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SEM Samples

Specifications of SEM samples

For SEM, a specimen is normally required to be **small** (5 mm)& **completely dry**, since the specimen chamber is at high vacuum. Hard, dry materials such as *wood, bone, feathers, dried insects or shells* can be examined with little further treatment.

Living cells and tissues and whole, soft-bodied organisms usually require **chemical fixation** to preserve and stabilize their structure

Specimens that pose problems :

- Wool and Cotton tissue
- Cosmetics
- Fats and Hydrocarbons
- Emulsions (margarine)
- Biological and Organics (polymers)
- Contains any Volatiles and water
- Friable samples

الجامعة الأردنية

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for more details visit:

http://science.ju.edu.jo/Pages/SEM.aspx

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2012-1962 50

INSPECT F50

high-brightness,
high-current,
high-resolution imaging,

The INSPECT F50 , a SEM equipped with a high resolution Schottky Field Emission source (3.0 nm at 1kV/1.0 nm at 30kV SE), provides clear, sharp and noise-free imaging. In combination with the optimized analytical chamber geometry and its four-axis, motorized tilt, eucentric specimen stage, the high- and stable beam current makes this tool well suited for (automated) short- and long-time EDS, and EBSD analysis and mapping.
The system's excellent lateral resolution enables easy detection of low-Z elements at low beam energies.

Applications:

- *Industrial Applications*
- *Life Science Applications*
- *Natural Resources & Energy*
- *Scientific Research*
- *Nanotechnology Applications*

most instruments samples must be stable in a vacuum on the order of 10^{-3} - 10^{-5} Pascal. Samples likely to outgas at low pressures (rocks saturated with hydrocarbons, "wet" samples such as coal, organic materials or swelling clays, and samples likely to decrepitate at low pressure).

NanoCharacterization

- *Metals & alloys, oxidation/corrosion, fractures, welds, polished sections, magnetic and superconducting materials*
- *Ceramics, composites, plastics*
- *Films/coatings*
- *Geological sections, minerals*
- *Soft materials: polymers, pharmaceuticals, filters, gels, tissues, plant material*
- *Particles, porous materials, fibers*

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Faculty of Science

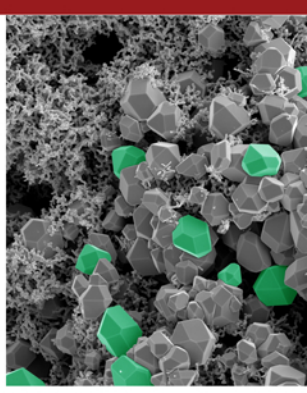
Scanning Electron Microscope

Inspect F50
Schottky Field Emission Gun
High Vacuum < 6e-4 Pa
Everhart-Thornley SE detector
Solid–state BSE detector
Eindhoven, Netherlands

SE

Secondary Electron

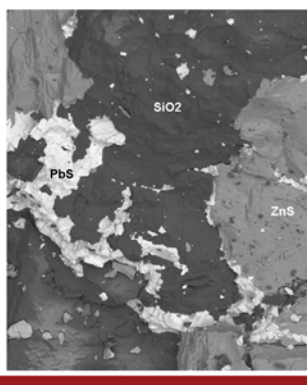
Secondary electrons (SE) are the primary imaging signal in SEM where they provide good spatial esolution and high topographic sensitivity. SE are electrons from sample atoms that have been scattered by beam electrons.



BSE

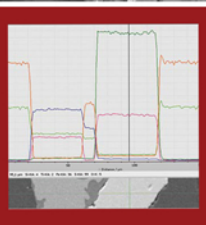
Backscattered Electron

In BSE , the signal intensity is a function of the average atomic number of the sample volume that interacted with the beam, thus providing atomic number contrast (Z-contrast) in the image

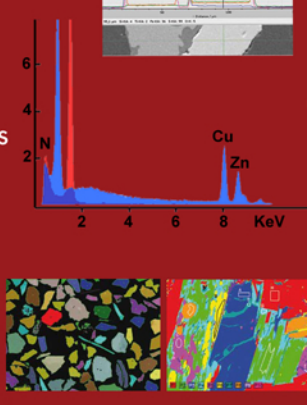


EDS

Energy Despersive X-Ray Spectroscopy



X-ray microanalysis uses an energy dispersive X-ray (EDX) spectrometer to count and sort characteristic X-rays according their energy. The resulting energy spectrum exhibits distinctive peaks for the elements present, with the peak heights indicating the quantitative elemental composition of the sample within the volume of interaction.



EDX Microanalysis Solutions

Analysis

Qualitative and quantitative analysis
Standardless or standard-based quantification
Element identification and spectrum evaluation

Line scan & Mapping

Ultra-fast acquisition of line scans and element maps
Spectrum data based line scan
Ultra high speed digital X-ray mapping

EDS Microanalysis - X Flash Silicon Drift Detector (SDD) - Bruker AXS Microanalysis GmbH