



Company and Product Background

Laser Analysis Technologies (LAT) is a specialist manufacturer of next-generation analytical equipment using Laser Induced Breakdown Spectroscopy.

Part of the XRF Scientific Ltd group, LAT's capabilities include all aspects of LIBS instrumentation design, manufacture and support.

Through a worldwide network of distributors LAT provides quality service and support on a global scale.

Products

The Spectrolaser analysis systems are simultaneous elemental analyzers utilizing Laser Induced Breakdown Spectroscopy. The instruments are capable of minor and major component analysis in a range of materials including:

- metals
- ceramics
- glass
- geological materials
- coal
- plus many more.

Spectrolasers have sophisticated sample scanning systems enabling averaging of data across a sample surface, or alternatively displaying graphically the concentration variations of components across a surface.

Laser Induced Breakdown Spectroscopy

During analysis a high-power laser is used to induce a bright spark (or plasma) at the surface of the material, the light from which is subsequently analyzed by a unique patented spectrometer and detection system. The technology is sensitive to a wide

range of elements present in materials in addition to key low atomic number elements - such as hydrogen to sodium - which are often not detected by alternative technologies.

Example Applications

Spectrolasers have been utilized in diverse applications worldwide, for example:

- analytical measurements of as-mined geological materials,
- analytical measurement of process materials to enhance process performance (power generation, minerals processing, specialty chemicals manufacture, cement manufacture...),
- surface mapping of elemental concentrations as a means of quality control,
- measurement of the occurrence of light elements such as Li, Be, B, and C
- soil fertility and carbon sequestration measurements,
- identification and characterization of gemstones, and
- advanced research and development applications.

Sample Preparation

Geological and process materials are most often crushed and pressed into a pellet prior to analysis with the Spectrolaser. Crushing ensures a homogeneous sample is presented to the instrument for analysis and is easily accomplished with standard laboratory equipment. Metal samples can often be analyzed with little or no sample preparation.

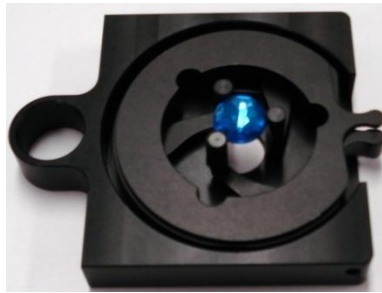
Odd-sized samples such as gemstones, rock chips, nuts, bolts etc. can be analyzed using LAT's jaw clamp sample holders.

Sample Holders

Spectrolasers can be equipped with a range of sample holders for samples of up to a maximum of 50 mm diameter. Alternatively, small mass sample holders can be fitted to analyze powdered materials with a mass as low as 5mg. Shown below is a holder for standard size 32 or 40 mm pressed pellets.



Jaw clamp systems can be provided to analyses odd shaped pieces such as rock chips, metal bolts, and gemstones as shown in the following photographs.



Product Performance

Fast element analysis and rapid composition determination is a distinguishing feature of Spectrolaser analysis. Analysis times are measured in seconds and include averaging from multiple laser measurements within the analysis time.

Detection limits in LIBS can vary depending on the element and matrix analyzed. Detection limits in the low ppm range are realistic for many commonly analyzed elements.

Reproducibility depends on sample homogeneity. As a guide relative standard deviation in measurements is 5% for pressed pellet analysis but can be as low as 1% in well prepared homogeneous materials.

Although most Spectrolaser measurements are simply performed in the laboratory atmosphere, all Spectrolasers also have solenoid controlled buffer gas capability that further enhances element sensitivity in some circumstances.

Calibration

The Spectrolaser can be used in multiple ways to meet specific application objectives. Methods of data analysis include:

- Qualitative spectra interpolation using an in-built spectral database and line search function. Multiple spectra are easily displayed, stored and analyzed using the Spectrolaser software. The relative intensities of identified spectral lines reveal the trends in material composition.

- Full quantitative analysis using “like-for-like” calibration. This is the most common means of material identification whereby standards of similar material are used to calibrate the instrument prior to routine analysis of unknown samples. The Spectrolaser software conveniently allows the storage of multiple calibrations for differing matrix types allowing easy and flexible use of the instrument in situations where different material types are routinely analyzed.
- Chemometric correlation; Using inbuilt correlation algorithms datasets of similar materials can be analyzed and correlations determined for a range of material properties. Bulk properties such as moisture and calorific value have been successfully measured using this method of analysis.
- A recently developed semi-quantitative analysis package is also supplied with the instrument. This allows semi-quantitative analysis without the need of calibration standards in some circumstances.

Required Laboratory Services

The Spectrolaser fits on most standard laboratory benches and office desks and only requires single-phase mains power to operate.

Application Development

We have an experienced team of engineers and scientists to support all application development needs. Custom instrument development is also available in some circumstances.

To assist in technology comparisons, a testing service is provided whereby customer supplied samples are analyzed and instrument parameters optimized to allow for effective assessments to be made.

Application Data

Our website www.laseranalysis.com provides a useful source of product information and application data.

Please contact one of our application specialists for advice on your specific needs at info@laseranalysis.com.

Product Demonstration

Laser Analysis Technology has a demonstration facility in Melbourne Australia that may be visited and used free-of-charge for application development by interested researchers and technologists.

Laser Analysis Technologies is also a regular exhibitor at local and international conferences exhibiting laboratory products.