Advantages of SEM(scanning electron microscope)

Advantages of SEM include its wide-array of applications, the detailed three-dimensional and topegraphcal imaging and the versatile information gamered from different detectors.

SEM are also easy to operate with the proper training and advances in computer technology and associated software make operation user-friendly.

This instrument works fast, often completing SEI,BSE and EDS analyses in less than five minutes. In addition, the technological advances in modern SEMs allow for the generation of data in digital form

Although all samples must be prepared before placed in the vacuum chamber, most SEM samples require minimal preparation actions.

Advantages and Disadvantages

Advantages of Scanning Electron microscope:

- Magnifies objects more than 500 000X
- Possible to investigate a greater field of depth
- Modern SEM allow for the generation of data in digital form
- Most SEM samples require minimal preparation actions

Disadvantages of Scanning Electron microscope:

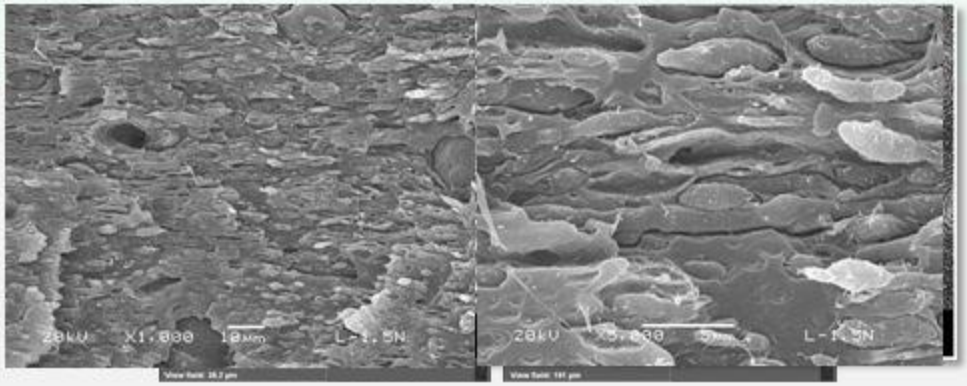
- Very large (operated in special rooms)
- Affected by magnetic fields
- Preparation of material is lengthy
- Require expertise
- Preparation may distort material
- Images are in black and white
- Expensive to purchase and operate
- SEMs are limited to solid samples

Applications

- SEM is one of the most versatile technique, and can be used to-
  I. Image morphology of samples
  II. Image compositional and some bonding differences
  III. Examine wet and dry samples while viewing them (only in an ESEM)
  IV. View frozen material (in a SEM with a cryostage)
  V. Generate X-rays from samples for microanalysis (EDS)
  VI. View/map grain orientation/crystallographic orientation and study related information like heterogeneity

Scanning Electron Microscope (SEM)

Application



1) Surface morphology

2) Crystal structure

3) Multi-phase structure

4) Acquiring elemental maps or spot chemical analyses using EDS (Energy-Dispersive X-Ray Spectroscopy)

5) Obtaining discrimination of phases based on mean atomic number (commonly related to relative density) using BSE (Back-scattered Electron Detector)

6) Getting compositional maps based on differences in trace element "activators" (typically transition metal and rare earth elements) using CL (cathodoluminescence)