GDS850A Glow Discharge Spectrometer

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Glow Discharge Spectrometer

LECO Glow Discharge Atomic Emission Spectrometers (GD-AES) are the clear choice of leading companies around the world, providing the most accurate bulk analysis, as well as quantitative depth profiling for a wide variety of sample matrices and applications.

Delivering customers a true turn-key solution, the GDS850 is configured and calibrated at the factory, in order to provide a custom analytical tool optimized to your sample matrices. Due to the robust nature of the system, samples can be analyzed immediately after installation. Only LECO provides this level of customization and customer support.

Using the latest technology in hardware and software, the GDS850A is designed to enhance the performance of both process control and R&D applications. This instrument covers a wide spectral range (120 to 800 nm) and allows for custom configurations of up to 58 channels. Compared with spark sources, GD-AES employs a non-thermal glow discharge source for atomic excitation. Excitation of the atoms occurs in the glow discharge plasma discretely apart from the sample surface thereby reducing the metallurgical and chemical history inherent in all samples. Emission of ion wavelength spectra is almost completely eliminated thereby giving rise to less complex spectra typical of thermal excitation sources.

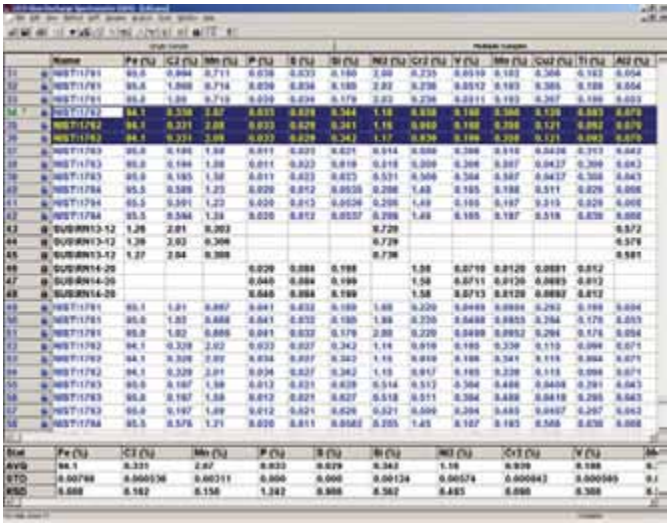
This unique method of excitation results in true bulk analysis providing a distinct advantage in accurately identifying chemical compositions, especially of difficult materials, over other excitation methods.

GDS advantages over other analytical techniques

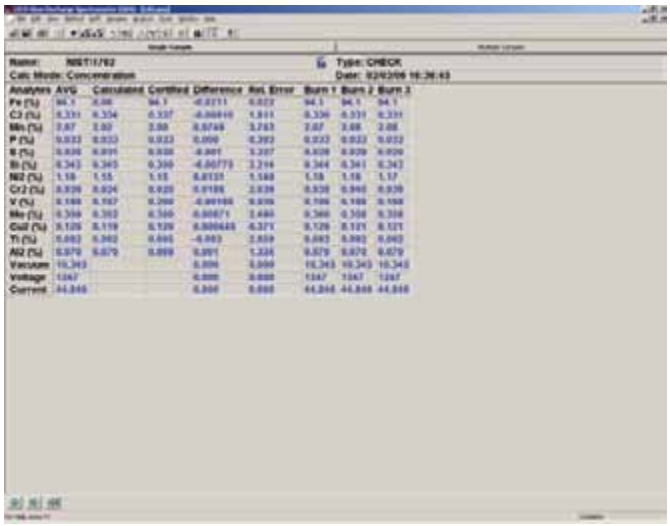
- Separation of sputtering and excitation
- Linear calibration curves with wide dynamic range
- Less self absorption and no material re-deposition
- Atomic emission consists primarily of ground state atom lines, resulting in fewer lines and reduced interferences
- Freedom from metallurgical and chemical history
- Fewer standards required for calibration
- Minimal memory effects for a quick matrix change
- Low Argon gas consumption
- Automatic cleaning between samples

Accurate Bulk Analysis

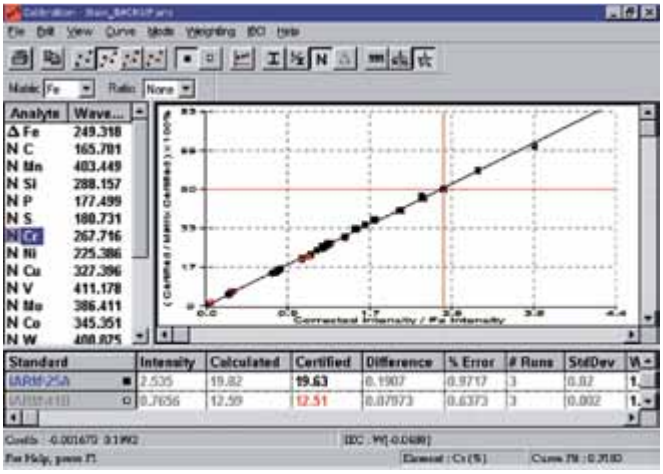
Ideal for foundries, die casters, smelters, and all ferrous/nonferrous applications.



Multiple sample presentation of bulk data using the GDS850A Glow Discharge spectrometer displaying all samples analyzed in a simple organized spreadsheet.



Single sample screen of a certified check standard can be easily monitored for elements of interest and accuracy.



Calibration Screen

Use the Windows®-based toolbars and drop-down menus to select a variety of analytical procedures. Simply select a method, choose the samples and standards to be analyzed, and start.

The software allows sampling rates of up to 2000 data points-per-second regardless of the number of channels selected. Results from ppm levels can be viewed on a large color monitor.

QDP

Quantitative Depth Profiling (QDP) Solutions

QDP is an ideal method for early identification of potential problems with your materials (including coatings, layers, and thermochemical treatments). Why use GDS? The GDS technique can perform a depth profile analysis continuously from nanometers to hundreds of micrometers. Combined with a fast sputtering rate (0.5 μm to 30 μm/min.), GDS provides the complete chemical composition (ppm to 100%) from the surface to the substrate in only a few minutes. All elements are acquired simultaneously, increasing sample throughput while minimizing cost-per-analysis.

QDP Applications

Your instrument will be fully calibrated for your specific application upon delivery.

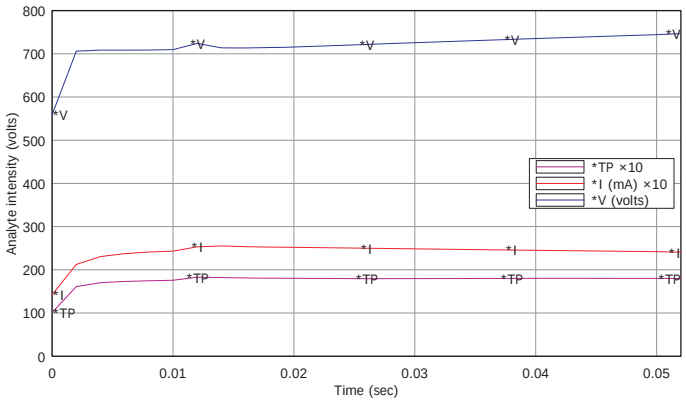
- Galvanizing (EG, Hot Dip, Galvalume, Galvanneal, Galfan, Zinc-Nickel)
- Plating (Sn, Cr, Cd, Ni, Cu)
- Thermochemical treatments (Carburizing, Nitriding, Carbonitriding)
- Hard coatings made by PVD/CVD
- Clad (Aluminum)
- Oxide layers
- Organic coatings
- Semiconductors
- Glass/Ceramics

QDP Quickly Identifies

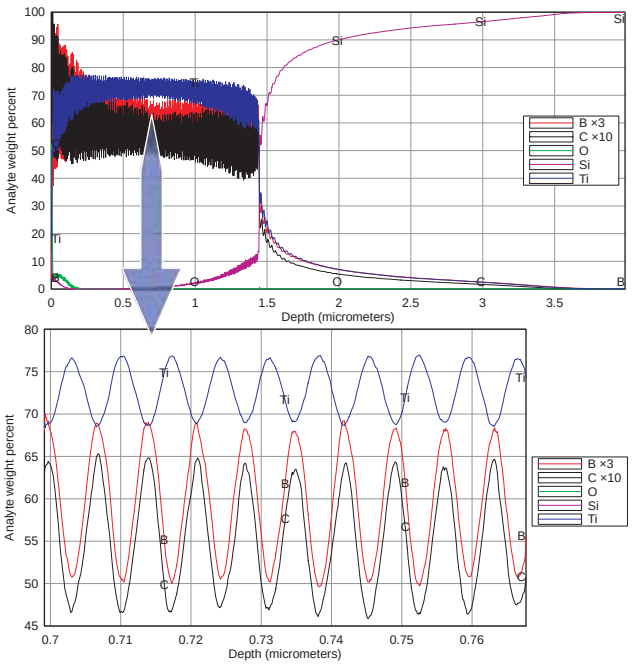
- Contamination and cleanliness at the surface and interfaces
- Migration and diffusion at interfaces
- Heterogeneity of coating/substrate
- Adherence issues
- Oxidation/corrosion
- Inclusion/blister
- Chemical composition
- Layer thickness/coating weight

Thin Alternating Multi-Layers

LECO offers you the ultimate Glow Discharge Spectrometer capable of quantifying thin alternating multi-layers.



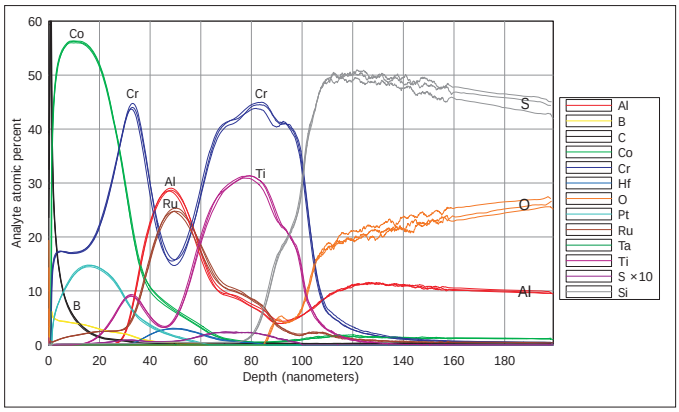
Example of fast startup plasma stable in less than 5 ms.



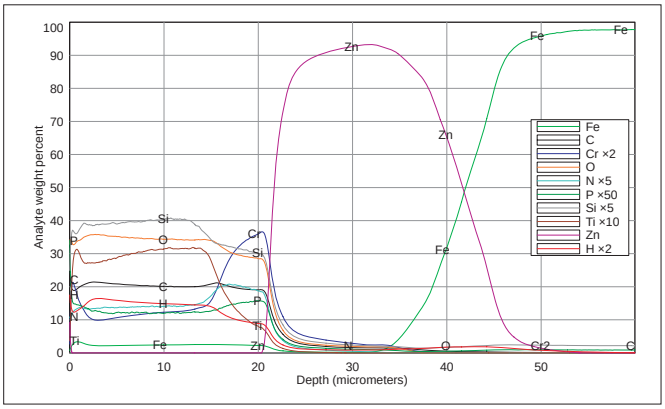
Zoom showing the composition of the PVD coating layers of boron carbide and titanium on silicon, providing resolution in the nanometer range.

Quantitative Depth Profiling (QDP) Solutions

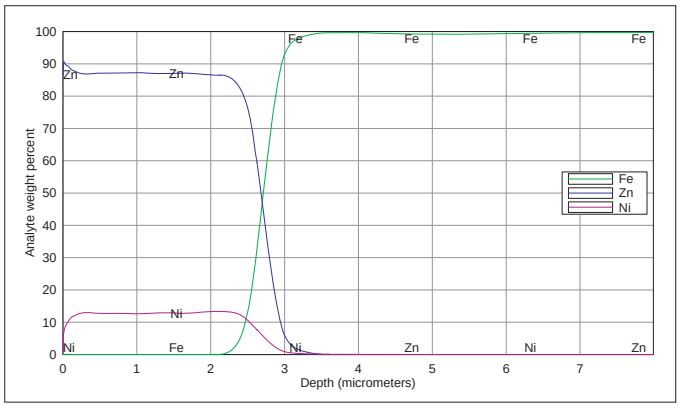
Meeting production, process, and research requirements.



Three replicate QDPs of the surface of a hard disk exhibiting seven resolved layers at a depth of 100 nanometers.

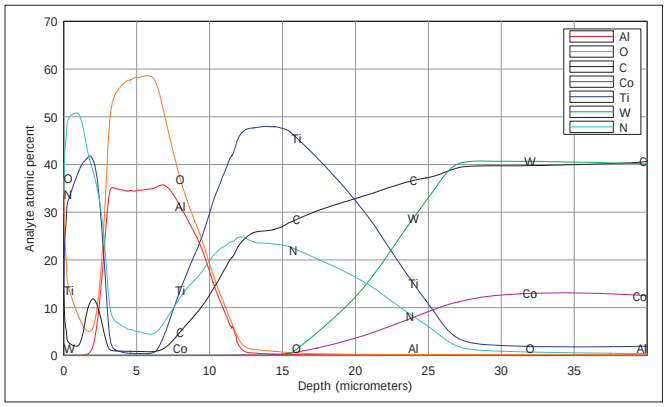


QDP analysis of organic coatings. QDP of painted steel sheet showing three different organic layers—topcoat paint and primer—on the galvanization (Zn).



QDP of the corrosion-resistant electro-galvanized Zn/Ni coating on the surface of sheet steel, showing coating thickness, weight, and alloy composition.

Name	Zn Depth, µm	Coating Wt, g/m²	Zn%	Ni%
Zn-Ni 1	2.72	19.93	87.36	12.61



QDP analysis of multilayer sample, including conductive and non-conductive layers. Example of TiN, TiCN, Al_2O_3, TiN, and TiCN on cemented carbide. Display of Atomic % vs. Depth for stoichiometry check.