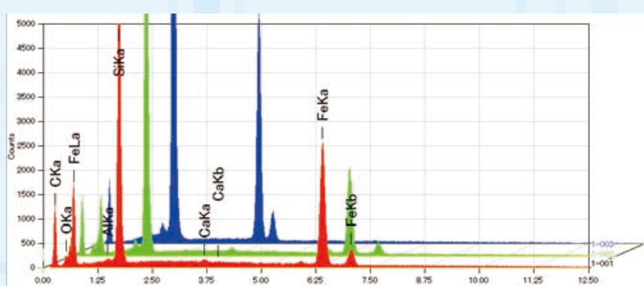


Start analysis.

Point analysis

When multiple analytical points are selected on the image, the system will automatically analyze the elements on each point, and display spectral data. These spectra can be compared after the analysis is completed.

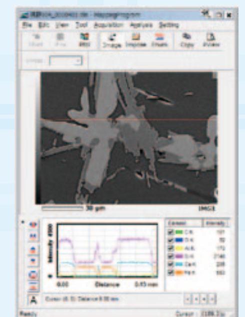




Line analysis

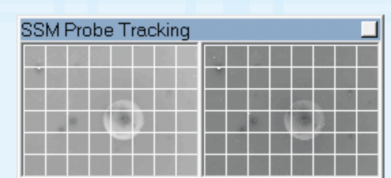
When a line is defined on the image, the system will begin measuring relative concentration changes in the elements on the line.

The elements may be edited after the analysis is completed.



Probe tracking

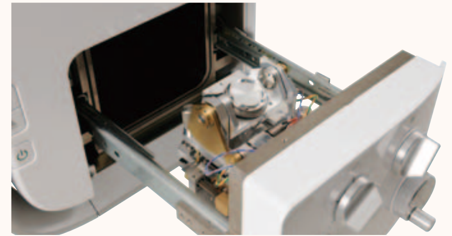
Probe tracking is designed to maintain a stable analytical point for prolonged operation.



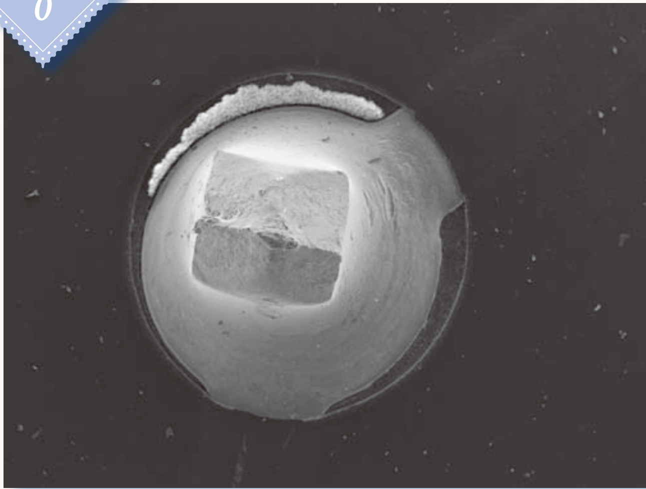
06 View at varying angles OPTION

Tilting and Rotating Motor Drive Holder

The Tilting and rotating motor drive holder allows the operator to examine samples at different angles.
Observation of a tilted sample results in 3 dimensional information of the sample.
The tilt rotation motorized specimen holder is optional.



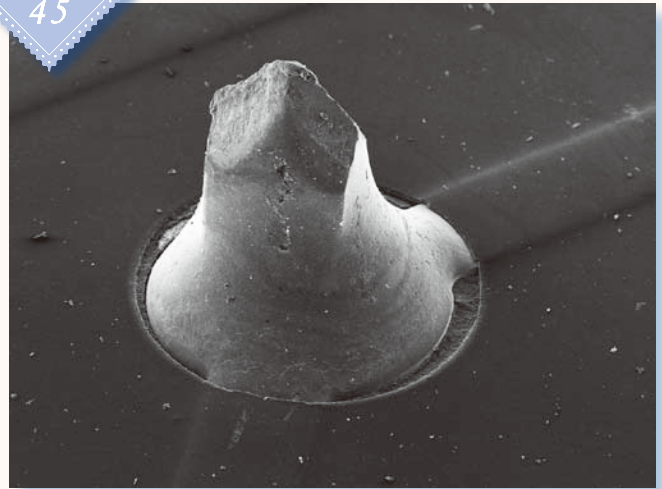
Tilt 0°



Sample: Substrate; magnification 45×

10 μm

Tilt 45°



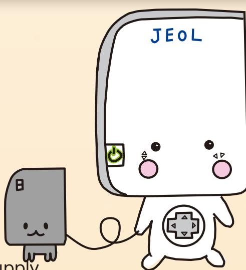
Sample: Substrate; magnification 45×

10 μm

Design your own operating environment

You can select any wallpaper for your GUI.
Select one that you desire.

Sample: Spiderwort, uncoated, Low Vac mode



Mr.Power Supply

JCM-6000 character 「Rokumaru kun」

Quick response

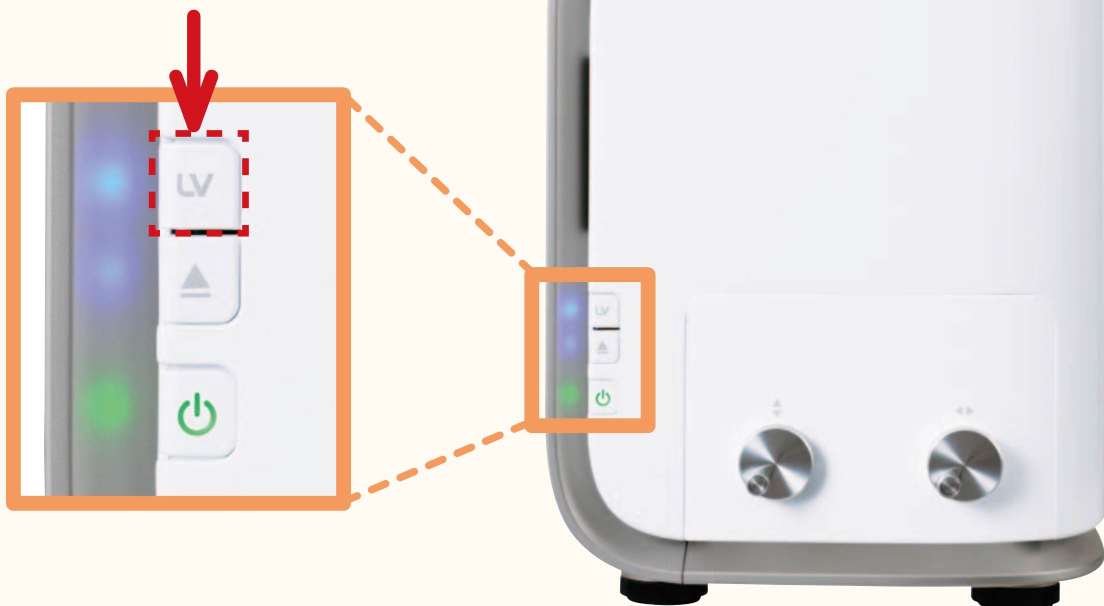
Startup

NeoScope™ will be ready for operation in 3 minutes after it is powered on.

Placing a sample and closing the door will automatically initiate the evacuation sequence.
An SEM image will be displayed when the evacuation is completed.

Selecting High Vacuum or Low Vacuum mode

A single touch on the panel can switch the mode between High Vacuum and Low Vacuum.



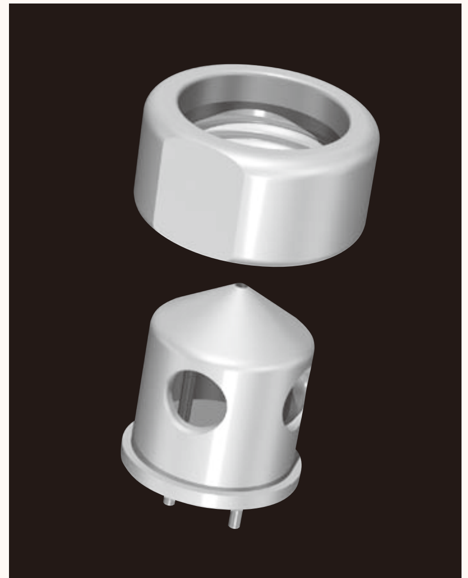
EDS analysis

NeoScope™ incorporates a JEOL proprietary dry SD detector. The detector is always ready for analysis during SEM imaging.

Easy maintenance

Filament

Changing filaments is simple and easy.
Unlike the conventional filament assembly that requires cleaning of the wehnelt, the electron gun in NeoScope™ uses a pre-centered cartridge filament that integrates a wehnelt. Since the cartridge is replaced as a unit, cleaning of the wehnelt or centering of the filament is not needed. The exchange process is quick and insures correct positioning of the filament.



Filament-wehnelt integral grid

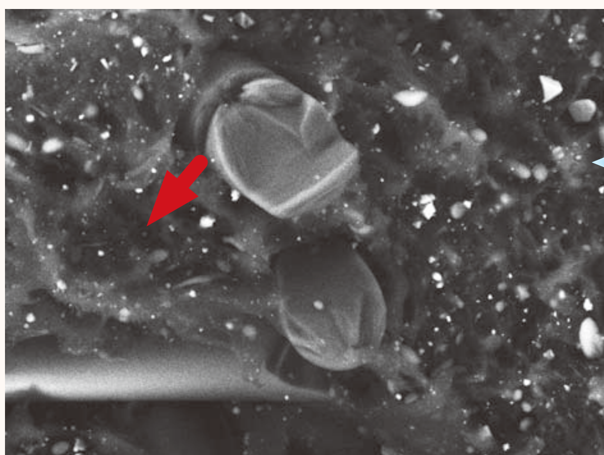
Auto gun alignment

Any new filament that is installed requires alignment to insure good image quality. This alignment process is fully automated in NeoScope™.

Peripherals

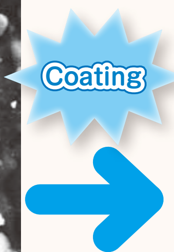
Coating device

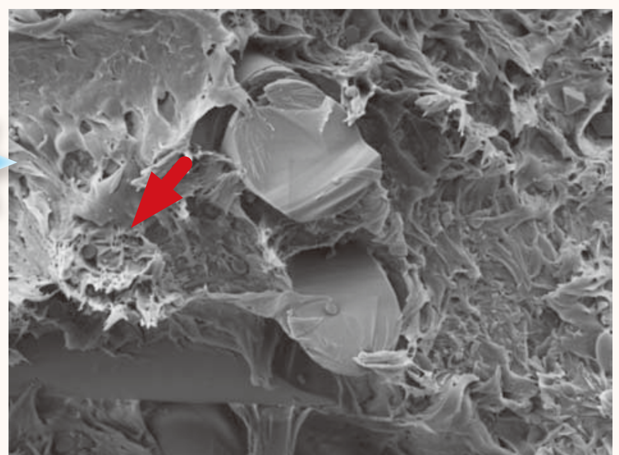
Coating allows non conductive samples to be observed in the SEI mode under high vacuum. Comparing the SEI image with the low vacuum BEI image allows for closer examination of the fine surface structure.



20 μm

Sample: Resin fracture surface , Uncoated
Low Vacuum mode, backscattered electron image×
Accelerating voltage: 15 kV; magnification: 1,500×





20 μm

Sample: Resin fracture surface, gold coated
High Vacuum mode, secondary electron image
Accelerating voltage: 15 kV; magnification: 1,500×

Specifications

Magnification	Secondary electron image: ×10 to ×60,000 Backscattered electron image: ×10 to ×30,000 (when image size is 128 mm × 96 mm)
Imaging mode	Secondary electron image, backscattered electron image
Accelerating voltage	Secondary electron image; 5 kV, 10 kV, 15 kV (3 stages) Backscattered electron image; 10 kV, 15 kV (2 stages)
Electron gun	Small gun with cartridge filament integratinng wehnelt
Bias current	Auto bias (linked to accelerating voltage and filament current)
Condenser lens	Two stage electromagnetic zoom condenser lens
Objective lens	Electromagnetic lens
Auto magnification correction	Magnification corrected with reference to sample height (7 mm, WD56 to 53 mm, WD10)
Preset magnification	6 levels, user programmable
Specimen stage	Manual control for X and Y: X: 35 mm, Y: 35 mm
Maximum sample size	70 mm diameter × 50 mm height
Specimen exchange	Draw-out mechanism
Image memory	One, 1,280 × 960 × 16 bits
Pixels	640 × 480, 1,280 × 960
Image processing	Pixel accumulation Image accumulation (recursible)
Automated functions	Filament, alignment, focus, stigmator, exposure
Metrology	Distance between 2 points, angles
File format	BMP, TIFF, JPEG
Computer	PC (desktop PC), OS Windows®7
Monitor	23 inch wide LCD monitor (touch panel)
Evacuation system	Fully automatic, TMP: 1, RP: 1

Optional accessories

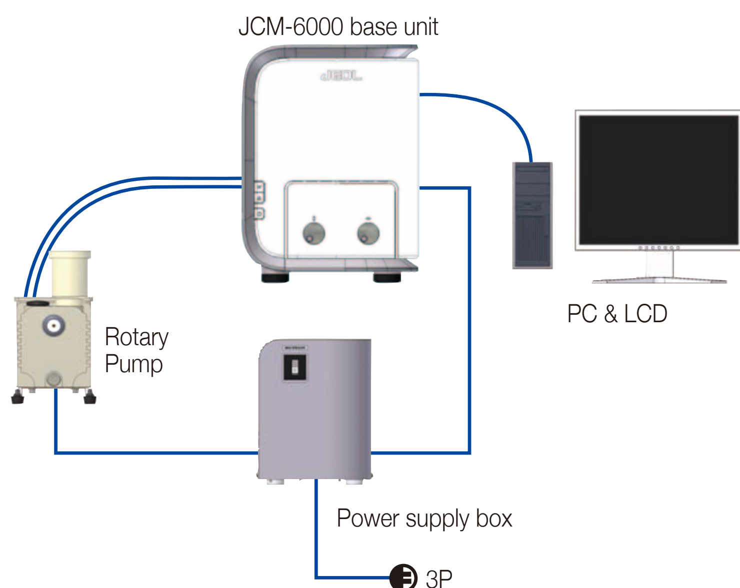
- Tilt rotation motorized holder
  Tilt: -15° to +45°; rotation: 360°
- EDS

Installation requirements

Power supply	Voltage: Single phase AC 100 V (120 V, 220 V, 240 V) 50/60 Hz, 700 VA (AC 100 V), 840 VA (AC 120 V), 880 VA (AC 220 V), 960 VA (AC 240 V), Fluctuation ±10% or less, with grounding
Installation Room	
Room temperature	15 to 30°C
Humidity	60% or less
Operation table	Sturdy table with a loading capacity of 100 kg or more
Weight	Main console: approximately 50 kg RP: approximately 9 kg Power supply box: approximately 10 kg
Base unit dimensions	(Width) (Depth) (Height) 325 mm × 490 mm × 430 mm

※ Specifications subject to change without notice.
※ The official name of Windows7 is Microsoft(R), Windows(R), Operating System.
※ Windows is a registered trademark of Microsoft Corp. in the U.S.
※ Other trademarks referenced in this catalog and marked with* are the property of our allied companies.

System composition



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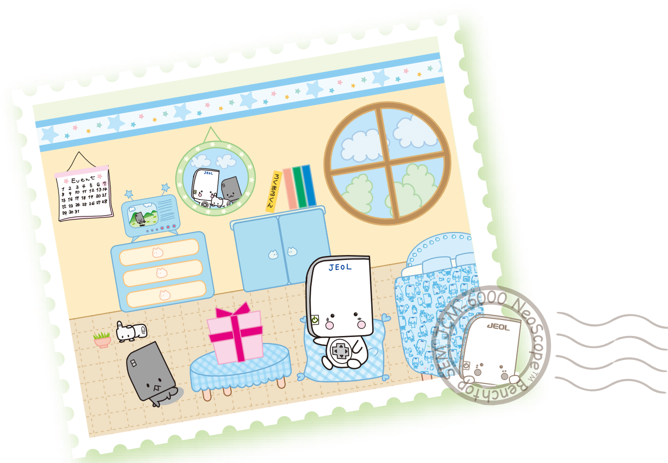
Iron rust	4
Yogurt culture	6
Metal fracture surface	6
Butterfly scales	6
Coated paper	6
Mouse trachea	6
Aluminum alloy	7
Concrete	7
Filter paper (LV)	7
Dandelion puff (LV)	7
Cookie (LV)	7
Human hair	8
Star sand	9
Metal particles	9
Black ore (mineral)	10
Substrate	12
Spiderwort (LV)	12
Resin fracture surface (LV, HV)	14



JCM-6000 NeoScope™

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*Products: Hardware and its technical information (including software)

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

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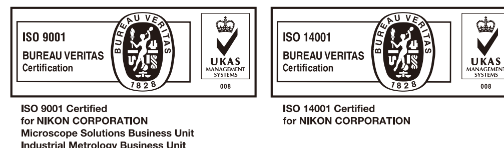
Shinagawa Intercity Tower C, 2-15-3,
Konan, Minato-ku, Tokyo 108-6290, Japan
phone: +81-3-6433-3701 fax: +81-3-6433-3784
http://www.nikon.com/instruments/



ISO 9001 Certified
for NIKON CORPORATION
Microscope Solutions Business Unit
Industrial Metrology Business Unit

ISO 14001 Certified
for NIKON CORPORATION

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