TROY INTELLIGENT



Scanning Electron Microscope (SEM)

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Scanning Electron Microscope

TR3200

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Product Introduction

SEM3200 is a tungsten filament scanning electron microscope with high performance and wide application.

It has excellent imaging quality capabilities in both high and low vacuum modes. It also has a large depth of field with a user friendly environment to characterize samples.What's more, rich scalability helps the users to explore the world of microscopic imaging.

Resolution

High vacuum:3 nm @ 30 kV(SE),8 nm @ 3 kV(SE),4 nm @ 30 kV(BSE)

Magnification

1~300,000x (polaroid);1~1000,000x(display)

Acceleration Voltage

0.2 kV～30 kV

Product Advantages

(*optional)

Scalability
SE\BSE\EDS\EBSD, etc

Optical navigation
quickly navigate the region of interest (ROI)

***Large image mapping**
Automatic image acquisition and stitching

Mixing imaging（SE+BSE）
The composition and surface information of the sample is observed in an image

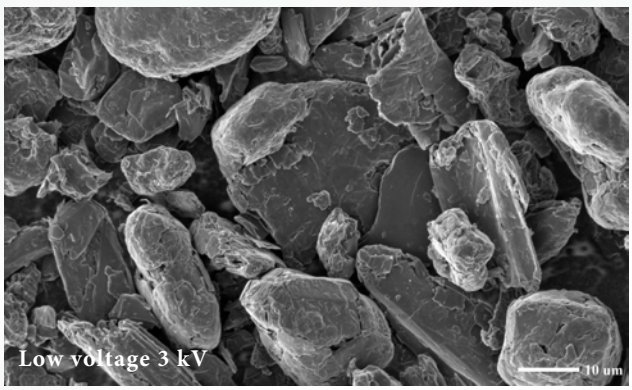
***Tetrode emission system**
Tetrode design provides excellent resolution under low landing energy

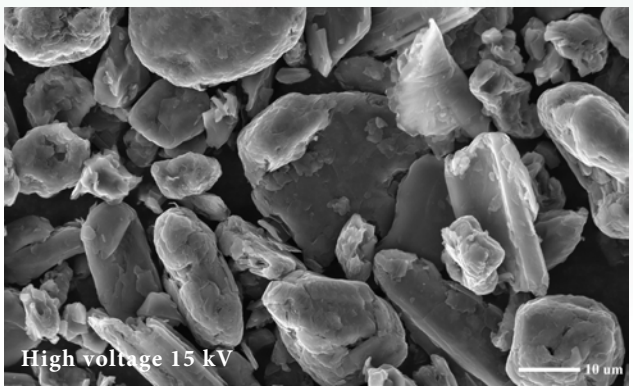
***Low vacuum mode**
Provides sample surface details and morphology at low vacuum, and the software switches the vacuum state with one click

Product Features (*Optional)

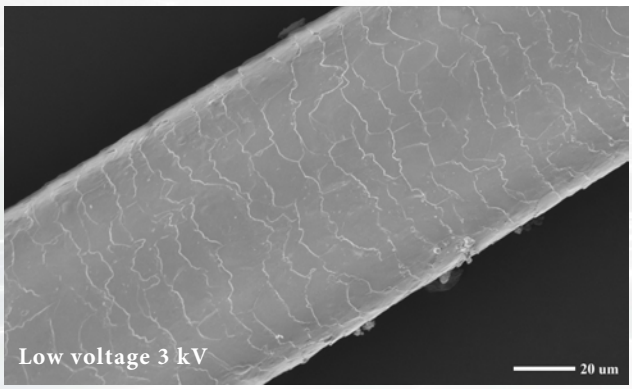
Low voltage

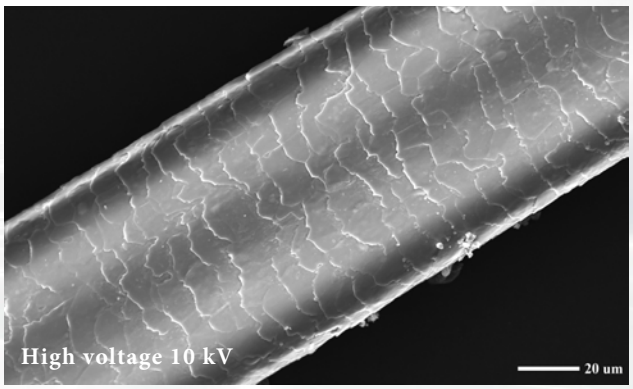
For carbon material samples, at low voltage, the penetration depth is small, and the true morphology of the sample surface can be obtained with richer details.





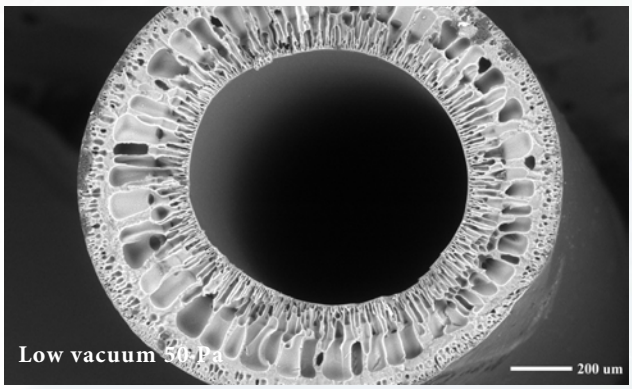
For hair samples, at low voltage, the damage of electron beam irradiation is reduced and the charge effect is eliminated.

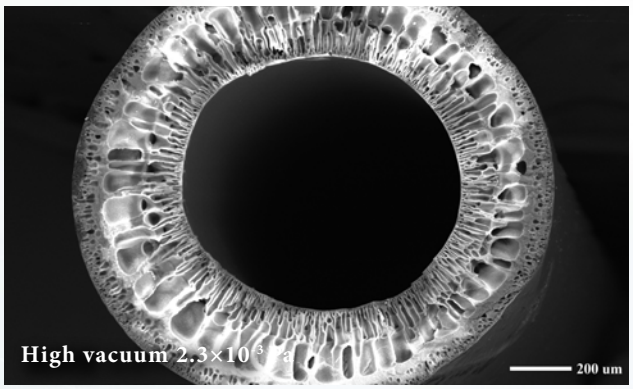




Low vacuum

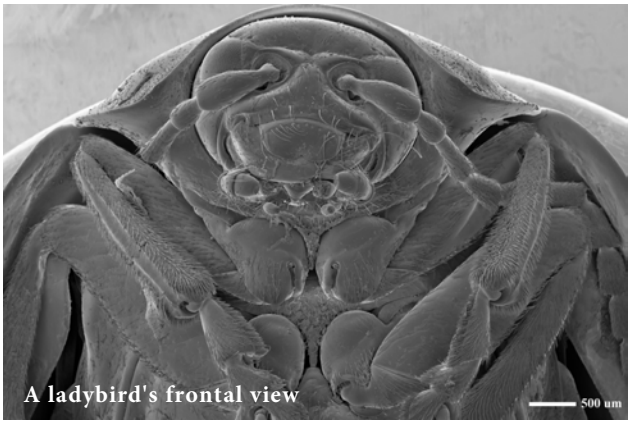
The filter fiber tube material has poor electrical conductivity and obvious charge under high vacuum. Under low vacuum, the non-conductive sample can be directly observed without coating.

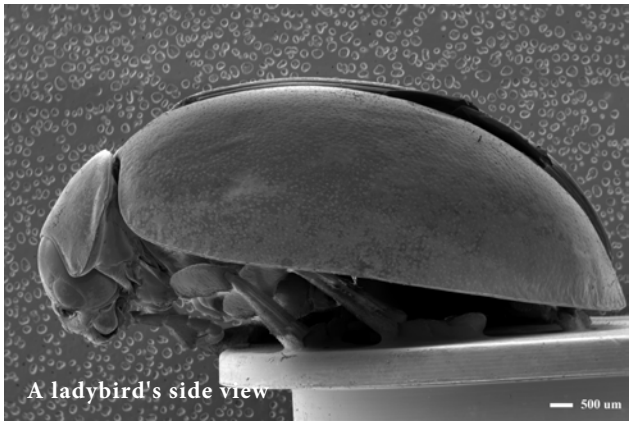




Wide field of view

Biological samples can easily obtain the overall morphology and head structure details of the ladybug by using wide-field observation, and display cross-scale analysis.

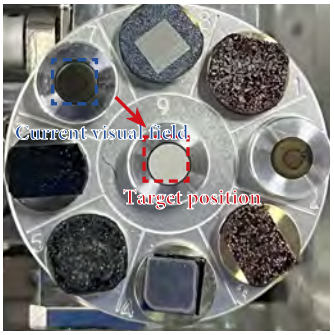




Navigation & Anti-collision

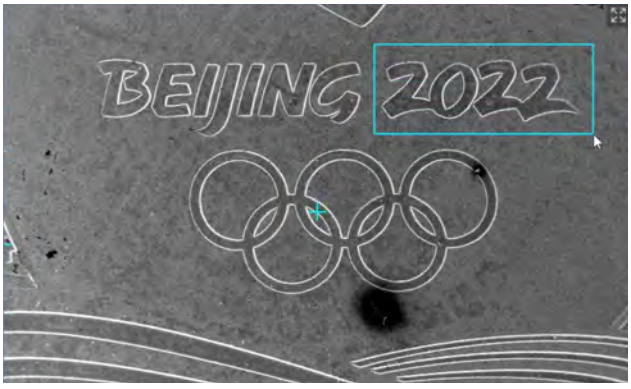
Optical navigation

The standard camera in the warehouse can take high-definition photos of the sample station and quickly locate the sample.



Gesture shortcut navigation

Box selection and magnification: under the low-power navigation, you can get a large field of view of the sample, which can quickly select the sample area you are interested in, improving work efficiency.





Anti-collision technology

Multi-dimensional anti-collision scheme：

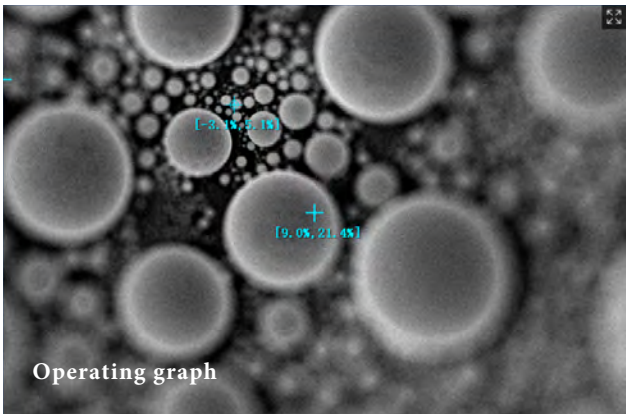
1. Manually input the sample height to accurately control the distance between the sample and the lower end of the objective to prevent collision;
2. Based on image recognition and dynamic capture technology, real-time monitoring of the pictures in the warehouse in the process of movement;
3. Hardware anti-collision, can stop the motor at the moment of collision, reduce collision damage. (*)

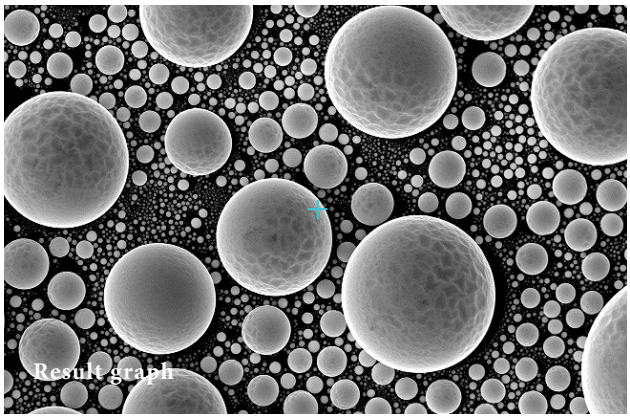


Feature function

Intelligent assisted astigmatism

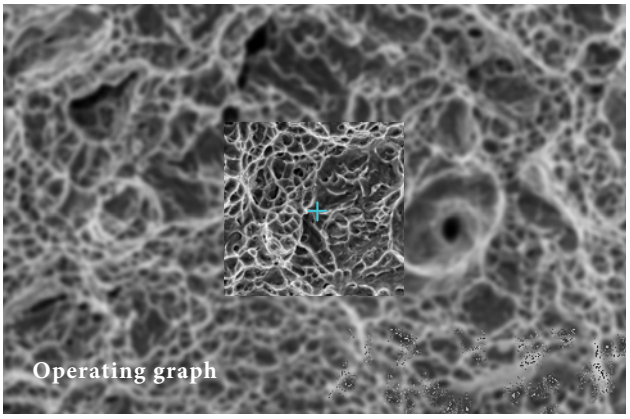
Directly reflect the astigmatism of the whole field of vision, through the mouse click clear, can quickly adjust the astigmatism to the best.

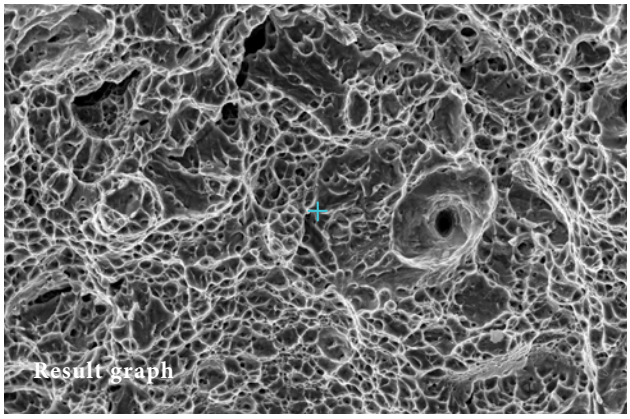




Autofocus

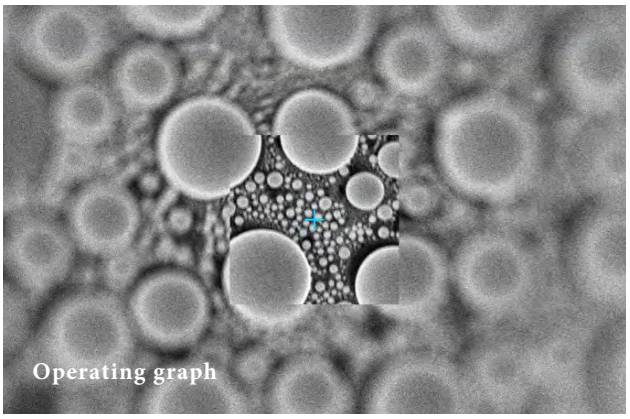
One-click focus for fast imaging.

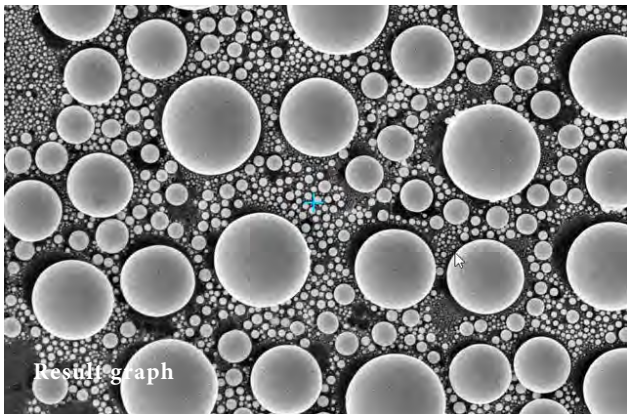




Automatic astigmatism

One-click astigmatism, improve efficiency.





Automatic brightness contrast

One-click automatic brightness contrast, gray level appropriate image.

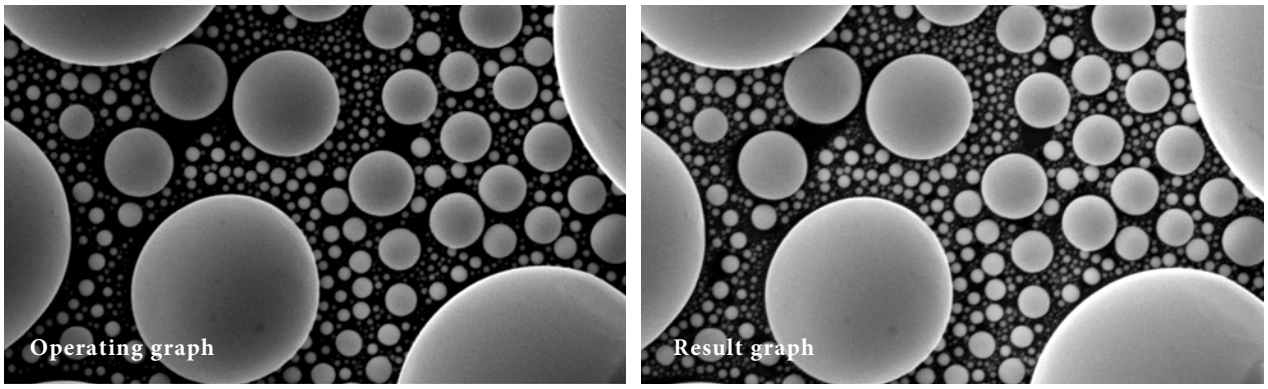
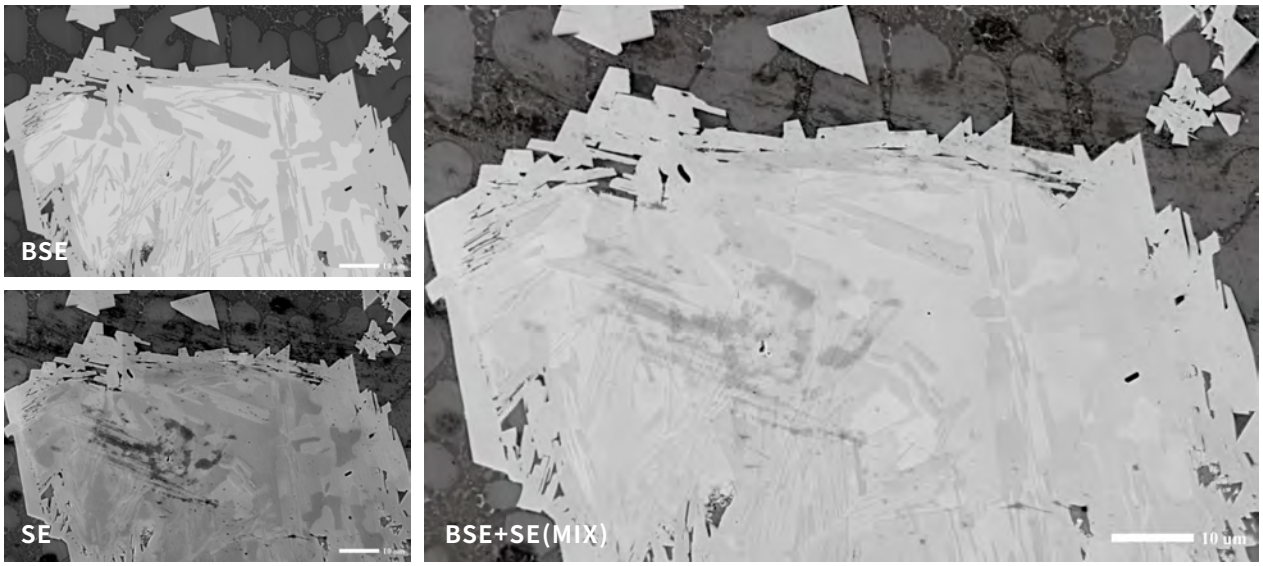


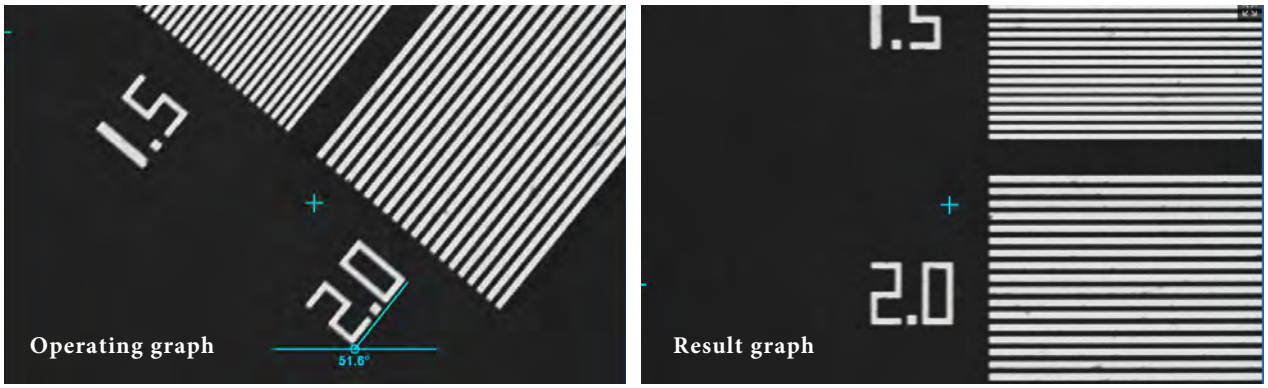
Image multiple information simultaneously

SEM3200 supports one-click switching between SE and BSE hybrid imaging, the morphology and composition information of samples can be observed simultaneously.



Fast image rotation

Drag a line and the image is instantly "angled".



Rich scalability

Scanning electron microscope is not only limited to the observation of surface morphology, but also can be used to analyze the micro-components of the sample surface.

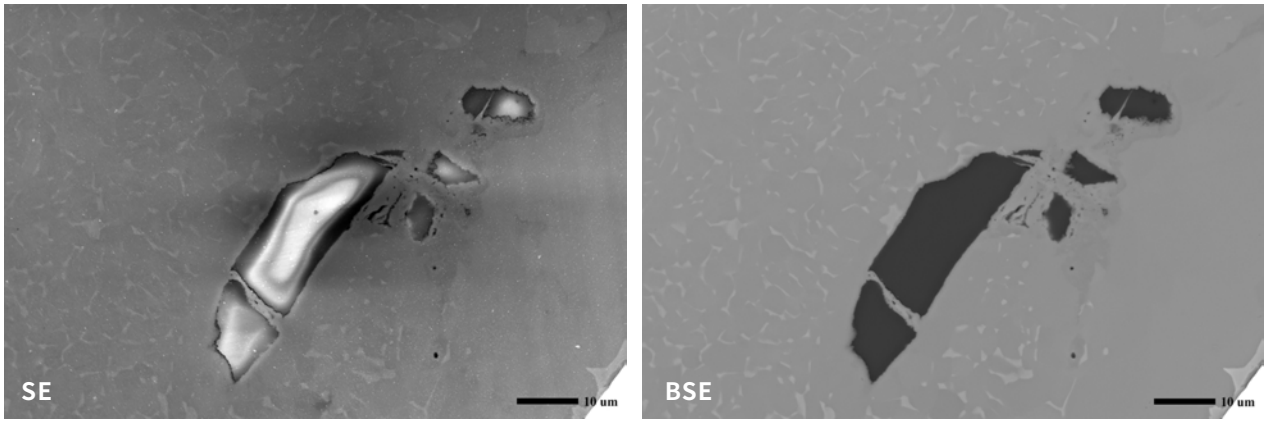
In addition to conventional secondary electron detector (ETD), backscattered electron detector (BSED), and X-ray energy dispersive spectrometer (EDS), many interfaces are reserved, such as electron backscattered diffraction (EBSD), cathode ray (CL) detectors can be integrated on SEM3200.

Backscattered electron detector

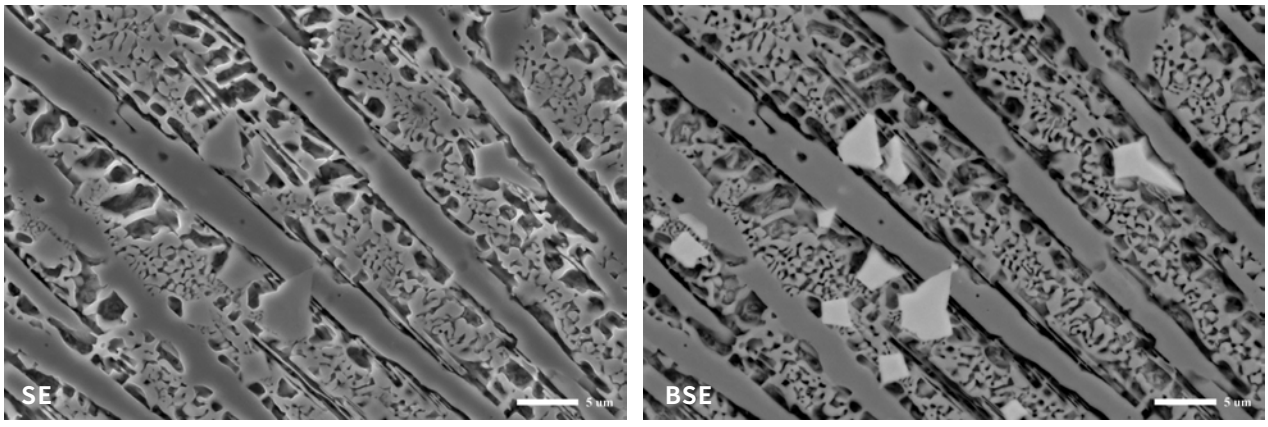
Contrast between secondary electron imaging and backscattered electron imaging

In the backscattered electron imaging mode, the charge effect is weakened obviously, and more composition information can be obtained on the sample surface.

Coating sample：

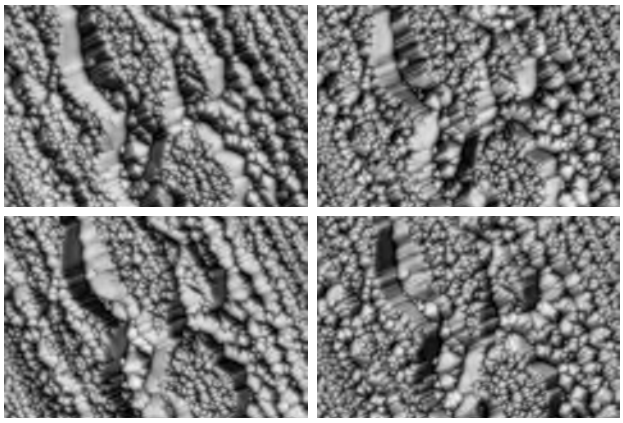


Tungsten steel alloy sample：

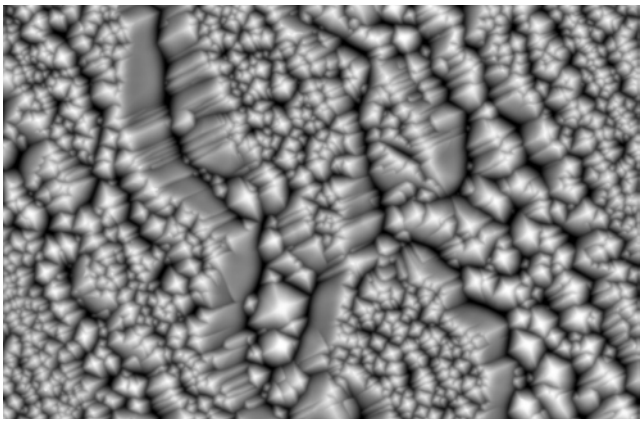


Quadripartite backscattered electron detector -- multichannel imaging

The detector is exquisitely designed and highly sensitive. It adopts a 4-segment design, and can obtain shadow images and component distribution images in different directions without tilting the sample.



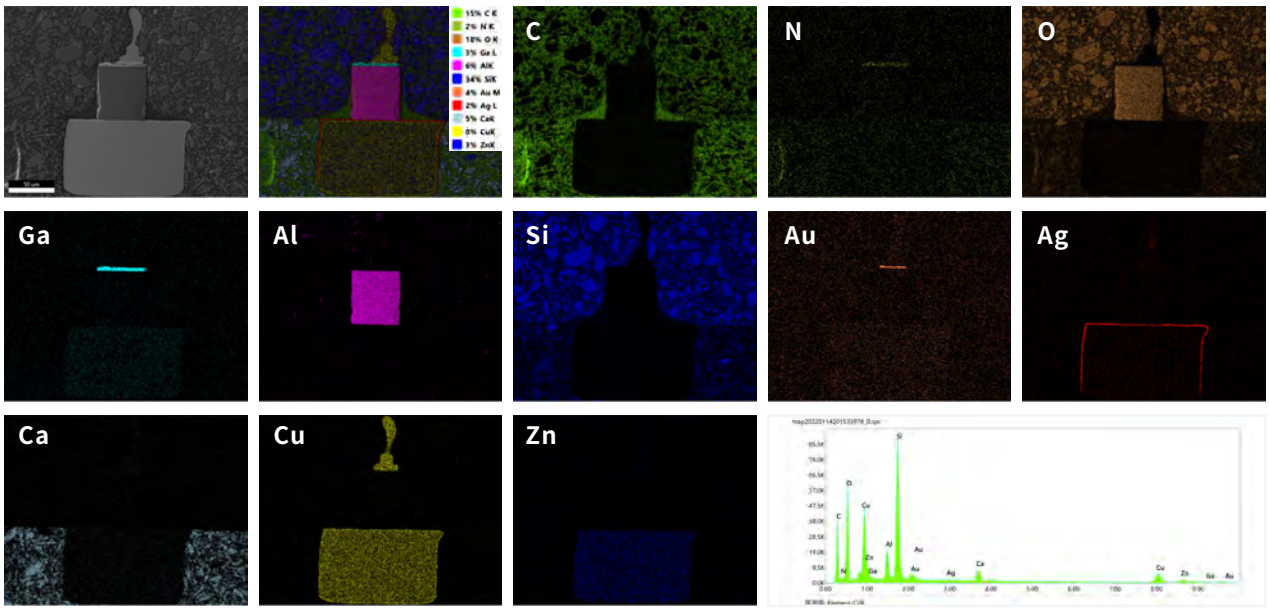
Four single-channel shadow images



Composition image

X-ray energy dispersive spectrometer (EDS)

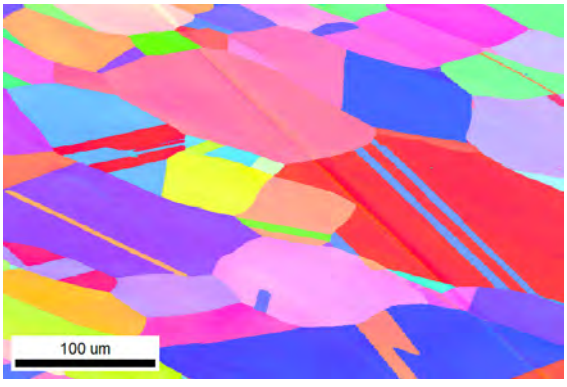
EDS analysis results of LED beads.



Electron backscatter diffraction

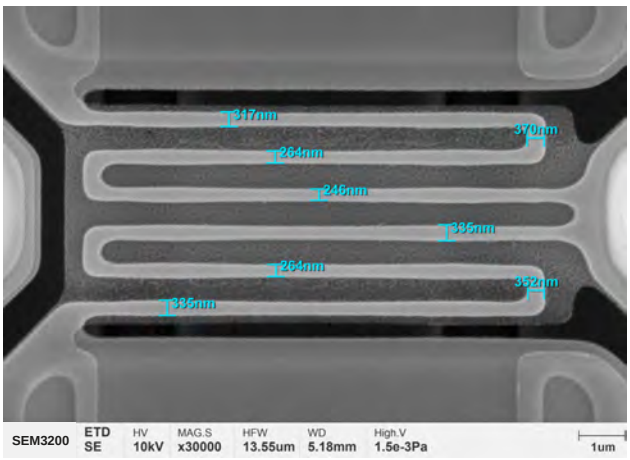
Tungsten filament has a large electron microscope beam, which fully meets the testing requirements of high resolution EBSD. It can calibrate the crystal orientation and analyze the grain size of polycrystalline materials such as metals, ceramics and minerals.

The EBSD reverse polar diagram of Ni metal standard samples can identify grain size and orientation, grain boundaries and twins, and accurately judge the material structure.



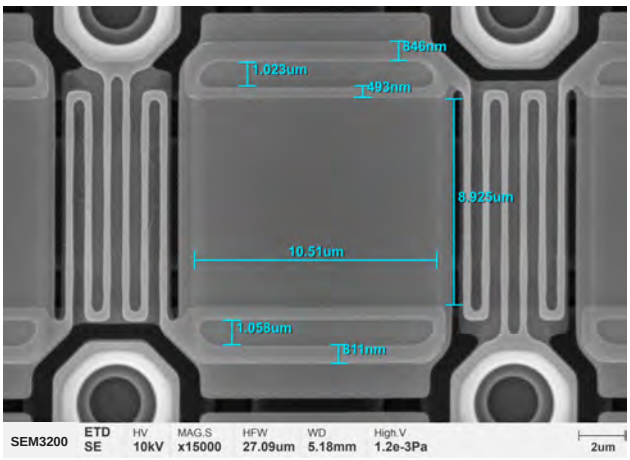
Application

Semiconductors and electronic components



Chip-1

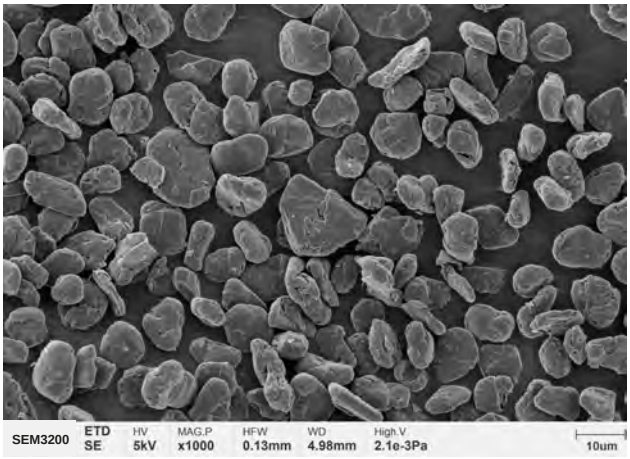
Acceleration voltage：10 KV / magnification：×30000



Chip-2

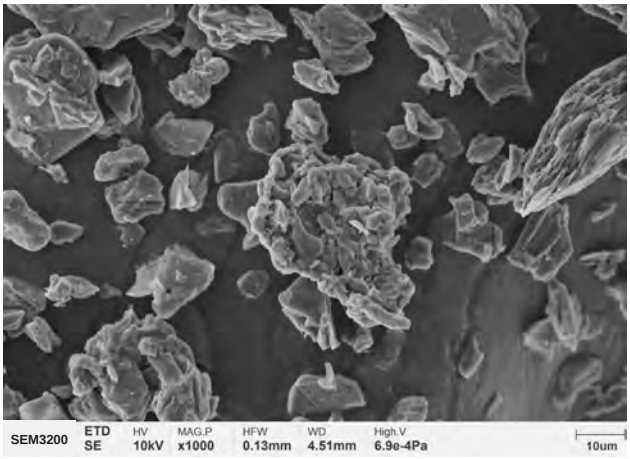
Acceleration voltage： 10 KV / magnification： ×15000

Batteries and new energy



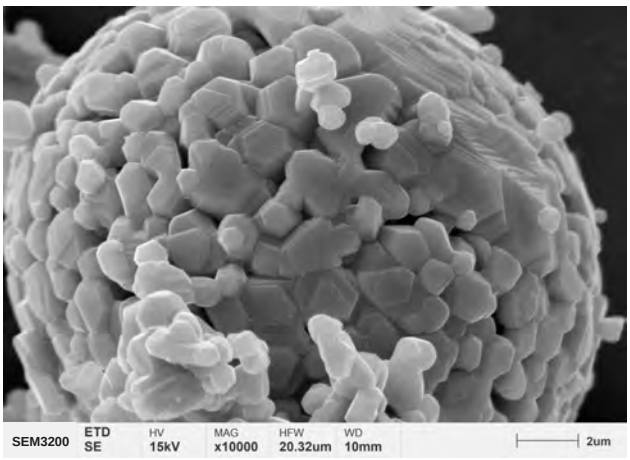
Negative electrode -- carbon

Acceleration voltage: 5 KV/ Magnification: ×1000



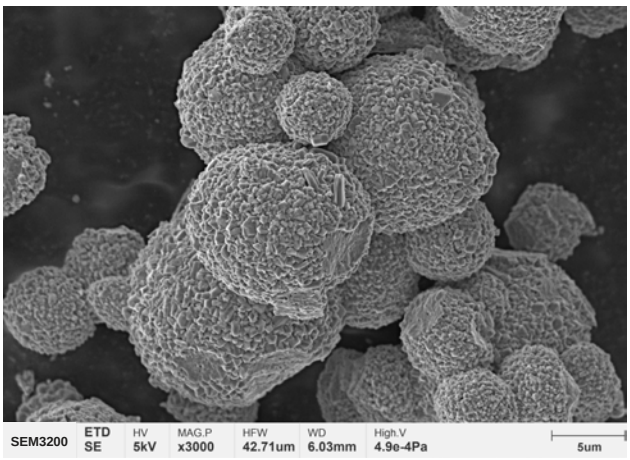
Negative electrode - carbon coated silicon

Acceleration voltage: 10 KV/magnification: ×1000



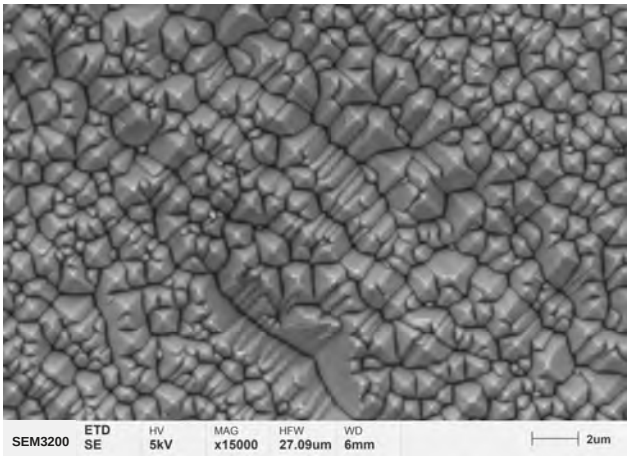
Positive electrode --Lithium cobaltate

Acceleration voltage: 15 KV/ Magnification: ×10000



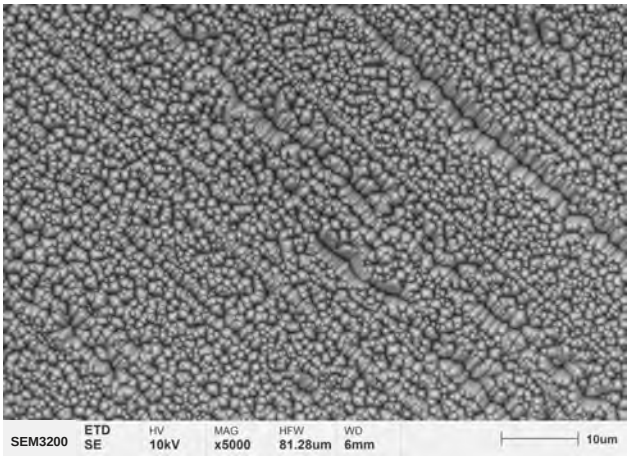
Positive electrode --Lithium manganate

Acceleration voltage: 5 KV/ Magnification: ×3000



Solar cell-1

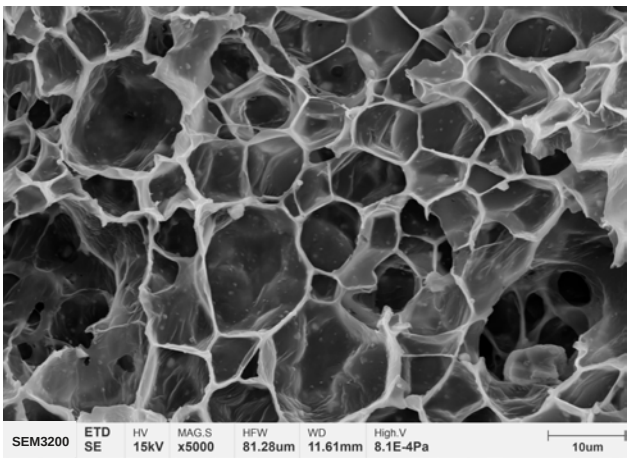
Acceleration voltage: 5 KV/ Magnitude: ×10000



Solar cell-2

Acceleration voltage: 10 KV/ Magnitude: ×5000

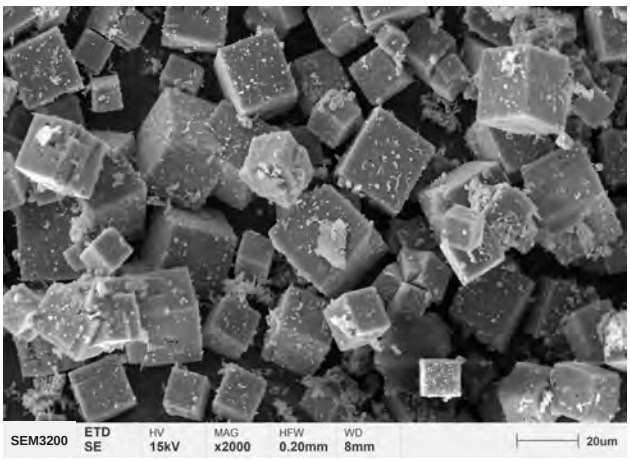
Polymer material



Polymer foam

Acceleration voltage: 15 KV/ Magnitude: ×5000

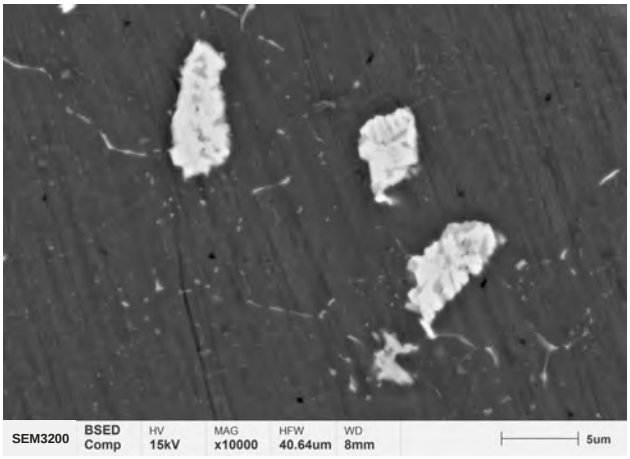
Chemicals



Catalyst -MOF material

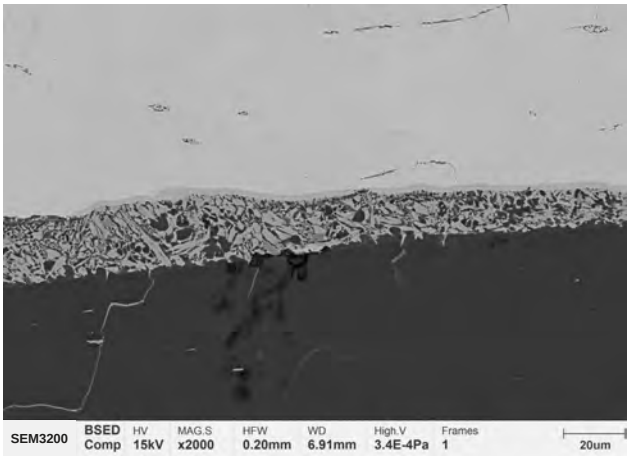
Acceleration voltage: 15 KV/ Magnitude: ×2000

Metal



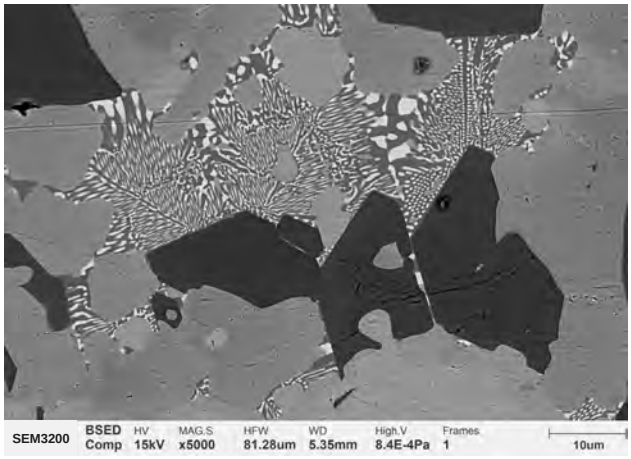
2A12 Aluminium alloy precipitated phase

Acceleration voltage: 15 KV/ Magnitude: ×10000

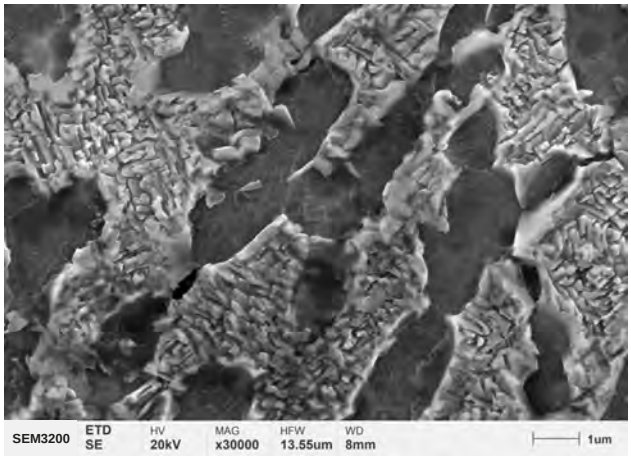


Mg-ZnAlloy compound layer

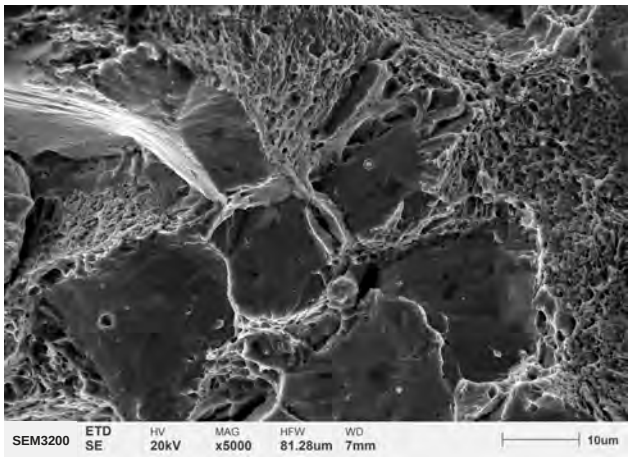
Acceleration voltage: 15 KV/ Magnitude: ×2000



Stainless steel - brass welds
Acceleration voltage: 15 KV/ Magnification: ×5000



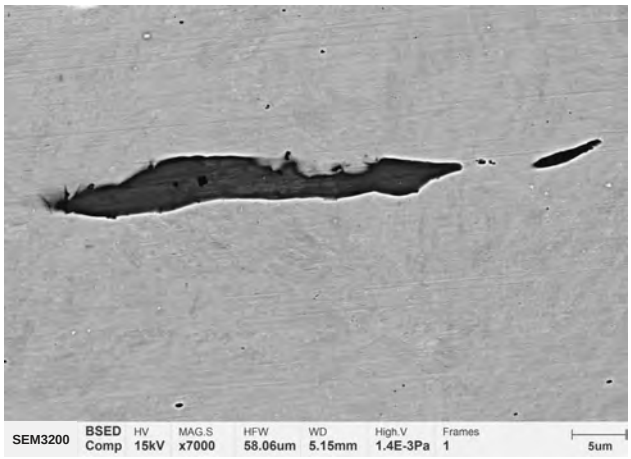
Titanium alloy matrix structure
Acceleration voltage: 20 KV/ Magnification: ×30000



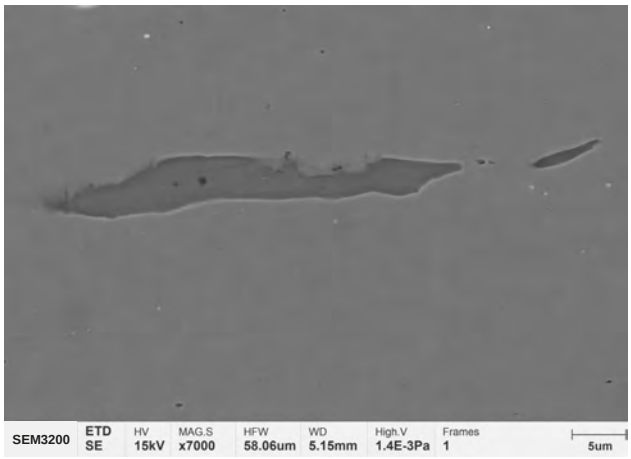
Alloy fracture brittleness + toughness
Acceleration voltage: 20 KV/ Magnification: ×5000



Ductile fracture
Acceleration voltage: 20 KV/ Magnification: ×1000

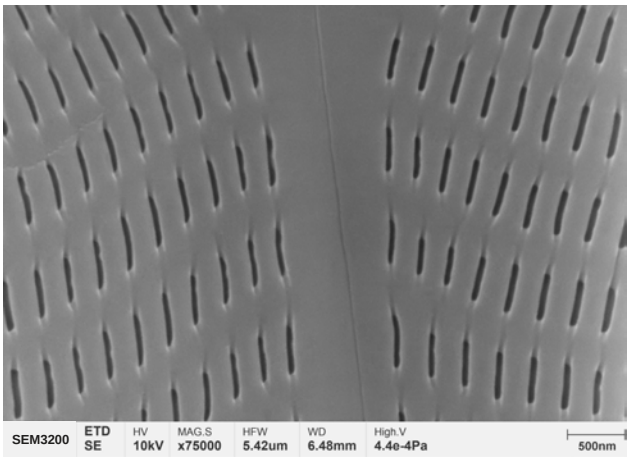


Steel inclusion BSE
Acceleration voltage: 15 KV/ Magnification: ×7000

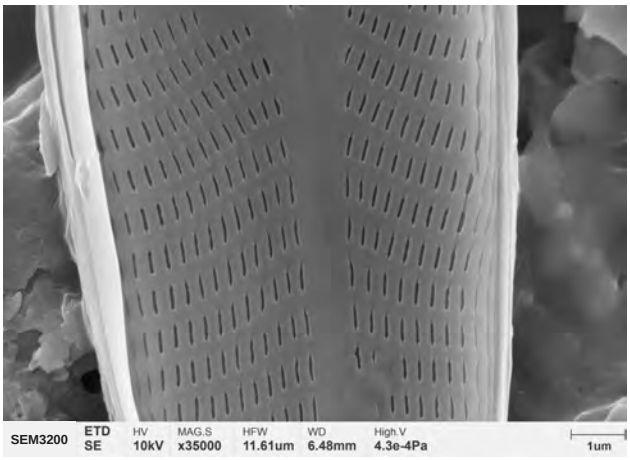


SESteel inclusion SE
Acceleration voltage: 15 KV/ Magnification: ×7000

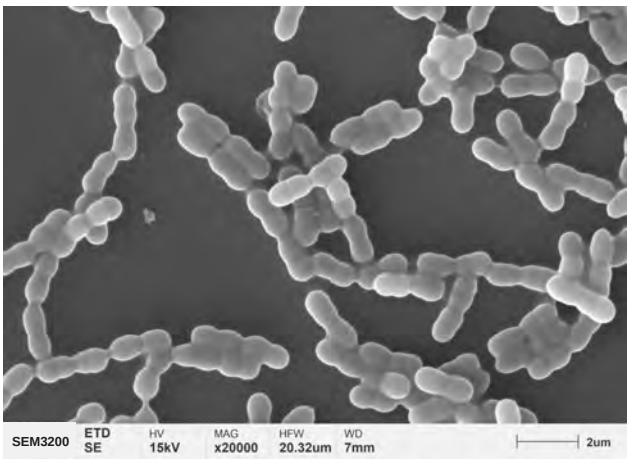
Organism



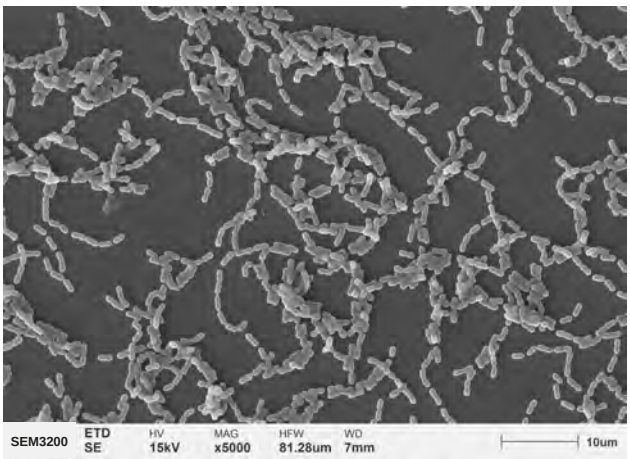
Diatom-1
Acceleration voltage: 10 KV/ Magnification: ×75000



Diatom-2
Acceleration voltage: 10 KV/ Magnification: ×35000

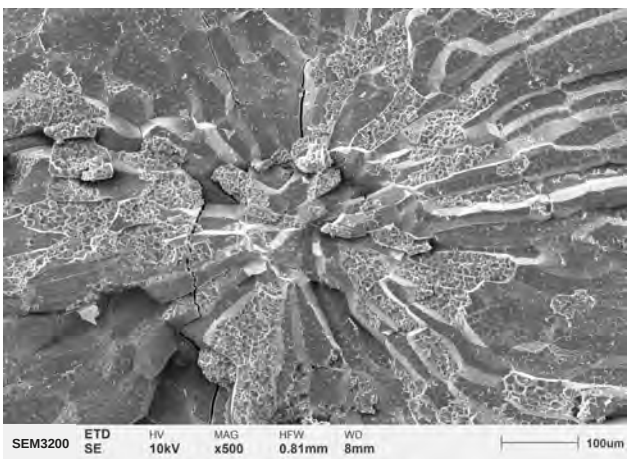


Staphylococcus galli-1
Acceleration voltage: 15 KV/ Magnification: ×20000

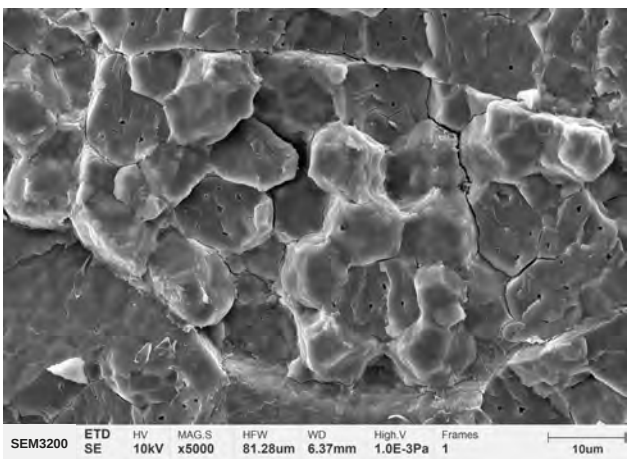


Staphylococcus galli-2
Acceleration voltage: 15 KV/ Magnification: ×5000

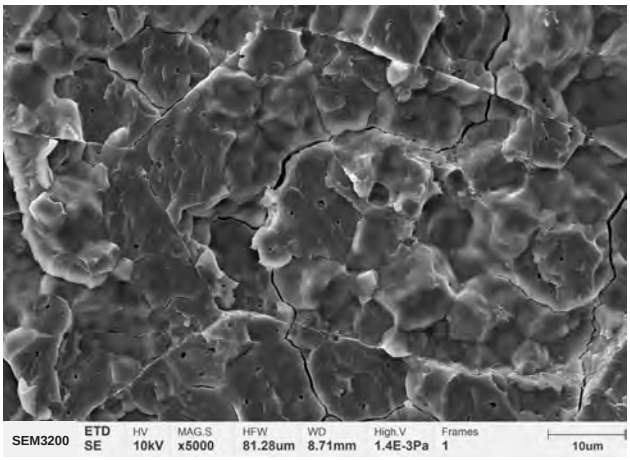
Food



Rice
Acceleration voltage: 10 KV/ Magnification: ×500



Glutinous rice starch granules-1
Acceleration voltage: 10 KV/ Magnification: ×5000



Glutinous rice starch granules-2

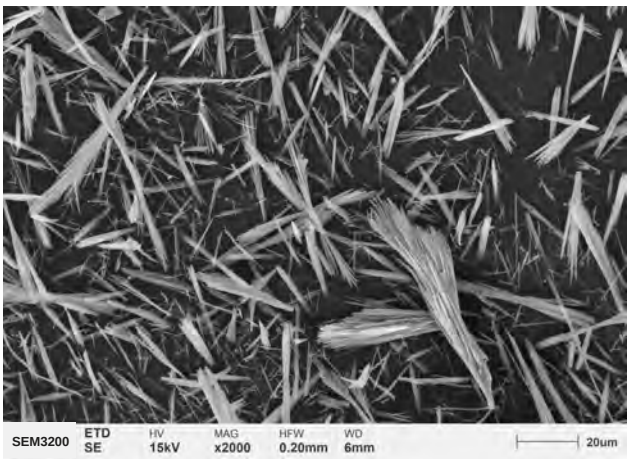
Acceleration voltage: 10 KV/ Magnification: ×5000



Damp salt particles

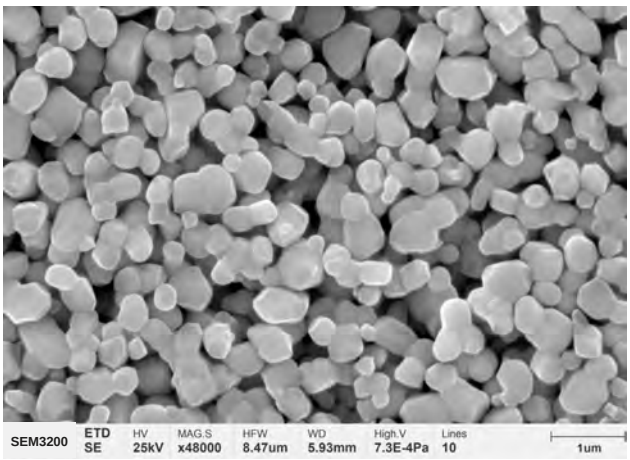
Acceleration voltage: 1 KV/ Magnification: ×500

Basic research



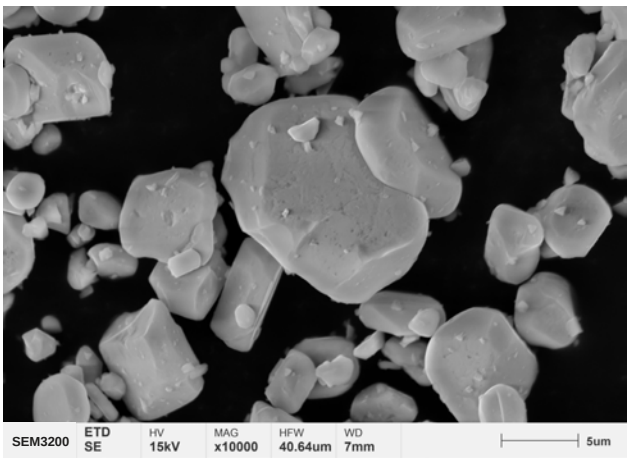
Powder - Magnesium sulfate

Acceleration voltage: 15 KV/ Magnification: ×2000



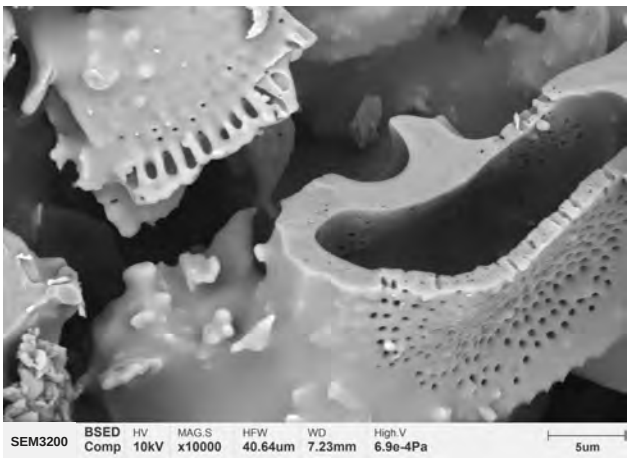
Powder - barium titanate

Acceleration voltage: 25 KV/ Magnification: ×48000



Powder alpha-alumina

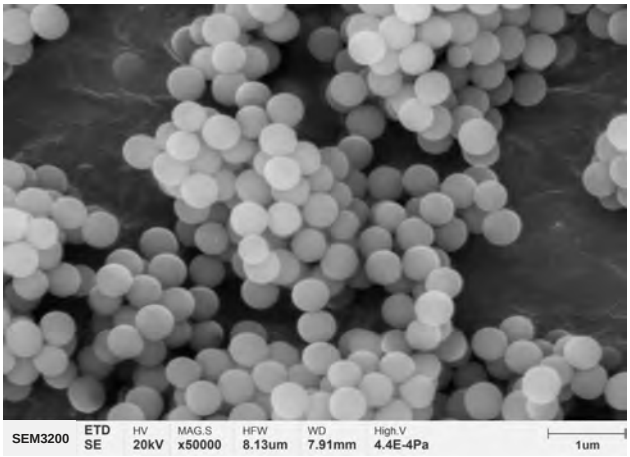
Acceleration voltage: 15 KV/ Magnification: ×10000



Filter function material

Acceleration voltage: 10 KV/ Magnification: ×10000

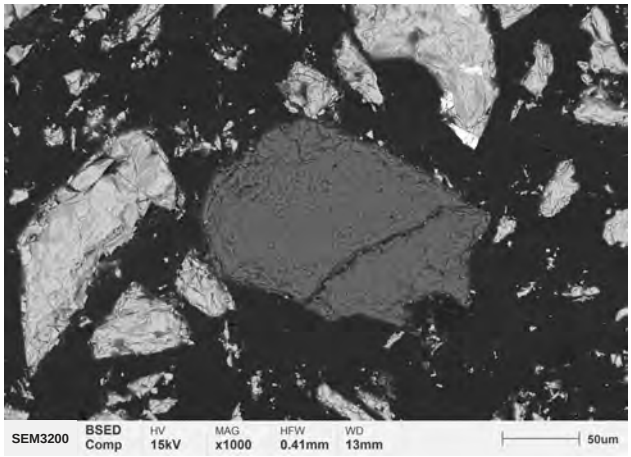
Basic research



Nanomaterial - silica microspheres

Acceleration voltage: 20 KV/ Magnification: ×50000

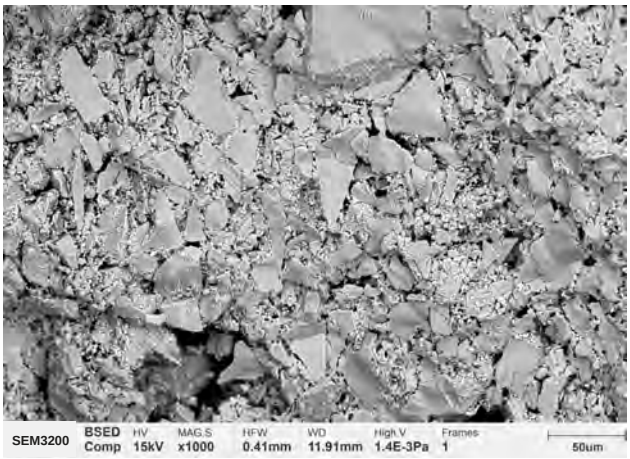
Environment



Rock

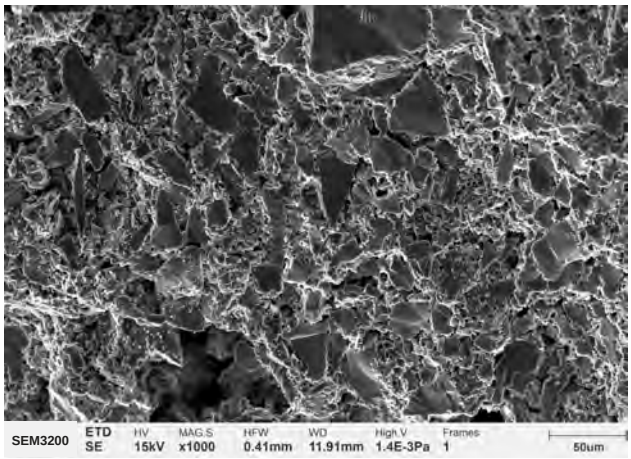
Acceleration voltage: 15 KV/ Magnification: ×1000

Ceramic



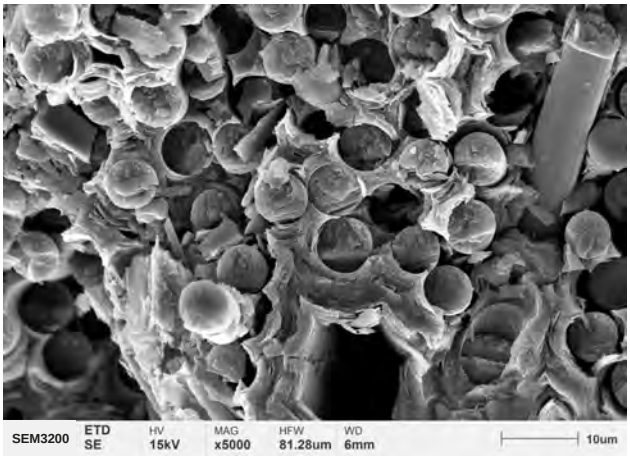
SiC ceramic BSE

Acceleration voltage: 15 KV/ Magnification: ×1000



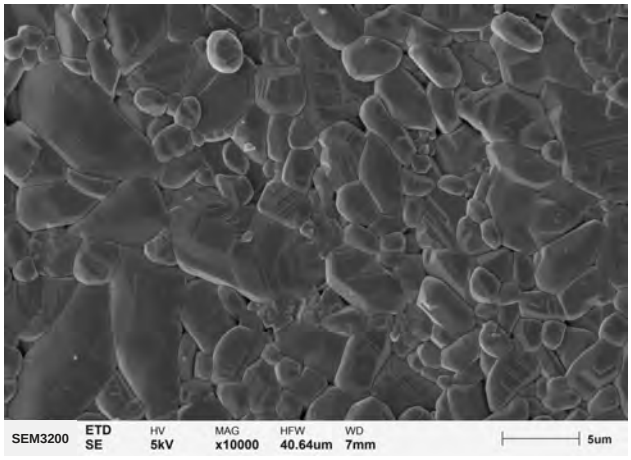
SiC ceramic SE

Acceleration voltage: 15 KV/ Magnification: ×1000



Ceramic composite

Acceleration voltage: 15 KV/ Magnification: ×5000



Ceramic structural material

Acceleration voltage: 5 KV/ Magnification: ×10000

Products Specifications (*Optional)

Model			TR3200
Electron optical system	Electron gun		Pre-aligned medium-sized fork-type tungsten filament
	Resolution	High vacuum	3 nm @ 30 kV (SE) 4 nm @ 30 kV (BSE) 8 nm @ 3 kV (SE)
		*Low vacuum	3 nm @ 30 kV (SE)
	Magnification		1~300，000x (Polaroid)
			1~1000，000x (Display)
	Accelerating voltage		0.2 kV～30 kV
Imaging system	Detector		Secondary electron detector （ETD）
			*EBSD、*LVD、*EDS
	Image format		TIFF、JPG、BMP、PNG
Vacuum system	Vacuum mode	High vacuum	Better than 5×10^{-4} Pa
		*Low vacuum	5～1000 Pa
	Control mode		Full automatic
	Turbo molecular pump		≥ 240 L/S
	Rotary pump		200 L/min (50 Hz)
Sample chamber	Camera		CCD Optical navigation
			IR Monitoring
	Sample stage		Five axis automatic
	Distance		X: 125 mm
			Y: 125 mm
			Z: 50 mm
			R: 360°
			T: -10°～ +90°
Software	Language		Chinese/English
	OS		Windows
	Navigation		Optical navigation, gesture quick navigation
	Automatic function		Auto brightness contrast, auto focus, auto astigmatism
	Featured function		Intelligent assisted astigmatism, maximum image Mosaic (optional software)
Installation Requirements	Size		L ≥ 3000 mm，W ≥ 4000 mm，H ≥ 2300 mm
	Temperature		20 ℃～25 ℃
	Humidity		≤ 50 %
	Electrical power		AC 220 V(±10 %)，50 Hz，2 kVA

Product Services

Scanning electron Microscope Laboratory

We have scanning electron microscopy laboratories in Hefei and Wuxi, which are equipped with many electron microscopy technical experts and senior electron microscopy application engineers, providing a variety of services including electron microscopy application technology development and sample shooting. The main application fields are lithium batteries, new nanomaterials, semiconductor materials, mineral metallurgy, geological exploration, biomedicine and so on.

Relying on electron microscope products, the laboratory carries out scientific research projects with independent intellectual property rights in the field of electron microscopy application, and is committed to achieving the goals of scientific research and talent training. At the same time, the laboratory also provides high quality services for research institutes, universities, enterprises and institutions that have the application needs of electron microscopy.



