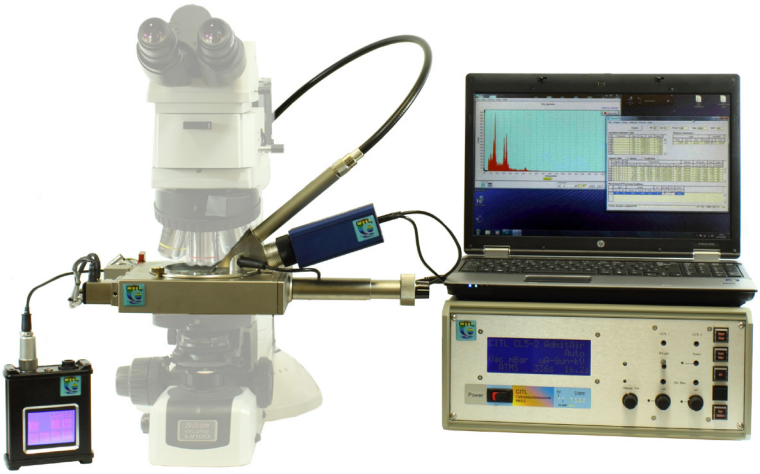
CAMBRIDGE IMAGE TECHNOLOGY LTD (CITL)

CITL Mk5 EDX System



Elemental analysis of samples referencing to the Periodic Table.

No need to coat or specially treat specemins.

Simultaneous edx/optical examination of samples.

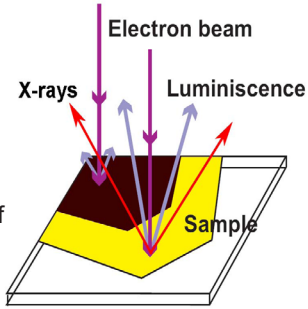
Analysis spot range 50µm to 3mm analysis spot.

Fast screening of samples.

No need for seperate SEM/Probe lab.

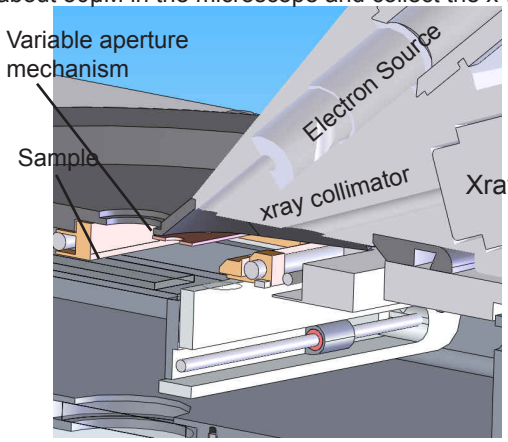
Cost effective analysis .

How it works

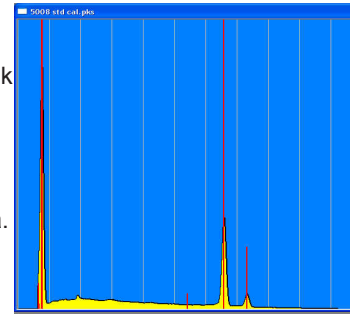


When we get Cathodoluminscence from our geological samples we also generate X-rays as a by product. These x-rays are characteristic of the elements in our sample. In the same way that due to trace elements we get optically different colours coming from a sample we also get different energy x-rays. By positioning a energy sensitive x-ray detector close to the sample we can collect a proportion of these x-rays and then sort them into their different energies, using a multi channel analyser (MCA). Exactly the same way as an EDX in a SEM or Micro probe.

They can then be processed mathematically to determine how much of each element is present in the sample.we have a Large flood beam which would be collecting x-rays from the entire electron bombarded area of the sample. Whilst this can be useful for Bulk sample analysis for geological sections etc. it is not very convenient, because of this we firstly place a collimator in front of the detector this reduces the area which the detector is looking at to about 1mm dia. Second we place an aperture in the electron beam line which reduces the size of the electron beam to 50µM minimum. this allows us effectively centre objects of about 50µM in the microscope and collect the x-ray data on those points.



The X-ray detector is a silicon drift detector (SDD) the same as used in most modern SEM's. Not the older liquid Nitrogen type but peltier cooled and as such requires very little maintanance. It has a resolution of better than 139eV. Like all x-ray detectors it requires very careful handling. The front of the detector is protected as long as it is inserted into the spectralATP which is specially designed to accept and protect the detector. Unlike detectors in SEM's there is no danger of the stage running into the detector and damaging the delicate 8µM beryllium window. The particular detector used has a very high count rate capable of up to 5 x 10^5 counts per second with a peak to background ratio of 3000. An easy to use software package is supplied with the system which enables easy calibration of the detector system using a pure Ge sample (supplied). The detector is sensitive to all xray energies above Na. Once a spectrum has been collected it can be quantified by the built in analysis system. The quality of the collected data has been shown to be comparable to that collected on a typical SEM EDX system.

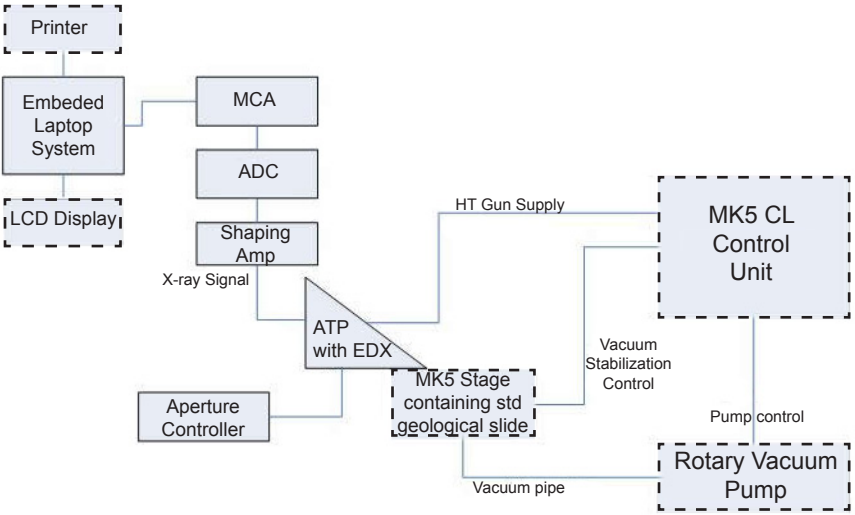


Ge calibration spec-

Our web site www.citl.com contains several reference papers to the use of CL and CL with EDX. The EDX system consists of the Special Analytical Top Plate with automated beam aperture changer. Which allows the beam size to be controlled easily and accurately and is specifically designed to accept the Peltier cooled detector. This is NOT supplied without the detector as each manufacture's detector is different and would require a specially designed ATP.
Along with the detector a computer with high performance MCA matched to the detector and control / analysis software is supplied. The EDX system can be supplied with the Mk5 CL chamber and control unit which was specially designed to work with it or fitted as a upgrade option to both Mk5 CL stages or Mk4 CL stages unfortunately it is not suitable for connection to older CL units.

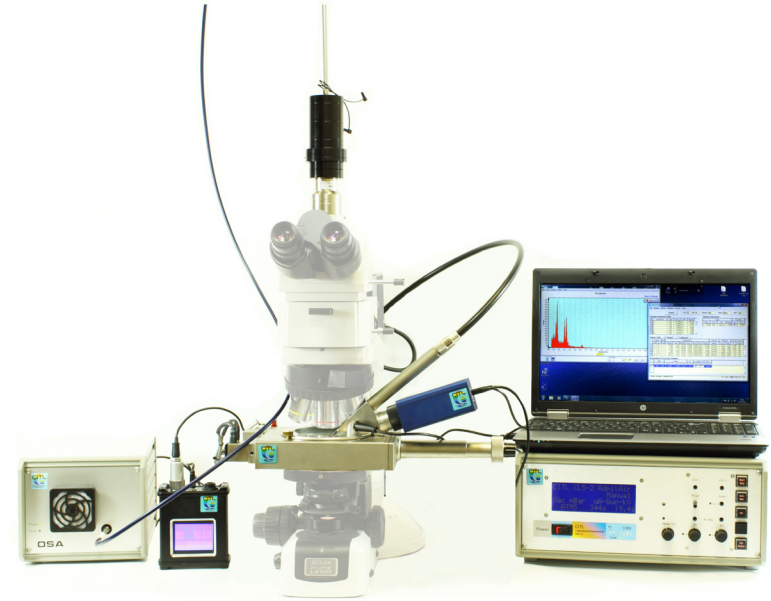
EDX system Specification

SATP Top Plate with multi-aperture beam stop.
Control box for SATP.
SDD x-ray detector with better than 139ev resolution at Fe55 .
CITL Spectrometer Control System consisting of:-
Windows embeded computer system with Flash Operating System
High qualtity MCA with nucleonic pre-amp with adjustable gain/shift/shaping times.
Inbuilt LCD Monitor, VGA connector for external Monitor
Printer.
MCA control and analysis software.



Block diagram of Mk5 EDX system

The Energy Dispersive X-Ray Spectrometer (EDX) can be used concurrently with the Optical Spectral Analyser (OSA) for real time comparative spectrum analysis.



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