SEM
Scanning electron Microscope

Description

Large chamber Analytic SEM, with an Energy Dispersive X-RaySpectrometer (EDS) and a Wavelength Dispertive X-Ray Spectrometer (WDS).
Our SEM is equipped to perform variable pressure examinations.

Principle

The sample surface is scanned by a beam of electrons. Some incidental electrons are "reflected" (backscattered electrons), whilst others penetrate more deeply into the sample.

Secondary electrons are also ejected under the effect of interaction between the incidental beam and the observed zone. Detectors capture the electrons to form images. Images obtained by secondary electrons provided topographical information on the observed zone.

The resolution of the SEM is of 3nm (0.003µm). In practise, specimen images amplified up to 10 000 - 30 000 times the original size can be obtained for industrial samples. Interactions between the incidental beam and the material also generate X-Rays which are used to analyse the sample composition.

- EDS spectrometry enables to simultaneously detect elements of the Periodic Table beginning from and including carbon (boron is detectable in materials if in large quantities).

-WDS spectrometry is used for searching elements which are only present in small quanitites.

The smallest observable volume is approximately 5µm-diameter sphere (the diameter varies according to the material and analytic conditions).
Quantitative analysis can be performed on bulk samples (glass, minerals, metals, etc.)

Applications

- Characterising heterogeneities in the material (e.g. inclusions, lack of homogeneities, crystallisations), as a complementary method of optical microscopy

- Characterising surface degradation (corrosion, scratches, traces of impact, stains...), as a complementary method of optical microscopy

- Evaluating material fractures, as a complementary method of optical microscopy analysing microfissures and metallic deposits due to impact, etc.)

- Powder characterising, as a complementary method of laser granulometry

- Identifying foreign bodies in food or pharmaceutical products, as a complementary method of optical microscopy and infra red microscopy (FTIR)

- Characterising microstructures in rocks, building and ceramic materials, as a complementary method of XRD (X-Ray Diffraction) and optical microscopy

- Characterising fillers in polymers, as a complementary method of XRD (X-Ray Diffraction)