

Scanning electron micrograph (SEM) showing a dense collection of nanomaterials, including large, flat, hexagonal or polygonal flakes and numerous smaller, needle-like or rod-like structures. The background is dark, and the nanomaterials are light gray.

COXEM

Product Catalog

www.coxem.com



COXEM'S NEW SEMs

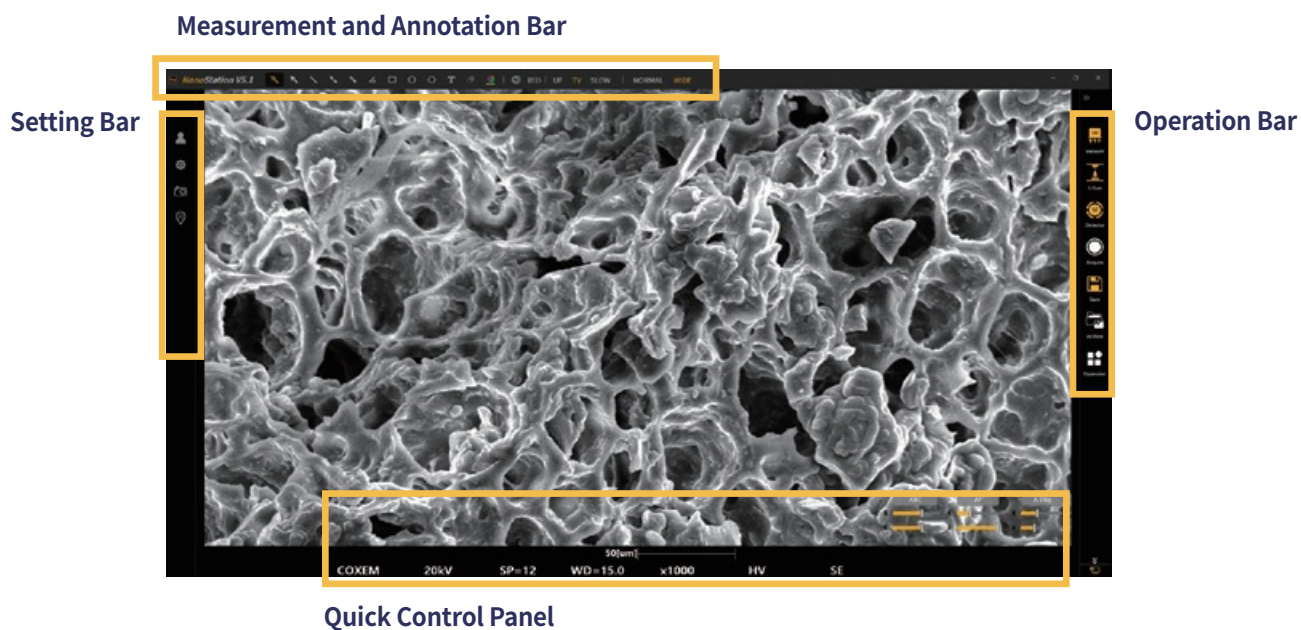
EM-40 / CX-200K / CX-300



New GUI NanoStation 5.1

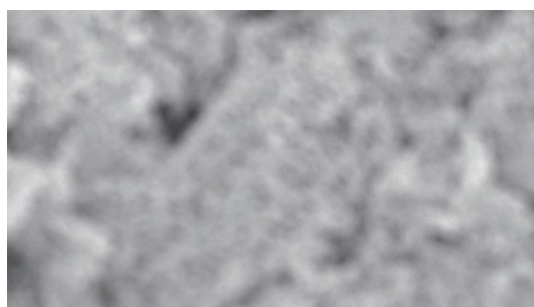
NanoStation5.1은 EM-40에 맞춰 더욱 신속하고 정확히 분석하기 위해 최적화된 분석 프로그램입니다.

또한 시료의 형상과 형태 이미지를 4분할 화면으로 실시간 LIVE 관찰 가능하며, SE, BSE 신호를 합친 하나의 이미지로도 관찰 가능합니다.

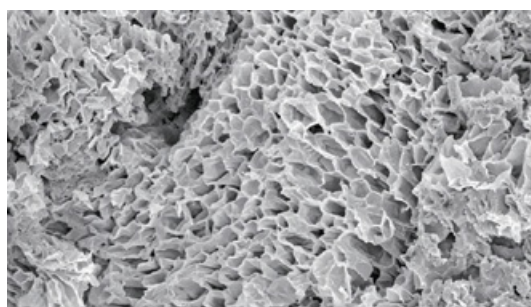


Auto Focus in 3 seconds

Auto Focus (AF)는 자동 이미지 포커싱 기능으로 시료 이미지 분석 시간을 획기적으로 단축할 수 있습니다.

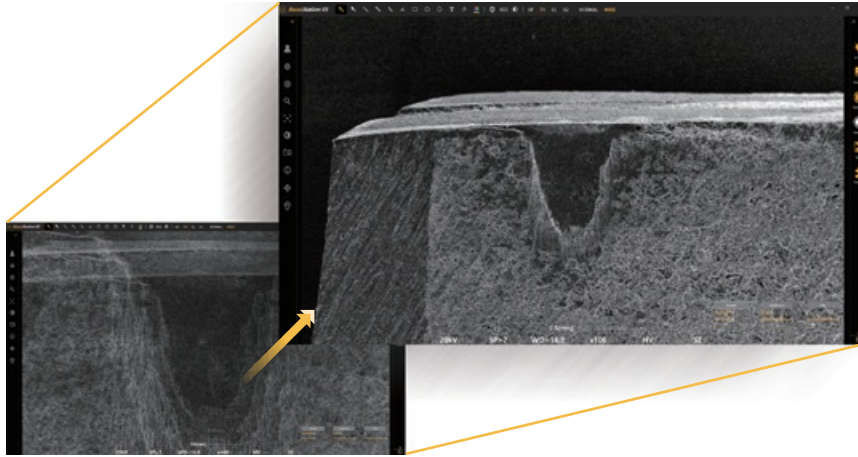


Auto Focus
in 3 seconds



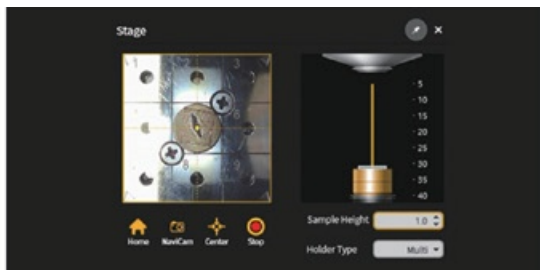
Fast scanning speed (ULTRA / TV / SLOW mode)

EM-40은 기존의 EM Series보다 스캔 속도가 매우 향상되었으며, 사용자가 선호하는 이미징 속도를 직접 선택하여 다양한 스캔 모드로 보다 빠르고 선명하게 시료를 관찰할 수 있습니다.



Motorized stage & Multi-sample holder

EM-40은 자동 스테이지(X, Y, Z 축)를 제공하며, Z 축으로 렌즈와 시료 사이의 작동거리(Working Distance)를 실시간으로 조절할 수 있습니다. 따라서 시료 분석 시간을 단축시켜 보다 빠른 분석이 가능합니다.



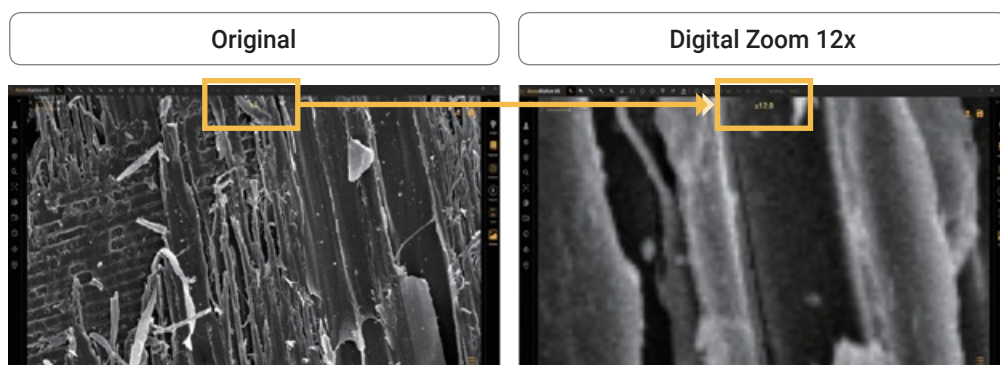
Multi-sample holder



Pin stub

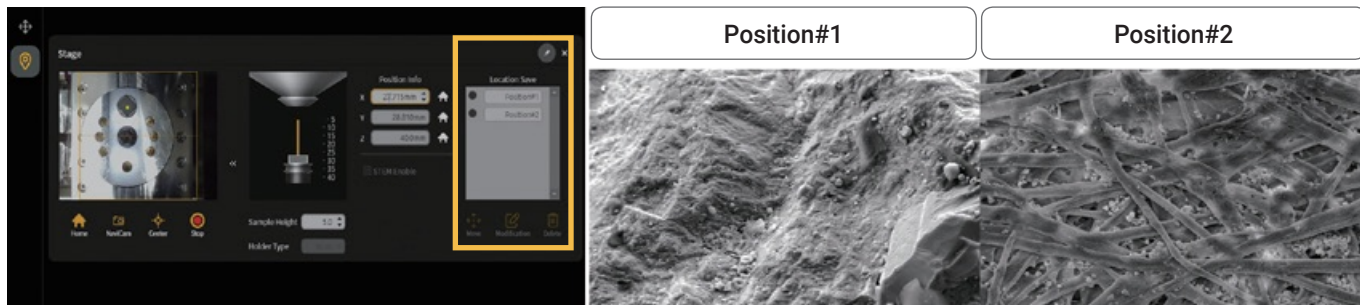
Archive editing function

Archive에 저장된 시료의 이미지에서 시료의 규격, 글자 표기 등을 다시 재편집할 수 있으며, Digital Zoom 기능을 사용하여 저장한 이미지를 최대 12배까지 확대 및 편집이 가능합니다.



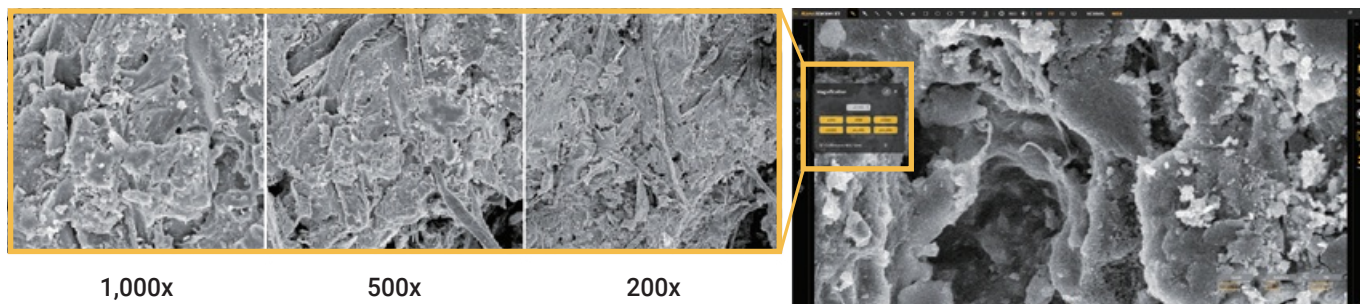
Location save function

다수의 시료를 분석할 때, 사용자가 원하는 분석 위치를 최대 8개까지 저장할 수 있으며, 저장한 위치로 정확하게 이동하여 빠른 시료 관찰이 가능합니다.



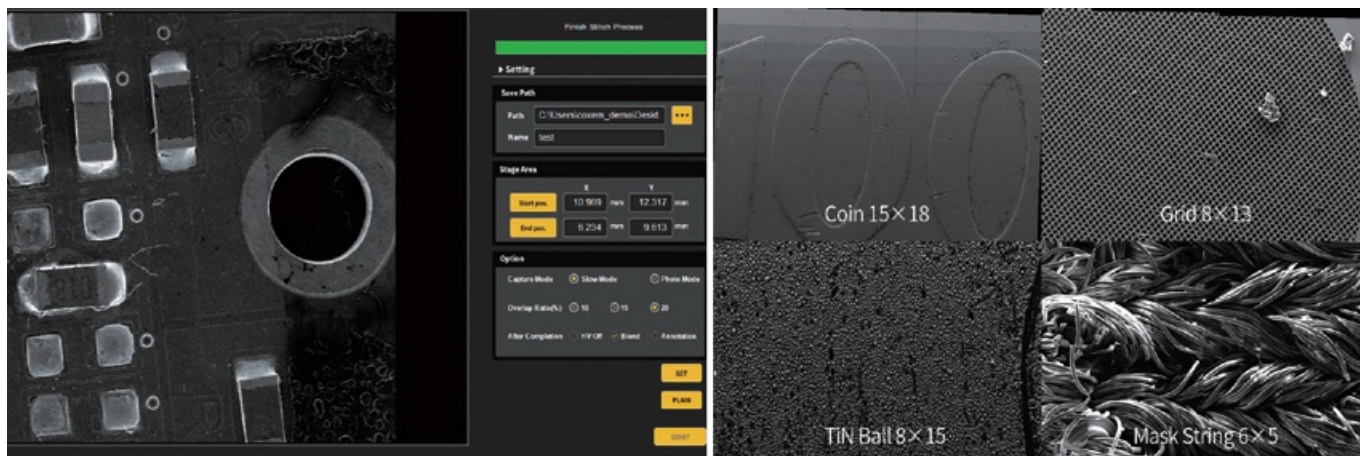
ContinuousMagSave function

시료를 분석하고자 하는 위치에서 사용자가 원하는 여러 배율을 직접 설정하여, 지정한 배율의 이미지를 자동으로 촬영 및 저장합니다.



Panorama 3.0

EM-40에는 Panorama 3.0가 기본적으로 제공되며, 보다 업그레이드된 Stitching 기능으로 대면적 시료 분석 시 더욱 정밀하고 정확한 이미지를 획득할 수 있습니다.



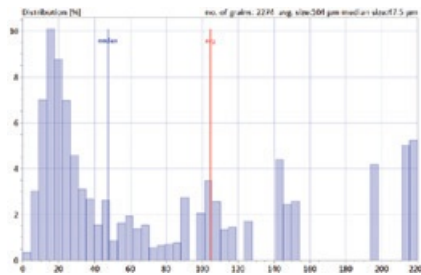
Options

Compatible with compact EBSD

EBSD는 입사된 전자빔에 의해 샘플 표면의 후방 산란된 전자가 만들어내는 회절 패턴을 분석해서 재료의 결정학적 정보를 얻게 됩니다.
(주)코셈의 EM-40은 EBSD를 적용시킨 세계 최초의 Tabletop SEM으로서 금속학, 재료공학, 지질학 등 다양한 분야에서 활용이 가능합니다.



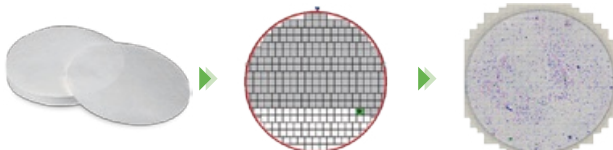
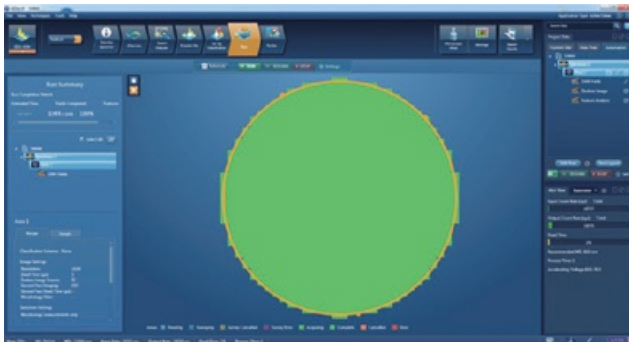
QUANTAX ED-XS



Ni alloy with bimodal grain size distribution

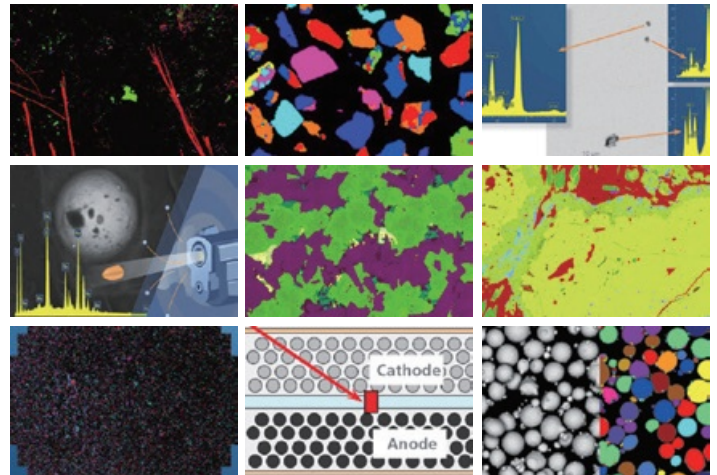
Fast particle analysis

향상된 스캔 속도로 더욱 빠른 입자 분석이 가능하며, 시료가 단일 원소가 아닌 혼합물인 경우에도 정확한 분석이 가능합니다.



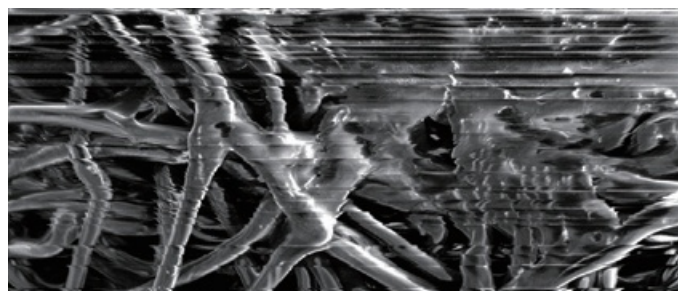
47mm Membrane Filter

Mechanical Stage Field

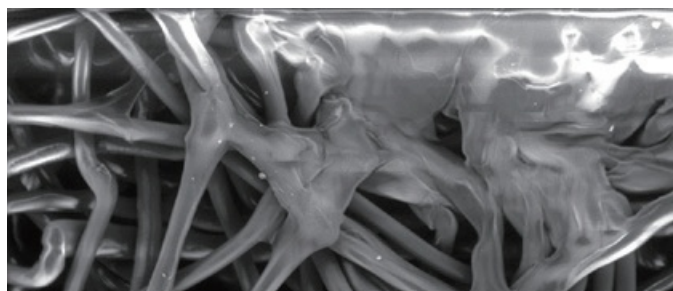


Variable pressure (10 / 20 / 30Pa) ——

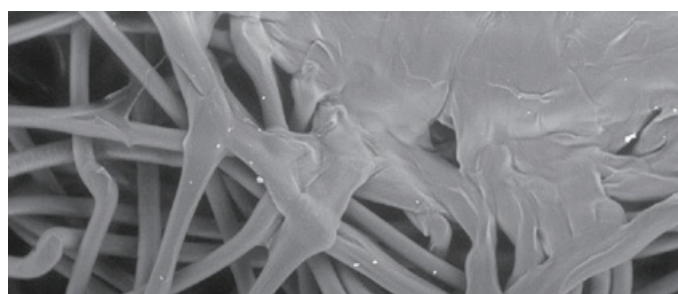
유동적인 압력 조절 모드(Variable pressure)를 이용함으로써 별도의 시료 전처리 과정 없이 생물시료나 절연재료의 분석이 가능합니다.



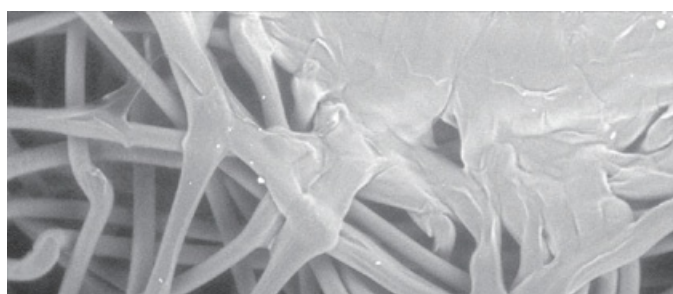
High vacuum



10Pa



20Pa



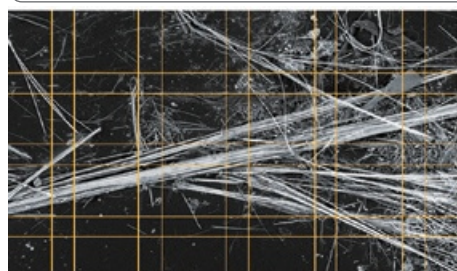
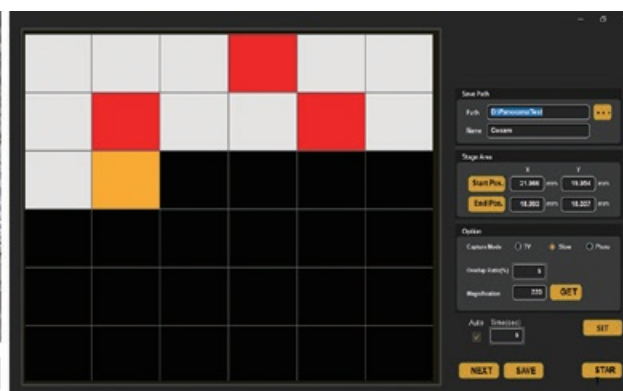
30Pa

NanofiberScanner ——

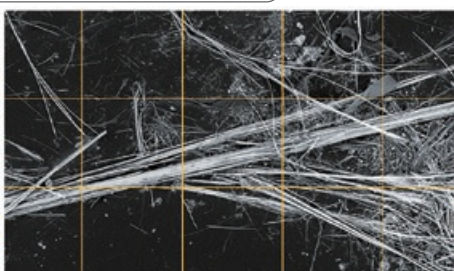
Nanofiber Scanner는 석면(Asbestos) 분석에 적합한 코셈의 새로운 분석 프로그램으로 대면적 분석 진행 중에 원하는 위치에서 바로 시료 이미지와 분석 위치를 저장할 수 있습니다.



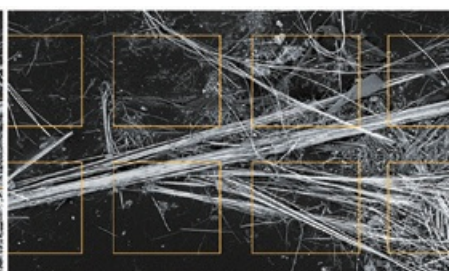
Asbestos



+30%



0%



-30%

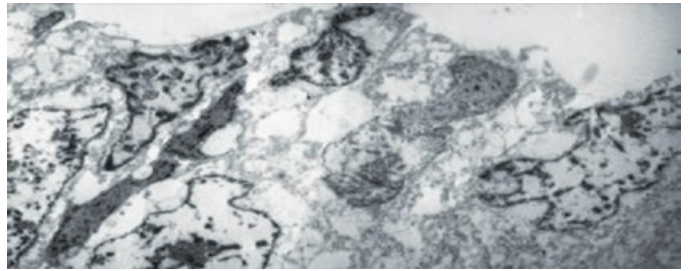
STEM analysis

EM-40은 STEM 검출기를 삽입해, 센서를 통한 TEM 분석이 가능하며, 석면, 세포조직, 나노구조물 등을 분석할 수 있습니다.

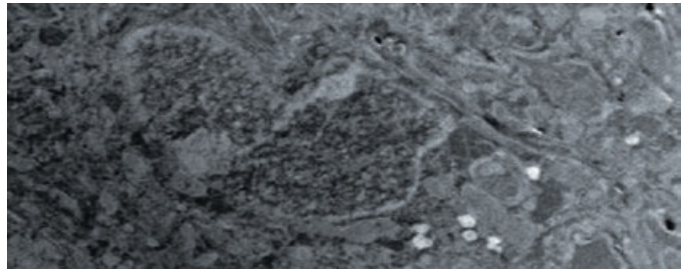


Stage stroke at STEM mode

- X axis 0 ~ 35mm
- Y axis 0 ~ 35mm
- Z axis 33mm (fixed)



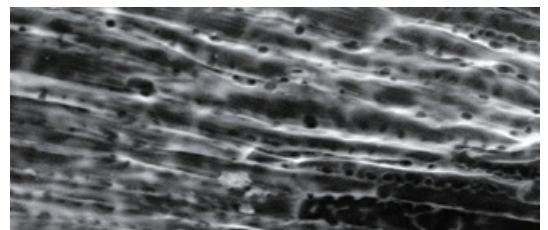
Bright field mode



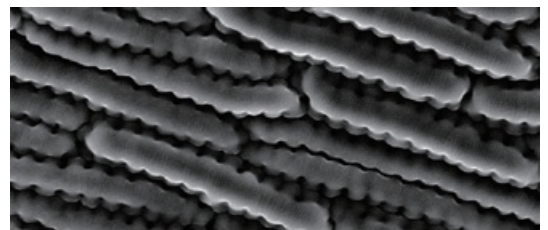
Dark field mode

Coolstage

수분을 포함한 시료의 SEM 분석 시, EM-40의 Coolstage 기능을 사용하여 시료대의 온도를 낮춰 시료를 냉각함으로써, 수분을 제거하고 고정하는 복잡한 시편 전처리 과정 없이 시료 고유의 미세구조 손상이 없는 분석 이미지를 얻을 수 있습니다.



Leaf without Coolstage



Leaf with Coolstage

The Next Level of EM Series

EM-40

- All-new GUI, NanoStation5.1
- Fast frame rate up to 13fps
- X, Y, Z axes motorized stage
- Variable pressure (10, 20, 30Pa)
- Compatible with compact EBSD
- Fast particle analysis with EDS



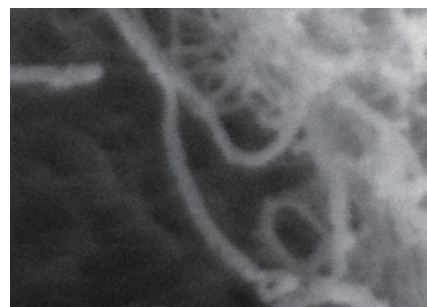
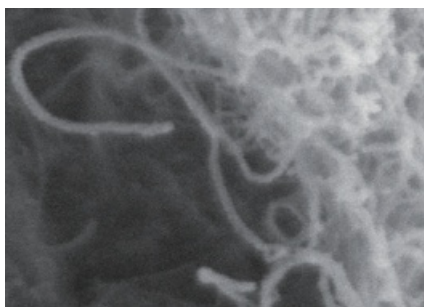
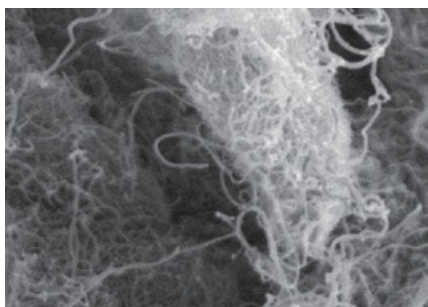
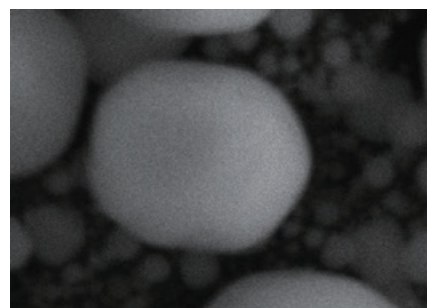
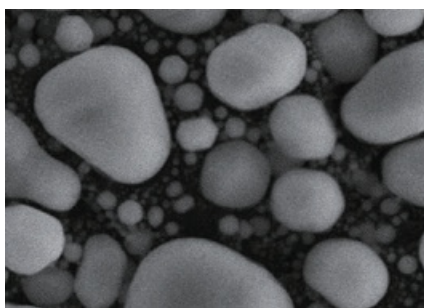
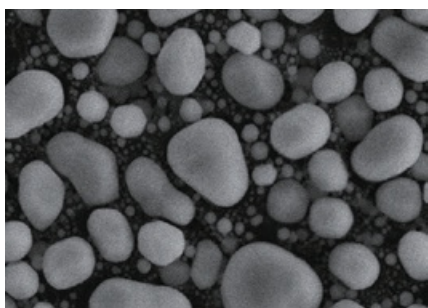
Perfect image quality across all magnification ranges

EM-40은 기존 EM-30N 보다 더 높은 배율 (Max. 250,000x)에서 시료 관찰이 가능하며, 전압, 작동거리, 전자 빔의 크기를 조절하여 고분해능 이미지를 효과적으로 얻을 수 있습니다.

50,000x

150,000x

250,000x

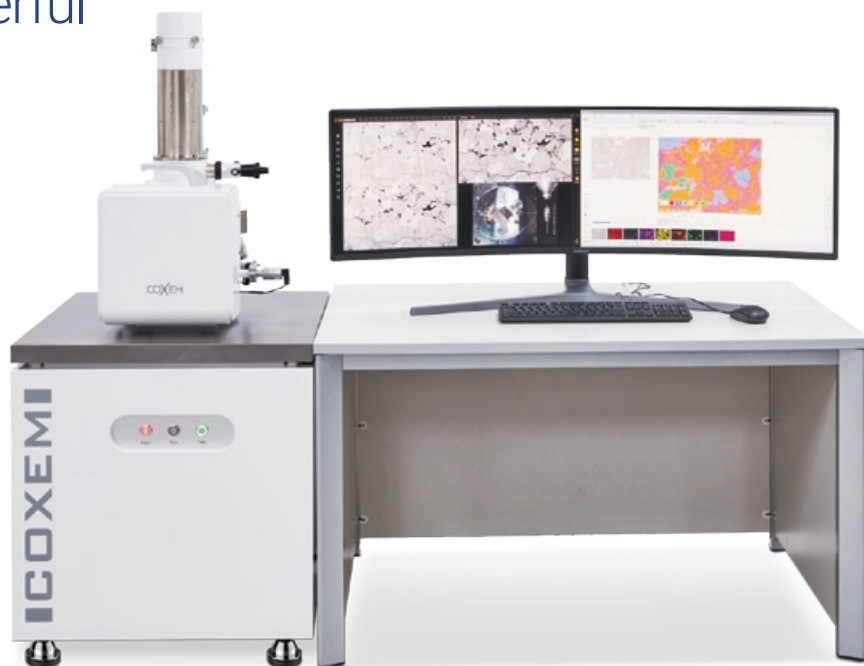


EM series

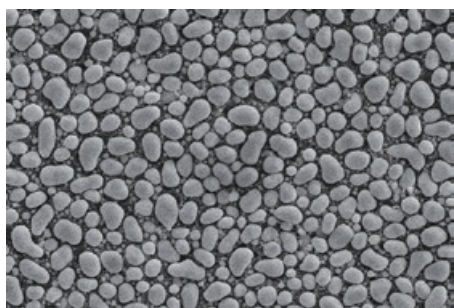
Model	EM-30N	EM-40
Electron gun	Tungsten filament (W)	Tungsten filament (W)
Spatial resolution	< 5nm	< 5nm
Magnification	15x to 150,000x	13x to 250,000x
Accelerating voltage	1 ~ 30kV	1 ~ 30kV
Sample stage	X : 35mm, Y : 35mm, Tilt : 0 ~ 45° 3-axis motorized	X : 40mm, Y : 40mm, Z : 40mm, 3-axis motorized
Detector	SE, BSE, EDS*	SE, BSE, EDS*
Vacuum mode	HV, LV*	HV, LV*, VP*
Vacuum system	Turbo pump (80L) + Rotary pump (100L)	Turbo pump (80L) + Rotary pump (100L)
Dimension	400(W) × 630(L) × 600(H)mm, 95kg	315(W) × 560(L) × 580(H)mm, 81.5kg
Features	Panorama 1.0 Auto focus Auto brightness & contrast Auto start Signal mixing Dual display & Save Line profile Image filtering Annotation tool NaviCAM	Panorama 3.0 Auto focus 1 Second auto brightness & contrast Auto start Signal mixing Triple display & Save Line profile Image filtering Annotation tool NaviCAM Deep 3D(Live 3D) basic Auto Stigmatism
Data output format	JPEG, TIFF, BMP	JPEG, TIFF, BMP
Options*	EBSD, STEM Coolstage LV (20Pa), VP (10 / 20 / 30Pa) NanofiberScanner Panorama 2.0 Diaphragm pump	EBSD, STEM Coolstage LV (20Pa), VP (10 / 20 / 30Pa) NanofiberScanner Nano Particle Analyzer Deep 3D pro Dynamic Focus &Tilt correction Diaphragm pump

The Standard, Yet Powerful CX-200K

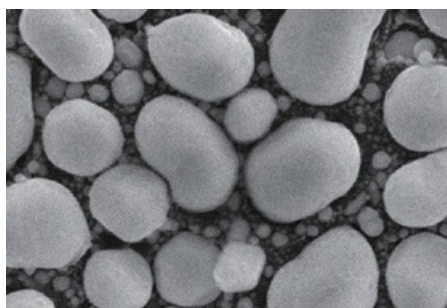
- All-new GUI, NanoStation5
- Maximum Mag. 500,000x
- Self-diagnostic system
- Optimized imaging
- 5-axis motorized stage
- Air-protection module
- A variety of options (EDS, EBSD, Coolstage, STEM etc)



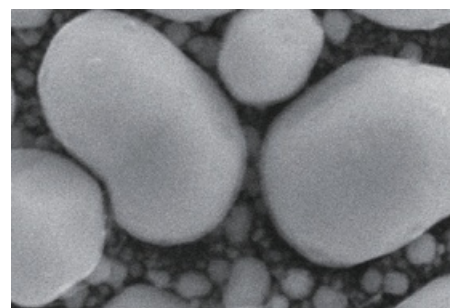
Optimized imaging



10,000x



50,000x



100,000x

Stage control



Home: Stage의 좌표 0.0점 위치

NaviCam: 샘플 로딩 시, Cam으로 시료 실제 이미지를 저장

Center: 시료를 Stage의 좌표 가운데 위치로 정렬

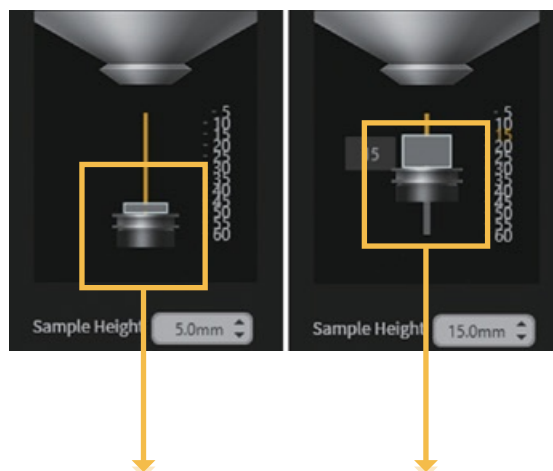
Stop: Stage의 움직임을 수동으로 멈춤

H.D (Home Disable): 해당 Stage의 축이 Home 위치로 이동하는 것을 비활성화

Move: 시료의 저장된 위치로 이동

Modify: 시료의 이름을 수정

Delete: 시료의 저장된 위치를 삭제

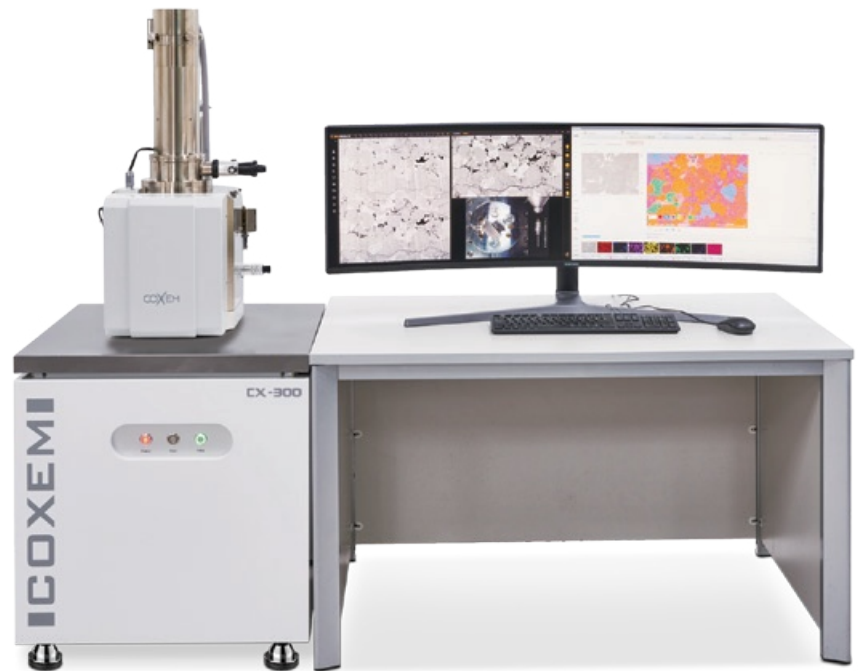


Graphic display according to the sample height and working distance

The Advanced Innovation CX-300

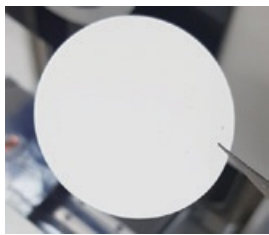
Advanced features

- Designed for Large-area
- Convenient working process with NaviCam, ChamberCam

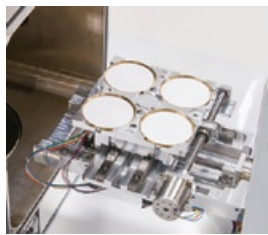


Large area analysis

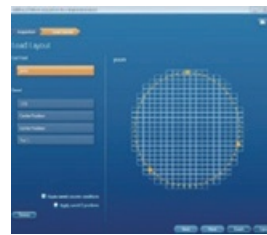
CX-300은 대면적에서 나노입자의 크기, 분포, 조성 등의 결과를 체계적으로 분류하는 나노입자 분석 솔루션을 제공합니다.



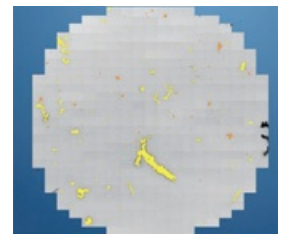
Sample collection
(Membrane filter)



Sample loading



Analysis area setting

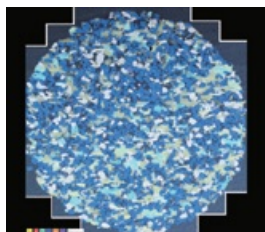


Analysis result

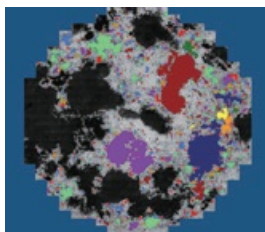
Applications of large-area analysis



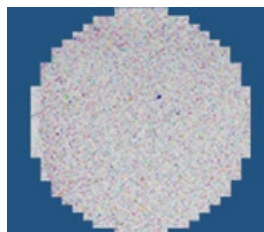
Engine oil



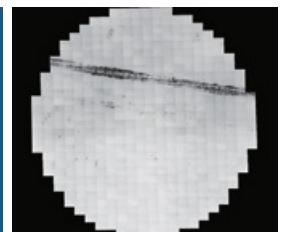
Geological material



Micro plastic



Environment
(Micro dust)



Coating paper

Air-protection module

대기와 급격히 반응하는 시료들의 경우, 대기 노출로 인한 손상을 막기 위해 질소나 아르곤 등의 불활성 가스 환경이 조성된 글러브 박스 내에서 대기와 완전 차폐가 가능한 특수한 홀더에 시료를 전처리 합니다.

해당 홀더를 바로 코셈의 SEM에 장착하여 시료 표면을 관찰하거나, Ion Beam Polisher에 넣어 단면 식각을 한 후 SEM에 장착하여 시료 단면을 관찰하면, 대기에 의한 시료 손상 없이 정교한 분석이 가능합니다.



Glove box



Ion Beam Polisher (IP-10K)



Normal SEM (CX-200K and CX-300)



For SEM



For IP

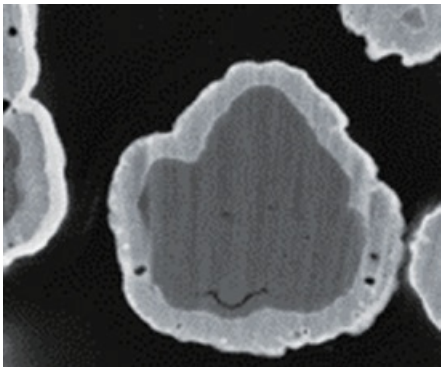


Lid knob

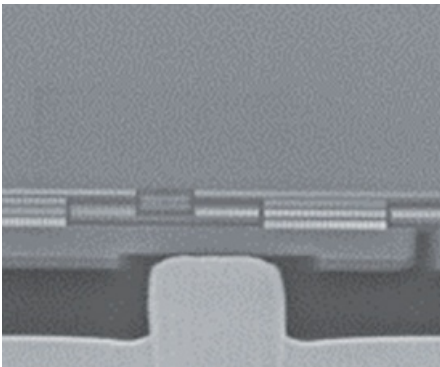
CX series

Model	CX-200K	CX-300
Electron gun	Tungsten filament (W)	Tungsten filament (W)
Spatial resolution	< 3nm	< 3nm
Magnification	9x to 500,000x	9x to 500,000x
Accelerating voltage	1 ~ 30kV	1 ~ 30kV
Sample stage	X : 60mm, Y : 60mm, Z : 60mm, R : 360, T : -20 ~ 90°	X : 100 mm, Y : 100mm, Z : 60mm, R : 360, T : -20 ~ 90°
Detector	SE, BSE, EDS*	SE, BSE, EDS*
Vacuum mode	HV, LV(20Pa)*, VP(10, 20, 30Pa)*	HV, LV(20Pa)*, VP(10, 20, 30Pa)*
Vacuum system	Turbo pump (300L) + Rotary pump (100L)	Turbo pump (300L) + Rotary pump (100L)
Dimension	640(W) × 682(L) × 1,432(H)mm, 210kg	640(W) × 690(L) × 1,460(H)mm, 210kg
Features	Panorama 3.0 Auto focus Auto brightness & contrast Auto start Auto Stigmation Deep 3D(Live 3D) basic Signal mixing Triple display & Save Line profile Image filtering Annotation tool ChamberCAM, NaviCAM	Panorama 3.0 Auto focus 1 Second auto brightness & contrast Auto start Auto Stigmation Deep 3D(Live 3D) basic Signal mixing Quad display & Save Line profile Image filtering Annotation tool ChamberCAM, NaviCAM
Data output format	JPEG, TIFF, BMP	JPG, TIFF, BMP
Options*	EBSD, STEM Coolstage LV(20Pa), VP(10 / 20 / 30Pa) NanofiberScanner Nano Particle Analyzer Deep 3D pro Dynamic Focus &Tilt correction Scroll pump Air-protection module	EBSD, STEM Coolstage LV(20Pa), VP(10 / 20 / 30Pa) NanofiberScanner Nano Particle Analyzer Deep 3D pro Dynamic Focus &Tilt correction Scroll pump Air-protection module

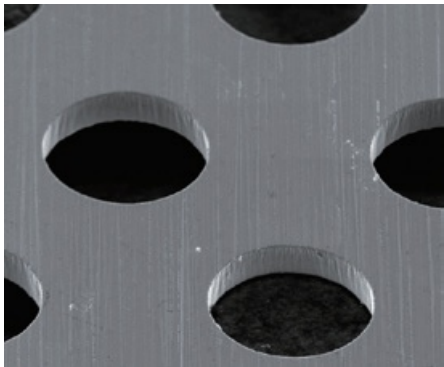
Applications



Metal powder



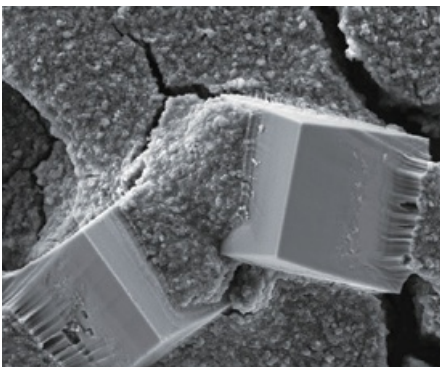
Semiconductor



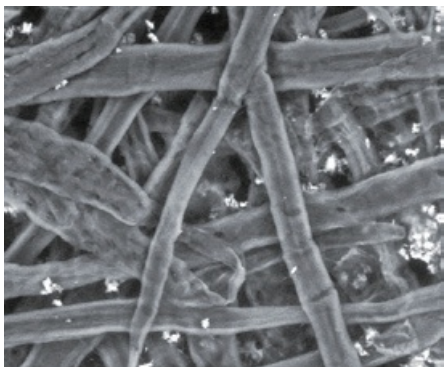
Metal plate



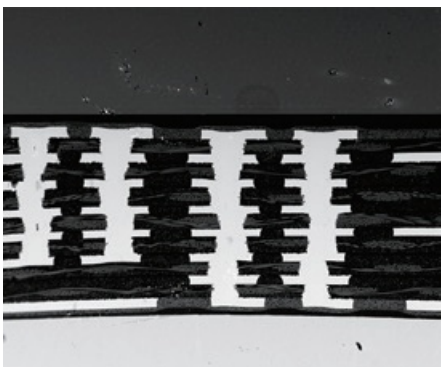
PCB



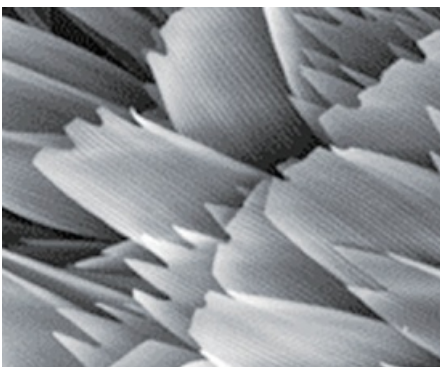
Emulsion



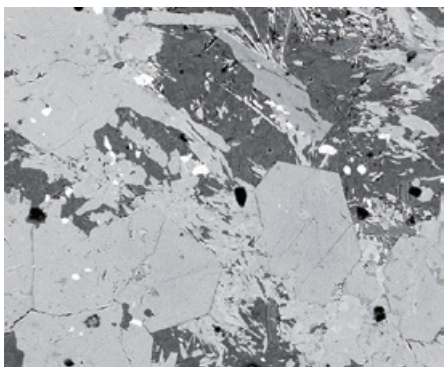
Paper



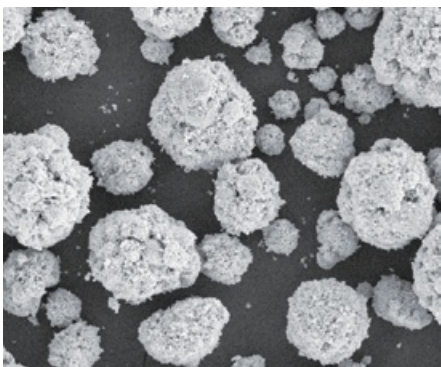
PCB



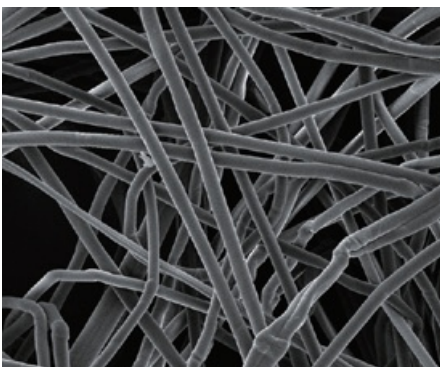
Bug



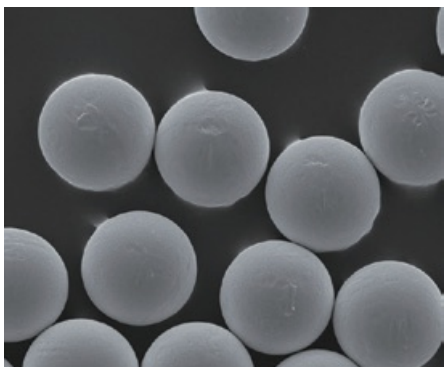
Mineral (Shale)



Nickel powder



Mask sheet



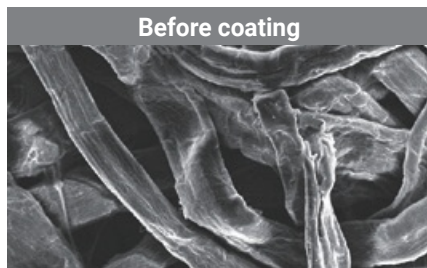
Tin ball

Powerful Sample Preparation Instrument : Ion Sputter Coater

SPT-20

SPT-20은 SEM 분석을 위한 시료 전처리 장비로 적합합니다.

SPT-20은 시료 위에 얇은 전도성 물질을 증착하여 시료를 표면 손상으로 부터 보호하고 더 높은 품질의 SEM 이미지를 제공합니다.



Before coating



After coating

SE



BSE

Features

- Compact and cost-effective solution
- One-touch operation from the LCD touch panel
- Stable coating with current feedback function
- Various metal targets available : Pt, Au

Specification

50mm dia. 0.1mm thickness, 99.9%



Ion sputter coater system :

Dimension & Weight	420(W) × 220(L) × 230(H)mm, 10kg
Power consumption	AC 110 or 220V, 50/60 Hz, 300W
Chamber size	Ø100mm
Target size	50mm
Target	Pt, Au
Operating vacuum	0.1 Torr
Maximum Ion voltage	3kV
Ion current	0 ~ 9mA
Coating time	10 ~ 300sec

Pump system :

Vacuum pump set	Rotary vacuum pump (50L)
Pump dimension & Weight	120(W) × 373.5(D) × 200(H)mm, 14kg
Power consumption	AC 110V or 220V, 50/60Hz, 0.12kW

Ion Beam Polisher IP-10K



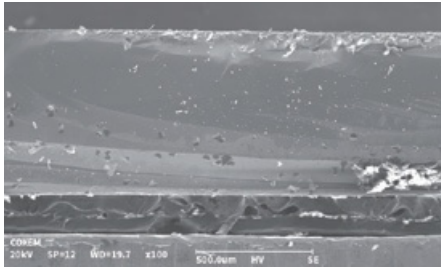
IP-10K는 코셈의 업그레이드된 이온 빔 폴리셔로 flat-milling, cooling stage 및 air-protection module 등 다양한 옵션을 갖추고 있어 다양한 응용 분야에서 향상된 성능과 사용성을 보장합니다. 마이크로 스케일 수준에서 시료의 정밀한 밀링을 위해 탁월한 분석 솔루션을 제공합니다.

Features

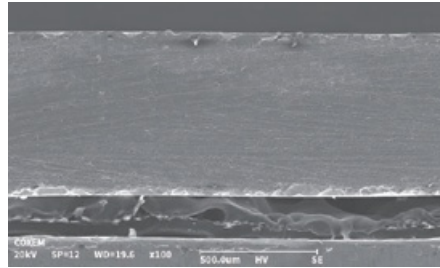
- A fast milling speed of 1,000um/h (Si, 8kV)
- Minimizes thermal damage with the cooling stage
- Air-protection module compatible with SEM
- Flat-milling function provided for planar etching
- A fast pump/vent time with easy sample loading
- Higher front mask usability

Ion beam polishing

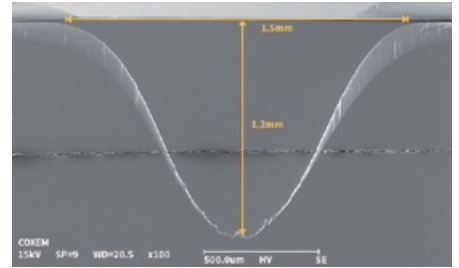
이온빔으로 연마한 단면 이미지는 자르거나 기계 연마된 샘플의 이미지에 비해 보다 정교하고 깔끔하게 연마됨을 알 수 있습니다.



Fractured



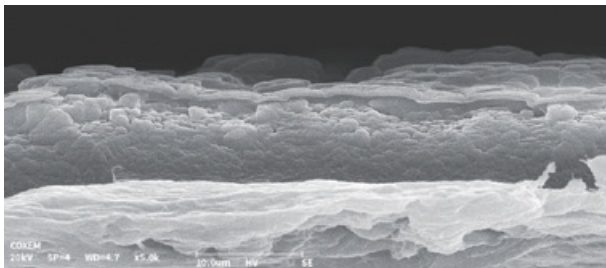
Mechanical polishing



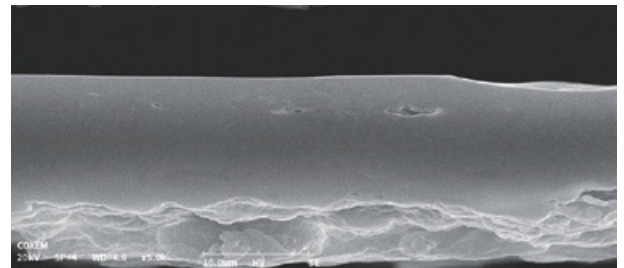
Ion Beam polishing

Cooling module

열에 취약한 시료를 분석할 경우, -20°C까지 냉각이 가능한 Peltier-type cooling stage를 사용하여 시료의 열 손상 위험을 최소화할 수 있습니다.



Milling condition : 4kV1h

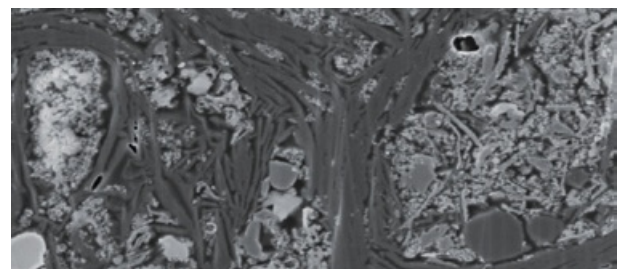


Milling condition : 4kV1h -20°C

Air-protection module

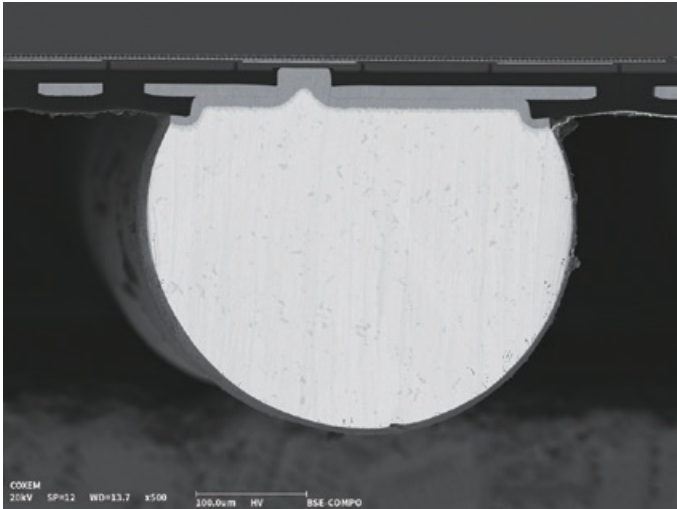
시료가 대기 중에서 변형되기 쉬운 경우, Air protection 옵션 사용을 제안합니다.

이 옵션을 사용하면 대기에 노출되지 않고 샘플의 밀링부터 이미지 분석까지 완료할 수 있습니다.

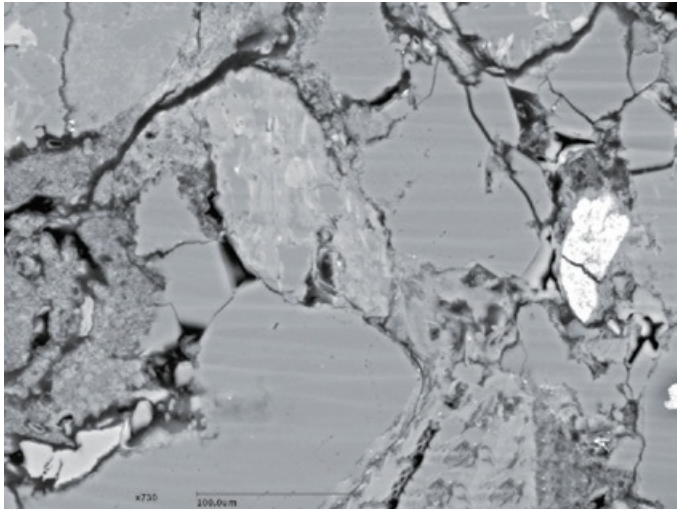


Battery

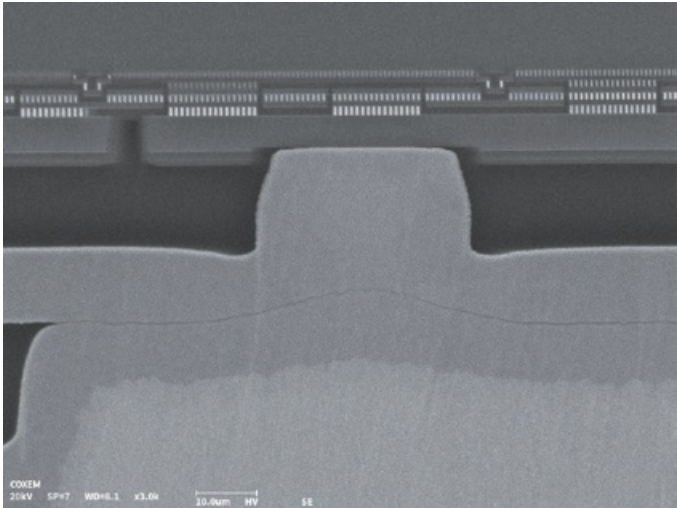
Applications



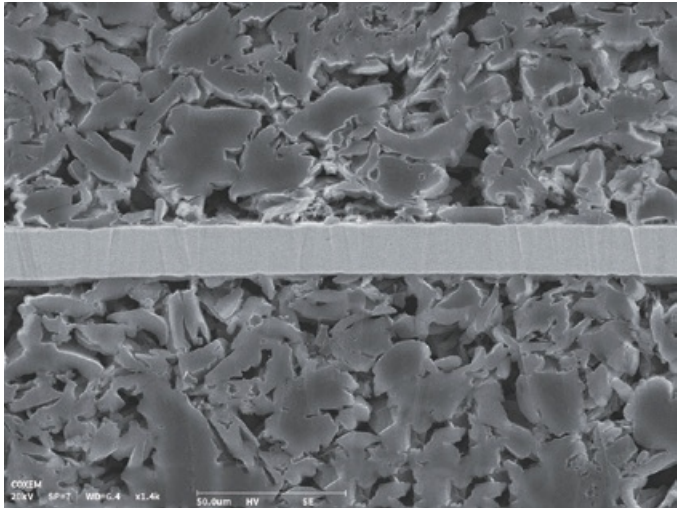
Solder ball



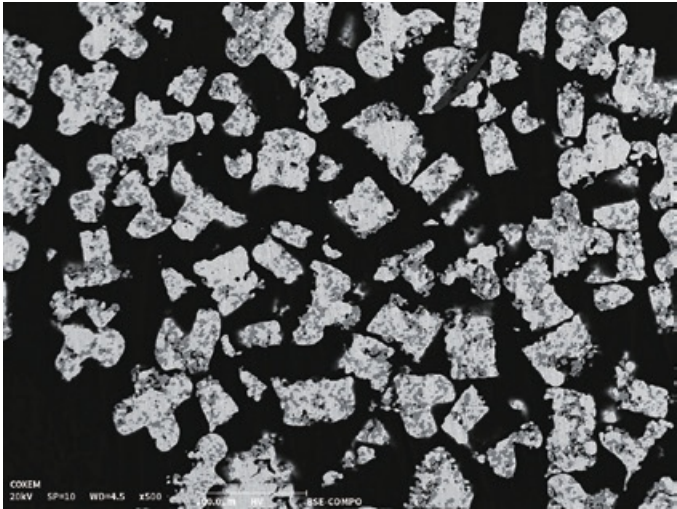
Mineral



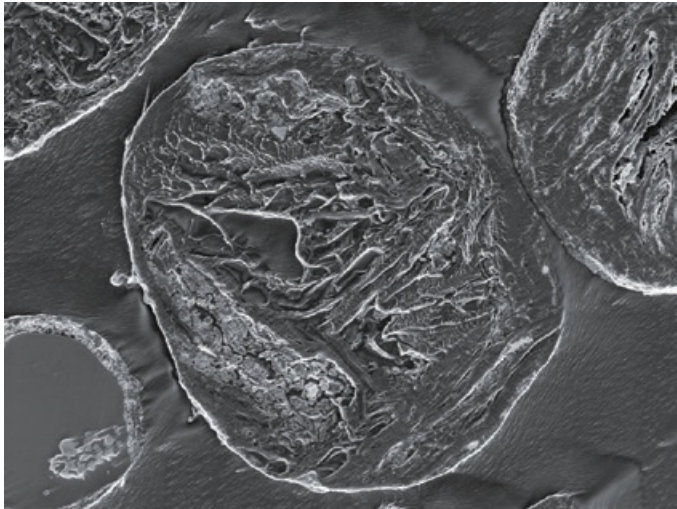
Solder ball



Anode powder



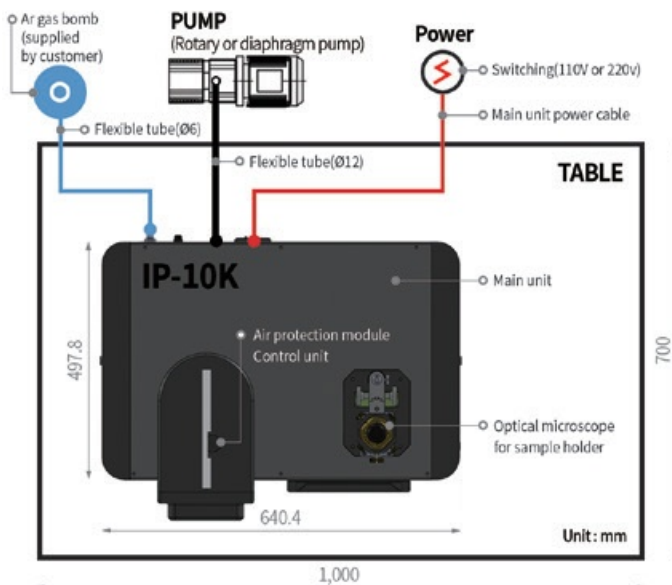
Metal powder



Anode powder

Specifications

Model	IP-10K	IP-8K
Accelerating Voltage	2 to 8kV	2 to 8kV
Milling Speed	1,000 $\mu\text{m}/\text{h}$ (at 8kV on Si wafer)	700 $\mu\text{m}/\text{h}$ (at 8kV on Si wafer)
Sample Stage Swing Angle	$\pm 35^\circ$	$\pm 35^\circ$
Maximum Sample Size	20(W) $\times$ 10(L) $\times$ 5.5(T) mm 16(W) $\times$ 10(D) $\times$ 9.5(H) mm	20(W) $\times$ 10(L) $\times$ 5.5(T) mm 16(W) $\times$ 10(D) $\times$ 9.5(H) mm
Specimen Movement Range	X axis movement : ± 3.5 mm Y axis movement : ± 2 mm	X axis movement : ± 3.5 mm Y axis movement : ± 2 mm
Operation	7 inch touch panel	7 inch touch panel
Digital Microscope for Sample Positioning	Mag. 5x, 10x, 20x, 40x	Mag. 5x, 10x, 20x, 40x
Chamber Camera for Monitoring	Mag. 5x, 10x, 20x, 40x Brightness adjustable in 4 steps Ion beam observation mode (LED off)	Mag. 5x, 10x, 20x, 40x Brightness adjustable in 4 steps Ion beam observation mode (LED off)
Gas Used	Argon gas (99.999%)	Argon gas (99.999%)
Gas Pressure	0.03 MPa ~ 0.05 MPa	0.03 MPa ~ 0.05 MPa
Gas Flow Control	Mass Flow Control unit	Mass Flow Control unit
Vacuum Systems	Turbo pump, Diaphragm pump	Turbo pump, Diaphragm pump
Dimension	640(W) $\times$ 492(D) $\times$ 282(465)(H) mm	640(W) $\times$ 492(D) $\times$ 282(465)(H) mm
Weight	Main system 45 kg / Diaphragm pump 6.5 kg	Main system 45 kg / Diaphragm pump 6.5 kg
Flat Milling (Option)	O (10° to 90°)	O (10° to 90°)
Cooling Module (Option)	Peltier Type (-25°C ~ $+50^\circ\text{C}$)	X
Air-Protection Module (Option)	O	X





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환경보호를 위해 친환경 식물성 원료인 콩기름 잉크로 인쇄되었습니다.



KOSDAQ
코스닥상장법인

COXEM Co., Ltd.

[34025] 대전광역시 유성구 테크노2로 199 미건테크노월드 201호

TEL. 042. 861. 1686

FAX. 042. 861. 1689

E-MAIL. domestic@coxem.com
overseas@coxem.com
customerservice@coxem.com

www.coxem.com

