

Want the **entire** picture?



## Get SciAps Field Portable Solutions for **Instant Geochemistry & Mineralogy**

The range of SciAps field portable LIBZ analyzers allows a wide variety of diagnostic information to be collected on geological samples. LIBZ allows you to see not only what elements are present but where they are. Perform whole rock and trace geochemistry and understand mineral chemistry in the field.

**Get Real-Time Geochemistry with - LIBZ Laser Induced Breakdown Spectroscopy Field Testing for Even the Lightest of Elements: Li, B, Be, C, Na, Mg - Detailing 50µ Spots or Averaging Over Large Areas**



### Z500

The most advanced handheld LIBZ analyser available. It enables analysis elements as light as H [Z=1] and as heavy as U [Z=92], - provides the best possible limits of detection. Highest power pulsed laser, best resolution spectrometer [200-850nm extend to 930nm] patented OPTi-purge™ technology for higher precision and better limits of detection, and a large sized display.



### Z100

Smaller and lighter hand held LIBZ analyser. Great alternative for many HHXRF applications. Enables analysis of elements as light as Li [Z=3], as heavy as U [Z=92] - does not have argon purge, will not analyse Carbon [C]. Provides excellent detection limits, incorporates a high powered pulsed laser, a mid range resolution spectrometer [200-850nm] and medium sized display.

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# SciAps

# GEOCHEM

**Instant Geochemistry & Mineralogy**

Field portable LIBZ analyzers provide  
instant analysis of major and trace  
elements in geochemical samples.



## Analyze Any Mineral, Any Element Anyplace on the Planet



Combines never before possible element suites with spatial elemental mapping at a micro scale in a hand held device.

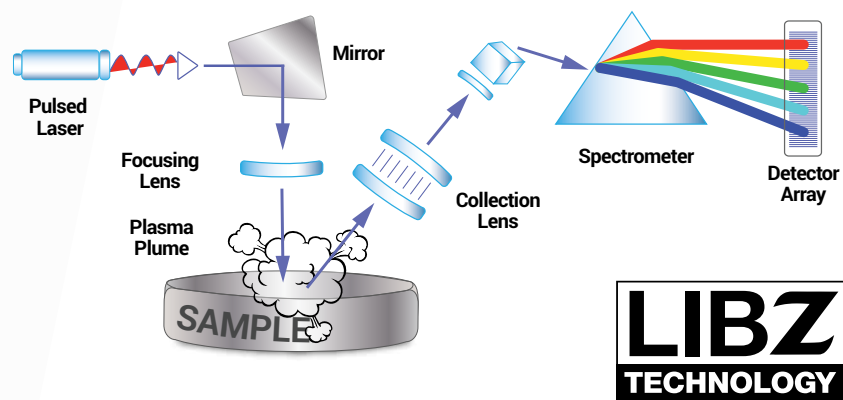
Instant results for very light elements such as **Na, Mg, Li, Al, Be, B, C, F**, transition metals, heavy metals, **REE** including **HREE** and many more.

Get the entire picture for exploration, grade control and block modeling, process optimization & environmental clean-up.





## In the World of Handheld LIBS, it's All About the Technology



### What is LIBZ?

LIBS or Laser Induced Breakdown Spectroscopy is an analytical technique where using a laser a plasma is created on the sample and as the plasma cools characteristic photons are emitted and measured to determine elemental presence and abundance at the sampled location.

The key to good elemental analysis with LIBS is good LIBS technology. SciAps harnesses our premier LIBZ technology for breakthrough in-field elemental analysis.

- **Most powerful laser** in any

handheld LIBS: 6 mJ/pulse, 10-20 Hz, PULSAR laser. Class 3B 1064nm, delivers best limits of detection and testing speed.

- **Widest range**, highest resolution spectrometer: Range from 200 nm out to 850 nm, or optionally out to 930 nm. Complete coverage of the Periodic Table of the Elements!
- **Dual testing** options: bulk sample analysis or pinpoint elemental mapping of veins, inclusions in rocks or core. The Z features a 3D internal stage with programmable X-Y raster and auto-focus.

- **OPTi-purge™** integrated argon gas purge (optional) – enhanced detection limits and precision compared to air-based operation.
- **On-board high resolution camera** for effective targeting of analysis
- **On-board GPS** for capturing spatial metadata
- **Google/Android Operating System:** As intuitive as a Smartphone, easy connectivity for sharing data
- **Hot swap Li ion batteries** for 8-10 hours field use.

## Better In-field Elemental Analysis

The Z delivers the best of both worlds: Pinpoint elemental mapping of a rock and traditional bulk sample analysis. Our unique integration of small spot (50 um), rastering laser and on-board camera delivers surgically precise elemental mapping of minerals, veins and inclusions on rocks, core samples and thin sections. Why? Because the Z is designed for the real world of mineral exploration: Heterogeneous rock samples.

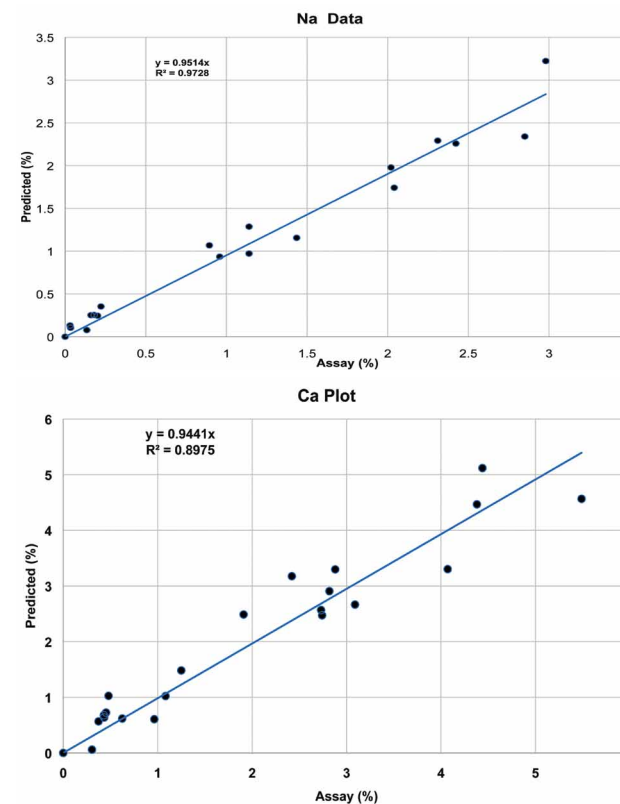
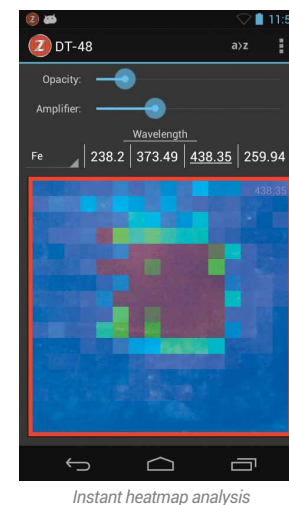
### Advantages

**Identify** a wide range of elements to discriminate specific mineral phases and identify zonation within minerals and veins right in the field. **Create** instant heat maps at a micro scale showing the distribution of elements in the sample in real time. **Analyze** bulk samples too. The XY raster also delivers bulk sample analysis similar to traditional XRF, but with many more elements analyzed.

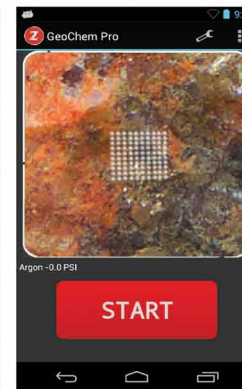
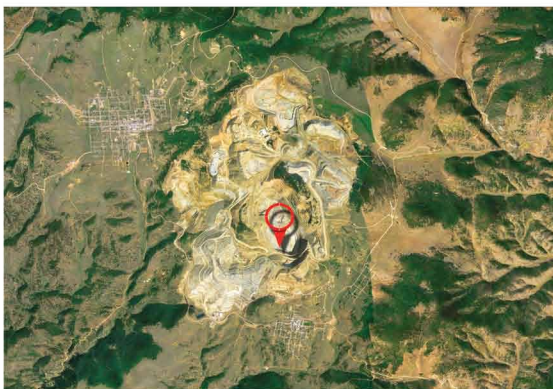
**Geochemical Indices** are now possible using Na. With the Z, you can determine a variety of critical geochemical element ratios in the field, allowing better discrimination of rocks types. The in-field analysis of Na, Mg, Al, K and other low atomic number elements, at low concentrations, delivers in-field data for these well-established geochemical techniques.

- **Geochemical element ratios** such as Ca/(Na+Ca) and K/Na
- **Aluminium-driven ratios** including A/CNK (Al/ Ca+Na+K) and A/NK (Al/Na + K), in particular for igneous rock formations
- **Si - measure silicon** in-field as well to analyse geochem ratios versus SiO<sub>2</sub> concentrations.

#### Built-in Heat Map



## Map Your Minerals with On-board GPS and Full Elemental Analysis.



### More Elements Analyzed for Better Geochemistry

The Z LIBZ analyzers measure elements that could never before be analyzed in the field with a handheld device. Includes sodium, boron, beryllium, carbon, fluorine and other halogens, plus many more elements.

#### Major Elements

Perform major element geochemistry and determine critical geochemical element ratios in the field. Test **Na, K, Al, Mg, Si, Ca, Fe, Ti, Mn** and easily toggle between elemental and oxide value with in-built oxide equivalence tables. Geochemical Indices in the Field: With the Z's excellent sensitivity to many low atomic number

elements, including sodium, widely utilized ratios may be generated on-site: Geochemical element ratios such as **Ca/(Na+Ca)** and **K/Na**, Aluminium-driven ratios including **A/CNK (Al/ Ca+Na+K)** and **A/NK (Al/Na + K)**, in particular for igneous rock formations, **Si** – measure silicon in-field as well to analyze geochem ratios versus SiO<sub>2</sub> concentrations.

#### Trace Elements

**Test Li, Be, B, As, Bi, Te, Ba.** Instantly identify, quantify and index trace elements in the field – yield understanding of specific chemistry of mineral phases and classification of rock types. **Halogens: Analyze F, Cl and Br**, plus more sensitive measurements of **K** due to our wide range spectrometer (out to 850 nm or optionally 930 nm).

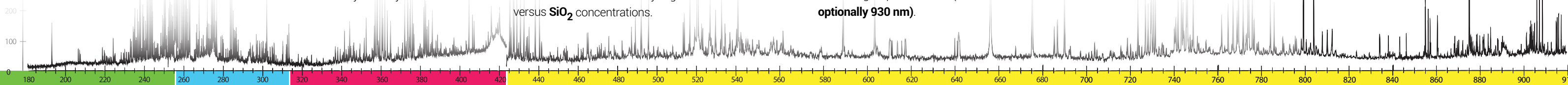
#### Base-Metals, Precious & Transition Metals

The Z also analyzes base metals such as **Cu, Pb, Zn, and Ni** plus **Au, Ag, Pt, U, Th, V**, Rare Earth Elements [REE] including Heavy REE [HREE] **Test C** Using the Z500 with **OPTi-purge™ Ar purge** and improve performance on other important elements

## The other Z Advantage: No X-Ray Radiation & much Lower Maintenance Costs

No X-ray Radiation! Safely test any samples, even small ones, in your hand. No X-rays means no need for test stands to safely test samples in field.

- Minimal, if any, regulatory restrictions. Travel freely internationally without registration or licensing headaches.
- Lower Maintenance costs: There's no detectors to break, no X-ray tubes to die. Maintenance costs with LIBZ are typically a tenth of portable XRF.





# LIBZ Delivers a Whole New World of Analysis for Rock Samples

## Introducing The GeoChem Pro APP

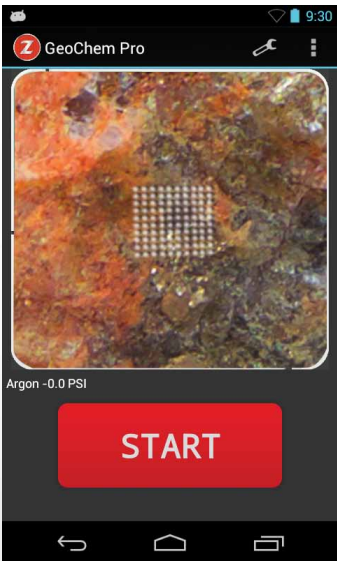


- ✓ YES! Major Element Geochemistry
- ✓ YES! Trace Element Geochemistry
- ✓ YES! Geochemical Element Ratios
- ✓ YES! Base Metals

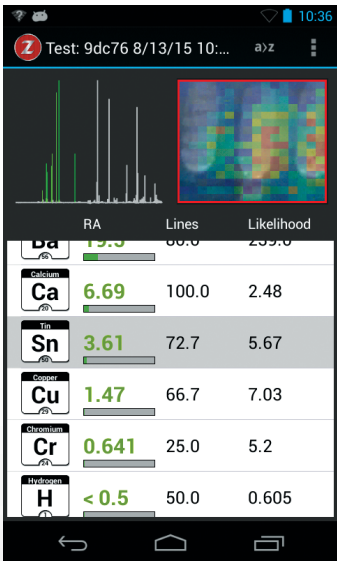
### How it Works



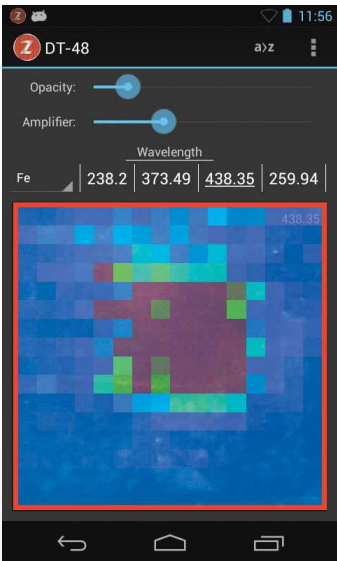
1 - The Z LIBZ analyzer allows precise targeting of specific regions on a geological sample. Simply place the Z onto the rock or core. Samples can be safely held in the operator's hand because the Z is laser based.



2 - Users can view the sample image via the on-board camera, and align the rock and adjust the raster (if needed) to strike specific zones within the sample. Operators also view the laser during testing, and may observe the plasmas being generated. Complete spectral data is collected and analyzed at each point.



3 - The Z series contains an on-board data base of emission lines and relative intensities for every element detected are instantly presented, including qualitative relative abundances. Tap on an element, and the spectral view zooms to the relevant spectral lines. A "thumbnail" shows the heat map for that element, by position in the sample.



4 - Tap on the heat map to enlarge it. For the first time ever – instant elemental micro-analysis in the field is possible to help facilitate mineral identification and assess zonation in minerals and alteration in rocks. Instantly visualize "hot spots" for selected elements. The spatial distribution of elements often indicate the mineral or mineral family present.

By determining the spatial distribution of elements and their associations with one another, geoscientists can often deduce the mineral or mineral family present and subtle indications of geological processes at a micron scale.

For the first time ever, geoscientists can perform micro-analysis in the field with a hand held device. Specific minerals, veins, inclusions or other regions of interest in rocks can be viewed and analyzed with pinpoint accuracy, yielding elemental "heat maps." Determine both what elements reside in a sample, and where those elements are distributed. This powerful app can:

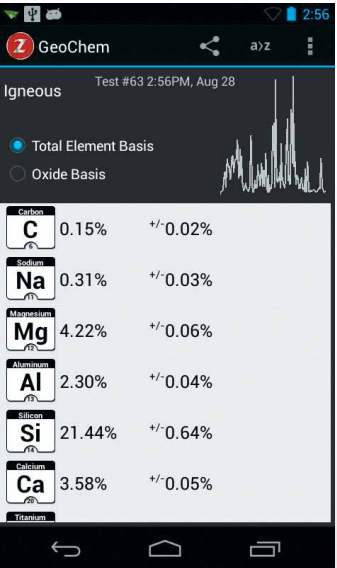
- Instantly visualize "hot spots" for selected wavelengths related to specific elements or ratios and indices of elements.
- Assist understanding the formation of ore bodies and geological events in the field,
- Drive selection of samples for further laboratory analysis using electron microprobe,
- LA-ICP-MS [Laser Ablation ICP MS] and XRF/SEM methods can be optimised by understanding elemental spatial distributions in the field.

## Traditional Bulk Sample Analysis – The GeoChem App

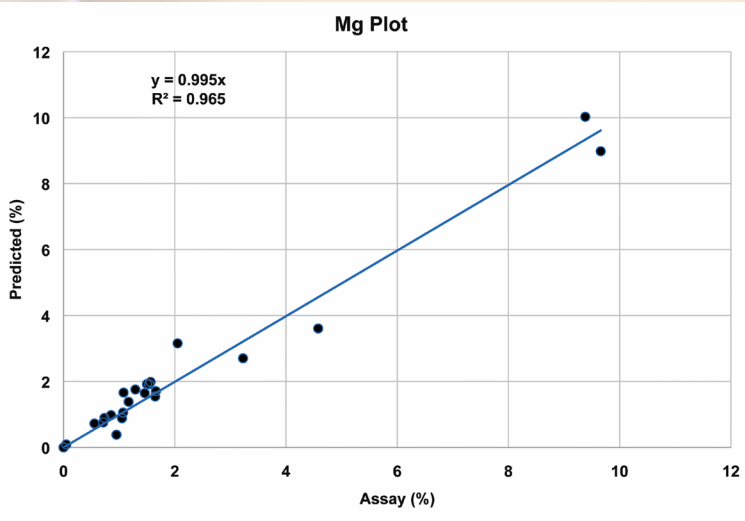
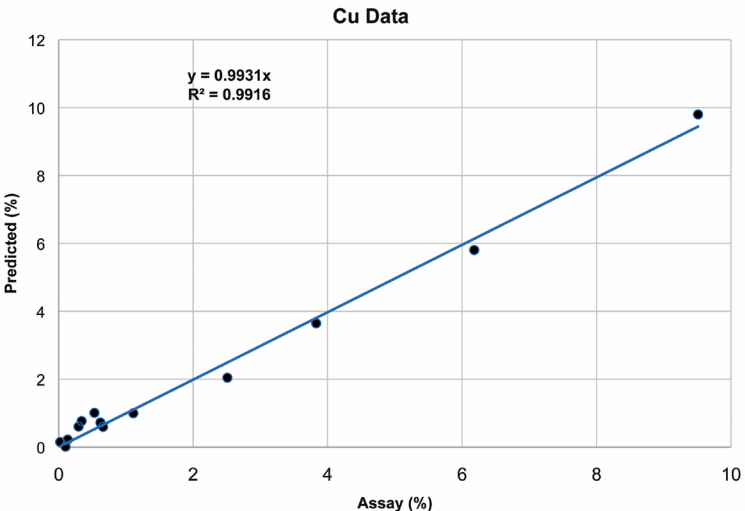
Many users analyze mineral samples using conventional field portable technology, most commonly portable XRF. In these cases, samples are often collected and prepared to ensure homogenization, and tested for quantitative elemental content.



Z offers the same quantitative testing on a more comprehensive element suite with the GeoChem App. Analysis can be carried out directly on a smooth rock surface. Ideally pulverized samples are pressed and tested, typically requiring the same amount of time as HHXRF. Pressed samples can be stored in their consumable holders for later analysis or laboratory confirmation.

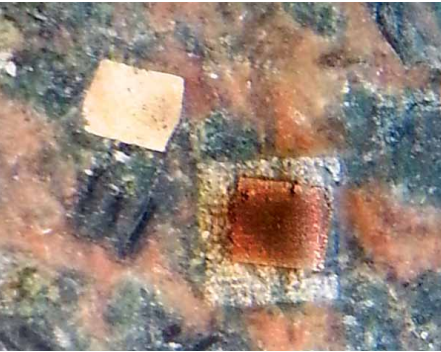


On-board calibrations are used to report elemental content in % or ppm, depending on concentration levels. Operators can use on-board oxide equivalence tables to display elements as oxides.



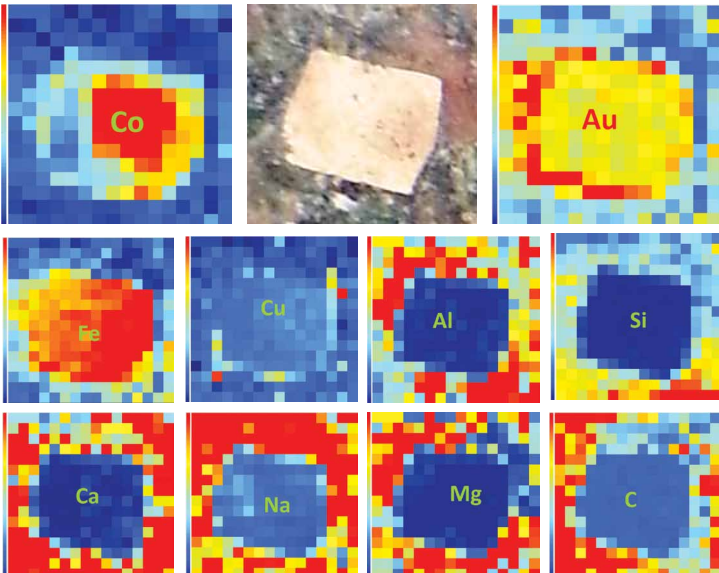
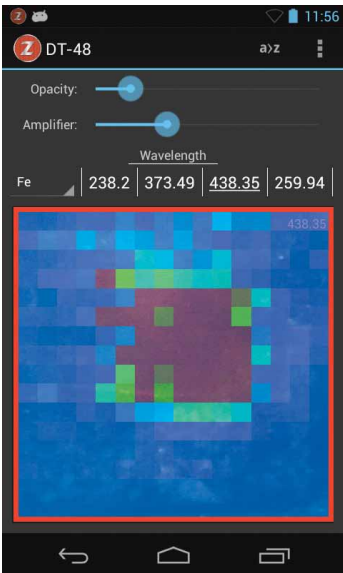
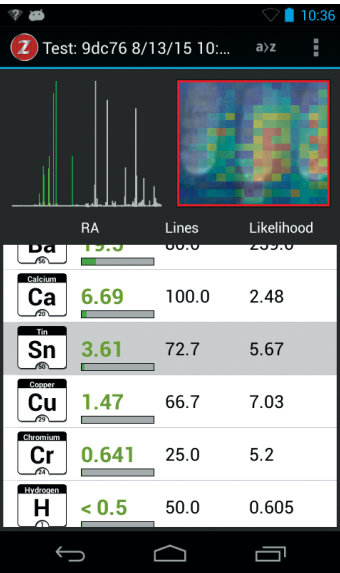


# The Power of Handheld LIBS – An Applications Example



A compelling benefit of the SciAps LIBZ technology is the possibility of performing both micro analysis and bulk sample analysis. In the example below, pyritic rocks from a gold bearing ore-body are analyzed using the Z. From the user's perspective, the heterogeneous rock is viewed through the Z's high resolution camera. The laser is directed onto a region of interest, and analyzed in a few seconds. From the list elements and abundances displayed on

the Z, the user can quickly tap on an element to bring up heat maps of each. LIBZ analysis of a single pyrite from the gold bearing mineralizing system indicates a Co rich core and secondary mineralisation associated with gold and some copper on the outer rim of the pyrite. Analysis of the rock surrounding pyrite for major elements indicates the mineral assemblage of the surrounding host rock and can assist geologists in logging the rock accurately.

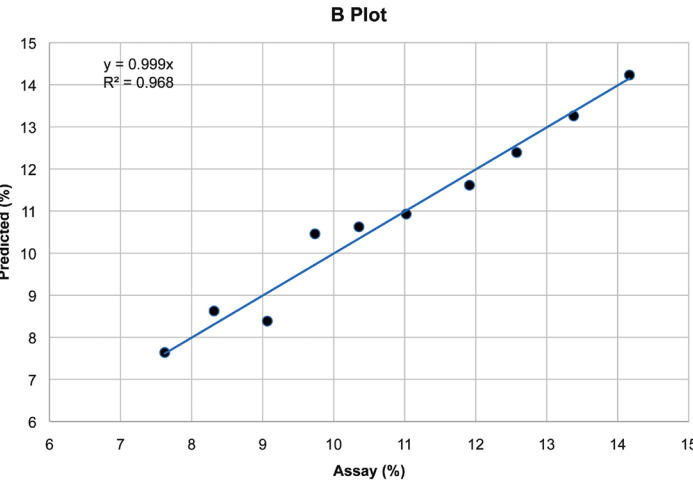
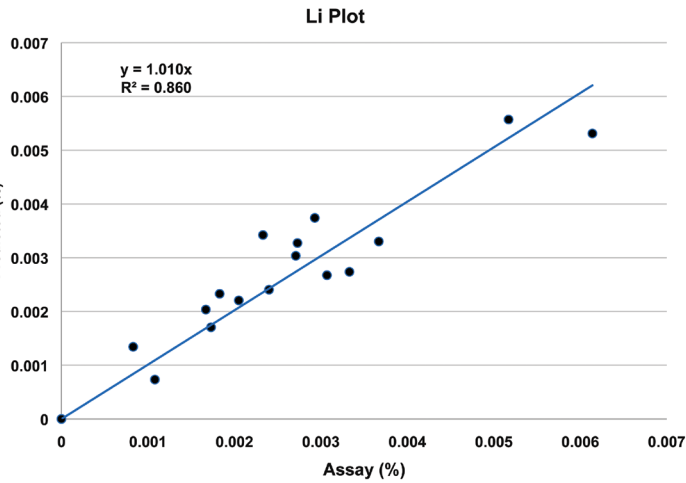


## Supercharge your Bulk Sample Analysis

Many geo's want to perform quantitative elemental analysis in the field as they've traditionally done with x-ray technology. Now LIBZ takes that analysis a major step forward by providing major element analysis.

In addition to transition and heavy metals, the SciAps Z also analyzes the lower atomic number elements including **Na, Mg, Al, K, Li, Be, B, C** and others. LIBZ technology means elements such as **Li, Na, B, Be and C** are

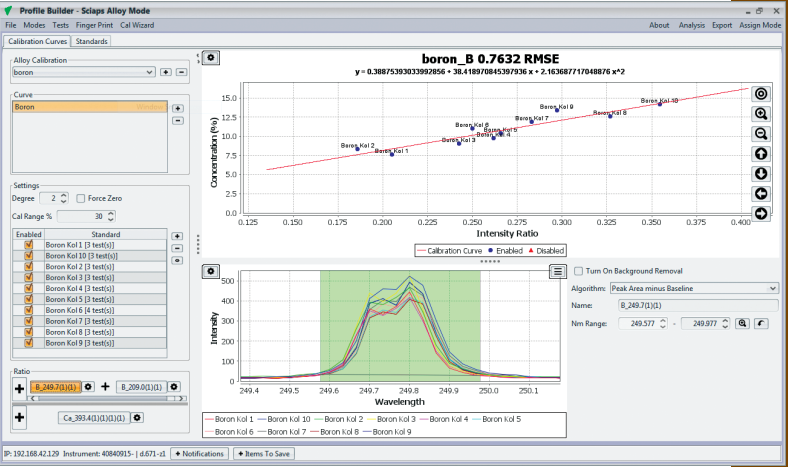
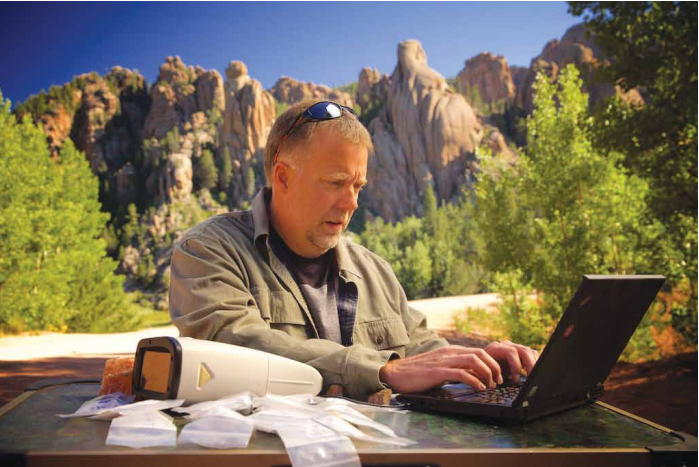
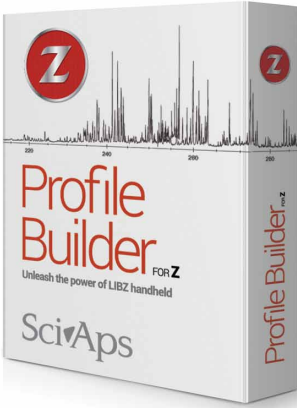
possible for field measurements in a hand held device for the first time. And, key element ratios that rely on **Na, Mg and Al and K** can be now measured in the field, because LIBZ is particularly good at these elements.



# Tune and Customize your Calibrations with Profile Builder

SciAps Profile Builder (PB) frees you from factory generated calibrations and methods. PB is loaded with common industry CRMs (assays) and users may add their own. Users may add new elements to the analysis and build calibration curves using an intensity ratio of the analyte line(s) to one or more matrix elements. The software allows users to easily select between a variety of common pre-processing methods such as Savitzky-Golay smoothing to reduce noise, nth derivative to

reduce baseline, or baseline subtraction. Users can quickly optimize spectral pre-processing on their sample set by observing the effect on the calibration curve in real time. Connectivity is via USB and wireless. Or, choose an element to see where the lines for that particular element are expected. Once you know the line, simply create a region around it and build a calibration curve. The software will guide users by suggesting common emission lines for each element of interest.



# Intuitive Data Management, Reporting and Sharing

Z is Google-Powered! Built on the Android Platform, users experience easy, intuitive operation with wireless, Bluetooth and GPS capabilities allowing seamless connectivity to any Android device or PC. This makes sharing and reporting data easier than ever with a hand held analytical device. Android's easy updates of on-board software eliminates the legacy upgrade difficulties inherent in proprietary platforms. New applications (Apps) can be added anytime to extend analytical capability, new sample types, etc..

