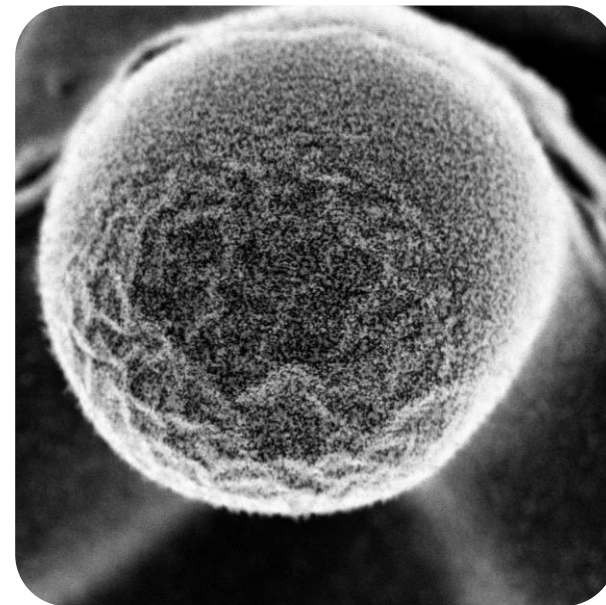
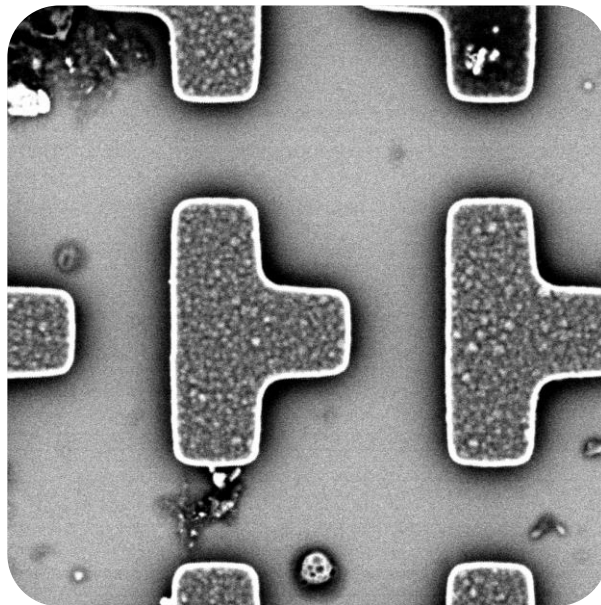
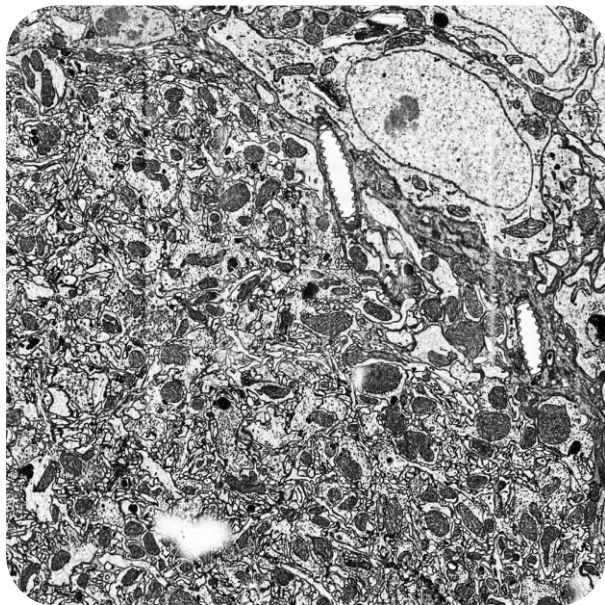


Navigator

-High Throughput SEM System



Seeing is believing...

Introduction

Products and Service

Technology and Feature

Applications

Introduction



Beijing (Headquarter & RD)



Ningbo (MFG)

Focus e-Beam Technology was founded in 2015, who is a leading manufacturer for *High Throughput SEM* and its industrial solutions.

Introduction

Focus e-Beam Technology is focusing on the solution of High Throughput SEM imaging and analysis for Bioscience Research, Material Science and other Industry Applications.

We supply customized fully automatic SEM system which has high stability of Thermal Field Emission Gun and Zero-Field Curvature Electron Optic Column that have been verified by Semiconductor Industry FAB for over 16 years.



Simpleness, a brand new experience.

Introduction

Products and Service

Technology and Feature

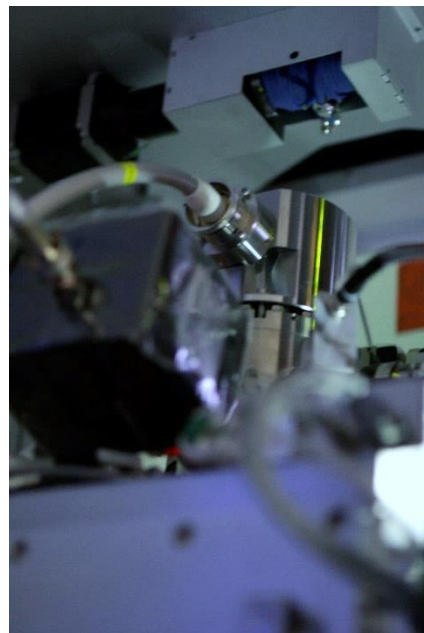
Applications



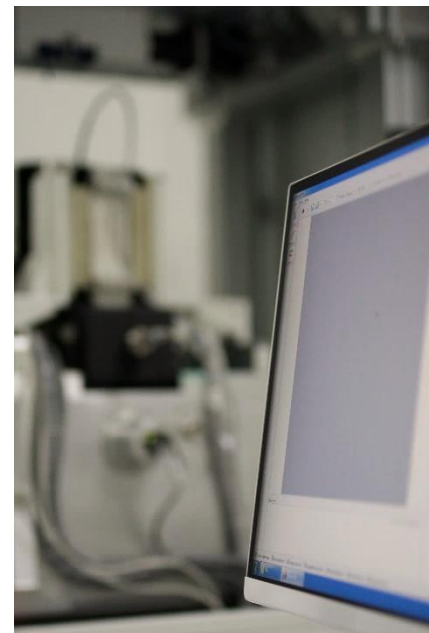
Friendly



Intelligent



High Performance



Stable

Products and Service



We launched the first *High Throughput SEM* in worldwide for science research and industry applications

- Dec. 1st 2017.

Products and Service

High Throughput SEM: Navigator™



Fastest SE/BSE Imaging in the world

Auto-loader for 6-inch wafer

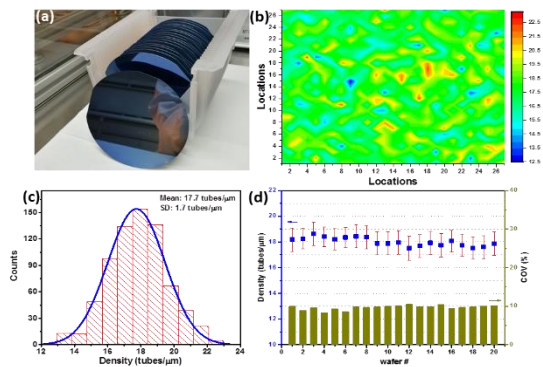
7days-24 hours automatic working

Optical Navigation applied

Navigator™ Essential Specifications

| | | |
|----------------------|---|--|
| Resolution | 1.8nm@1kV 1.5nm@3kV (SE) 1.2nm@10kV | 3nm@1kV 2.5nm@3kV (BSE) 2.0nm@10kV |
| Accelerating Voltage | 0.1kV-12kV | |
| Magnification Zoom | 200X – 600,000X (SEM) 1X -200X (Optical) | |
| Emitter | Schottky field emission drift<1%/week | |
| Beam Current | 50pA–300nA | |
| Image Processing | 512X512–24kX24k | |
| Image Rotation | +/-90° | |
| Beam Shift | +/-2μm at 20,000X | |
| Stage Repeatability | +/-100nm with 200mm range (optional) | |
| Image Channels | BSE Detector SE Detector Bright field STEM Detector (optional) Dark field STEM Detector (optional) | |
| Image Rate | Up to 2X100M pixels/s | |

Products and Service

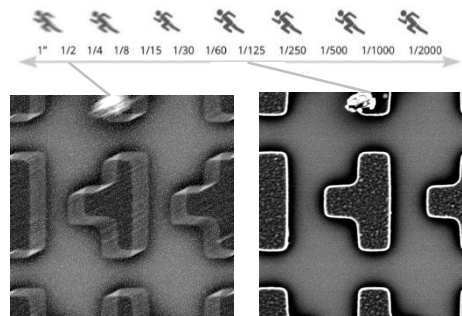


Full-scale Atlas

- Particle sizes distribution
- Component density distribution
- Multi-component mixture distribution
- Defect distribution
- ...



A.I.+

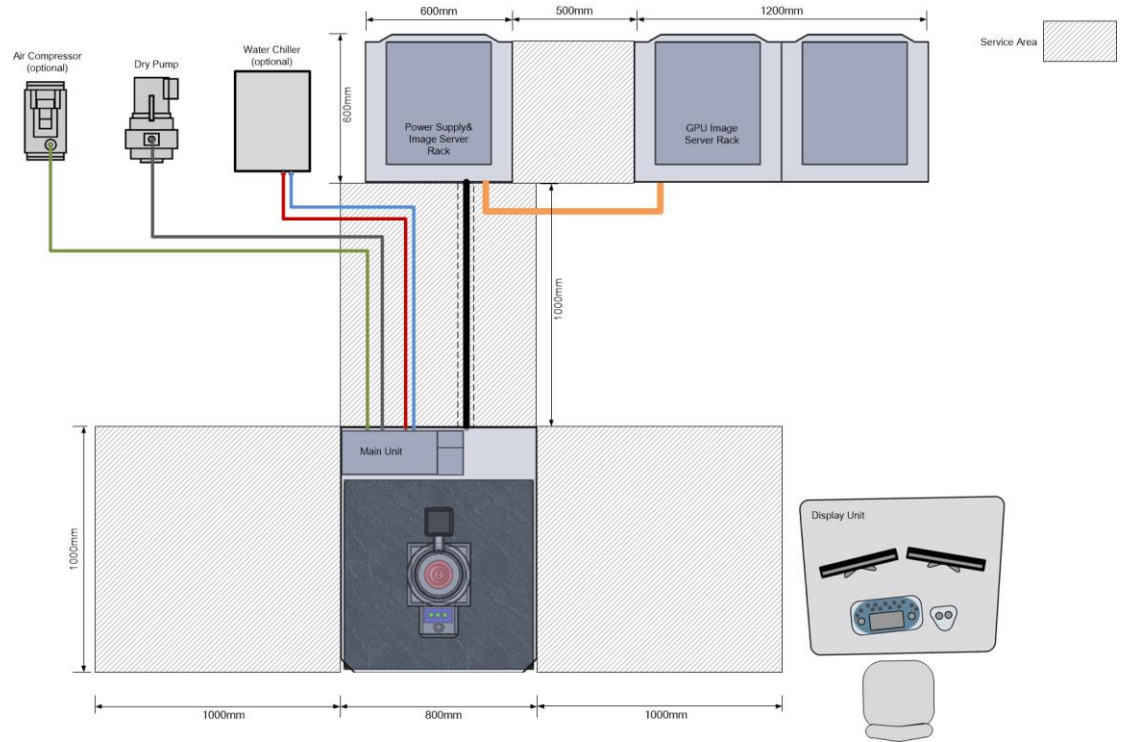


Dynamic Recording

**Not only a clear image,
but also solutions!**

Products and Service

| Installation Site Conditions | |
|------------------------------|--|
| Room temperature | 15 – 23°C (Temperature fluctuation: <1°C/hr) |
| Humidity | 40 – 60% RH |
| Power | Single phase AC 220 V ±10%, 50/60 Hz, 6kW Single phase AC 220 V ±10%, 50/60 Hz, 1.5 kW |
| Grounding resistance | <1 Ω |
| Cooling water | Temperature: 16 – 18°C (fluctuation: <0.1°C/min.) Flow: 2.0 – 2.2 L/min Pressure: 50 – 200 kPa Quality: PGW 50/50 or City water with residual chlorine <0.5 ppm |
| Compressed air | 350 – 500 kPa |
| Dry nitrogen | Gas pressure: 0 – 100 kPa regulated with purity of 99.99% |
| Stray AC Magnetic fields | < 40 nT for a-synchronous < 300nT for synchronous for line times, 20 ms (50 Hz mains) or 17 ms (60 Hz mains) |
| Acoustics | Site survey required |
| Floor vibrations | Site survey required |



System Layout

Technology and Feature

SE Image

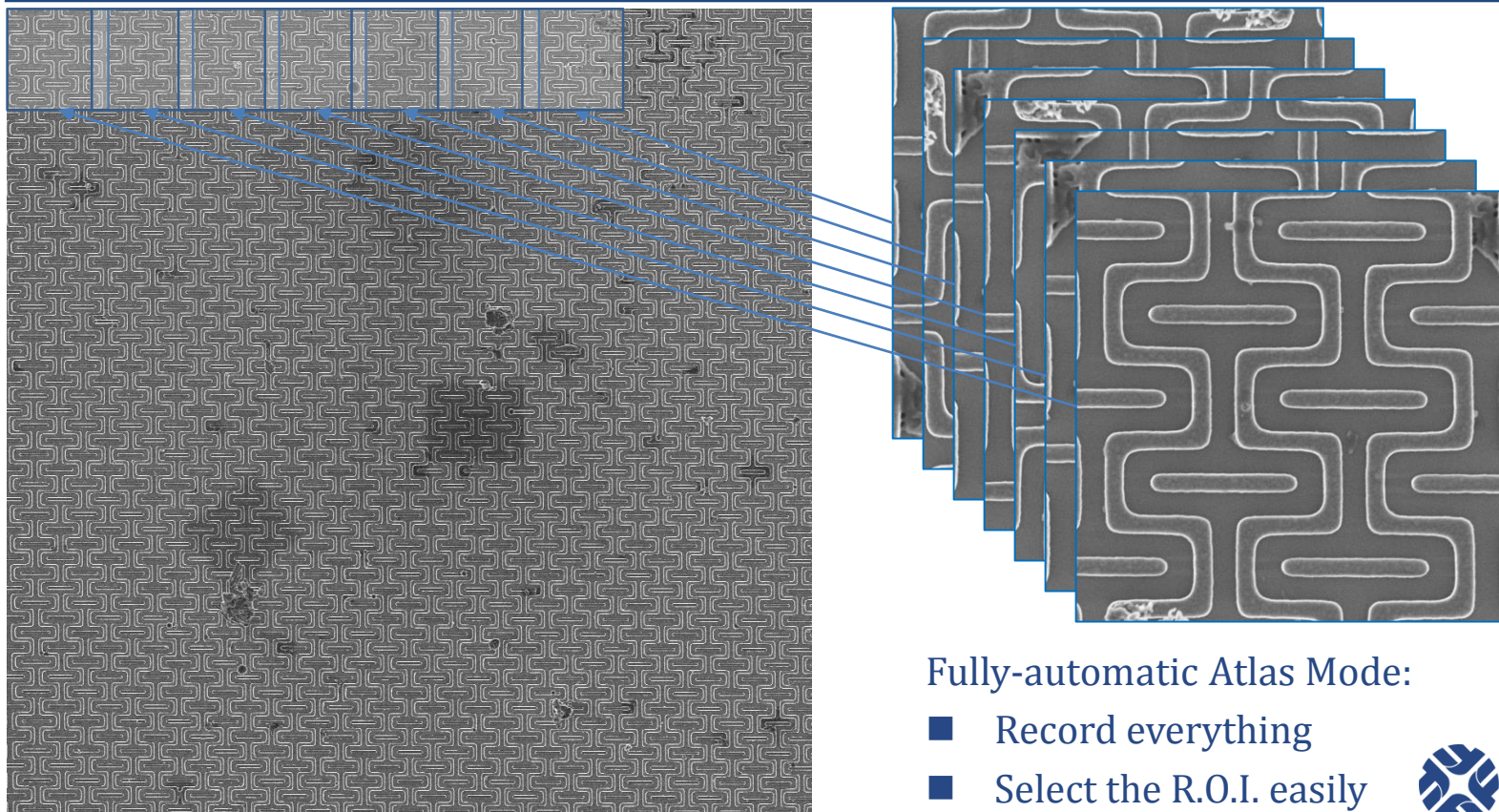


BSE Image



High resolution SE and BSE Images (1kX1k) @1kV are collected

- ✓ Simultaneously
- ✓ Same R.O.I.
- ✓ with 5 TV rate !
- ✓ Mix available



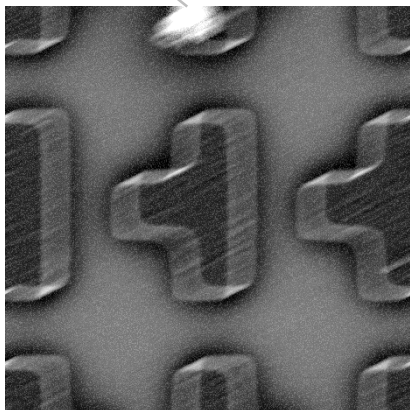
Fully-automatic Atlas Mode:

- Record everything
- Select the R.O.I. easily

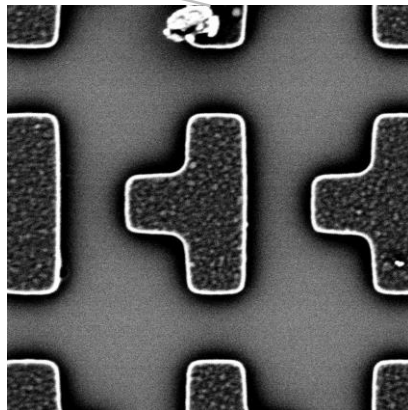
Products and Service

Real-time SEM imaging as high as 120 fps (512x512)

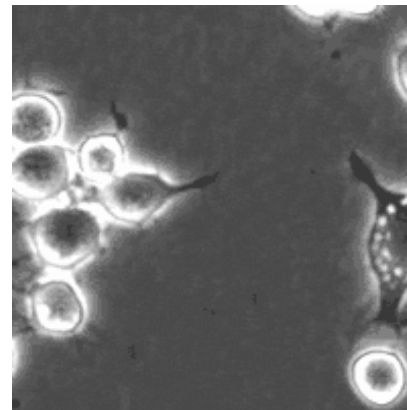
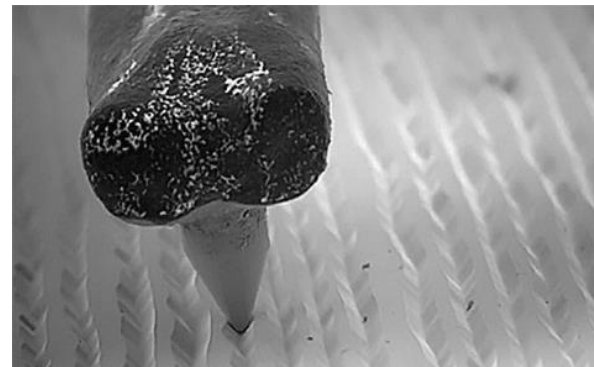
- Track moving object in nanoscale
- Monitor dynamic reaction



Conventional SEM



Navigator™



Introduction

Products and Service

Technology and Feature

Applications

Technology and Feature

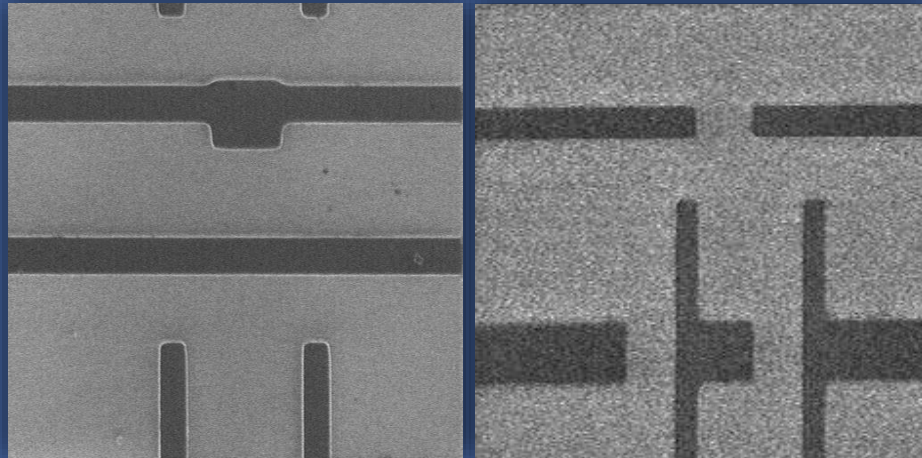
High speed of SE/BSE imaging

- Optimized Electron Optics Design for BSE collection (Patented)
- High efficiency of BSE collection (>90%) with good SNR
- 2-Layer of BSE and SE in-axis detector layout, almost have the same gain(speed), synchronously.
- Semiconductor Electron Detector (PIN) have better SNR, that means less Average is needed.

High throughput SEM

- PIN Detector (Direct Detection)
- Moderate Gain with Better SNR
- Bandwidth >50MHz

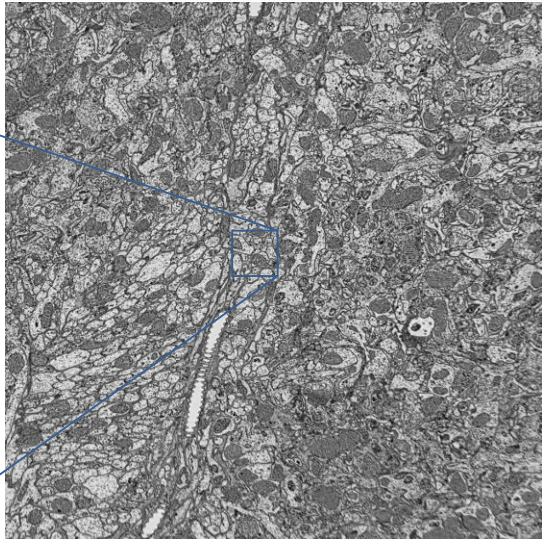
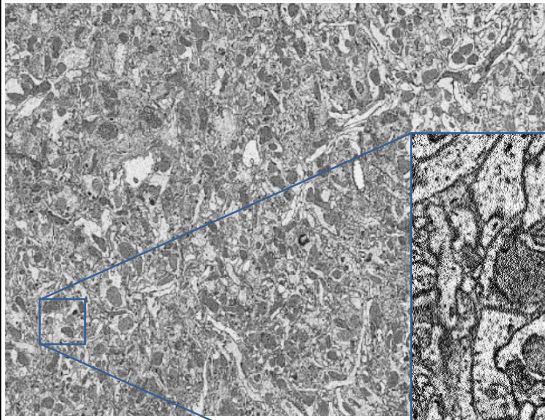
$$I_b = \frac{K^2 M^2 e}{4\tau\delta}$$



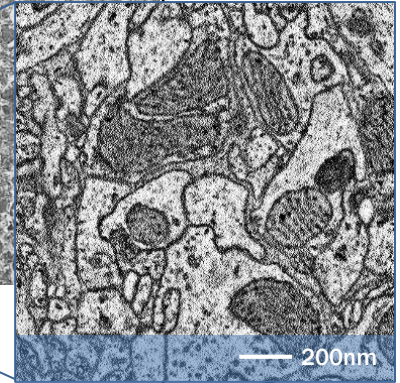
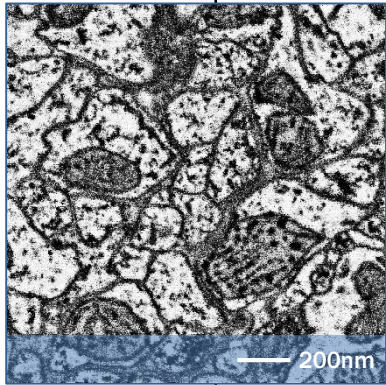
Conventional SEM

- Scintillator+PMT Detector
- High Gain with Lower SNR
- Bandwidth limited <10MHz

Technology and Feature

| Model | FBT Navigator™ | Conventional SEM |
|----------------|--|---|
| Detector | BSE | BSE |
| Dwell time | 812ms (13ns/pixel) | 43500ms (890ns/pixel) |
| Beam Current | 1.5nA | 1.5nA |
| Landing Energy | 3kv | 3kv |
| Image Size | 8k X 8k with 1.5nm pixel size | 8k X 6k with 1.5nm pixel size |
| |  |  |
| Comment | Navigator is the only SEM system which be able to receive BSE image as low as 1kV with 3X TV rate on tissue sample(fly brain). | |

50 times faster



Introduction

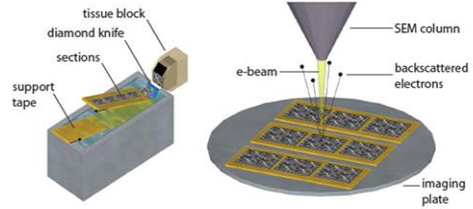
Products and Service

Technology and Feature

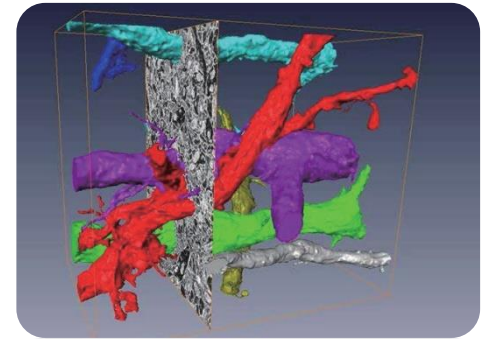
Applications

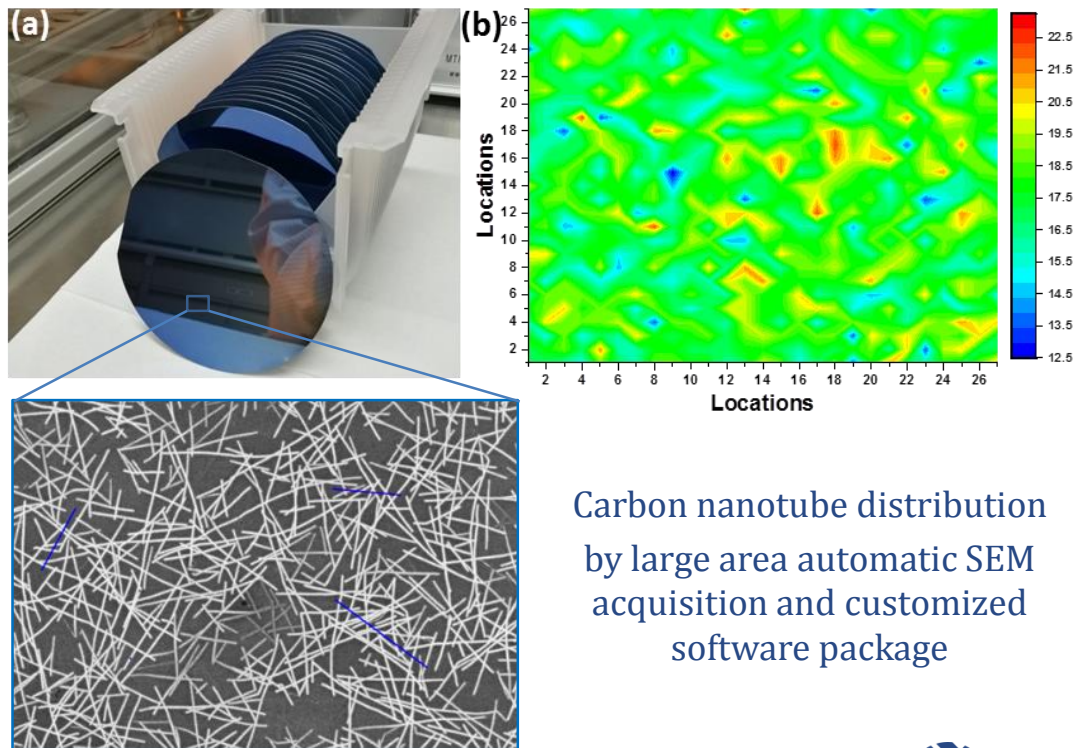
Applications-Bioscience

Automated tape collection ultramicrotomy (ATUM)



Human Brain Connectome
Cell/Tissue 3-D Reconstruction





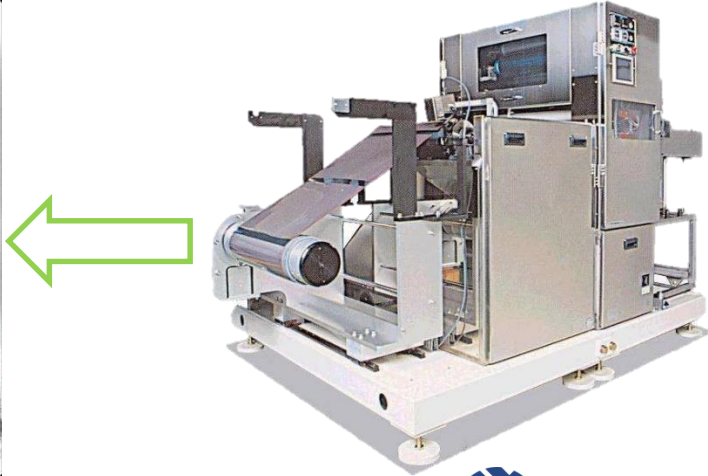
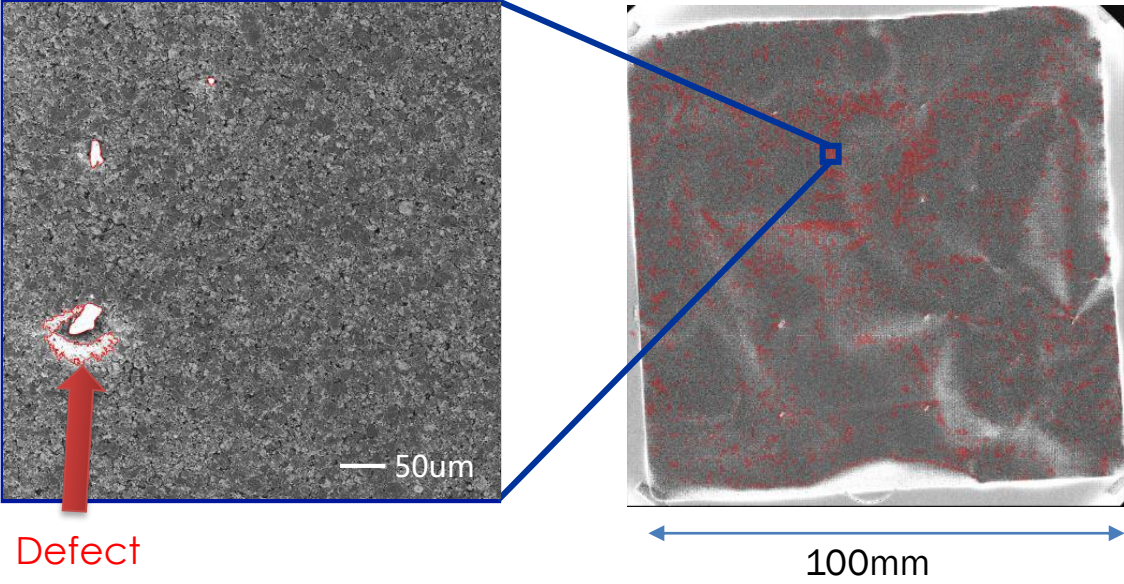
Carbon nanotube distribution by large area automatic SEM acquisition and customized software package

Applications-Li-ion Battery(LIB) Industry

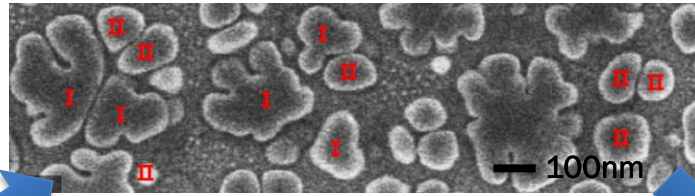
| Signal | Acc | Image size | Pixel size | No. | Data | ROI | Time |
|--------|-----|------------|------------|--------|------|-------------|------|
| BSE | 5kV | 8k x 8k | 60nm | 62,000 | 4TB | 100mmX100mm | 12hr |



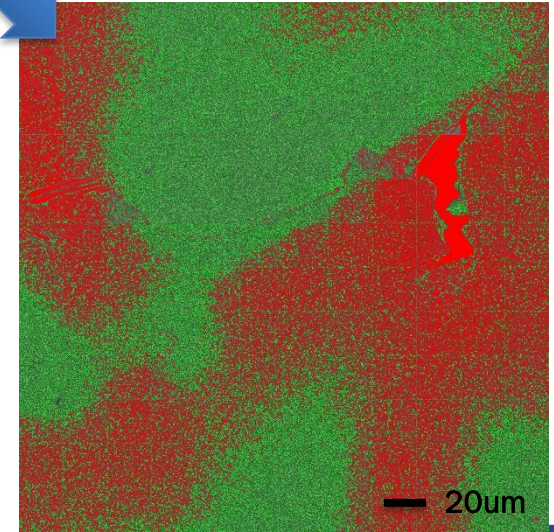
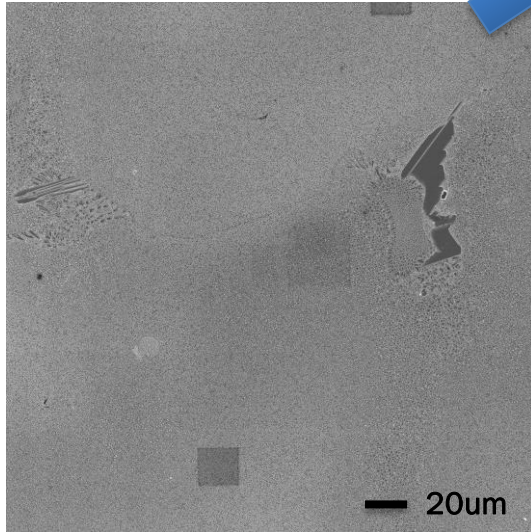
Defect distribution map



Applications-Superalloy



A.I. Recognition

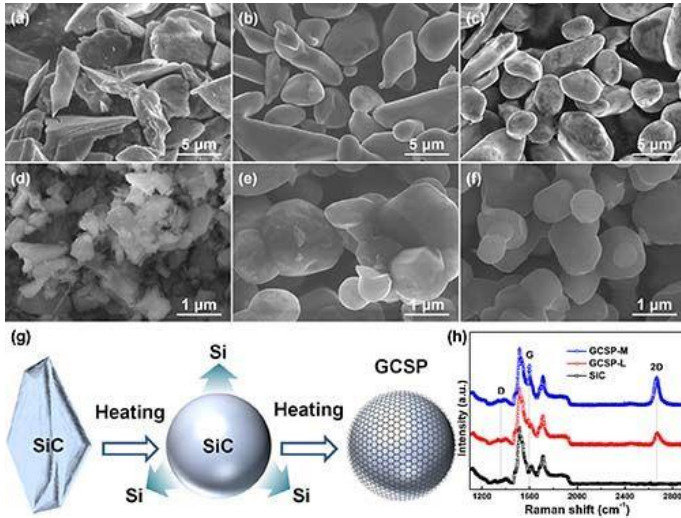


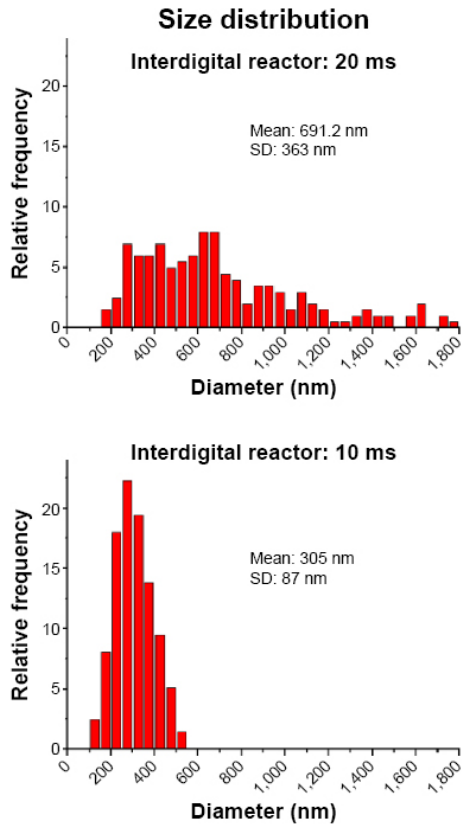
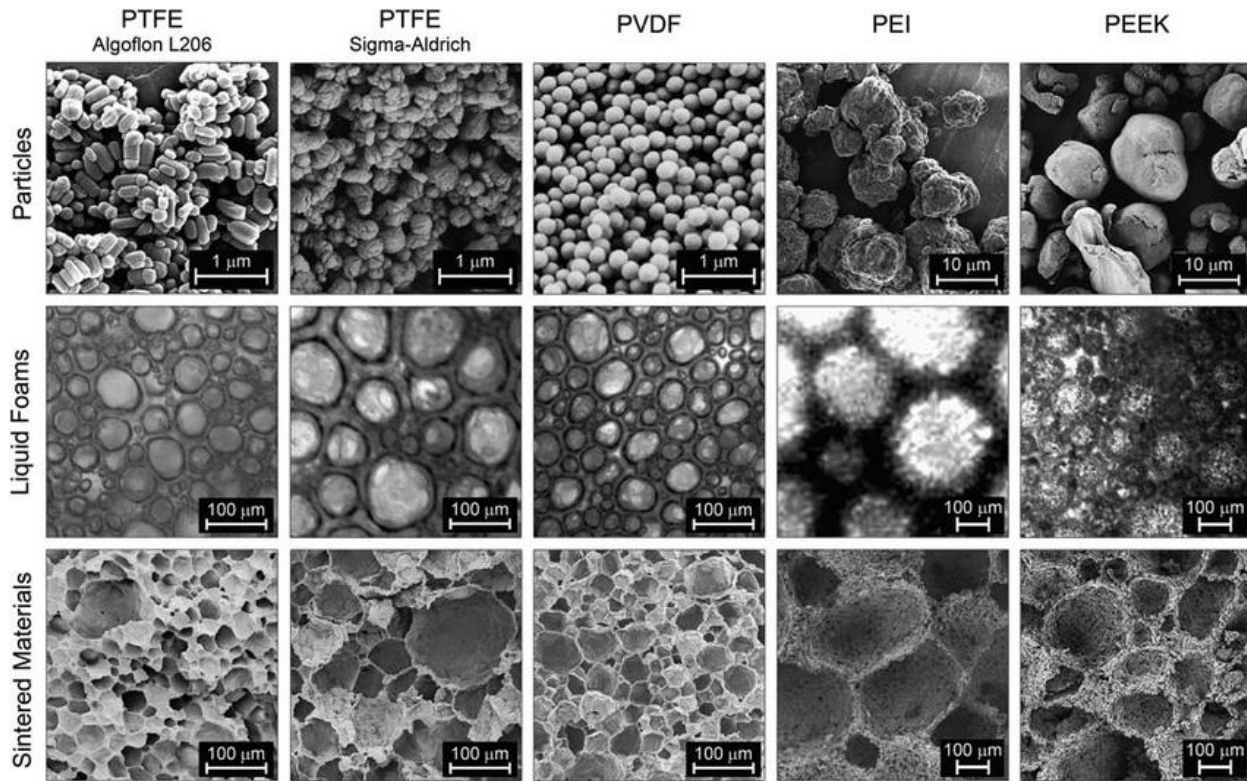
XHD(12kX12k) SE image of Superalloy

Distribution map of precipitates

Applications-Nanomaterial Industry

Graphene manufacture
by real-time SEM monitoring and
customized software package







FBT

Simpleness, a brand new experience.

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E-mail: contact@focus-ebeam.com