A compact and versatile forensic laboratory instrument, the ECCO® 2 Laser Induced Breakdown Spectrometer (LIBS) is an ideal tool for the comparison and identification of Glasses, Papers, Inks, Drugs, Soil, Explosives, and other valuable traces of evidence.

Using ECCO®, forensic examiners can quickly identify the presence of more than 90 different elements down to concentrations of low PPM.

LIBS requires minimal sample preparation and provides spectra in a matter seconds, making the technique a rapid, relatively low cost, and highly effective alternative to more common analytical tools such as SEM-EDS and LA-ICP-MS.
LIBS is a versatile analytical technique which offers significant advantages in speed, sensitivity and cost effectiveness over other processes such as XRF, SEM, and mass spectrometry.

Having placed an item of evidence into the ECCO®2 sample chamber, a high intensity pulsed laser is focussed on the sample creating a tiny plasma of vaporised matter which emits an atomic spectrum of the constituent elements of the sample providing a material “fingerprint”. Within seconds, this fingerprint is compared against the ECCO®2 database of emission lines to provide automatic identification and labelling of all elements present within the sample.

LIBS analysis with ECCO®2 is fast, simple to operate, requires minimal sample preparation, gives immediate results of the elements and is sensitive to low parts per million.

Features include:
- Automatic identification of elements
- Comprehensive library of element emission lines
- Comparative display of spectra and peak ratios
- Relative measurement of element concentrations
- Air Cooled Q-switched Nd:YAG 1064nm laser with 1064nm emission at 0.5Hz provide minimum 50mJ to max. 100mJ Laser energy
- Integral sample selection camera with digital zoom
- XYZ sample positioning/focusing stage
- Interlock sample chamber with full laser safety features
- Forensic casework management system

LIBS Detectable Elements

Analysis by LIBS can (in principle) detect all elements and is limited only by the specification of the laser and spectrometer hardware.

Equipped with a powerful 1064nm laser and a highly sensitive spectrometer/gated detector system, ECCO®2 is capable of detecting all elements of forensic interest, including common elements, rare earth metals, and light elements.
LIBS as a Forensic Tool

Analysis by LIBS can identify each element in the periodic table to determine the elemental composition of a sample. Convenient and efficient, LIBS is an ideal technique for the analysis and identification of forensic trace evidence including:

- Glass fragments
- Pen and printer inks
- Illicit drug precursors
- Paint chips and smears
- Minerals and precious stones

Discriminating Glasses

LIBS can be used to identify many of the elements present in glass down to concentrations of low PPM. In addition the ratios of the spectral peaks of minor and trace elements to those of the major elements are often effective in discriminating between glasses which cannot be separated by refractive index.

Illicit Drug Precursors

ECCO\textsuperscript{2} can identify lithium, phosphorous and iodine, precursors to the manufacture of methamphetamine. Lithium with atomic number 3 is particularly difficult to detect by other analytical methods.

Counterfeit Coins

Where close visual inspection cannot differentiate between real and fake coins, elemental analysis can be used to detect the presence or absence of the specific trace elements that distinguish genuine coins from counterfeit.

Counterfeit Goods

The ECCO2 can be used identify counterfeit goods through the examination of its packaging and in some cases of the goods themselves.
ECCO®2 Software and Emissions Library

Uncomplicated and simply presented, the ECCO®2 software provides the user with complete control of all system functions as well as automatic identification of elements.

A live video image of the sample chamber enables accurate sample alignment before spectra acquisition is triggered. Having fired the desired number of laser shots, the resulting spectra is displayed on screen with peaks being automatically identified and labelled.

A comprehensive emissions library is used to identify the elements present within a sample. The library includes pre-selected groups of elements that are relevant to a particular evidence type, e.g. Gun shot residue = Barium (Ba) + Lead (Pb) + Antimony (Sb). Grouping evidence in this way aids the identification and comparison process.

ECCO®2 Laser Induced Breakdown Spectrometer

Order Code: ECCO2
Specifications are regularly revised and updated

**Laser**
- Air Cooled actively Q-switched Nd:YAG 1064nm laser
- Full laser safety features

**Detector**
- Gateable back thinned scientific grade resistive gate CCD covering 225 – 380 nm
- Gateable CMOS detectors covering 380 – 930 nm
- 2 microsecond minimum integration time for UV detector

**Spectrometer**
- Wavelength range of 225-930nm
- 0.14nm optical resolution in the UV
- Gateable detectors

**Sample Chamber**
- Large examination bed. Analyse items up to 300 x 210mm
- XYZ sample positioning/focusing stage
- integral colour camera with digital zoom for sample selection.
- Provision for argon atmosphere for increased signal strength and signal averaging for improved signal to noise

**Power Requirements**
- 110 - 230VAC

**Windows PC and 24” Monitor**
- For current spec please contact sales@fosterfreeman.com

The ECCO 2 software suite provides the user with full control of the system hardware and includes the following features:

**Spectra Analysis**
- Automatic identification of elements
- Comprehensive library of element emission lines
- Comparative display of spectra and peak ratios
- Automatic measurement of peak statistics

**Calibration**
- NIST traceable wavelength calibration standard 1411
- Automatic or manual calibration

**Forensic casework management system**
- Export data in text or graphical format
- Research operation mode

**SAFETY CLASSIFICATION**
ECCO 2 is a Class 1 laser products and is safe under all conditions of use.

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**After Sales Support**
Foster + Freeman's excellent product engineering is supported with full after sales support including advice, training and maintenance. For more information on our world-wide services please contact your nearest Sales Office.