

Scanning Electron Microscopy

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Credits: 3 CFU (24 hours)

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Course Program

1. Differences between optical and electron microscopy: the Airy disc, the dual nature of electron (behaves both as a material particle and as a wave), aberrations.
2. Description of a Scanning Electron Microscope: emitter (W, LaB₆, FEG), column, lens, chamber, vacuum system (high-vacuum, variable and environmental pressure chambers), detectors.
3. Images and resolution with a SEM: beam diameter, escape volume of secondary electrons (SE), back scattered electrons (BSE) and of X rays.
4. Microanalysis: energy dispersive (ED) and wavelength dispersive (WD) spectrometers; qualitative and quantitative microanalysis, crystal chemical formula, X ray maps.
5. Sample preparation.

Exercise: sample preparation of geological specimens; image, microanalysis and X ray map of their surfaces.