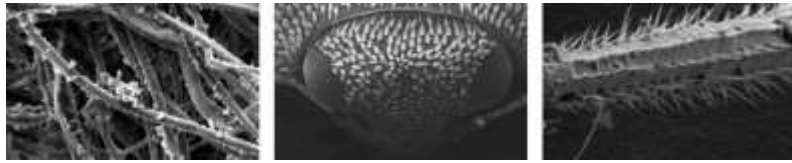


### Genesis Series / Veritas Series

Navigate, Explore, ... and Discover In Every Research Area



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# High-Performance Scanning Electron Microscope

Genesis Series / Veritas Series

Navigate, Explore, ... and Discover In Every Research Area



# Navigate, Explore, ... and Discover In Every Research Area

High-Performance  
Scanning Electron Microscope

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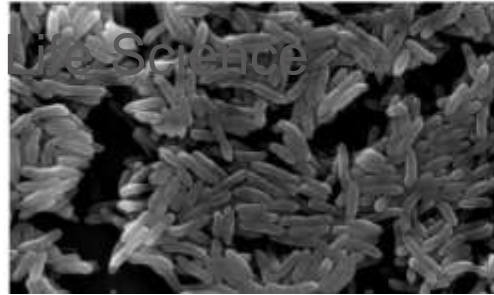
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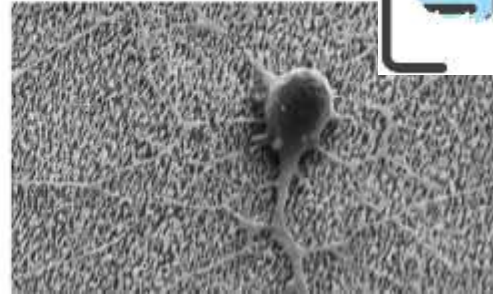
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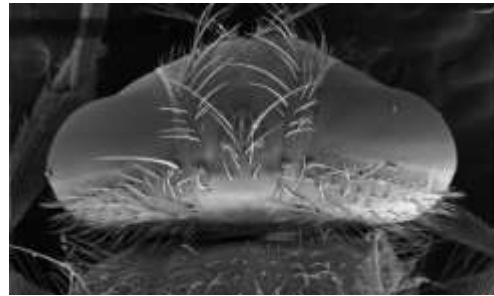
# 01 Applications



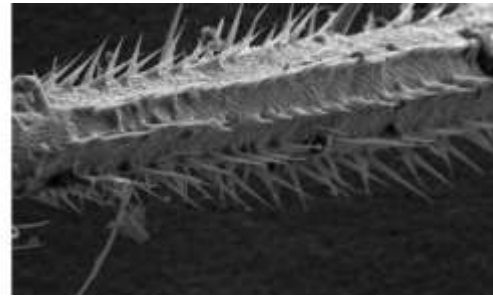
Bacteria



Neuron



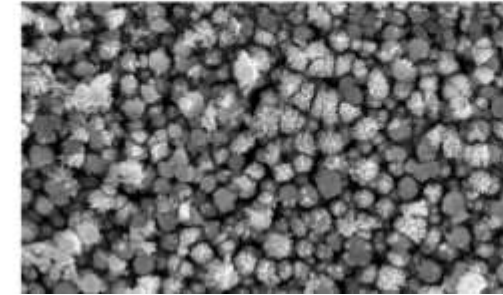
Insect (Fly's head)



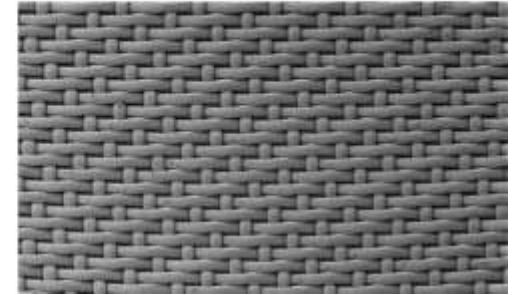
Insect (Fly's leg)



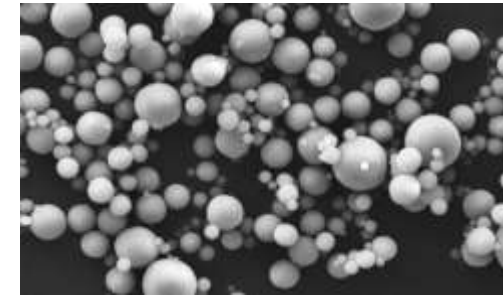
## Material Science



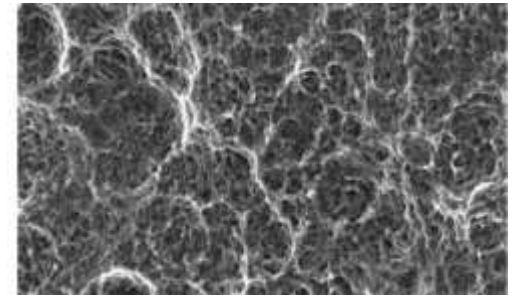
Cadmium Oxide



Fabric



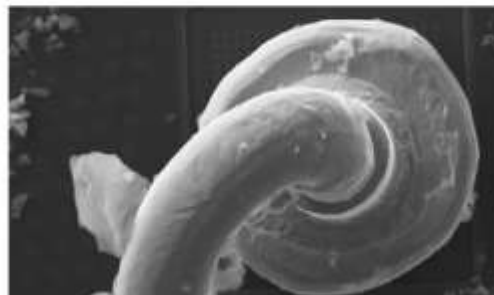
Powder



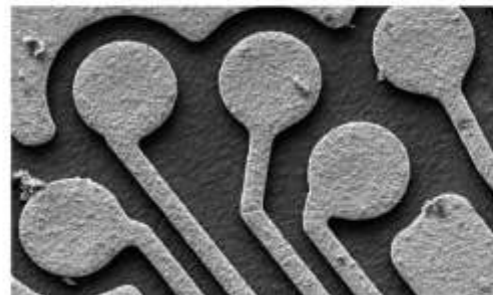
Dental Implant



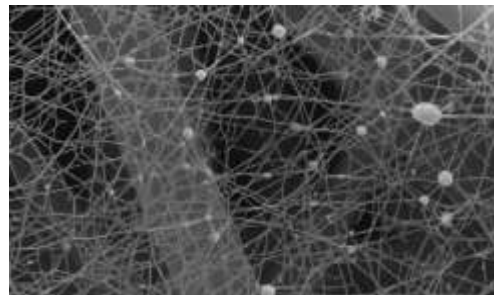
## Electronics



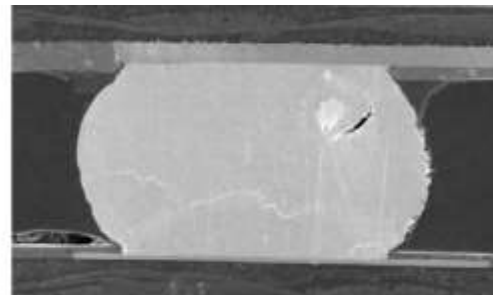
Wire bonding



Printed Circuit



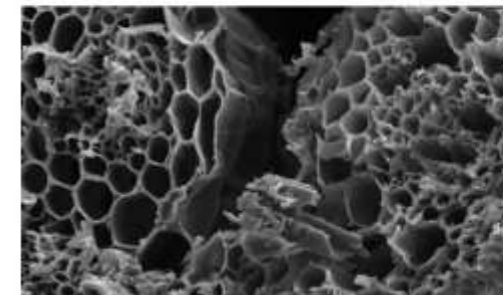
Nano Fiber



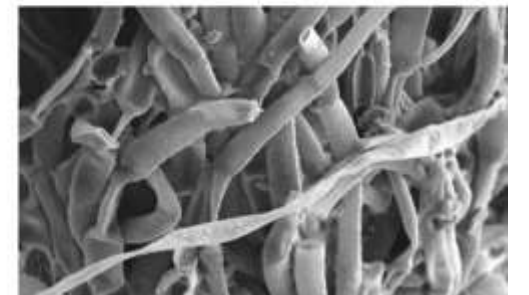
Semiconductor Package



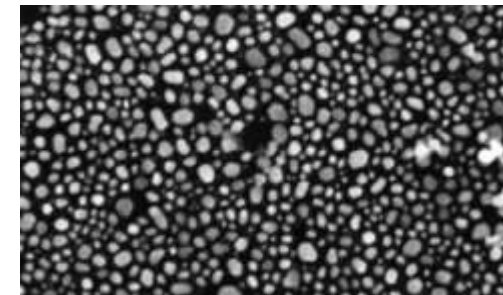
## Natural Resource



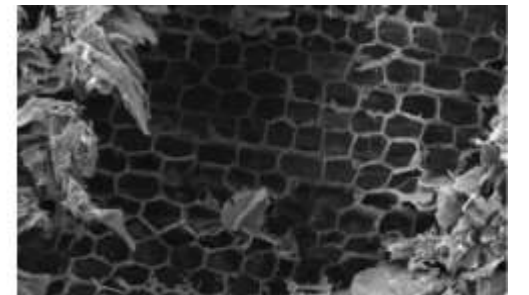
Leaf Cross Section



Stamen



Gold Powder



Cross section of a tree

## 02 Compact SEM Genesis-Series

- 5-Axis Eucentric Stage
- More Value in Less Space
- Straightforward & Intuitive Manual Stage (Genesis-1000 / 1100)
- More Versatile 5-Axis Motorized Stage (Genesis-2020 / 2120)
- Observation of Non-Conductive Sample (Genesis-1100 / 2120)

Genesis series is a high-performance W-filament SEM with x300K magnification and 3nm resolution.

High performance and versatility are integrated in a stylish design which is the most compact of the world in the same category.

EmCrafts-Patented vacuum system enables faster specimen exchange. (within 3min.)

Universal extension ports are available for future upgrade and user customization.

Due to factory-centered filament cartridge, filament exchange is easy and quick.

Images are saved in various formats and can be easily restored for annotation simply by clicking on the thumbnails.



### Cost-Effectiveness

- Genesis series are most affordably priced
- Perfect solution for any laboratory



### Easy Maintenance

- Filament Burn out Notification
- Precentered Filament  
Only 1~2 Minutes are Required for a Filament Replacement
- Remote Diagnostics  
Electrical Checkpoints are Probed and Reported



## Genesis 1000/1100

- Intuitive 5-axis manual eucentric stage on Genesis-1000/1100 provides easy and straightforward way to move specimens.
- Variable pressure capability of Genesis-1100 enables users to observe non-conductive samples such as biological samples.

Magnification	x10 ~ x300,000
Stage	X, Y : 40mm / Z : 5~45mm / T : -20~90° / R : 360°
Maximum Sample Size	96mm(H), 50mm(V)

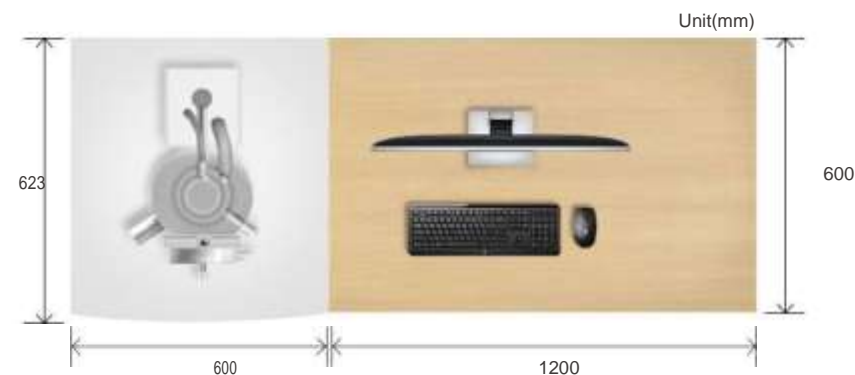


## Genesis 2020/2120

- Genesis-2020/2120 provides 5-axis motorized eucentric stage in the same compact design.
- Intuitive "Point & Go" operation enables effortless stage movement in a quick manner.
- Position save and restore function is useful especially for multi-specimen mount.

Magnification	x10 ~ x300,000
Stage	X : 90mm, Y : 60mm / Z : 5~60mm / T : -20~90° / R : 360°
Maximum Sample Size	150mm(H), 60mm(V)

### Installation Footprint



## GENESIS-Series specification

Model	Genesis-1000	Genesis-1100	Genesis-2020	Genesis-2120
Stage	5-axis Manual X : 40mm (-20mm ~ 20mm) Y : 40mm (-20mm ~ 20mm) Z : 5 ~ 45mm T : -20° ~ 90° R : 360°		5-axis Motorized X : 90mm (-45mm ~ 45mm) Y : 60mm (-30mm ~ 30mm) Z : 5 ~ 60mm T : -20° ~ 90° R : 360°	
Variable Pressure	X	O	X	O
Vacuum Mode	High Vacuum only (<math>9 \times 10^{-3}</math>Pa)	High Vacuum Mode (<math>9 \times 10^{-3}</math>Pa) Low Vacuum Mode (10~230Pa)	High Vacuum only (<math>9 \times 10^{-3}</math>Pa)	High Vacuum Mode (<math>9 \times 10^{-3}</math>Pa) Low Vacuum Mode (10~230Pa)
Vacuum System	Fully Automated Evacuation System - Turbo molecular pump(Vacuum ready within 3 minutes) - Rotary vane pump - Electrical valve system			
Electron Gun	Precentered Tungsten Filament			
Detector	SE(ET-type)	SE(ET-type) BSE(4channel, Semiconductor)	SE(ET-type)	SE(ET-type) BSE(4channel, Semiconductor)
Resolution	3.0nm (SE Image)	3.0nm (SE Image) 5.0nm (BSE Image)	3.0nm (SE Image)	3.0nm (SE Image) 5.0nm (BSE Image)
Magnification	x10 ~ x300,000			
Acceleration Voltage	200V ~ 30kV			
Objective IRIS	20/20/50/100μm( Variable aperture)			
Image Shift	±50μm			
Maximum Sample Size	Horizontal : 96mm, Vertical : 50mm		Horizontal : 150mm, Vertical : 60mm	
Advanced Scan Mode	Dynamic Focus, Point & Line Scan, Tilt Compensation			
Working Distance	0~45mm		0~60mm	
Automatic Function	Auto Brightness/Contrast, Auto Focus, Auto Gun Alignment, Auto Saturation, Auto Filament / Bias			
Image Format	JPG, TIFF, BMP, PNG			
Display Mode	Focus Mode : 320x240 pixel, Resizable Preview Mode : 800x600 Slow Mode : Applicable to both preview and focus mode Photo Mode : Up to 3200x2400			
Dimension(mm)	Installation Dimension : 1800(W) x 600(D) - Main System: 600(W) x 623(D) x 1350(H), 130Kg - Rotary Pump : 454(W) x 134(D) x 121(H), 22Kg			
Supplied Accessories	Factory-centered Filament Cartridge 1box(10units), Specimen Mounts 1box(10units), Tweezer, Carbon Tape, Hex. Driver 0.89mm (1 ea.), Hex. T Wrench 2.5mm (2 ea.)			
Operation Device	Windows10 -based All-in-One 21.5" Workstation -100% controlled by keyboard and mouse			
Optional Devices	EBSD(Electron Back Scattered Diffraction) EDS(Energy Dispersive Spectroscopy) WDS(Wavelength Dispersive Spectroscopy) CL(Cathodoluminescent) Imaging Chamber Camera LaB <sub>6</sub> /CeB <sub>6</sub> Upgrade 3D Imaging Raman Spectroscopy E-beam Lithography			
Power Supply	Single Phase : 100 ~ 240VAC, 50/60Hz, 1kVA			

## 03 Big Chamber SEM Veritas-Series

- High Performance and Productivity
- Large Scale Stage Movement

Veritas-series has 5-Axis eucentric motorized stage to provide easier measurement of large scale samples.

Magnification	x10 ~ x300,000
Stage	X,Y : 120mm / Z : 5~65mm / T : -20~90° / R : 360°
Maximum Sample Size	210mm(H), 65mm(V)



### Application



**Large Samples Analysis**  
Veritas-series can analyze large-scale samples conventional SEMs cannot. ex : Wafer, disk

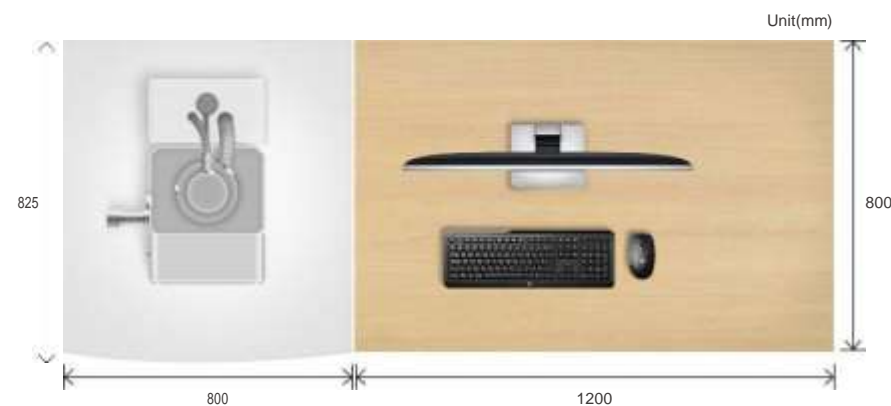


**Non-destructive Samples Analysis**  
Able to analyze samples without cutting  
ex : PCB, Semiconductor pattern Analysis



**Heavy Samples Analysis**  
Able to analyze heavy samples up to 2kg  
ex : Rock, Iron Ore

### Installation Footprint



### VERITAS-Series specification

Model	Veritas-3000	Veritas-3100
Stage Type	5-axis Motorized X,Y : 120mm(-60mm~60mm) Z : 5~65mm T : -20°~90° R : 360°	
Variable Pressure	X	0
Vacuum Mode	High Vacuum Mode (<math>9 \times 10^{-3}</math>Pa)	High Vacuum Mode (<math>9 \times 10^{-3}</math>Pa) Low Vacuum Mode(10 ~ 230Pa)
Vacuum System	Fully Automated Evacuation System - Turbo molecular pump (Vacuum ready within 3 minutes) - Rotary vane pump - Electrical valve system	
Electron Gun	Precentered Tungsten Filament	
Detector	SE Detector	SE Detector BSE Detector (4channel, Semiconductor)
Resolution	3.0nm (SE Image)	3.0nm (SE Image) 5.0nm (BSE Image)
Magnification	x10 ~ x300,000	
Acceleration Voltage	200V ~ 30kV	
Objective IRIS	20/20/50/100μm (Variable aperture)	
Image Shift	±50μm	
Maximum Sample Size	Horizontal: 210mm, Vertical: 65mm	
Advanced Scan Mode	Dynamic Focus, Point & Line Scan, Tilt Compensation	
Working Distance	0 ~ 65mm	
Automatic Function	Auto Brightness/Contrast, Auto Focus, Auto Gun Alignment, Auto Saturation, Auto Filament / Bias	
Image Format	JPG, TIFF, BMP, PNG	
Display Mode	Focus Mode : 320x240 pixel, Resizable Preview Mode : 800x600 Slow Mode : Applicable to both preview and focus mode Photo Mode : Up to 3200x2400	
Dimension(mm)	Installation Dimension : 2000(W) x 800(D) -Main System : 800(W) x 825(D) x 1500(H), 200kg -Rotary Pump : 454(W) x 134(D) x 212(H), 22kg	
Supplied Accessories	Factory-centered Filament Cartridge 1box(10units), Specimen Mounts 1box(10units), Tweezer, Carbon Tape, Hex. Driver 0.89mm (1 ea.), Hex. T Wrench 2.5mm (2 ea.)	
Operation Device	Windows 10-based All-in-One 21.5" Workstation   100% controlled by keyboard and mouse Chamber Camera   LaB <sub>6</sub> /CeB <sub>6</sub> upgrade	
Optional Devices	3D Imaging   Raman Spectroscopy   EDS(Energy Dispersive Spectroscopy) EBSD(Electron Back Scattered Diffraction)   WDS(Wavelength Dispersive Spectroscopy) CL(Cathodoluminescence) Imaging   E-beam Lithography	
Power Supply	Single Phase : 100 ~ 240VAC, 50/60Hz, 1kVA	

# 04 Virtuoso

## Easy-to-Use Operation Software

### Image Save & Export



### Annotation Tool



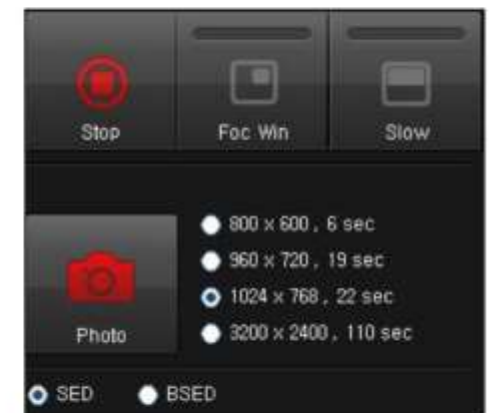
### Image Parameter Control



### Automatic Functions



### Vacuum Control & Status Monitor



### Observation Mode Selection



Various Image Formats  
JPEG, TIFF, BMP, PNG

Observation Mode  
Focus Window Mode  
TV Mode  
Slow Scan Mode  
Photo Mode

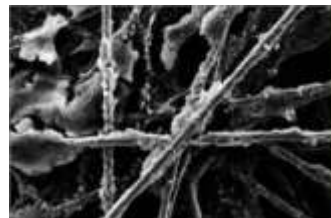
Automatic Functions  
Filament/Bias  
Brightness/Contrast  
Gun Alignment  
Focus  
Stigmator

User Friendly Functions  
Multi-User environment  
Wobble  
Filament burn-out alarm  
Customizable annotation

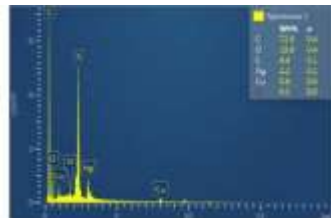
# 05 Optional Device

## 1. EDS SYSTEM

- LN2-free operation, Silicon Drift Detector.
- Detects elements from Be(4) to Cf(98).
- Premium Resdution of 129 eV is available.
- Quantitative Analysis, Qualitative Analysis, Multi-Point Analysis, LineScan, Mapping.
- EDS Maker: Oxford, Thermo, Bruker, EDAX, Evex.



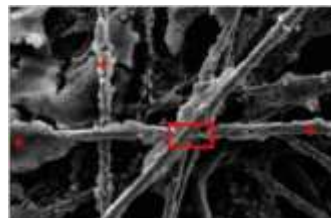
SEM Image



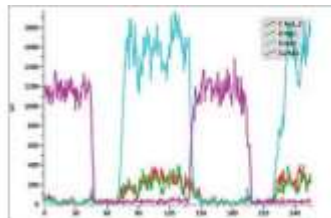
Qualitative Analysis

Element	Line Type	Apparent Concentration	k Ratio	Wt%	Wt% Sigma	Standard Label	Factory Standard	Standard Calibration Date
C	K series	6.87	0.8666	72.81	0.42	C-VIS	Yes	
O	K series	2.32	0.00782	19.76	0.42	SiO2	Yes	
Si	K series	0.05	0.00037	0.07	0.01	SiO2	Yes	
P	K series	2.72	0.03340	4.42	0.06	FeS2	Yes	
Cu	K series	0.25	0.00451	0.78	0.05	Cu	Yes	
Ag	K series	1.18	0.0118	2.19	0.06	Ag	Yes	
Total:				100.00				

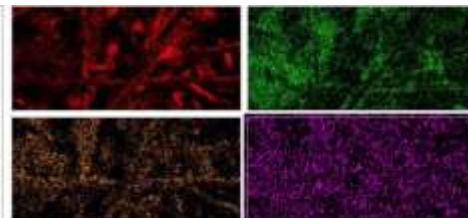
Quantitative Analysis



Point and Area Analysis



Line Scan



Mapping

## 2. ION SPUTTER COATER



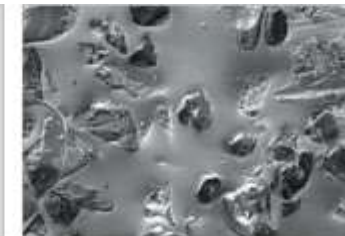
- Operating principle : Top Electrode discharge system
- Ionization power : ~50mA(Max : 500V)
- Target : 50mm(Ø) x 0.1mm thick, Disc type(Au, Pt)
- Instrument case : 270(W) x 470(D) x 385(H)
- Power requirements : 220V / Single phase AC 50/60Hz, 10A
- Weight : 22kg
- Rotary Pump : 16L/min[at 60Hz]

## 3. BSE Defector

- Semiconductor Type, 4 Channel Detector.
- BSE detector make it possible that sample with non-coating is observable and the boundary interface of alloy sample can be disentangled.



BSE Defector



SE Image



BSE Image

## 4. Holder



Multi Holder for 7 pin Stubs



Big Mount



45° Pin Stub Holder



Set Screw Vise

## 5. Filament



LaB<sub>6</sub> Filament



Factory-Centered Filament Cartridge



## 6. Critical Point Dryer

- Critical point dryer is an instrumental device which is used to preprocess biological specimens such as plants, insect, liver tissue, nerve cell, brain tissue etc.
- At critical point, the specimen is dried using CO<sub>2</sub>. The original shape of specimen would be maintained and analyzed without causing surface tension by moisture and necrosis of biological tissue by dehydration.



## 7. Freeze Dryer

- Freeze dryer is to fix, dehydrate biological specimen with minimal shrinking and deformation.
- Electronic temperature control ranging from 0°C to 40°C. Rapid adjustment of temperature, 10 minutes for adjustment from 40°C to 5°C.

## 8. Cool Stage

Cool stage offers a flexible heating/cooling to observe biological specimen. Biological specimen can be observed using cool stage with minimal dehydration and deformation at lower temperature. Easily damaging Specimen by E-beam is also observable using cool stage.

## 9. Polishing Machine



The top of the range automatic polishing machines.

- **Powerful** Fitted with powerful motors controlled by a frequency controller!
- **Reproducible** Built-in memory stores all your polishing processes!
- **Efficient** All the settings are completely adjustable and programmable!
- **Simple** Design and touch pad control!
- **Intelligent** All the Technological experience goes into the most complete polishing machine on the market!

## 10. Mounting Machine

Emcrafts offers super short mounting times and maximum user-friendliness. Speed is further improved by using the optional dosing system.

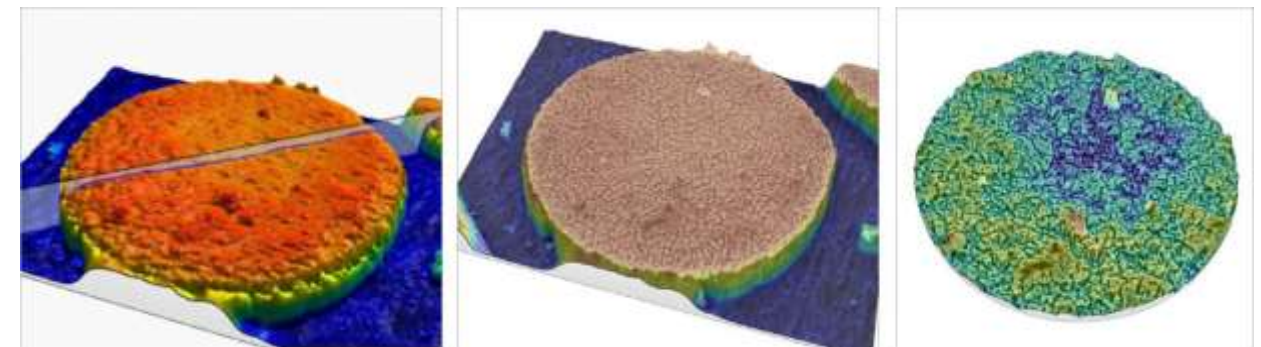


**Powerful hydraulic system**

- Fast heating and cooling using new heating and cooling technology
- Available dual sample products with intermediate piston
- Two cylinder sample products available in different sizes
- Requests for up to 4 sample products at once are possible
- 18 preset functions according to resin and mold size
- Good sample product system with preheating
- Faster cycle with optimized cooling system.

## 11. 3D Reconstruction S/W

- Many nano-scale require depth information but most optical microscope and scanning electron microscope haven't delivered successful solutions so far. EmCrafts Products supplies state-of-the-art 3D reconstruction software which is capable of 3D imaging from multiple images at different angles or illuminations which can replace expensive solutions such as atomic force microscope.



## 12. More advanced applications are available

- EBSD(Electron Back Scattered Diffraction)
- WDS(Wavelength Dispersive Spectroscopy)
- CL(Cathodoluminescence) Imaging
- Chamber Camera
- Raman Spectroscopy
- Etc.