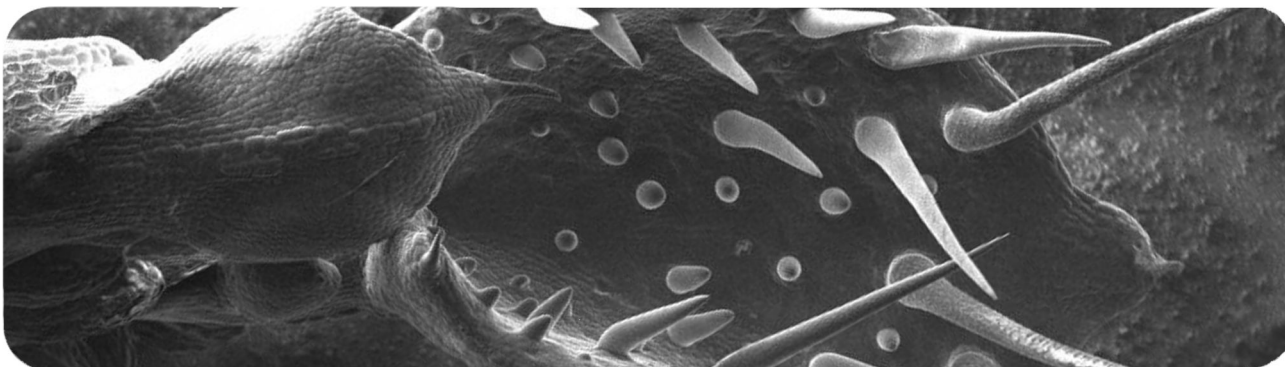


Tabletop Scanning Electron Microscope



The Ultimate Solution
SH-3500MB / SH-4000M / SH-5000M



Imagine a Higher state of Resolution

The Hirox SEM series is focused on two essentials: powerful performance and user-friendly operation. Using the table-top compact configuration, Mini-SEM provides high-resolution, high-magnification SEM images with the ease of use. Auto-focus, Auto-auto brightness and contrast produce an excellent image every time.

No doubt about strong performance and flexible integration. 5-axis full stroke control and 4-hole variable aperture of SH-5000M help fine-resolution SEM image. Built-in multi detector (SE+BSE) of SH-4000M provides the ideal observation for each different type of specimen. All Mini-SEM series including SH-3500MB provide image observation condition within 3 minutes after sample loading.

Optional EDX system and many other tools can be adapted for your application.

Major Applications

Material Science

- Metal / Ceramic Surface, Fiber Texture
- Particle Distribution and Size Measurement
- Failure Analysis – Corrosion, Stress

Semiconductor

- Wafer, Bonding Wire, LED, Micro-Pattern
- CNT (Carbon Nano Tube)

Biological / Pharmaceutical

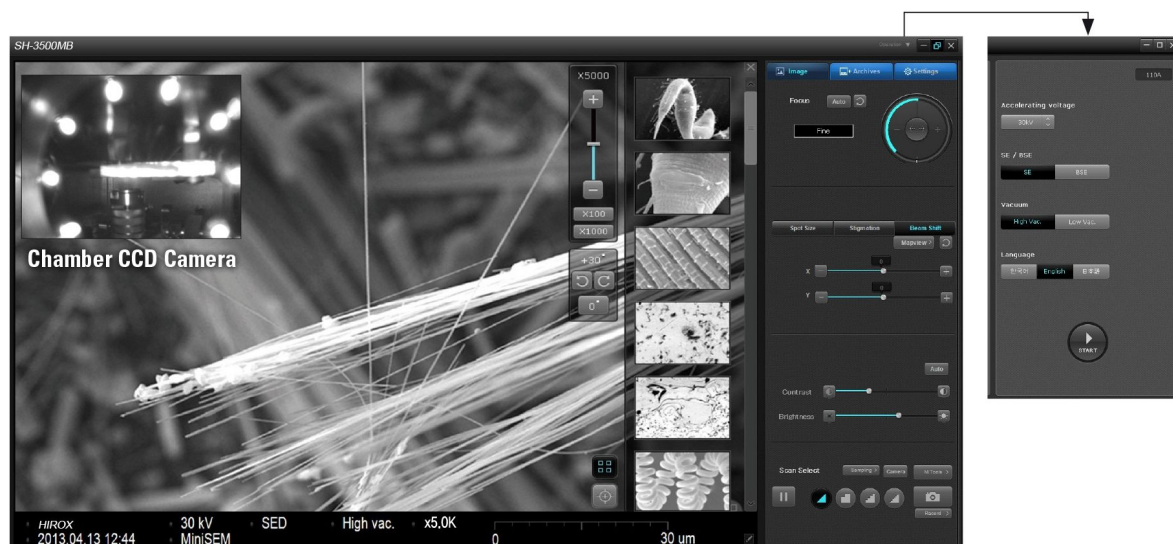
- Food, Bacteria, Medicinal Powder

Life Science / Energy

- Solar Cell, Battery Electrode, Catalyst

Education / Healthcare

Operating Software - User Interface



SH-5000M

- ▶ Max. 100,000x Magnification
- ▶ SE Detector (Option – BSE Detector)
- ▶ 5kV to 30kV Variable Accelerating Voltage
- ▶ Image Observation Ready within 3 min.
- ▶ 5-axis Strokes – X, Y, R, Z, T
- ▶ 4-Hole Variable Aperture (30 / 50 / 100 / 200 μm)
- ▶ Options – EDX System, Cooling Stage, Low Vacuum Control
Multi-Vacuum Mode - Standard / Charge Up Reduction



SH-4000M

- ▶ Max. 60,000x Magnification
- ▶ SE Detector & BSE Detector – Multi Mode
- ▶ 5kV to 30kV Variable Accelerating Voltage
- ▶ Multi-Vacuum Mode – Standard / Charge Up Reduction
- ▶ Image Observation Ready within 2 min.
- ▶ 3-axis Strokes – X, Y, R (Option - X, Y, T)
- ▶ Options – EDX System, Cooling Stage



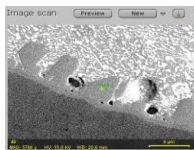
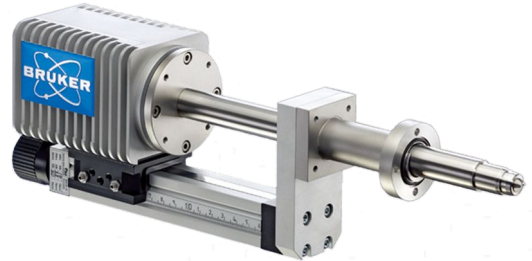
SH-3500MB

- ▶ Max. 30,000x Magnification
- ▶ BSE Detector (Solid State Type)
- ▶ 5kV to 30kV Variable Accelerating Voltage
- ▶ Multi-Vacuum Mode – Standard / Charge Up Reduction
- ▶ Image Observation Ready within 2 min.
- ▶ 3-axis Strokes – X, Y, R (Option - X, Y, T)
- ▶ Options – EDX System, Cooling Stage

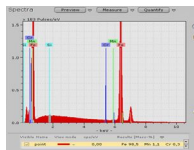


EDS System

- ▶ SDD Type – Nitrogen Free
- ▶ Elemental Detection from Boron (5) to Americium(90)
- ▶ Spectrum Resolution < 133 eV(MnKa)
- ▶ Multi-point Analysis / Line Scan / Elemental Mapping



SEM Image Acquisition



Elemental ID Analysis

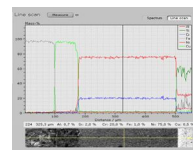
Results

	Primary energy	
	Tilt angle	
Series	nor. C	Atom C
	[wt.%]	[at.%]
Copper K series	40,38	55,85
Tin L series	59,62	44,15
Total	100,00	100,00

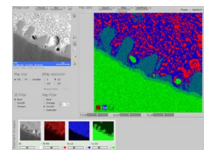
Quantification Analysis



Multi point Analysis



Line Scan



Mapping

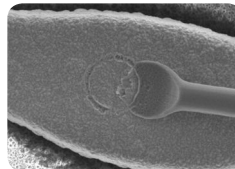
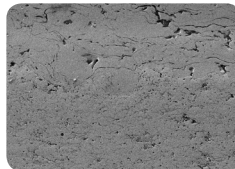
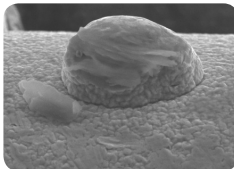
Ion Sputter Coater MCM-100

- ▶ Quick and Easy Operation
- ▶ Sample Loading Size - Max. 50mm
- ▶ Target Material - Au(Gold) or Pt(Platinum)
- ▶ Dimension / Weight: 180(W) x 310(D) x 310(H)mm / 15kg

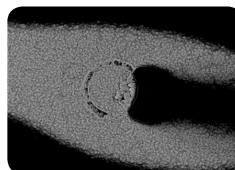
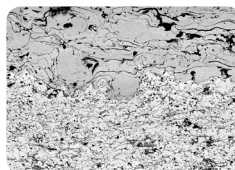
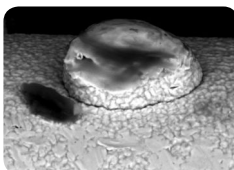


BSE Detector

- ▶ SE (Secondary Electron) Image



- ▶ BSE (Backscattered Electron) Image



4-Channel Fixed Type (Solid-State)
Composition or Topographic Analysis

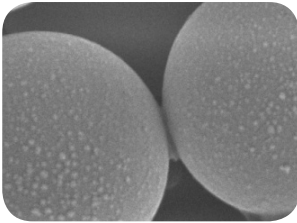


- Excellent atomic number resolution 0.1Z at Z=30
- Choice of Detectors for normal, low voltage, UVH

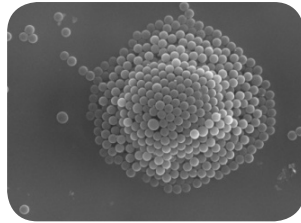
SEM Application

Particle Measurement and Characteristic Analysis

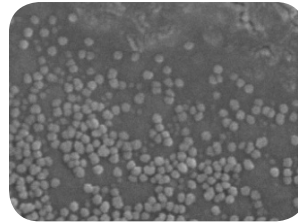
- ▶ Industrial Powder - High Molecule, Nano Powder
- ▶ Battery Electrode / Pharmaceutical and Biological



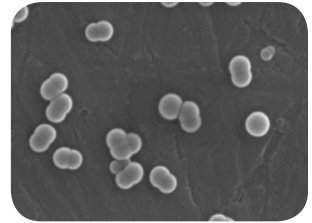
Latex



Silicon Powder



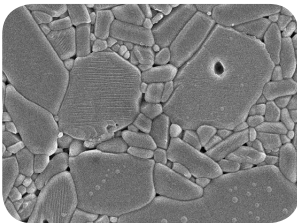
Nano Powder



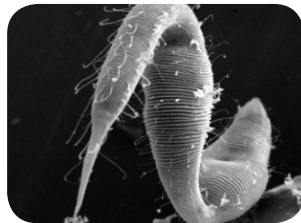
Lactic Acid Bacteria

Material Science and Failure Analysis

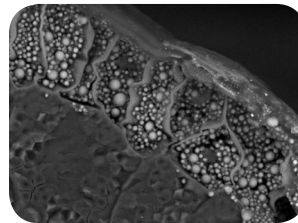
- ▶ Metal / Plastic and Ceramic / Film
- ▶ Bio-science



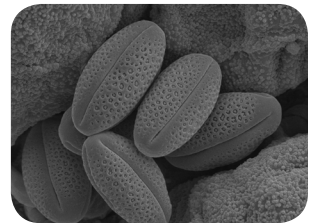
Ceramic



Sea Animal



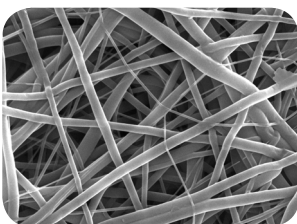
Rice



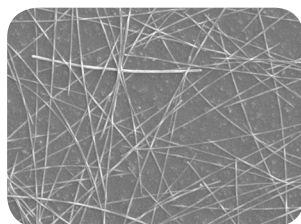
Flower's Stamen

Fiber Observation

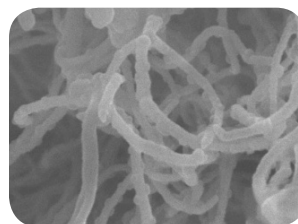
- ▶ Carbon Fiber / Glass Fiber
- ▶ CNT (Carbon Nano Tube)



Fiber



Nano wire



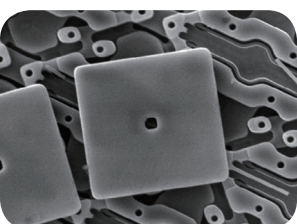
CNT (Carbon Nano Tube)



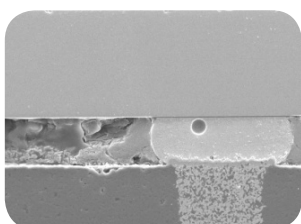
Fiber

Electronic Component Observation and Failure Analysis

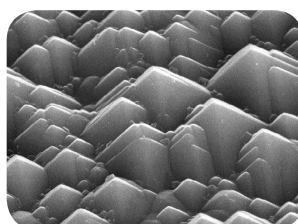
- ▶ BGA / PCB / LED / Wafer
- ▶ Bonding Wire / Micro-Electronics



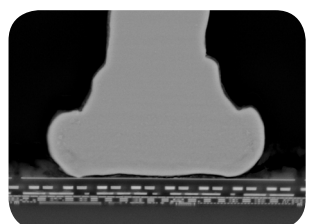
Pattern



BGA Chip



Solarcell

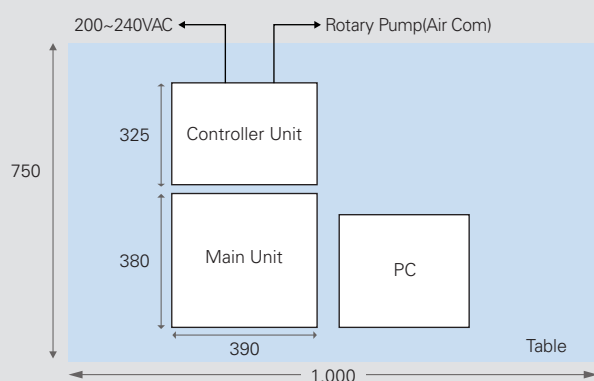


Wire Bonding

Mini - SEM Specifications

SH-3500MB		SH-4000M		SH-5000M	
Electron system					
Resolution	20nm (30kV, BSE Image)		15nm (30kV, SE Image) 20nm (30kV, BSE Image)		5nm (30kV, SE Image)
Magnification	30x ~ 30,000x		30x ~ 60,000x		30x ~ 100,000x
Accelerating Voltage	5~30kV (5 / 10 / 15 / 20 / 30 – 5 Steps)				
Detector	Backscattered Electron (BSE)		Secondary Electron Image (SEI)		Secondary Electron Image (SEI)
			Backscattered Electron (BSE) *Multi Mode		Backscattered Electron (BSE) *option
Observation mode	Standard mode Charge-up reduction mode		Standard mode Charge-up reduction mode		Standard mode
Electron Gun	Pre-centered Tungsten Filament Cartridge				
Lens System	Two-stage Electromagnetic Condenser Lens One-stage Electromagnetic Objective Lens				
Stage system					
Stage Traverse	3-axis System - X, Y-axis : 35mm / R-axis : 360° · Image Shift : ±150μm · Chamber CCD Camera · T-axis : 0 to 45°(Option)				5-axis System · X, Y-axis : 40mm / R-axis : 360° T-axis : 0 to 45°, Z-axis : 0 to 35mm · Image Shift : ±150μm
Max. Sample Size	70mm in Diameter x 30mm in Height				80mm in Diameter x 35mm in Height
Image system					
Frame Memory	High Speed Mode (320×240) : Preview mode Low Speed Mode (640×480) Photo Mode1 (1280×960) Photo Mode2 (2560×1920) Sampling Photo mode3				
Automation Function	Auto Start, Auto Focus, Auto Stigmator Auto Contrast & Brightness				
Image Format	BMP, JPG, PNG, TIFF				
Data display	Magnification, Detector Type, Accelerating Voltage, Vacuum mode, Logo(text), Date and time, Micron marker				
Vacuum System					
Vacuum mode	High & Low Vacuum system				High Vacuum System
Vacuum Pump	Rotary Pump + Turbo Molecular Pump [Full Automation System]				
Control system					
OS	Microsoft Windows® 7				
CPU	Intel® Core™ i5				
Memory / HDD	2GB / 500GB				
Interface connector	USB 2.0				
Dimensions and weight					
Main Unit	390(W)x380(D)x560(H)mm, 90kg				
Controller Unit	390(W)x325(D)x560(H)mm, 37kg				
Rotary Pump	400(W)x160(D)x340(H)mm, 24kg				
Installation room	Room temperature : 15℃~30℃ / Humidity : 70% or less / Electric power : Single phase 200~240 AC, 1KW, 50/60Hz				

Example of Installation Layout



- Specifications of Operating Computer are subject to change
- A table with casters is not recommended



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Specifications in this catalog are subject to change without notice as we continue to develop the latest technologies and products

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