

The University of Arizona Electron Microprobe Laboratory

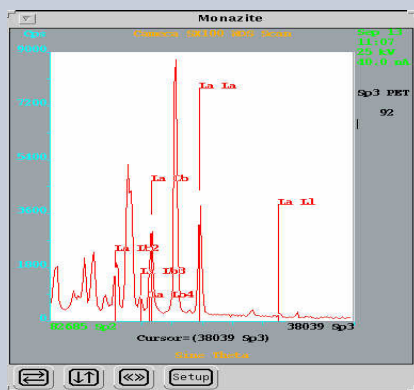
Qualitative Analysis

Two methods are available for rapid qualitative determination of the elements present and estimation of their relative abundances in an unknown sample:

- **wavelength dispersive scanning (WDS)**
- **energy dispersive spectrometry (EDS).**

Both methods are based on analyzing the spectra of characteristic x-rays emitted by the specimen.

WDS (Wavelength Dispersive Scanning)



Crystals in the WDS spectrometers are scanned over a pre-determined wavelength range and the intensity of the x-rays detected plotted vs. wavelength (or energy).

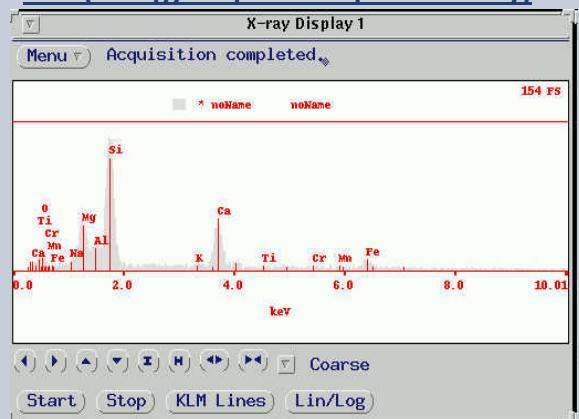
The elements present are identified by peak matching. WDS analysis is particularly useful for determining the presence of trace elements (< 0.1 wt%) in an unknown sample.

A reasonable full scan for all elements from Boron to Uranium can be obtained in approximately 10 minutes.

Applications:

- rapid phase identification
- qualitative determination of the presence or absence of major or trace elements
- determination of interferences and background positions needed for quantitative analysis by WDS

EDS (Energy Dispersive Spectrometry)



The PGT-5000 EDS detector **simultaneously collects all x-ray wavelengths** emitted from the sample and **displays an intensity vs. energy** (or wavelength) spectra in a few seconds. The **elements present are identified by peak matching.**

This method is very **useful for quickly identifying phases and minerals by pattern matching, rapid determination of the presence or absence of an element, and qualitative analysis of non-flat samples.**

However, detection is limited to elements with $Z > 9$ (Fluorine) and concentrations >1 wt%.