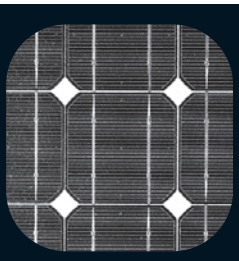
SPECTRUMA
ANALYTIK GMBH

CHEMICAL ANALYSIS
AT THE HIGHEST LEVEL
MADE IN GERMANY



GDA 750 / GDA 550

HIGH-RESOLUTION
GDOES SPECTROMETER
FOR LABORATORY APPLICATIONS

Our company has been operating since 1980 in the field of high-tech analysis equipment production. Our highly skilled team of experts with over 20 years of experience in development, production and service within the field of glow-discharge spectrometry together with our R&D engineers of the second generation form an innovative and future-oriented team.

We are dedicated to:

- Innovative development of systems and equipment tuned to industrial requirements
- High quality as a standard
- Continued quality of services offered at an acceptable price/performance ratio

Our competence:

- Analysing the chemical composition of solid material, thin films and coatings
- Hardware and software solutions for scientific instruments

At SPECTRUMA, service and customer care as well as production and distribution enjoy the same treatment. We have understood the need to meet the requirements of modern management and to steadily improve cooperation with our customers by not only being equivalent partners in the field of spectral analysis, but also in the application fields like material engineering, foundry, heat treatment, galvanic inspection and surface engineering. The software programs developed by SPECTRUMA are user friendly and comply with the high requirements of ISO 9000 ff.

As a result of the constant cooperation with scientific institutes and universities on the one hand and with renowned industrial enterprises on the other, our developments always correspond to the latest state-of-the-art in technology. SPECTRUMA is convincing its customers with high production depth, comprehensive service and customer support worldwide. The company headquarter is located in Hof, production facility locations are in Hof and Andechs, Germany.

GDA 750 / GDA 550

GDOES Glow Discharge Optical Spectrometry

GDOES made its first appearance in 1968 and was designed primarily for bulk spectrochemical analysis of various metals and their alloys. Since its introduction, this method has been steadily developed and has excelled in the areas of surface and coating analysis as well. Compared with conventional excitation techniques, the striking feature of Glow Discharge Technology is the ability to discern defined surface layers in the material being examined and analyze their chemical composition. In the field of metal analysis GDOES is ideal for concentration profile analysis and surface analysis. All kinds of surface treatment processes as well as surface coating processes can be monitored by analyzing the surface and near-surface areas of the treated material. Coating thickness and chemical composition can be accurately measured using the technique of depth profile analysis. GDOES is the preferred method of analysis for materials that were previously impossible to analyze by traditional methods, and it is one of the fastest methods available.

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GDA 750 / GDA 550

The GDA 750 / GDA 550 is an extremely sensitive high-performance spectrometer to determine the chemical composition of surfaces and coatings.

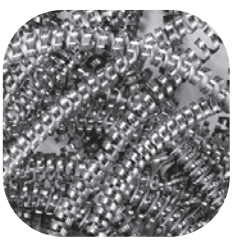
With up to 79 fixed analytical element channels, using photomultiplier tubes, the GDA 750 / GDA 550 glow discharge spectrometer is perfect for demanding applications requiring flexibility, high resolution, and analytical precision. The optional high resolution CCD optics extends the analytical capabilities of the GDA 750 / GDA 550 into unmatched dimensions allowing you to add an virtually unlimited amount of analytical CCD channels to any given method.
This flexibility permits the fast determination of the composition and thickness of technical coatings. All elements including the light ones (H, O, N, Cl and C) may be determined quantitatively.

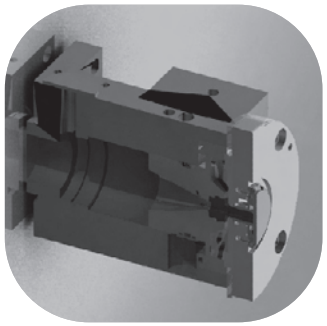
Primarily designed to analyse coatings up to a depth of 200 µm, with a resolution of one nanometer on the surface and 10% relative in deeper regions, the GDA 750 / GDA 550 is also capable of bulk analysis (chemical composition of materials) providing superior linearity of calibration curves for complex matrices. Detection limits are between 0.1 and 10 ppm.

The GDA 750 / GDA 550 is equipped with a newly developed glow discharge excitation source allowing sputtering diameters of 1 mm to 8 mm. Due to the small sealing ring of only 5 mm in diameter, the analysis of small and geometrically comlicated samples is possible. The universal sample unit (USU) GDS source can be used optionally for the analysis of non-flat or very small samples which would not seal with the normal O-ring.

The GDA 750 can be optionally equipped with a radio frequency (RF) excitation source to analyse non-conducting materials.

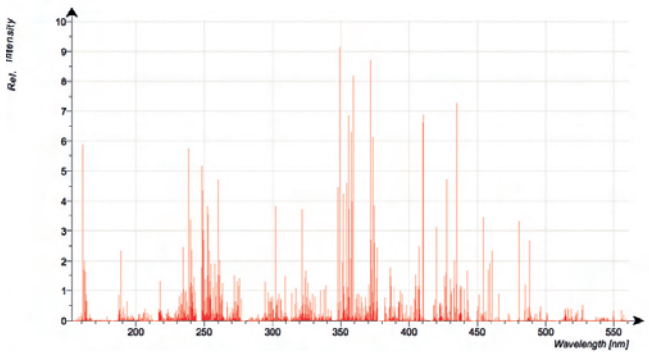
Using this optional RF glow discharge lamp, the GDA 750 is unsurpassed in analysing non-conductive materials such as ceramics, glass and paint layers, using the standard lamp set or a specially designed version of the universal sample unit.

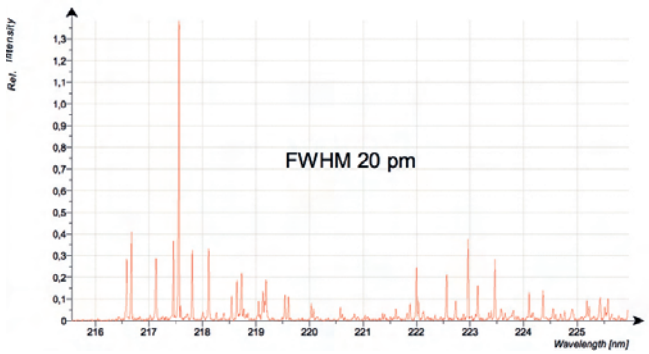




EXCITATION SOURCE

- The excitation source allows anode diameters ranging between 1 mm and 8 mm with optimum stability and reproducibility.
- High performance direct sample cooling device. Used for thermally sensitive samples and the analysis of very thin foils. Stainless steel foils with a thickness of 50 µm can be analysed directly.
- Optimised argon injection in the sample area for low detection limits and extremely high resolution in depth profiling analysis.
- Special automatic cleaning function for maximum measuring precision.
- Maximum sample thickness 45 mm, minimum sample thickness 0.05 mm.
- DC source, fully programmable in the range of up to 1500 V, and up to 250 mA.
- Only GDA 750: Optional: RF source, fully programmable up to 150 W, U, I monitor, real plasma regulation, pulsed plasma regulation.
- Optional: Autosampling unit for automated analysis of up to 100 samples.





OPTICS

- High spectral resolution typically less than 20 pm (FWHM).
- Usable wavelength range from 119 nm to 800 nm.
- Paschen-Runge mounting with Rowland circle diameter of 750 mm.
- Holographic master grating with 2400 lines/mm.
- Single exit slit mask with all element channels pre assigned.
- 63 PMT elements simultaneously determinable in the standard configuration. 16 PMTs in an optional 400 mm optic. The maximum number of PMTs is expandable.
- Facilitated lens cleaning.
- Optimised high-voltage supply for photomultiplier with a dynamic measuring range of 10^6, almost no need to change PMT setting
- Automatically adjustable sensitivity of the PMTs.
- Optional: High-performance CCD spectrometer with spectral ranges from 200 nm to 800 nm. Optical resolution of min 0.02 nm (FWHM) depending on configuration. The CCD spectrometer can be operated simultaneously to the 750 mm polychromator.
- Virtually unlimited number of CCD element channels simultaneously determinable.
- Optional: Monochromator with a spectral range of up to 1500 nm. Up to three different gratings can be installed which are individually selectable during runtime.

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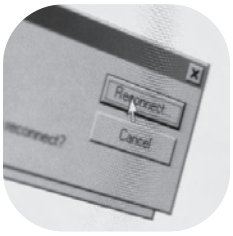
VACUUM SYSTEM

- Stainless-steel tubing in the whole system. Indispensable for trace element analysis, in particular for nitrogen.
- Modern two-phase rotary vane pump for optics, noise level < 50 dB.
- Dry-running pump system for the GDOES source. This pump prevents the C-H contamination typical for the rotary vane pump and is therefore a prerequisite for the precise determination of carbon, hydrogen and oxygen.
- Safety valve inside the rotary vane pump for the optics prevents unintentional ventilation in the case of a power failure.
- Optional: Turbo molecular pump for quick evacuation and best degassing performance of the GDS source.



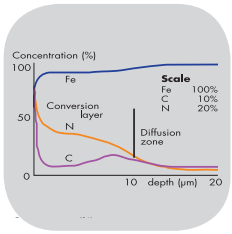
WinGDOES software

- Software under Windows® XP or higher.
- Efficient user interface allows simple operation and familiarizing with the equipment.
- Various software options are available.
- Convenient method generation with application support.
- Calibration sample input and management program with take-over function for your previous calibration samples.
- Calibration module with various calibration options.
- Bulk analysis module to determine chemical composition.
- QDP – Quantitative depth profiling analysis module.
- Full customisable report system.
- Jobs for automated processing of analytical data.
- Storage of analysis results through various interfaces – Export filters to third party applications.
- Software available in German and English, language selectable during runtime.

SAMPLE APPLICATIONS

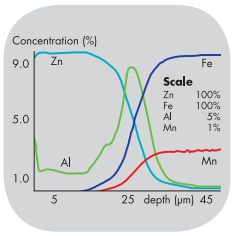
- Thermochemical treatments

  Determine the thickness of a layer and concentration profile of all elements with respect to depth. Quantify and/or qualify surface contamination, inclusions and phase ratios.



- Coated sheets

  Complete characterisation of the coating layer with respect to chemical composition, thickness and element distribution. Analyse non-conductive coatings such as varnishes and paints with the optional RF source.

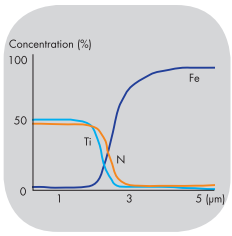


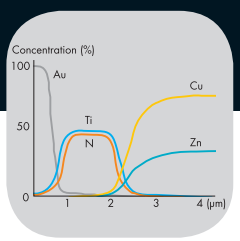
- Hardphase coatings

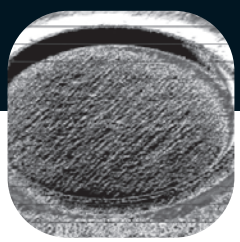
  Compound layer development can be determined by rapid analysis of the chemical composition. Other important material aspects such as depth penetration of the treatment process are possible.

- Ceramics

  Precise and accurate determination of the chemical composition is possible with the optional RF source.

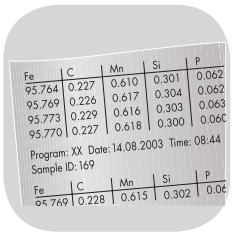






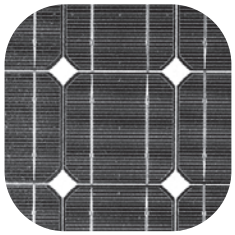
- Galvanized materials

  Galvanized layers that have a complicated structure and interface boundary can be easily analyzed. Analyze the chemical concentration, layer thickness, mass distribution and impurities for quality assurance and failure analysis.



- Chemical composition

  Precise determination of chemical material composition
  High reproducibility of analyses.
  Quick analysis < 60 s.
  Determination of all elements from H up to U from 100 % down to the ppm level.



- Thin film solar cells.

  Determinatation of elemental distribution in the coating of thin film solar cells, e.g. Cu (In,Ga) Se_2

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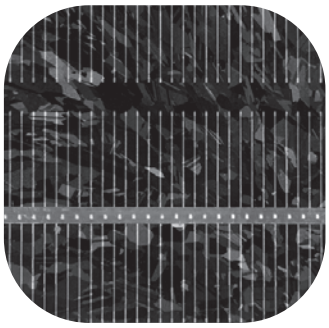
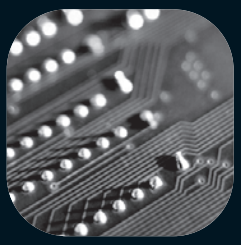
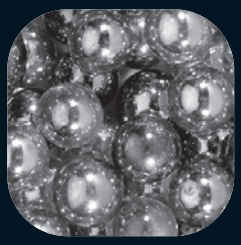
Some of our main markets at a glance:

- Automotive industry and its suppliers
- Metalworking industry
- Iron and steel industry
- Aerospace industry
- Electronics industry
- Glass and ceramics industry
- Surface technology
- Galvanizing industry
- Photovoltaic industry
- Scientific institutes







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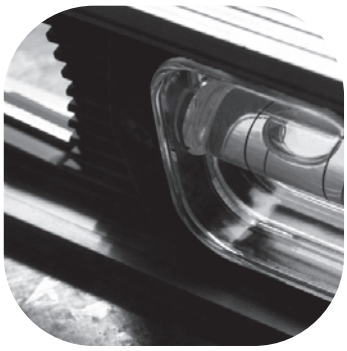

DIMENSIONS AND WEIGHTS

- Electrical connection: 230 V/50 Hz (others on request)/16 A.
- Gas: Argon with a purity of 5.5 or better for QDP and bulk analyses with H, N, O. Argon with a purity of 5.0 and higher for bulk analyses.
- Argon consumption 0 l/min (GDA 750) in standby and about 0.2 l/min during the analysis.
- Operating conditions temperature range: 15 ° to 28 °C
- Relative air humidity 20 % to 80 %.
- Dimensions without packaging: height 1380 mm, width 1440 mm, depth 890 mm.
- Weight approximately 580 kg.

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