EOS

- Handheld LIBS Analyzer for Alloy Determination

Handheld Laser Induced Breakdown Spectroscopy (HH-LIBS)

HH-LIBS technology allows for incredibly FAST analysis of alloy grade ID and chemistry; especially for light element alloys containing Li, Mg, Al or Si. Compared to handheld XRF, light element analysis with the EOS is approximately 10x faster. Over the course of a day, this can easily save you time and money. Optional calibrations are available for Iron, Nickel, Copper and Cobalt alloys.

Being fast is only part of the equation. The EOS will give you accurate and repeatable results that you can count on. In addition, user-friendly data transfer will allow you to easily create custom reports.

Benefits:

- HH-LIBS Technology
- No X-ray Regulations
- Preferred for Li, Mg, Al, Si
- Fast Grade ID & Chemistry
- Accurate & Repeatable
- Flexible Battery Design
  - ➢ 1 battery operation for reduced weight
  - ➢ 2 battery operation for 12hr run-time
  - ➢ "Hot-swap" capability

LIBS Scrap Metal Sorting

Applications Include:

- Metal sorting and valuation
- Fingerprint ID
- Positive Material Identification (PMI)
- Light element capability
- Li, Be, Mg, Al, Si

Calibrations:

- Calibrations based on traceable standards
- Accurate measurement for Al, Ti and Mg alloys
- Optional Fe, Ni, Cu and Co alloy calibration
- Automatic selection of calibrations
- Modes: Assay, Grade ID, Fingerprint ID
- Easily identify and separate Al Grades such as 356, 357, 6061, 6063 and 1000

EOS Software Features:

- Intuitive icon-based software
- Multi-Level Users login account for fleet management & user identification
- On-board instrument performance check
- On-board averaging with burst mode
- Type standardization
- Assay & grade ID mode based on advanced chemometrics algorithm
- Fingerprint spectral ID mode

Extensive Grade Library:

Bruker's EOS includes extensive grade libraries (400+ grade definitions) covering various international standards. User selectable libraries: UNS, DIN and others. The Bruker Toolbox software allows user to:

- Modify existing Alloy Grade Definition
- Add new Alloy Grades
- Upload, download and share grade libraries among instruments

Easy to use:

The EOS is an advanced portable HH-LIBS analyzer, with laboratory-grade hardware. The user interface has been designed to provide exceedingly intuitive operation and results presentation. Data management and transfer are very easy to use.

- Intuitive user interface - just point and shoot
- Requires very little operator training
- Multiple fields for sample identification
  Report generation tools
- Lightweight – only 2.4kg, including battery

EOS Hardware Features:

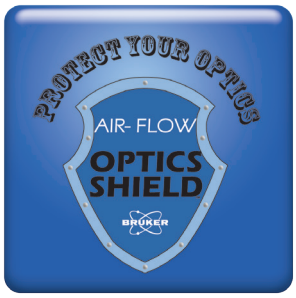
Air-Flow Optics Shield™:
HH-LIBS technique, like most other optical techniques, requires a small distance between the instrument nose and the sample surface in order to achieve an accurate analysis. The dust generated during the laser ablation stage is a significant source of contamination for internal optics. Over time, the dust will settle on the optics and hence reduce the light transmission. Without routine cleaning, this could result in precision and accuracy issues. Bruker's EOS has a unique "Air-Flow Optics Shield" feature which creates a continuous air shield in front of the optics in order to prevent dust build-up and allow the EOS to operate in the most demanding environments.

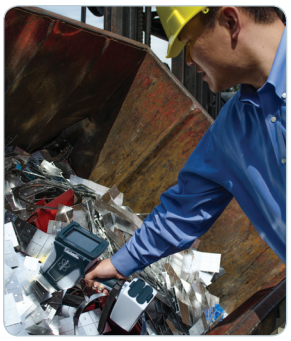
Rastering Scan:
The laser beam is very small and thus only gives data for a very precise spot. The EOS' rastering feature allows the laser beam to scan a larger area of the sample and therefore gives a more representative assay of the sample.

Multi-Detector (Multi-Spectrometer) Design:
Bruker's Multi-Detector design allows the EOS to cover an extended wavelength range from 170 nm to 720 nm, while maintaining outstanding resolution for a complicated metal matrix such as titanium. This broad wavelength range allows the detection of elements such as Li, Be, Si, etc.; which a single-spectrometer system could not cover. In addition, the extensive wavelength range also allows the EOS to utilize alternative measurement wavelengths and hence achieve better accuracy by avoiding spectrum overlap.

Environmental conditions:
The EOS is designed to withstand field operation in nearly all environments, including humid and dusty conditions in a scrap yard.

Proprietary laser technology:
Bruker's HH-LIBS analyzer, EOS, uses a proprietary 1064 nm laser for low background laser ablation atomic emission spectroscopy. Traditional LIBS systems utilize a high energy, low frequency laser design for plasma generation. Such designs results in a high background "noise", especially in the lower end of spectrum. Bruker's 1064 nm laser generates strong atomic emission signals without creating high background emissions, hence eliminating the need for a complicated gating system. Utilizing such a design, Bruker's EOS can easily analyze the most challenging elements such as Si and Mg at <0.1% concentration levels within seconds.





LIBS Scrap Metal Sorting

Specifications	
Laser	Class 3B, 1064nm
Average Power	~ 100mW
Power Density	> 1GW/cm^2
Rep Rate	5KHz
Elemental Range / Precision / LOD	See calibration sheet for details
Calibrations	Al, Ti, Mg alloys; optional Fe, Ni, Cu, Co alloys
Dimensions	275mm x 315mm x95mm (Length x Height x Width), 2.4kg (1 battery)
Operating Environment	10-40° C
Display	High brightness OLED display with touch screen. 48 x 80mm
Battery Pack	(2x) 7.2V, 6.8Ah, Li-Ion battery pack, hot-swap capable, 12hrs operation, >4,000 shots per charge
Data Storage / Transfer	250 MB internal and 4 GB USB flash external
Analytical Modes	Assay and Grade ID, Fingerprint ID

HH-LIBS and HH-XRF:
Physics indicates that HH-LIBS and HH-XRF are naturally complementary and each technique is preferred to measure certain elements and certain types of alloys. HH-LIBS is well suited to rapidly measuring the low atomic number elements like the alkaline (Li, Na, etc.) and alkaline-earth metals (Be, Mg, etc.) but are not well suited to measuring high atomic number elements such as the refractory elements (Nb, Mo, W, etc.). HH-XRF on the other hand, is well suited to measuring high atomic number elements but not well suited at measuring low atomic number elements like Mg, Al, Si. This makes HH-LIBS the ideal technique for measuring light alloys such as Mg, Al and Ti alloys while HH-XRF is the ideal technique for measuring standard alloys like stainless steel, high temperature alloys and the like. Now is your chance; choose the right tool for the job!

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