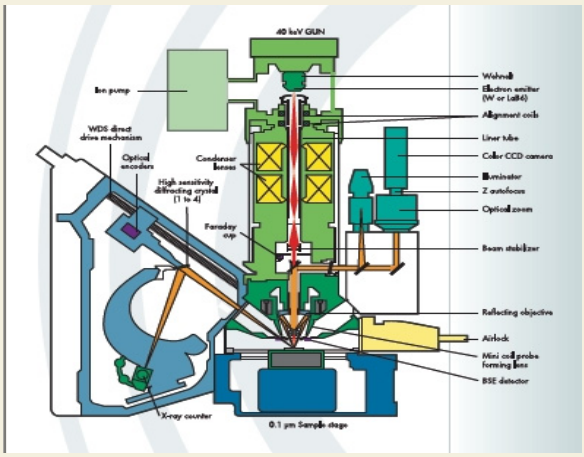
Lunar and Planetary Laboratory
50 years
1960 – 2010

# The University of Arizona Electron Microprobe Laboratory

## *Quantitative Analysis*

The main function of an electron microprobe is to perform **quantitative analysis using wavelength dispersive spectrometry** (WDS).

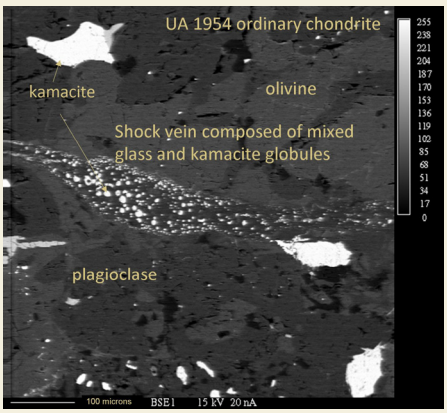
This technique provides accurate, non-destructive, quantitative chemical analyses of **areas a few microns in size** in solid materials. Most solid materials can be analyzed if properly prepared.




***The lab maintains a diverse and ever growing collection of almost 300 natural and synthetic standards to provide for the analysis of a wide range of different materials.***

A typical geochemical analysis for **11 elements** under conditions of **15 keV accelerating voltage, 20 nA beam current, 2 µm beam size, and 30 second peak count time** would require ~**4 minutes per analysis** and would yield MDLs of ~100 - 300 ppm (3σ) for all elements and a 1σ accuracy of 0.5 - 1.5% relative for major elements (those present at concentrations > 1 wt%).

**Computer automated analysis allows users to set up points, lines, or a combination of both to be analyzed unattended at a later time (usually overnight).**




Trace Elements

Higher accelerating voltages **to 30 keV** , 300 - 1000 nA beam currents, and long counting times enable **trace element analysis** (elements present at concentrations < 0.1 wt%) .

Our **CAMECA SX50** is equipped with four WDS spectrometers containing 12 diffracting crystals which allow analysis of all elements with Z ≥ 4 (Beryllium).

The new **CAMECA SX100** is equipped with five WDS spectrometers containing 14 diffracting crystals which allow analysis of all elements with Z ≥ 5 (Boron). Three of the spectrometers are equipped with large LPET and LLIF crystals which provide more counts and better peak-background ratios than do normal sized crystals of the same type.