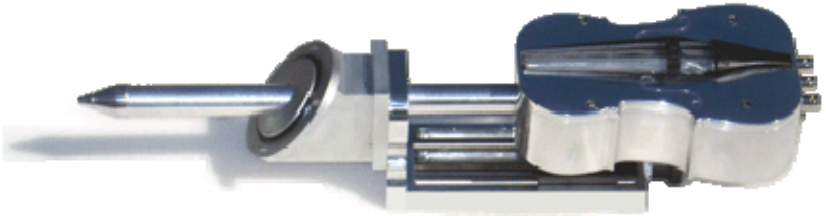
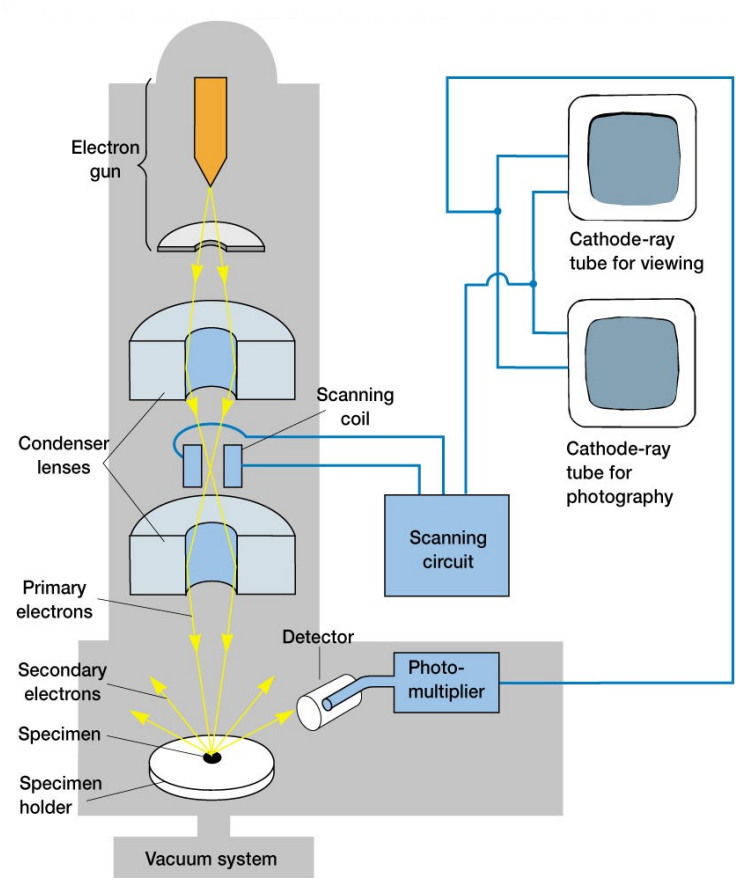
Advanced X-ray Detector Technology

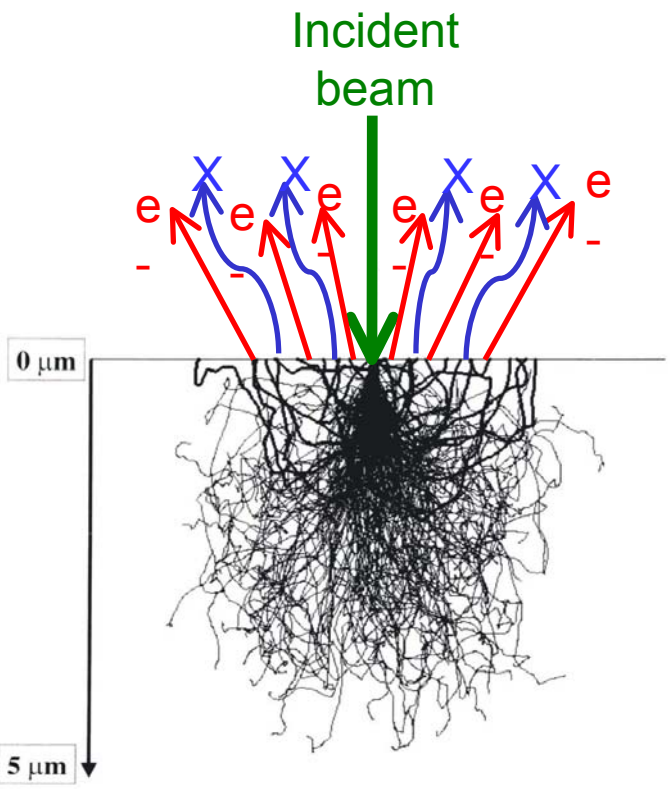


The Electron Microscope



The Electron Microscope

(The beam, the image formation and spectral x-ray detector)



The Beam

Focused beam of electrons.
Energy chosen between 1 and 30kV.
Electrons penetrate and lose energy in the specimen.

The Image Detector

Electrons ejected from sample are used for imaging in the SEI detector. (secondary electron detector)

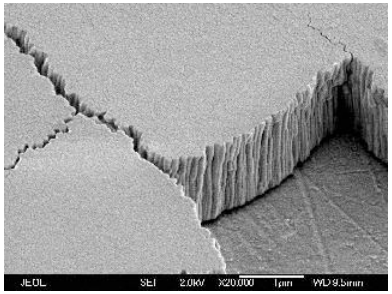
The X-Ray Detector

X-rays emitted from sample are used for chemical analysis by the the x-ray detector. The spectra is then analyzed for elemental identification

Information from Electron Microscope

Topography

The surface features of an object or "how it looks", its texture; direct relation between these features and materials properties

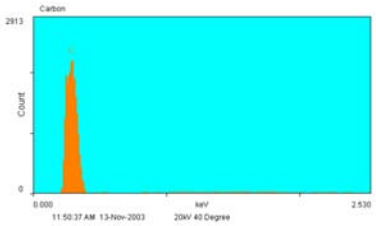


Morphology

The shape and size of the particles making up the object; direct relation between these structures and materials properties

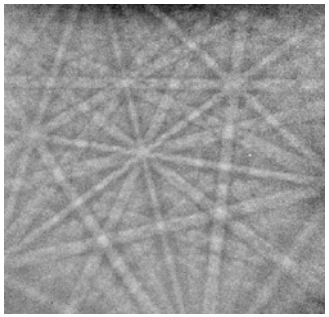
Composition

The elements and compounds that the object is composed of and the relative amounts of them; direct relationship between composition and materials properties



Crystallographic Information

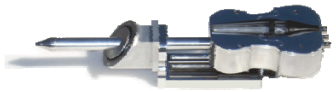
How the atoms are arranged in the object; direct relation between these arrangements and material properties



Evex X-ray Detectors Technologies

Evex - Si(Li)
Silicon Lithium
Crystal
129 FWHM
Lower Limit Be Beryllium
Window Size 10, 30, 50, 100mm

Evex – Ge(Li)
Germanium Lithium
Crystal
125 FWHM
Lower Limit Be (Beryllium)
Window Size 10, 30, 50, 100 mm



Evex-QDD Violin
Silicon
Chip Based
130 FWHM
Lower Limit Be – Beryllium
Window Size 5, 20, 50, 100 mm

X-ray Detector Windows - Thresholds

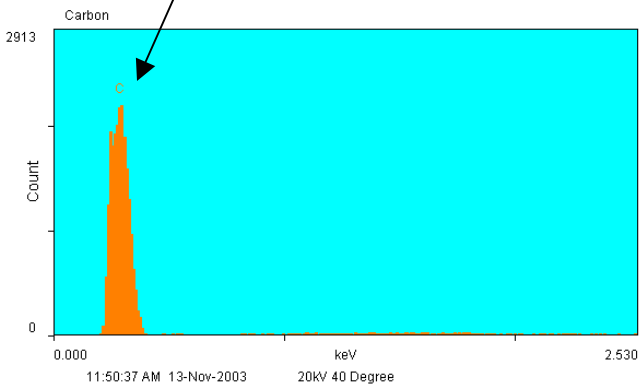
	SSUTW Super (UTW)	SUTW	UTW Ultra Thin	TW or (Be) Beryllium
Lower Detection Element	Be (4)	B (5)	C (6)	Na (11)
Energy	.109	.185	.282	1.041

SSUTW – Super Super Ultra Thin Window

SUTW – Super Ultra Thin Window

UTW – Ultra Thin Window

TW or (Be) – Beryllium Window



X-ray Windows

X-Ray Transmission

Light Rejection

Vacuum Tightness

Evex SSUTW windows are the highest performing x-ray windows available for low energy x-ray analysis.

Evex UTW windows are ideal for applications that require high x-ray transmission of light element energies, high mechanical strength, light rejection, vacuum tightness, and reliability.

Si(Li) vs QDD

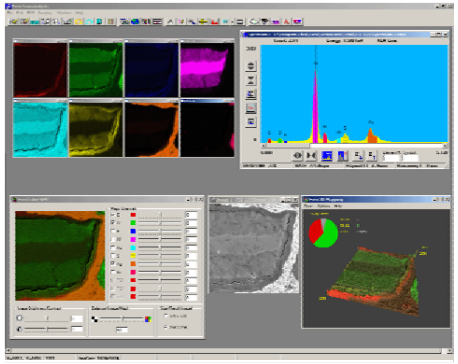
Evex - Si(Li)

- Detection
  - Sodium and Above
  - Beryllium and Above
- Windows
  - Beryllium (Be)
  - Light Element (UTW)
  - Super Light Element (SUTW)
- Count Rate <10,000 cps
- Peak Stabilty at Any Count RAte
- 129 FWHM
- Liquid Nitrogen Cooling
- 2-4 of cooling before use

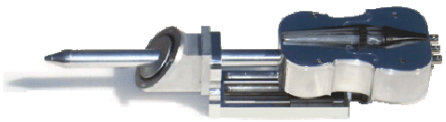
Evex-QDD Violin

- Detection
  - Sodium and Above
  - Boron and Above
- Windows
  - Beryllium (W) – Lowest Sodium - Na
  - Light Element (UTW) – Carbon - C
  - Super Light Element (SUTW) – Boron - B
  - Super Super Light Element (SSUTW) – Beryllium - Be
- Count Rate > 250,000cps
- Peak Stability at any Count Rate
- 130 FWHM
- No Liquid Nitrogen required for cooling
- Instant On

The Ultimate X-ray NanoAnalysis Machine For Electron Microscopy



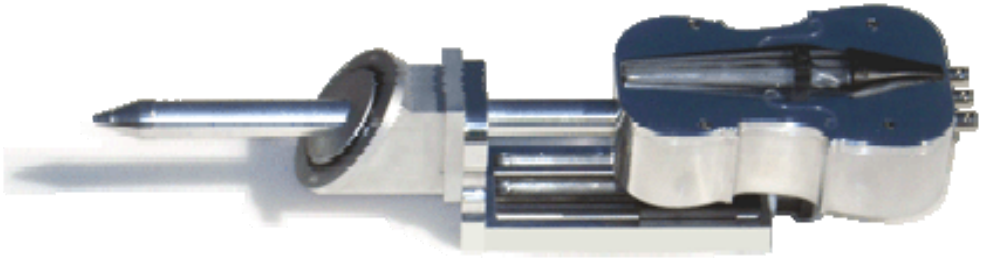
Advanced Detector Technology



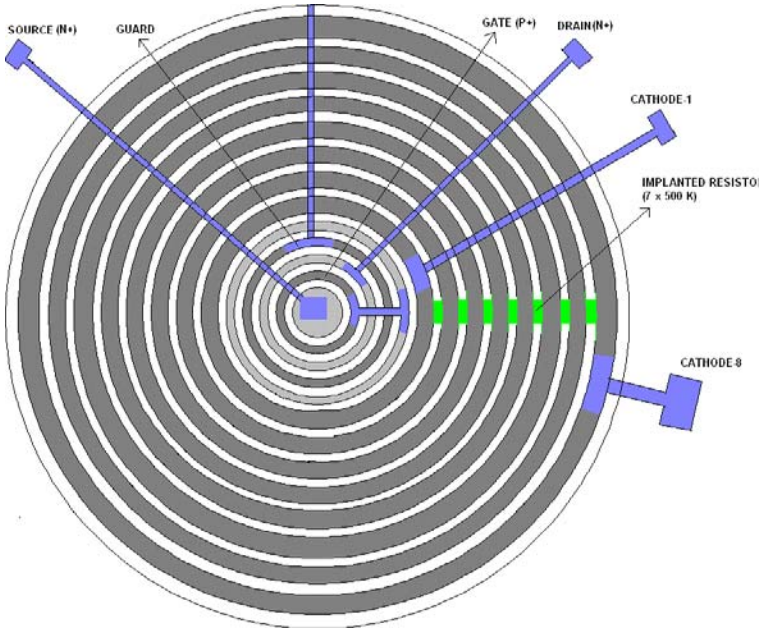
- **High Count Rate**
- **Light element detection**
- **No liquid nitrogen**
- **No vibrations**
- **No maintenance**
- **Great for high magnification**
- **Compact design**

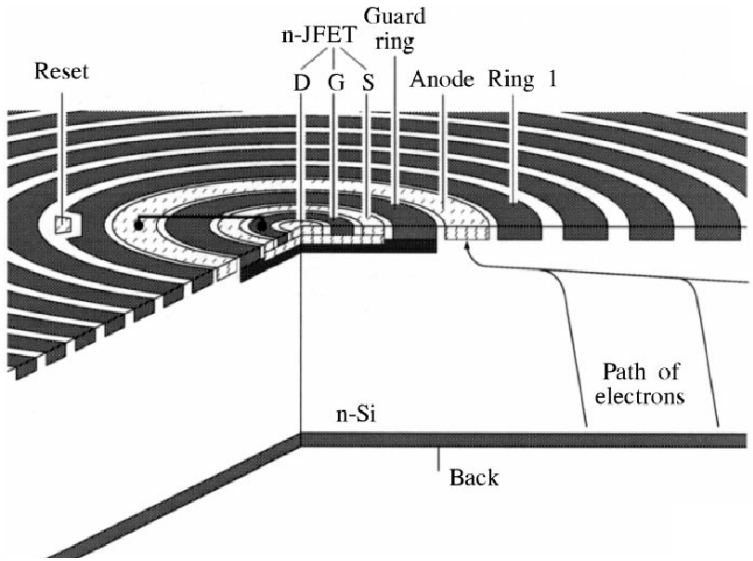
Benefits of Evex-QDD

- **High Count Rate**
- **Light element detection**
- **No liquid nitrogen**
- **No vibrations**
- **Low maintenance**
- **Great for high magnification**
- **Compact design**
- **Trace Analysis**

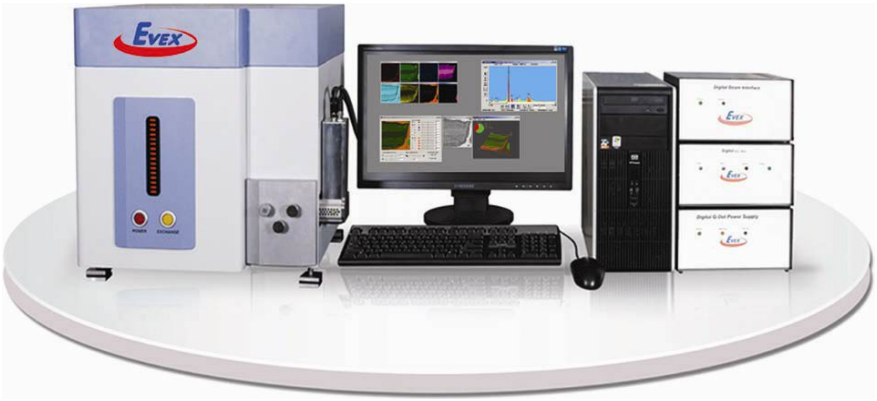


Inside the Evex QDD – Liquid Nitrogen Free, High Speed, X-ray Detector





Evex Mini-SEM with X-ray NanoAnalysis



Website
http://www.mini-sem.com

Electron Microscope Specification

Magnification	30,000 x (Digital Zoom x 4 ~ 120,000 x)
Acceleration Voltage	1 kv ~ 30 kv (variable)
Detectors	SEI, BEI, EDS
X-ray Detector	Evex QDD – Liquid Nitrogen Free, High Speed, X-ray Detector
Image Size	4096 x 4096
Image Format	JPG, TIFF, BMP, PNG
Data Display	Micron Bar, Magnification. Date, Kv
Voltage	110 volts / 220 volts

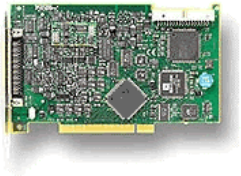
Evex NanoAnalysis System

Detectors

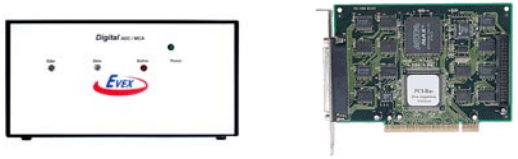
+

+

SEM Imaging



MCA



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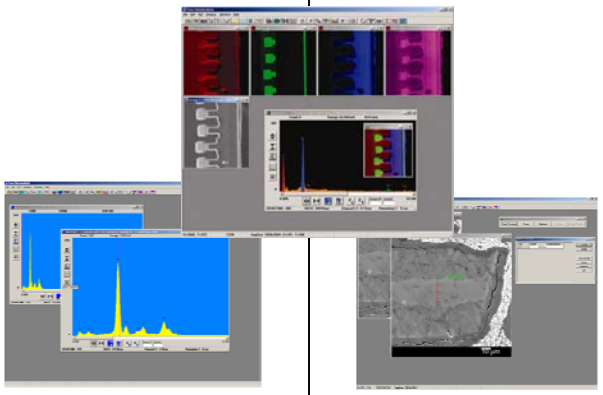

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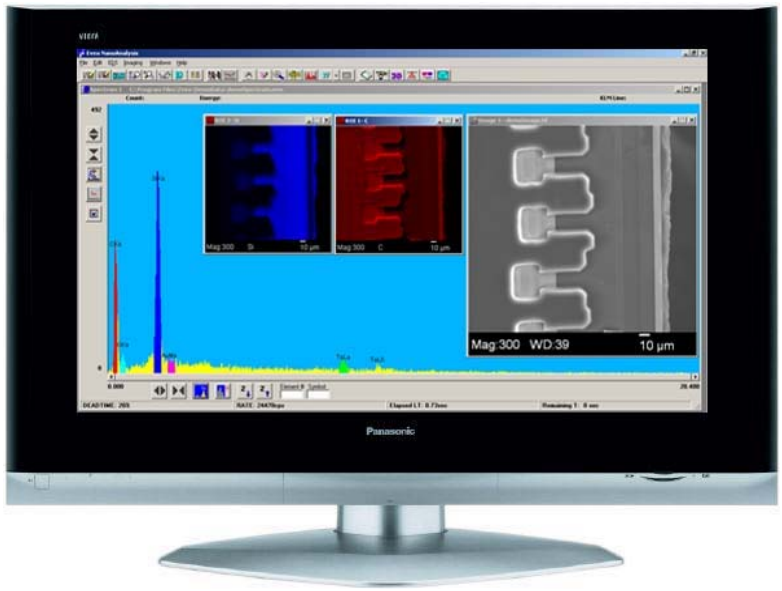
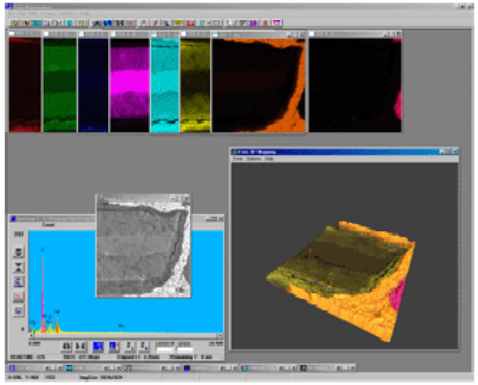
Workstation

Workstation
3.0 GHZ Processor
1.0 GB Memory
Microsoft Windows XP OS
160 GB Hard Drive
22” LCD Display
Network Card
Microsoft Office - Optional



NanoAnalysis Features

Image Acquisition Module
Image Processing
Image Analysis
Image Operations
Image Filters
Thermal Imaging
Image Measurement / Annotation
Easy Report Writing
AutoSave



Spectral Acquisition Module
Spectral Processing
Spectral Analysis
Qualitative Analysis
Quantitative Analysis
Monte Carlo Simulation
Detector Geometry Wizard
Auto ID with Peak Labeling
Auto Region of Interest (ROI)
Automatic Calibration & Logging
Easy Report Writing
AutoSave

Elemental Mapping
Standard Elemental Mapping
Ultra Fast Mapping
Line Scan
Point Mode & MultiPoint
AutoAnalysis (Spectra at Every Pixel)
ColorSEM - Quick Rendering
Focus Mapping
Thermal Mapping
Easy Report Writing
AutoSave

Advanced Features
Chemical Typing
Trace Sensitive Analysis
Critical Measurement
3D Mapping
3D Measurement
AutoAnalysis (Spectra at Every Pixel)
Remote Conferencing
Stereo Imaging
Synchro-Analysis