

Hitachi Tabletop Microscope
TM3030/TM3030Plus

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Inspire the Next



Science for a better tomorrow



Hitachi Electron Microscope

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For
standard
browsers



For
Facebook
Apps

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

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

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HTD-E240 2017.3

Shaping The Future of Electron Microscopy

Tabletop Microscope TM3030 Series



Tabletop Microscope TM3030 Series



*Screen shows simulated image.

The Hitachi TM Series: Pioneering the Future of Tabletop SEM

An instrument so compact that it fits on your desktop and as easy to operate as your digital camera. A scanning electron microscope designed for any level of expertise.

TM-I000

Released April 2005



- The first Hitachi tabletop microscope!
- EDX functionality added (2008 and later)

TM3000

Released December 2009



- Capable of observations at 30,000x magnification
- Added surface mode

TM3030

Released May 2013



- Improved image resolution
- Higher-resolution surface mode

TM3030Plus

Released August 2014



- Equipped with low-vacuum secondary electron detector
- Capable of observations at 60,000x magnification

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

2015

2016

Simple and speedy

Start observing images in just 3 minutes
Obtain the data you need quickly

►P3

No sample preparation

Possible to observe even non-conductive samples without prior preparation

►P5

High-sensitivity backscattered electron detector

Determine the composition and three-dimensional structure of samples at high magnification up to 60,000x

►P7

High-sensitivity low-vacuum secondary electron detector

First-in-class ability to observe secondary electron images (surface morphology) under low vacuum

TM3030Plus

►P9

Mixed images
(backscattered electron images + secondary electron images)

Simultaneous acquisition of surface morphology and material compositional information

TM3030Plus

►P11

Options

Variety of options from high-throughput EDX instruments to a choice of stages to meet your needs

►P12

Simple
and speedy

Start observing images in just 3 minutes. Obtain the data you need quickly.

Tabletop Microscope
TM3030 Series

Time to image:
3:00

From morphology observations to elemental analysis, everybody in your laboratory can see research results easily and quickly.

TM3030
Series

Procedural flow for
making observations:

1 Mount sample on sample stage



Sample: Printed circuit board

Proceed directly with no need for vapor deposition

In typical systems,
vapor deposition would be required
(non-conductive materials)



2 Mount sample stage in instrument



Accommodates samples of sizes up to 70 mm
(diameter) x 50 mm (thickness)
* We recommend using gloves to prevent contamination.

3 Initiate observation



Sample: Printed circuit board

Images observed in approximately 3 minutes

Space saving



Tabletop installation

No cooling water is needed, so installation is quick and easy and requires only a standard 100-240 V AC power supply. Power supply unit is designed to fit into the main unit.



1 minute for
chamber venting



1 minute for
specimen exchange

It takes 1 minute to vent the TM3030 specimen chamber. The high-performance vacuum system provides fast chamber venting.

Comparison of chamber venting time

TM3030 Series	About 1 min	← Time shortened →
TM-1000	About 2 min	



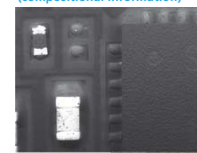
Equipped with diaphragm
pumps that need no oil

The vacuum-exhaust system uses diaphragm pumps that do not use oil. This eliminates the need to replace oil-mist traps or replenish the oil supply.



Automatically collect many types of data—
then switch back and forth with a single click!

Backscattered electron image
(compositional information)



Secondary electron image
(surface morphology)



Mixed images
(backscattered electron images
+ secondary electron images)

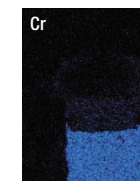
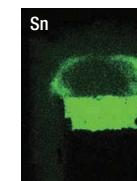
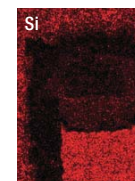
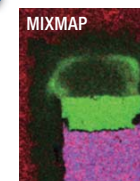


TM3030Plus

Sample: Printed circuit board



Rapid acquisition of element maps



Sample: Printed circuit board

From observation to analysis in no time!

Possible to observe samples without sample preparation



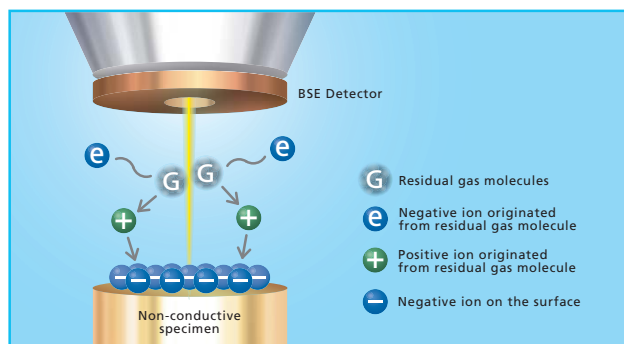
Low-vacuum conditions make it easy to observe samples—including even samples that contain water or that readily acquire electric charge—with no preprocessing

Conventional SEM* techniques cannot be used to observe non-conductive materials due to accumulation of electrons at the sample surface, causing the sample to acquire an electric charge. It is possible to observe such samples by—for example—applying a metallic coating; however, not only is this cumbersome and time-consuming, but it also leaves the sample surface covered in metal, which complicates subsequent characterization such as EDX analysis. The TM3030 series uses low-vacuum observation techniques which allow even non-conductive samples to be observed as is, with no need to apply metallic coatings.

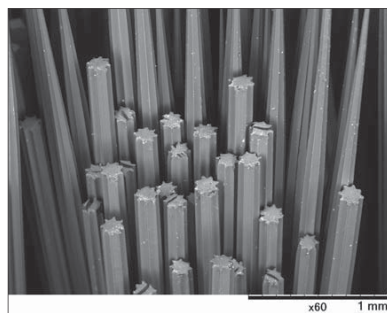
*Scanning Electron Microscope

Low-vacuum microscopy

By utilizing a low vacuum level inside the specimen chamber, more gas molecules are present. These gas molecules G can collide with the electron beam to generate positive ions $+$ and electrons e . Each positive ion $+$ can be neutralized by one of the excess electrons e on the specimen surface. Then the excess electrons on the surface of the sample are removed and the charge-up effect is eliminated or reduced.



Low-vacuum operation allows the sample to be observed right away as is!



EDX, charge-up reduction mode
Magnification: 60x

Sample: Tooth brush

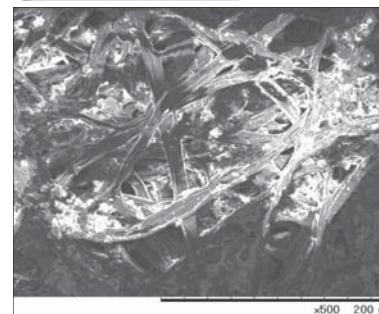
Charge-up reduction



Charge-up reduction mode

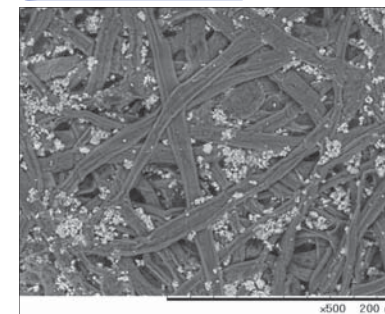
The TM3030 can operate either in "standard mode" or "charge-up reduction mode" depending on the extent of the specimen charging.

Standard mode



With image artifact due to charge-up

Charge-up reduction mode



Without image artifact due to charge-up

Sample: Recycled paper

Surface and composition analysis



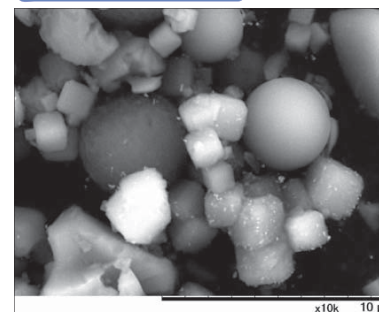
A wide variety of observations are possible under low vacuum

TM3030Plus

Even samples that are easily charged—such as powders or fibers—may be observed as appropriate for the objective in question.

Backscattered electron image

► P7

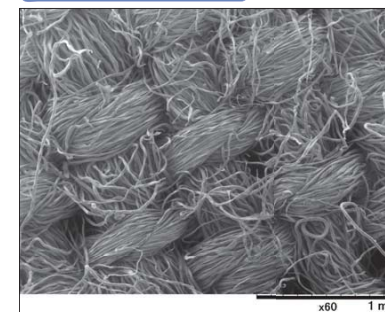


Standard (15 kV), charge-up reduction mode
Image signal: Backscattered electrons; magnification: 10,000x

Sample: Powder spray

Secondary electron image

► P9



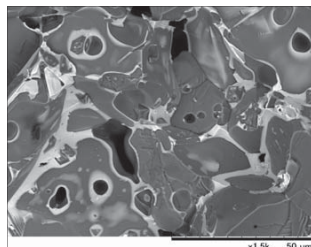
Surface (5 kV), charge-up reduction mode
Image signal: Secondary electrons; magnification: 60x

Sample: Japanese Yumihmagasuri textile fibers
Sample courtesy of Faculty of Medicine, Tottori University, Sumire Inaga, Ph.D.

High sensitivity

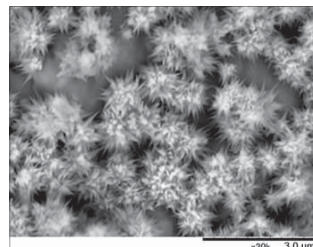
High-magnification observations with clear composition contrast

All instruments in the TM3030 series are equipped with a high-sensitivity, 4-subdivision backscattered electron detector, offering a powerful tool for obtaining information on the distribution of regions of distinct composition, in addition to surface roughness and corrugations.



EDX (15 kV)
Magnification: 1,500x

Sample: Varistor



Standard (15 kV)
Magnification: 20,000x

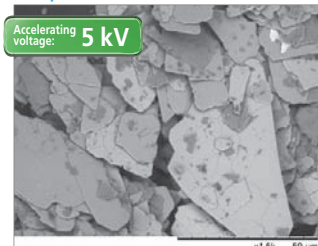
Sample: Hydrogen storage alloy

Surface mode (accelerating voltage 5 kV)

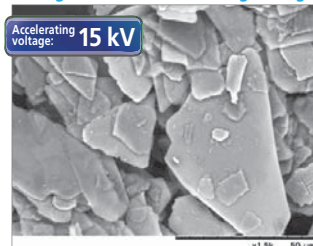
Acquire compositional information for the sample surface

In typical instruments, low accelerating voltages yield reduced signal strength, resulting in dark images. The TM3030 series features a high-sensitivity detector that produces bright images—reflecting surface information—even at an accelerating voltage of 5 kV.

Comparison of backscattered electron images at high and low accelerating voltages



Surface (5 kV)
Magnification: 1,500x



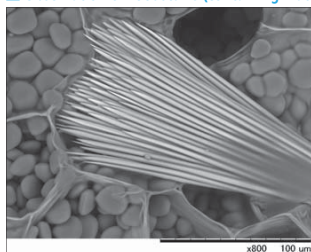
Standard (15 kV)
Magnification: 1,500x

Sample: EYESHADOW

Some illustrative observations

Examples of observations using the high-sensitivity backscattered electron detector

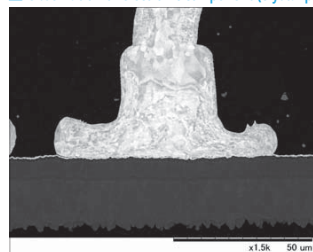
■ Observation of foodstuffs (containing water)



Standard (15 kV)
Magnification: 800x

Sample: Cross section of Chinese yam

■ Observation of electronic component (crystal particle morphology)



Surface (5 kV)
Magnification: 1,500x

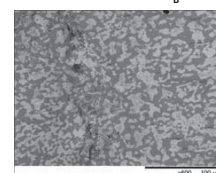
Sample: Gold bonding wire



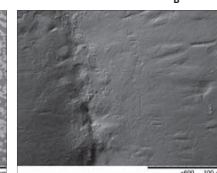
Directional imaging using the 4-segment detector

The TM3030 features a backscattered electron detector with 4 independent segments. By adding or subtracting the signals from the segments in different combinations it is possible to emphasize compositional or topographic detail in the image, as well as produce "shadowed" images which highlight the sample from a particular direction.

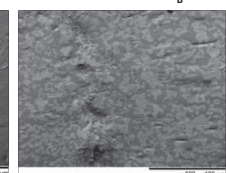
Compo



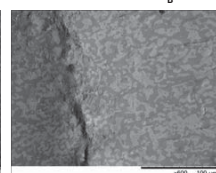
Topo



Shadow 1



Shadow 2



Sample: Solder

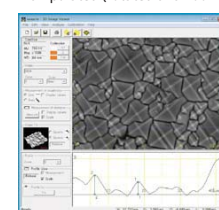


Three-dimensional models allow height measurements

3D-VIEW

Option

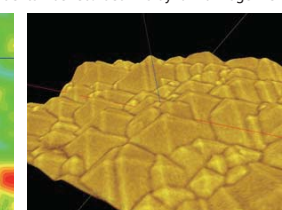
A 3-dimensional model can be generated without sample tilting and alignment, using 4 directional surface profiles from the signals acquired with each segment of the 4-segment backscattered electron detector. Surface roughness can be measured easily based on the height measurement between 2 points: the surface area and cross-section profile. The 3-dimensional model under observation can be manipulated (rotated and zoomed), while rotational manipulation of the model can be recorded in a dynamic image file.



3D-Image Viewer main screen



16-color contour lines



Bird's-eye view
Sample: Solar cell

Key specifications of 3D-View

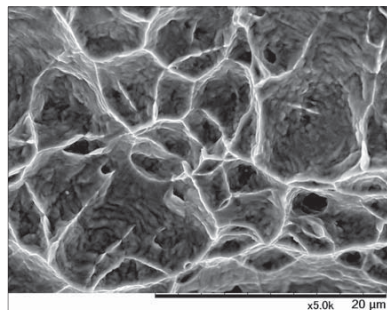
Item	Description
Import functionality	Automatic selection and reading of 4-element image data (with automated acquisition of observation conditions)
Measurement performance	Depth precision: ±20% (typical value). Depends on calibration accuracy, sample composition, observation mode, and observation conditions. Angles that may be detected: ±50 (typical value). This is a typical value assuming the observation mode is set to Standard mode. The typical precision values listed here do not apply to cases in which the observation mode is set to Charge-up reduction mode and the observation conditions are set to Surface.
Measurement functionality	Display cross-sectional profile / Perform various types of calibration / Measure the horizontal (X-direction) separation, vertical (Y-direction) separation, length, and angle between any two points specified in the image / Measure the surface area / Measure the horizontal (X-direction) separation, vertical (Y-direction) separation, length, and angle between any two points specified in the cross-sectional profile / Measure the surface roughness on a cross-sectional profile / Zoom a cross-sectional profile display in the depth direction / Perform baseline calibrations (straight lines and curves) / Display bird's-eye view / Display color contour lines
3D display functionality	Rotate, zoom / Record a video image of the display history (as an AVI file)
Supported OS	Windows® 7 Professional
Capture functionality	Automatic acquisition of 4-element image data from the backscattered electron detector
Brightness adjustment for captured images	Automatic

Note: For samples with extremely steep features that exceed the angular range of the detector, it may not be possible to display the surface-roughness structure accurately.

High sensitivity

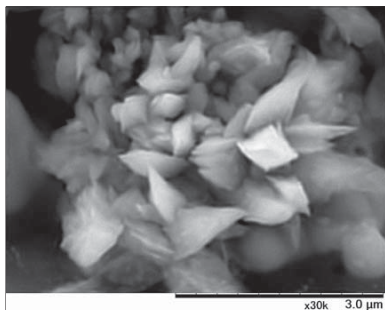
Clear observations at high magnification

The TM3030Plus is equipped with a high-sensitivity low-vacuum secondary electron detector installed on higher-end instruments, making it a powerful tool for observing the morphology of the outermost surface of samples.



Standard (15 kV)
Magnification: 5,000x

Sample: Cleaved metal surface



Standard (15 kV)
Magnification: 30,000x

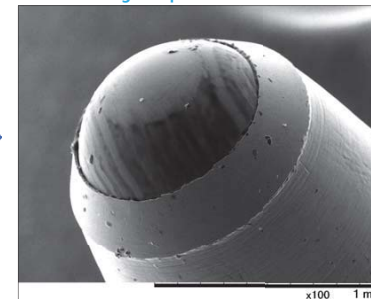
Sample: Metal interconnect in a solar cell

Illustrative observations

Examples of secondary electron images observed under low vacuum



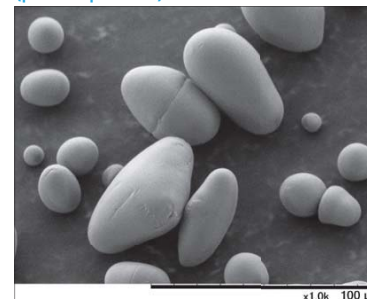
■ Observation of a pen tip with
oil-containing components adsorbed



Surface (5 kV)
Magnification: 100x

Sample: Ball-point pen tip

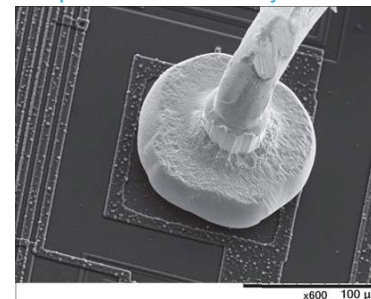
■ Observation of foodstuffs
(powder particles)



Surface (5 kV)
Magnification: 1,000x

Sample: Corn starch

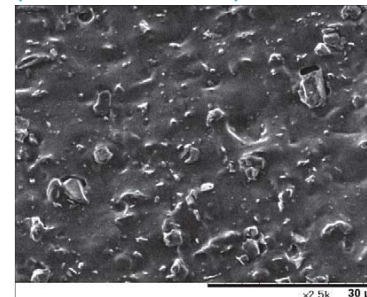
■ Observation of a printed circuit board
with poor electrical conductivity



Standard (15 kV)
Magnification: 600x

Sample: Wire bond

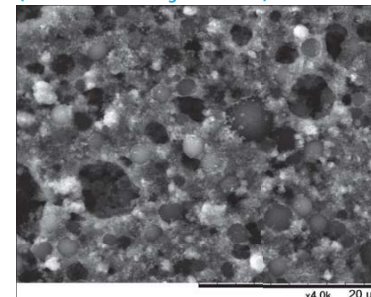
■ Observation of rubber
(a non-conductive material)



Surface (5 kV)
Magnification: 2,500x

Sample: Raw rubber

■ Observation of an emulsion
(a water-containing substance)



Standard (15 kV)
Magnification: 4,000x

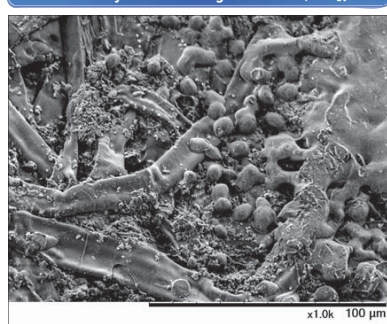
Sample: Sunscreen emulsion

Observe secondary electrons under low vacuum

Allows surface observations of non-conductive samples and samples containing water or oil with no need for preprocessing

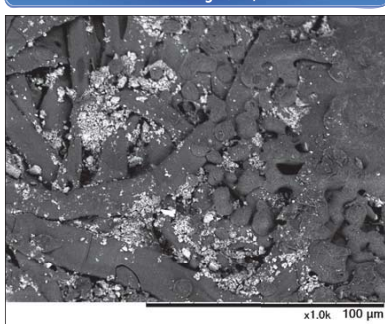
Observations are no longer restricted to conductive samples—now it is possible to observe non-conductive samples, and even samples containing water or oil, with no preprocessing required. You can also switch easily between secondary electron and backscattered electron images with the press of a single button.

Secondary electron image (surface morphology)



Surface (5 kV)
Magnification: 1,000x

Backscattered electron image (compositional information)



Sample: Printed characters on paper

Mixed images (backscattered electron images + secondary electron images)

Simultaneous acquisition of surface morphology
and material compositional information

TM3030Plus

Options

Image comparison &
verification software

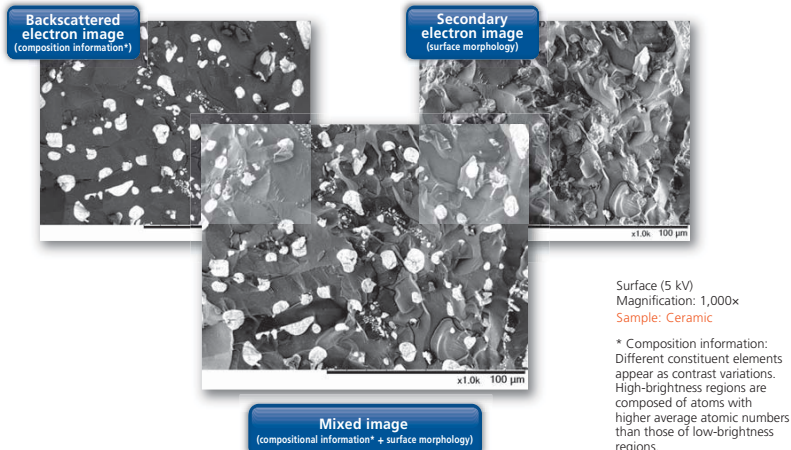
Tabletop Microscope
TM3030 Series

Mixed images



Combining backscattered electron and secondary electron information in a single observation

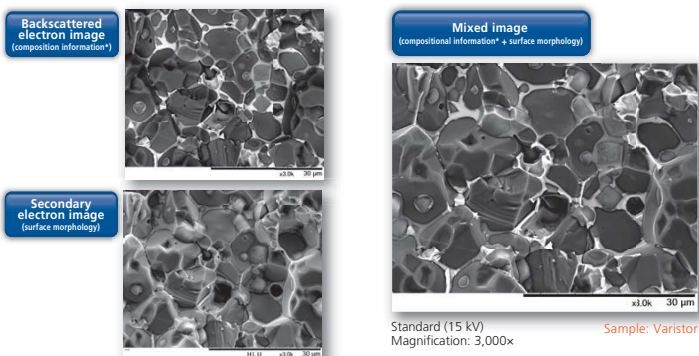
The TM3030Plus performs not only separate acquisition of backscattered electron images and secondary electron images, but also mixed images combining both types of information. This allows detailed morphological and compositional information about your sample to be combined for simultaneous visualization, yielding observations that utilize the strengths of both probes. Switching between backscattered electron images, secondary electron images, and mixed images can be done with a single mouse click.



Easily switch between different types of images — with just a click of the mouse!

Sample observations

Examples of mixed image observations

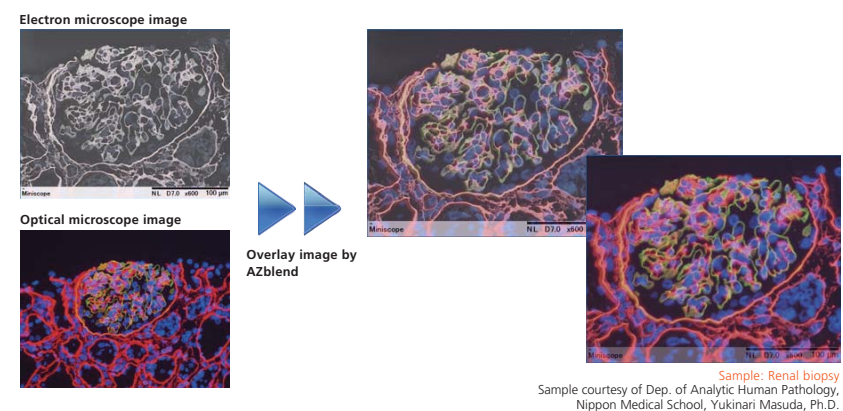
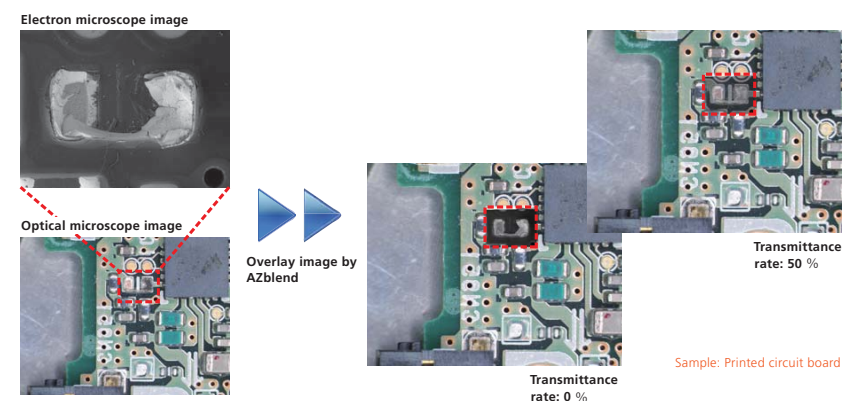


Overlay images

AZblend

- Transmittance rate is changeable for comparative verification
- Easy adjustment for differences in magnification or angle
- Keystone functions for monochromatic, band-pass, and difference filtering

New information can be obtained from image overlay of TM3030 Series and other microscopes



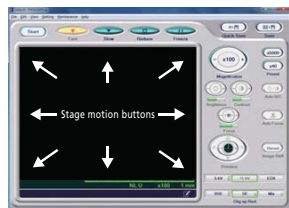
Sample courtesy of Dep. of Analytic Human Pathology,
Nippon Medical School, Yukinari Masuda, Ph.D.

Manufacturer: ASTRON Inc.

Moving stage

Motorized stage

Click an arrow at the edge of the screen, or double-click a desired location, to move smoothly to a new field of vision.



TM3030Plus

A handy optional feature for motorized-stage instruments: X-Y coordinate input function

Saving and recording the coordinates of stage positions. Simply type in numerical coordinates to move the field of view to the desired position.

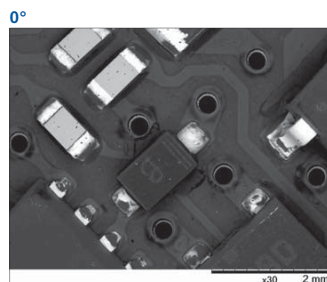
* This feature is an optional extension for the TM3030Plus motorized-stage instruments.



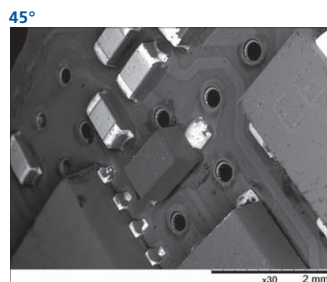
Tilting stage

Tilt Rotate Stage

Tilt Rotate Stage allows observation at -15° to 60° angles. It is possible to monitor the positioning in the sample chamber through a chamber scope.



Standard (15 kV)
Image signal: Backscattered electrons;
magnification: 30x



Standard (15 kV)
Image signal: Backscattered electrons;
magnification: 30x

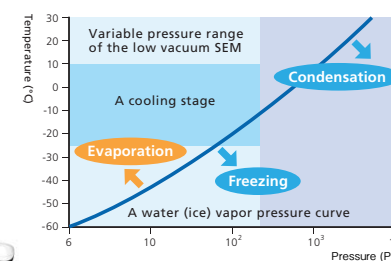
Sample:
Electronic component

Manufacturer: Deben UK Ltd.

Low-temperature observations

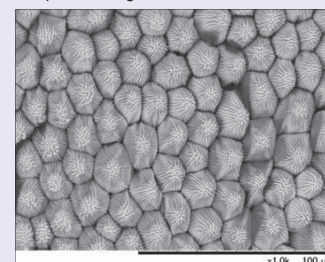
Cooling System

This cooling stage allows samples to be cooled to temperatures as low as -25°C and maintained there for times ranging from tens of minutes to a few hours. This reduces evaporation of water from moisture-containing samples, allowing observations and analysis to proceed without degradation of morphology. The cooling stage is particularly well-suited to observations of samples with high water content—such as foodstuffs and biological tissues—or samples susceptible to thermal damage.



At an ambient temperature

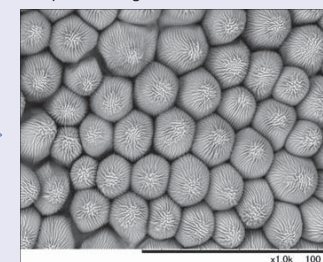
Sample shrinkage is seen after 5 minutes.



Surface (5 kV)
Image signal: Backscattered electrons;
magnification: 1,000x

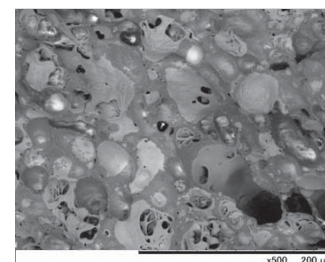
At -20°C (A cooling stage was used)

Sample shrinkage is not seen after 5 minutes.



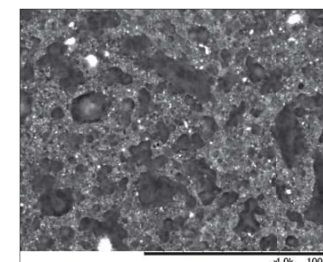
Surface (5 kV)
Image signal: Backscattered electrons;
magnification: 1,000x

Sample:
Rose petal



Surface (5 kV)
Image signal: Backscattered electrons;
magnification: 500x

Sample:
Chocolate mousse



EDX (15 kV)
Image signal: Backscattered electrons;
magnification: 1,000x

Sample:
Processed cheese

Manufacturer: Deben UK Ltd.

Simple,
intuitive operation

Quantax70

- High-speed color X-ray mapping with easy operation
- Move to specified locations to observe local spectra
- Hypermap allows spot analysis, line analysis, and mapping results with just a single measurement



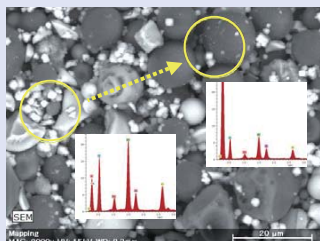
Sample configuration in combination with a TM3030 series instrument

*Screen shows simulated image.

Hypermapping enables many different types of analysis

Spot analysis

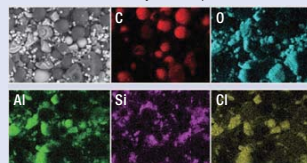
The displayed spectrum tracks the motion of the spot in real time, allowing easy visualization of elements of interest.



Various types of analysis can be performed in real time while sample measurements are underway

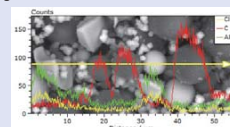
Element mapping

A high-throughput (30 mm²) detector allows rapid acquisition of mapping images. Combine with spot analysis to acquire rich, multifaceted information on your sample.

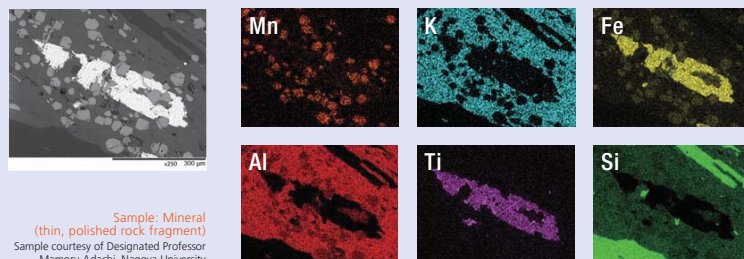


Line analysis

View spectral distributions in real time while varying the position, length, width, and thickness of the line.



Sample measurements with the Quantax70: Analysis of a mineral sample (no vapor deposition)



Sample: Mineral (thin, polished rock fragment)
Sample courtesy of Designated Professor Mamoru Adachi, Nagoya University

Full featured

AZtecOne / AZtecOneGO

Detection area:
30 mm², 10 mm²

- Icons arranged in order of procedural flow make operation easy
- Spectrum-fitting functionality allows easy observation of superposition of elements
- TruMap feature allows elements with overlapping peaks to be properly separated and displayed (AZtecOne)



Sample configuration in combination with a TM3030 series instrument

*Screen shows simulated image.

Easy-to-understand visual operating environment

Simple operation menu



Input Specimen Details

Acquire Maps

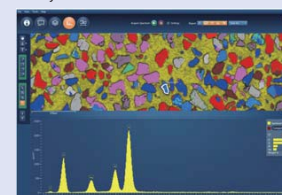
Acquire Line Scans

Acquire Image

Acquire Spectrum

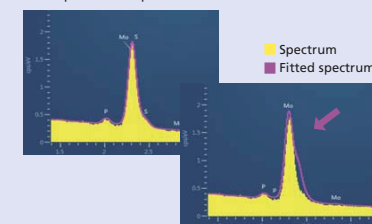
Example of mapping analysis

In addition to standard spectrum acquisition, the system allows spectra for user-specified regions to be reconstructed from mapping data. The selected region may be a point, a rectangle, an ellipse, or a region bounded by a user-drawn freehand curve.



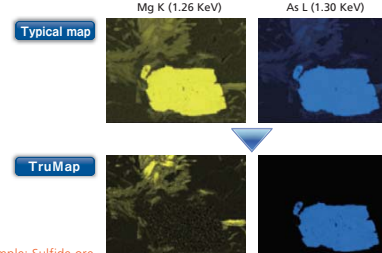
Spectrum-fitting functionality

Spectrum-fitting functionality facilitates qualitative analysis. This feature is particularly useful for cases in which peaks overlap.



TruMap functionality allows high-precision, high-reliability visualization of X-ray distributions (AZtecOne)

The TruMap feature allows spectra with overlapping peaks to be separated and visually mapped in real time. In the example shown here, we obtain elemental mapping images of Mg-K and As-L—whose peaks lie atop one another in typical maps—with no image contamination due to overlapping peaks.



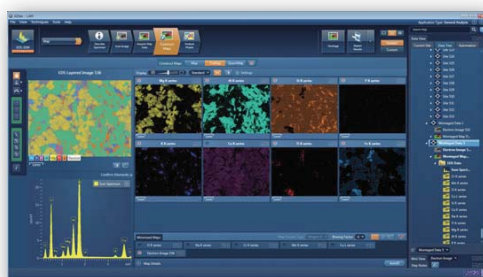
Sample: Sulfide ore

Multi-featured
analysis instrument

AZtec Energy

The AZtec Energy offers advanced analysis functionality and flexible configuration of settings and conditions. Can be combined with a motorized stage to automate analysis.

Detection area:
30 mm²

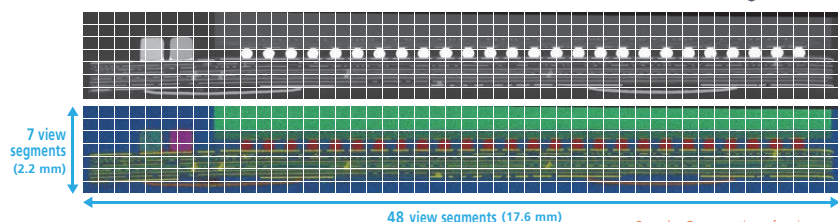


Sample: Mineral ore

Wide-area mapping option: AZtec Large Area Mapping

The AZtec Large Area Mapping software automatically acquires data for multiple specified regions to produce a single combined set of mapping information.

Wide-area
analysis



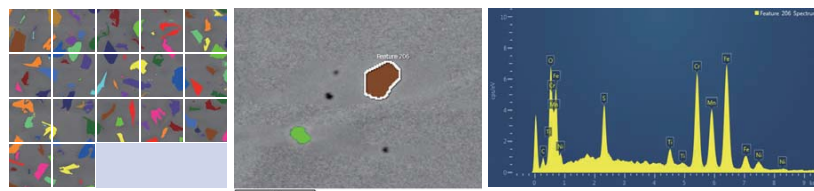
Magnification: 400x per view segment

Sample: Cross section of resin case
for electronic component

Particle analysis option: AZtec Feature

This analysis tool enables automated statistical processing, including classifying particles and determining particle size distributions from qualitative or quantitative analysis of particles detected in each view segment.

Particle
analysis



Quantax70 specification

(Made by Bruker Nano GmbH (Germany))

■ Detector	
Item	Description
Detector type	Silicon drift detector (SDD)
Detection area	30 mm ²
Energy resolution	154 eV (Cu-Kα) (Mn-Kα: equivalent of 135 eV or less)
Detection element	Br~Uu
Thermal cycle	Detector cool down on demand
Cooling method	2-stage thermoelectric (peltier) cooling (without fan and LN ₂ free)
■ Software	
Item	Description
Spectrum display	Enlarged display in horizontal and vertical directions; automatic scaling; KLM markers displayed
Qualitative analysis	Auto / manual
Quantitative analysis	Standardless quantitative analysis, normalized to 100%
Image acquisition	1,024×768, 640×480, 320×240 pixels
Element mapping	Single-element map display; multiple-element superposition map display; Maps combined with BSE images; colors in element maps may be changed
Line scan	Arbitrary line positions and directions may be specified; the color of line displays for each element may be changed; Lines may be superposed on scanning images; line-scan spectrum displays
Spot analysis	Analysis at points within a circle; measurement position may be modified; Spectrum displays, tables of quantitative results, graph displays, automatic element identification, automatic quantitative analysis; Element selection / deselection may be done by hand
Report preparation features	Templates for printing may be prepared; Spectra may be exported to BMP, TIFF, JPEG, Excel 2013, text formats; Spectra and results of quantitative analysis may be exported to Microsoft® Word 2013
■ Size / weight	
Item	Description
Detector	145 (width) × 105 (depth) × 130 (height) mm, 1.5 kg
MIN SVE signal processing	116 (width) × 228 (depth) × 66 (height) mm, 1.0 kg
External scan box	116 (width) × 228 (depth) × 66 (height) mm, 1.0 kg
■ Installation conditions	
Item	Description
Power supply (Quantax70)	MIN SVE signal processing unit: 50/60 Hz, 25 VA
	Single-phase AC, 100-240 V
	Scan generator: Single-phase AC, 100-240 V

AZtecEnergy specification for TM3030 series

■ Detector	
Item	Description
Detector type	Silicon drift detector (SDD)
Detection area	30 mm ²
Energy resolution	158 eV (Cu-Kα)
	(Mn-Kα: equivalent of 137 eV)
Detection element	Br~Uu
Thermal cycle	Detector cool down on demand
Cooling method	2-stage thermoelectric (peltier) cooling (without fan and LN ₂ free)
■ Size / weight	
Item	Description
Detector	145 (width) × 150 (depth) × 200 (height) mm, 2.7 kg
X-stream 2 (EDX pulse processor)	180 (width) × 260 (depth) × 330 (height) mm, 2.9 kg
MicaFm (external scan unit)	180 (width) × 260 (depth) × 330 (height) mm, 2.9 kg

AZtecOne specification

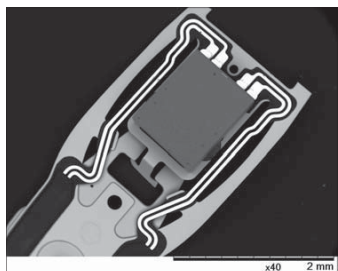
(Made by Oxford Instruments (UK))

■ Detector		
Item	AZtecOne	AZtecOneGO
Detector type	Silicon drift detector (SDD)	
Detection area	30 mm ²	10 mm ²
Energy resolution	158 eV (Cu-Kα) (Mn-Kα: equivalent of 137 eV)	151 eV (Cu-Kα) (Mn-Kα: equivalent of 129 eV)
Detection element	Br~U ₉₂	
Thermal cycle	Detector cool down on demand	
Cooling method	2-stage thermoelectric Cooling (without fan and LN ₂ free)	
■ Software		
Item	AZtecOne	AZtecOneGO
Spectrum display	Scaling display in horizontal and vertical directions; KLM markers displayed	
Qualitative analysis	Auto / manual	
Quantitative analysis	Standardless quantitative analysis, normalized to 100%	
Image acquisition	2,048×1,536, 1,024×768, 512×384	1,024×768, 512×384
Element mapping	Resolution: select from 1,024, 512, 256, or 128 pixels Detectable elements: Up to 80 elements MixMap: 7 or more	Resolution: select from 256 or 128 pixels
Line scan	Arbitrary line positions and directions may be specified; the color of line displays for each element may be changed; Lines may be superposed on scanning images; line-scan spectrum displays	
Point & ID (Beam control)	Number of points that may be selected: over 1,000 Rectangular, elliptical, or freehand-drawn regions of arbitrary sizes may be specified	
TruMap	Yes	No
Assistance	Operating guide functionality	
Data management	Managed separately for each project	
Report preparation features	Templates for printing may be prepared. Can produce printed versions of spectra, data-acquisition conditions, comments, and other content Spectra may be exported to BMP, TIFF, JPEG, text formats Reports in Microsoft® Word 2013 format may be exported	
■ Size / weight		
Item	Description	
Detector	145 (width) × 150 (depth) × 200 (height) mm, 2.7 kg	
Analyzer unit	290 (width) × 260 (depth) × 330 (height) mm, 10 kg	
■ Installation conditions		
Item	Description	
Power supply (AZtecOne)	Single-phase AC, 100-240 V, 50/60 Hz, 100 VA	

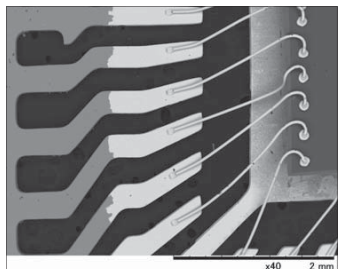
AZtecEnergy specification for TM3030 series

■ Software	
Item	Description
Spectrum display	Scaling display in horizontal and vertical directions; KLM markers displayed
Qualitative analysis	Auto / manual
Quantitative analysis	Standardless quantitative analysis, normalized to 100%
Image acquisition	64-8,192 pixels
Element mapping	Resolution: 64-4,096 pixels; Number of detectable elements: Up to 80; MixMap: 7 or more possible
Line scan	Arbitrary line positions and directions may be specified; the color of line displays for each element may be changed; Lines may be superposed on scanning images; line-scan spectrum displays
Point & ID (Beam control)	Number of points that may be selected: over 1,000; Rectangular, elliptical, or freehand-drawn regions of arbitrary sizes may be specified
Report preparation features	Templates for printing may be prepared. Can produce printed versions of spectra, data-acquisition conditions, comments, and other content. Spectra may be exported to BMP, TIFF, JPEG, text formats. Reports in Microsoft® Word 2013 format may be exported
Options	TruMap (TruLine), AZtec Large Area Mapping, AZtec Feature, etc.
	* For more information, please contact your Hitachi vendor.
■ Installation conditions	
Item	Description
Power supply (AZtecEnergy)	Single-phase AC, 100-240 V, 50/60 Hz, 1.5 kVA

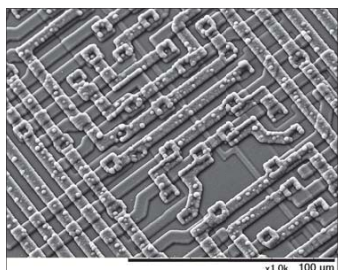
Electronic materials



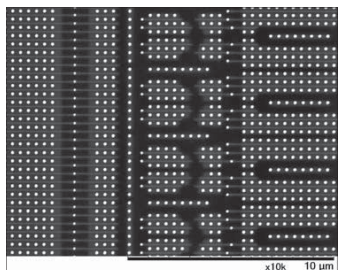
Surface (5 kV)
Image signal: Mix; magnification: 40x
Sample: Magnetic head



Standard (15 kV)
Image signal: Backscattered electrons; magnification: 40x
Sample: Electronic component

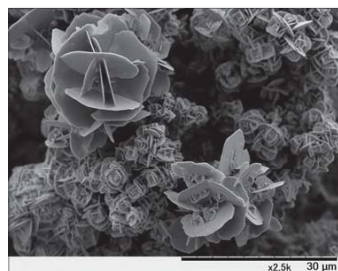


EDX (15 kV)
Image signal: Secondary electrons; magnification: 1,000x
Sample: LSI interconnect

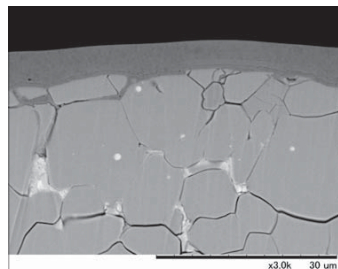


Standard (15 kV)
Image signal: Backscattered electrons; magnification: 10,000x
Sample: MOS transistor

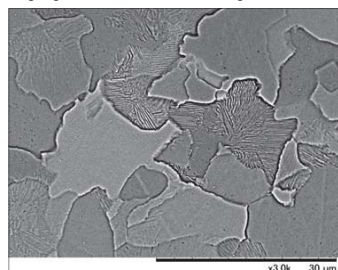
Metallic materials



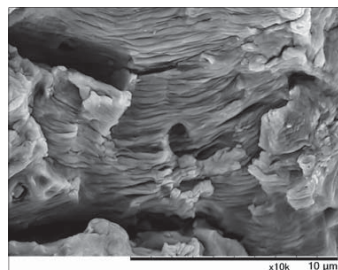
Surface (5 kV)
Image signal: Secondary electrons; magnification: 2,500x
Sample: Copper crystals



Standard (15 kV)
Image signal: Backscattered electrons; magnification: 3,000x
Sample: Neodymium magnet

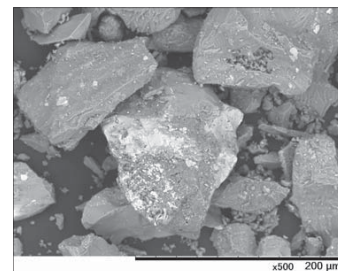


Standard (15 kV)
Image signal: Backscattered electrons; magnification: 3,000x
Sample: Metal structure

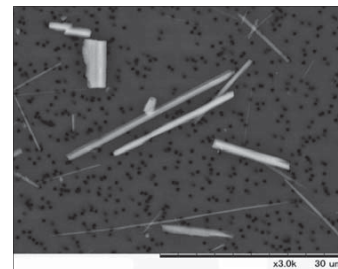


Standard (15 kV)
Image signal: Mix; magnification: 10,000x
Sample: Cleaved metal surface

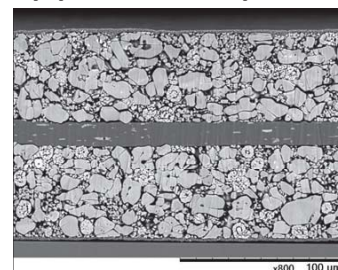
Environmental and energy-related materials



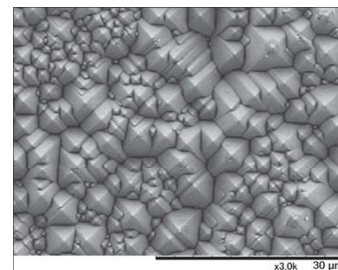
Standard (15 kV)
Image signal: Backscattered electrons; magnification: 500x
Sample: Volcanic ash



Standard (15 kV)
Image signal: Backscattered electrons; magnification: 3,000x
Sample: Asbestos

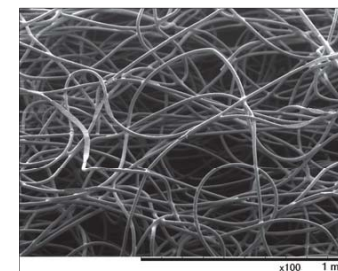


EDX (15 kV)
Image signal: Backscattered electrons; magnification: 800x
Sample: Lithium-ion battery

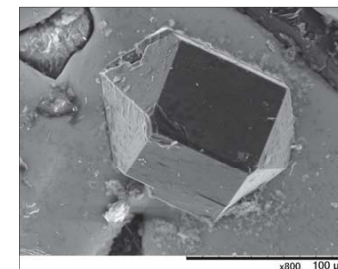


Surface (5 kV)
Image signal: Secondary electrons; magnification: 3,000x
Sample: Solar cell

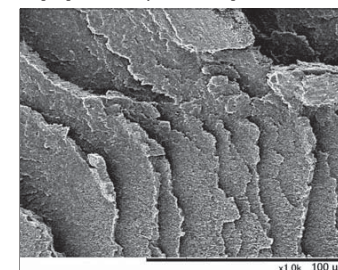
Processed product materials



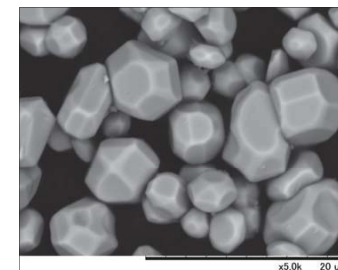
Surface (5 kV)
Image signal: Mix; magnification: 100x
Sample: Non-woven fabric



Standard (15 kV)
Image signal: Secondary electrons; magnification: 800x
Sample: Diamond bit



Surface (5 kV)
Image signal: Secondary electrons; magnification: 1,000x
Sample: Resin material

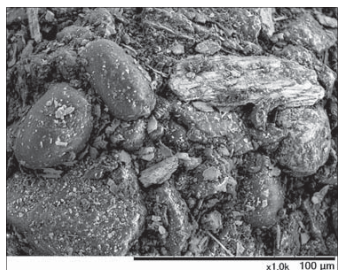


Standard (15 kV)
Image signal: Backscattered electrons; magnification: 5,000x
Sample: Fluorescent material

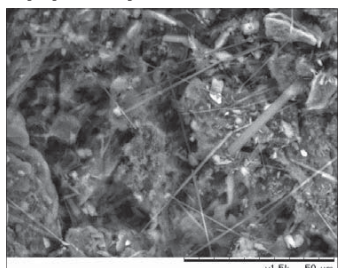
Biological samples, foodstuffs, pharmaceuticals



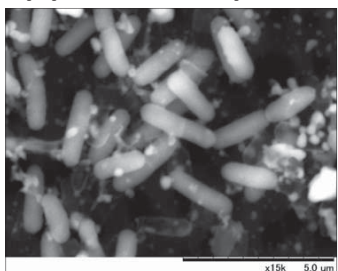
Surface (5 kV) Sample: Tick
Image signal: Secondary electrons; magnification: 100x



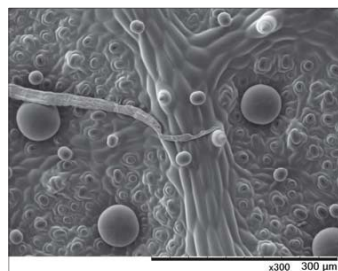
Surface (5 kV) Sample: Stomach medication
Image signal: Mix; magnification: 1,000x



Standard (15 kV) Sample: Headache medication
Image signal: Backscattered electrons; magnification: 1,500x



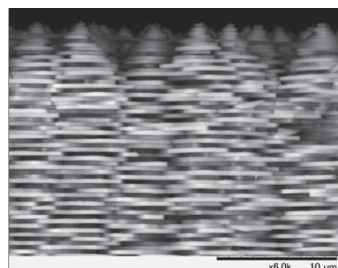
Standard (15 kV) Sample: Bacillus Natto bacterium
Image signal: Backscattered electrons; magnification: 15,000x



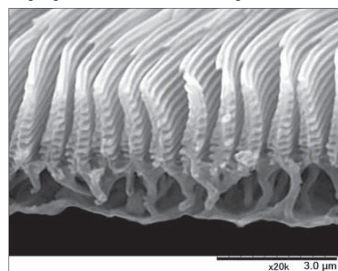
Surface (5 kV) Sample: Leaf of Japanese shiso lettuce
Image signal: Secondary electrons; magnification: 300x



Surface (5 kV) Sample: Kidney glomerulus
Image signal: Secondary electrons; magnification: 1,500x



Standard (15 kV) Sample: Cross section of abalone shell
Image signal: Backscattered electrons; magnification: 6,000x



Standard (15 kV) Sample: Butterfly wing
Image signal: Secondary electrons; magnification: 20,000x

TM3030Plus / TM3030 specification

Specifications

Item	TM3030Plus	TM3030
Magnification	x15 - x60,000 (With digital zoom: Up to x240,000)	
Observation condition	5 kV / 15 kV / EDX	
Signal selection	Backscattered electrons Secondary electrons Mix (backscattered electrons + secondary electrons)	Backscattered electrons
Observation mode	BSE: Conductor/Standard/ Charge-up reduction SE: Standard/Charge-up reduction Mix: Standard/Charge-up reduction	BSE: Standard/Charge-up reduction
Image mode(BSE)	COMPO/Shadow 1/, Shadow 2/TOPO	
Sample stage traverse	X: 35.0 mm, Y: 35.0 mm	
Maximum sample size	70 mm (diameter), 50 mm (thickness)	
Electron gun	Pre-centered cartridge filament	
Signal detection system	BSE: High-Sensitivity 4-segment BSE detector SE: High-sensitivity Low-Vacuum SE detector (LVD)	BSE: High-Sensitivity 4-segment BSE detector
Auto image adjustment function	Auto start, Auto focus, Auto brightness/contrast	
Frame memory	1,280x960 pixels, 640x480 pixels	
Image data storage	HDD of PC and other removal media	
Image format	BMP, TIFF, JPEG	
Data display	Micron marker, micron value, date and time, image number and comments, Image mode, Observation condition, D (Distance), Observation mode	
Evacuation system (vacuum pump)	Turbo molecular pump: 30 L/s x 1 unit, Diaphragm pump: 1 m ³ /h x 1 unit	
Operation help functions	Raster rotation, Magnification presets (2 steps), Image shift (±50 μm @ D4.5 mm)	
Safety device	Over-current protection function, built-in ELCB	

Required PC specifications

Item	TM3030Plus	TM3030
OS	Windows® 7 (64bit)	
CPU	Intel® Core™ i5-2520M (or equivalent or better)	
Display resolution	1,366x768 pixels (16.77 million colors)	
Screen size	15.6 inches	
Interface connectors	USB 2.0/3.0	
Memory device	HDD, DVD-ROM drive	

Size / weight

Item	TM3030Plus	TM3030
Main unit (manual stage)	330 (width) × 606 (depth) × 565 (height) mm	
Main unit (motorized stage)	330 (width) × 633 (depth) × 565 (height) mm	
Diaphragm pump	145 (width) × 256 (depth) × 217 (height) mm	
Weight (main unit)	65 kg(manual stage)	63 kg(manual stage)
	68 kg(motorized stage)	66 kg(motorized stage)

Optional accessories

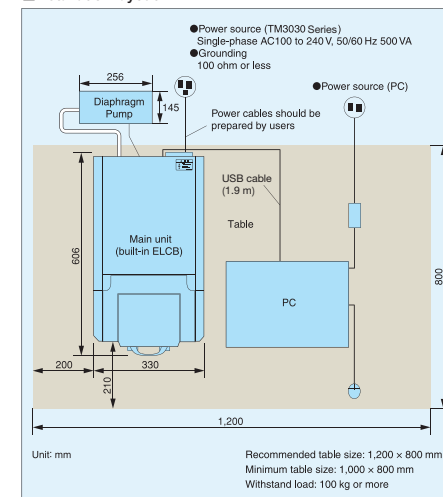
Energy Dispersive X-ray Spectrometer (EDX)
Three-dimensional image display/measurement function 3D-VIEW
Cooling stage
Tilt & Rotation stage
X-Y coordinate input function

Installation conditions

Item	Description
Room temperature	15-30°C (Δt=within ±2.5°C / h or less)
Humidity	45% - 70% RH (no condensation)
Power source (main unit)	Single-phase AC 100-240 V (minimum: 90 V; maximum: 250 V)
Grounding	100 ohm or less

Another power source for PC is required.

Installation layout



- *A table with casters is not suitable to put a main unit of TM3030 Series on.
- *Recommended table size: 1,200 × 800 mm, withstand load: 100 kg or more.
- *Periodical maintenance is required for this apparatus.
- *Limited to indoor operation.
- *TM3030 Series is not approved as a medical device.
- *Dedicated mentors, teachers who received the operation training of the instrument are required at compulsory schools.
- *Powercables, earth terminal and table should be prepared by users.
- *Please put a diaphragm pump under the table.
- *Please make room for more than 200 mm to the left side of a main unit and put it the closest to the center position of the table.
- *It is advisable not to install or relocate the instrument by yourselves.
- *When relocating the system, please contact in advance the sales department that handles your account or a maintenance service company designated by Hitachi.
- *Screen shows simulated image.