

Aludra Next

Gas Chromatograph – Mass
Spectrometer (Quadrupole)



GC-MS





ISO 9001
Quality Accreditation

GBC's Product Lines

AAS



HPLC



ICP-OES



UV-Vis



ICP-oTOFMS



XRD



GC



GC-MS



GBC has always placed a strong emphasis on quality in all aspects of our operation, from design and manufacture to the provision of service and support to our customers, and we are fully committed to continuous evaluation and improvement in all areas.

The GBC Quality Management System has been accredited to the ISO 9001 quality standard by Lloyd's Register Quality Assurance Limited. This certification is your assurance that the procedures and processes used to produce the goods and services which GBC provides comply with the relevant International Standard, and demonstrates commitment to meeting the needs and expectations of our customers.

Since 1978 GBC has been at the forefront of scientific technological development, manufacturing and marketing a wide range of award winning, quality scientific instruments.

Visionary Technology

GBC Scientific Equipment will advance people's knowledge and their capacity to enhance the quality of life for all humankind.



Aludra Next

GC-MS (Quadrupole)



The Aludra Next Gas Chromatograph Mass Spectrometer (GC-MS) is the latest innovation from GBC. It delivers versatile configurations and tailored solutions to meet every customer's specific application requirements.

With fully upgraded hardware and software, the Aludra Next offers superior stability, reliability, and intelligence. Building on the proven technology of the classic Aludra Plus, this comprehensive system features significant enhancements in performance, ease of use, stability, and expandability. Supporting routine analysis, emergency monitoring, and high-throughput testing, the Aludra Next is a high-performance, intelligent, and cost-effective quadrupole GC-MS solution.

Ion source system

- The Aludra Next comes standard with a high-performance EI (Electron Ionization) ion source.

Featuring a dual-alloy filament design and an independent heating system, this source is engineered for an extended service life. The assembly utilizes multi-point uniform heating to achieve a near-zero temperature gradient, effectively preventing contaminant deposition and ensuring exceptional operational stability.

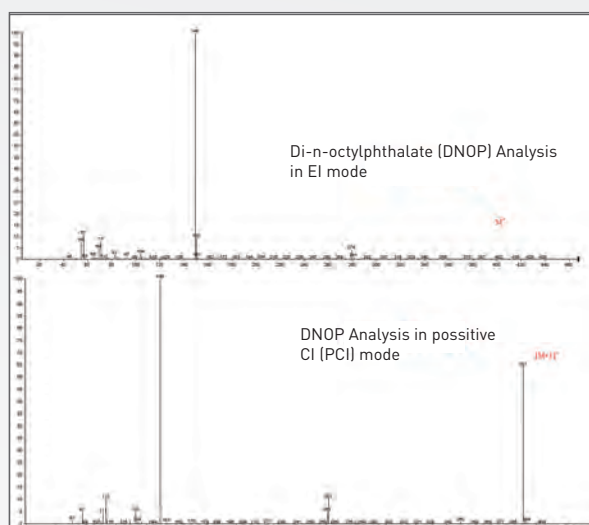
- The ion source temperature is precisely controllable from 150 °C to 350 °C, with a programmable emission current ranging from 10 to 350 μ A and adjustable ionization energy from 5 to 150 eV.

Designed for efficiency, the source incorporates a side-mounted, slide-rail quick-release structure with a leadless design, allowing a single operator to complete disassembly, reassembly, and maintenance in under 10 minutes. Built-in safety features also protect against burns and scratches during handling.

- For expanded application capabilities, an optional CI (Chemical Ionization) source is available, enabling rapid switching between ionization modes. This significantly lowers detection limits for explosives, low-response pesticides, and other challenging compounds, broadening your analytical scope.



Ion Source

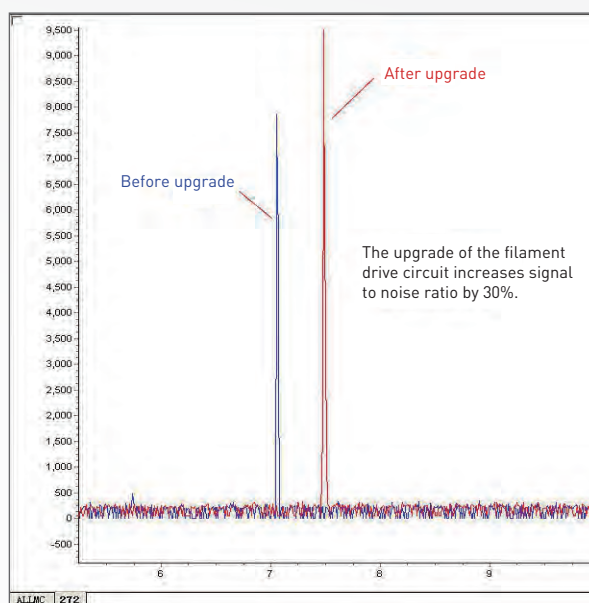


DNOP Analysis Results

Ion Optics and Mass Analyzer

The re-engineered ion optics system maximizes ion transmission efficiency and sensitivity while actively suppressing neutral noise and background matrix interference.

- The optimized ion source electronics feature intelligent dual-operating modes—constant emission and constant feedback regulation. In high-stability mode, emission current fluctuation is tightly controlled to within 0.02 μ A over an extended duration, guaranteeing superior signal repeatability. Leveraging precision lens voltage optimization, the spatial distribution of the electron beam is refined to yield up to a 30% enhancement in signal-to-noise (S/N) performance.
- The ion source incorporates a specialized field-shaping design to tightly focus the ion beam, minimizing fringe-field aberrations and preventing scatter into downstream quadrupoles. This ensures streamlined ion transmission, boosting both ultimate mass resolution and analytical sensitivity.
- The vertical-focus electron multiplier system utilizes a high-gain, low dark-current multiplier coupled with an off-axis parabolic conversion dynode. This configuration effectively deflects ions while screening out neutral particles and filament photon noise, significantly lowering detection limits and maximizing high-mass response.

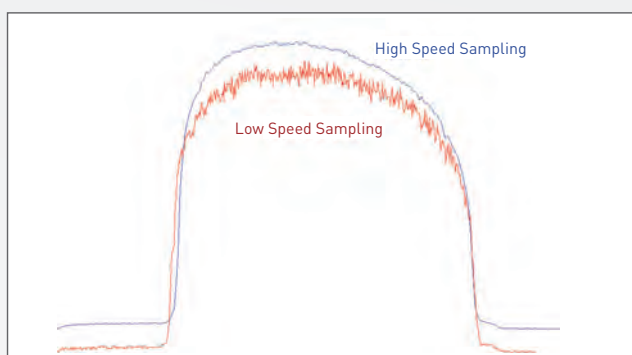


Analysis of octafluoronaphthalene (OFN)

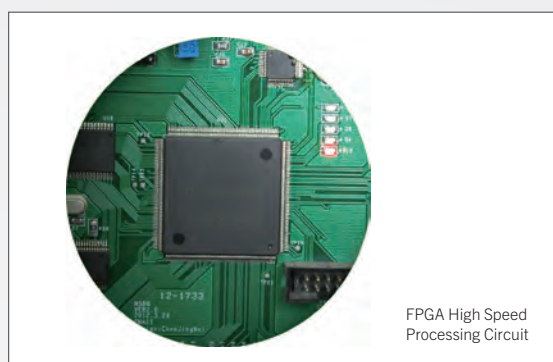
Advanced Improvement technique

Next-Generation Data Acquisition & Dynamic Ion Compensation

- Achieving 1 MHz sampling speeds via advanced FPGA architecture for unmatched signal fidelity, paired with a massive 1000 Mb Ethernet transfer rate and DC dynamic compensation that dramatically boosts high-mass ion transmission (m/z 502 increased from 6.4% to 37.6%).



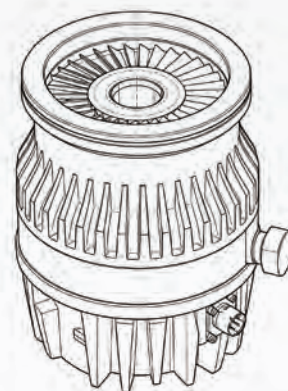
FPGA Sampling System



- Features shortened analog signal pathways and robust electromagnetic shielding. Electrostatic noise is reduced by one-third, while the linear dynamic range is expanded to 10^7 , delivering a wide analytical linear range from $10^{-12}g$ to $10^{-7}g$.
- Streamlined data communication interfaces establish a stable connection with the workstation in under 30 seconds.
- Incorporates proactive fault monitoring for pump power, axis temperature, subcomponent thermal status, and high-voltage outputs. Designed to prevent operator error and safeguard the instrument from damage, the intelligent early-warning system alerts users to potential issues before they cause costly downtime or component failure, maximizing laboratory efficiency and cost savings.

High-Performance Vacuum System

- A compact 300 L/s grease-lubricated turbo molecular pump delivers high foreline tolerance and a custom compression ratio, ensuring zero light-gas accumulation when using hydrogen carrier gas.
- Equipped with a standard 130 L/min backing pump to support large-diameter capillary columns for faster analysis and higher sensitivity, paired with an intelligent silencer for quiet operation.
- A durable cold cathode gauge provides continuous measurement from atmospheric pressure down to 10^{-7} Pa with zero consumables and minimal maintenance.
- Allows rapid column changes without venting or shutting down the mass spectrometer system.
- An optional installation tool ensures exact column dimensions for optimal sample transfer efficiency.



300 L/s grease-lubricated turbomolecular pump

Gas Chromatograph and Sample Introduction Unit

- The Aludra Next GCMS combines the advanced Nebula Plus GC platform with a new-generation mass spectrometer in a fully integrated system designed for modern laboratory workflows.

Its intuitive software makes instrument operation simple and flexible, with full control available from your computer or directly through the integrated 10-inch touchscreen. Whether setting up the system, running analyses, or monitoring performance, Aludra Next puts essential controls at your fingertips making everyday GCMS operation simpler, smarter, and more efficient.

- Our patented 3rd-generation EPC system provides precise and stable control of carrier-gas pressure and flow, delivering excellent retention-time and peak-area reproducibility.

The system supports programmable pressure/flow control, dual-column dual-flow configurations, and heart-cutting applications with split ratios up to 12,500:1. An intelligent gas-saving function automatically optimizes gas consumption, while automatic vaporization-chamber purging and programmable column cleaning help maintain system performance.

The fast, dead-volume-free valve switching minimizes pressure disturbances during switching, helping to maintain stable peak shapes and consistent chromatographic performance.

- A high-precision oven temperature control system maintains temperature stability to ± 0.03 °C, ensuring excellent repeatability and reliable chromatographic results.
- The system supports dedicated gas pathways for nitrogen, hydrogen, and air, providing flexible compatibility with a wide range of detectors and applications.

Enhanced temperature-programmed performance produces sharper, better-resolved peaks, particularly for the analysis of high-boiling-point compounds such as those found in oil and petroleum samples.

- The Chemical Ionization (CI) reagent gas control module uses closed-loop feedback to continuously monitor and regulate reagent-gas flow according to the selected CI gas setting.

This intelligent control maintains stable reagent-gas conditions for consistent CI performance, improved repeatability, and reduced reagent-gas consumption.

- A high-efficiency closed-loop vacuum system supports the use of hydrogen or hydrogen generators as carrier-gas sources, helping to reduce operating costs while maintaining stable system performance.

Built-in electrical and vacuum protection functions provide an additional layer of operational safety and system reliability.

- The Direct Injection Probe (DIP) provides a fast and practical approach for the direct analysis of solid and liquid samples, making it ideal for rapid structural identification, chemical synthesis, and research applications.

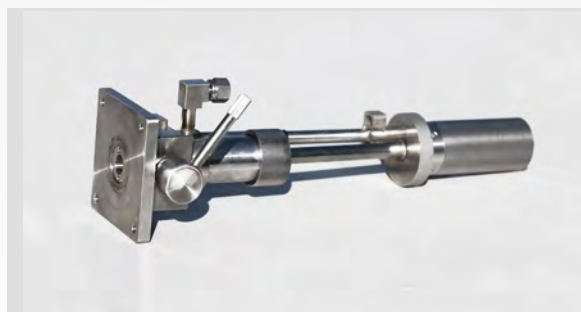
With a probe temperature of up to 650 °C, the DIP enables rapid introduction of samples without conventional GC separation. The replaceable probe heater simplifies maintenance and minimizes downtime in the event of contamination or damage.

- Compatible with standard GC columns, providing users with greater flexibility when selecting columns for different analytical applications.

The software provides intuitive configuration and control of a wide range of GC and GC-MS accessories, including:

- ♦ Purge-and-trap concentrators
- ♦ Liquid autosamplers
- ♦ Thermal desorption systems
- ♦ Headspace samplers
- ♦ Pyrolyzer
- ♦ Other optional sampling and introduction systems

An integrated digital I/O (DIO) interface also enables convenient communication and control of external devices, making the system adaptable to a wide range of laboratory workflows.

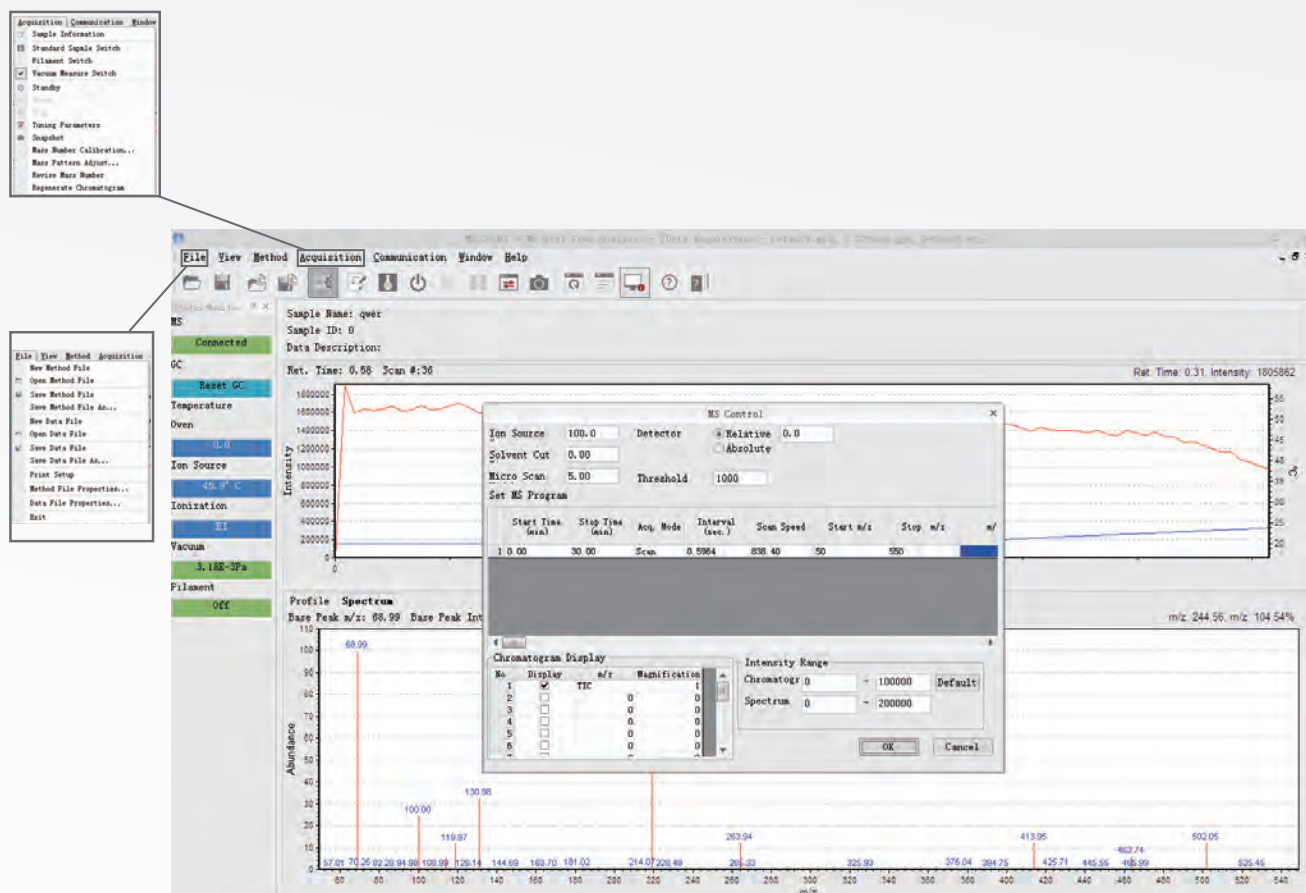


Direct Insertion Probe (DIP)

Powerful Software System

Designed for intuitive operation yet packed with advanced capabilities, our upgraded MDQ & MS3200 Data Acquisition & Analysis System (V2.0) delivers practical, streamlined solutions for every analytical workflow

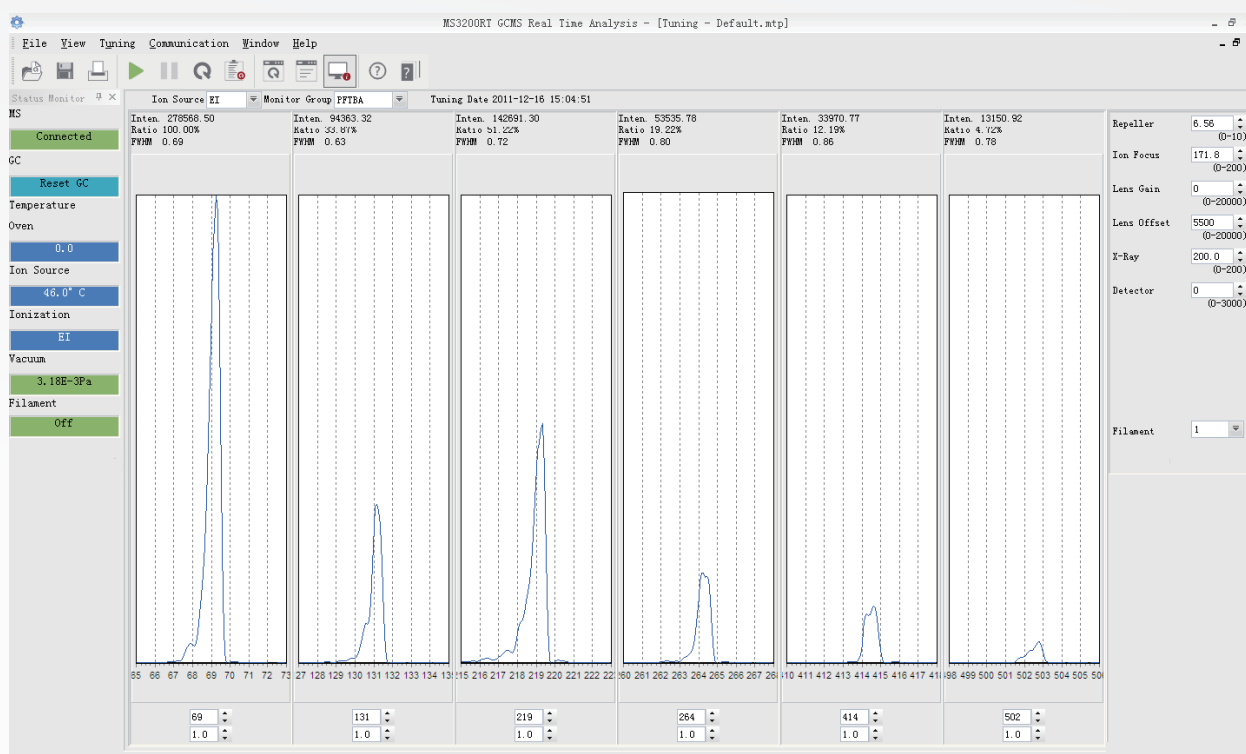
- Unified Multi-Pane Dashboard: Chromatograms, mass spectra, parameters, and instrument status are displayed simultaneously in a clean, unified interface, allowing users to reference all critical data at a glance.
- Flexible Acquisition Modes: Supports versatile scanning modes—including Full Scan, Selected Ion Monitoring (SIM), and simultaneous Scan/SIM—tailored to your speed and sensitivity requirements.
- Complete Software Control & Safety: Full digital management of all pneumatic, thermal, and operational parameters, paired with an automated safe shutdown sequence and intelligent low-vacuum protection to safeguard sensitive components like the filament and detector.
- Streamlined Method Management & Real-Time Diagnostics: Features effortless method import/export and real-time instrument status tracking with color-coded alerts for proactive maintenance and fault prevention.



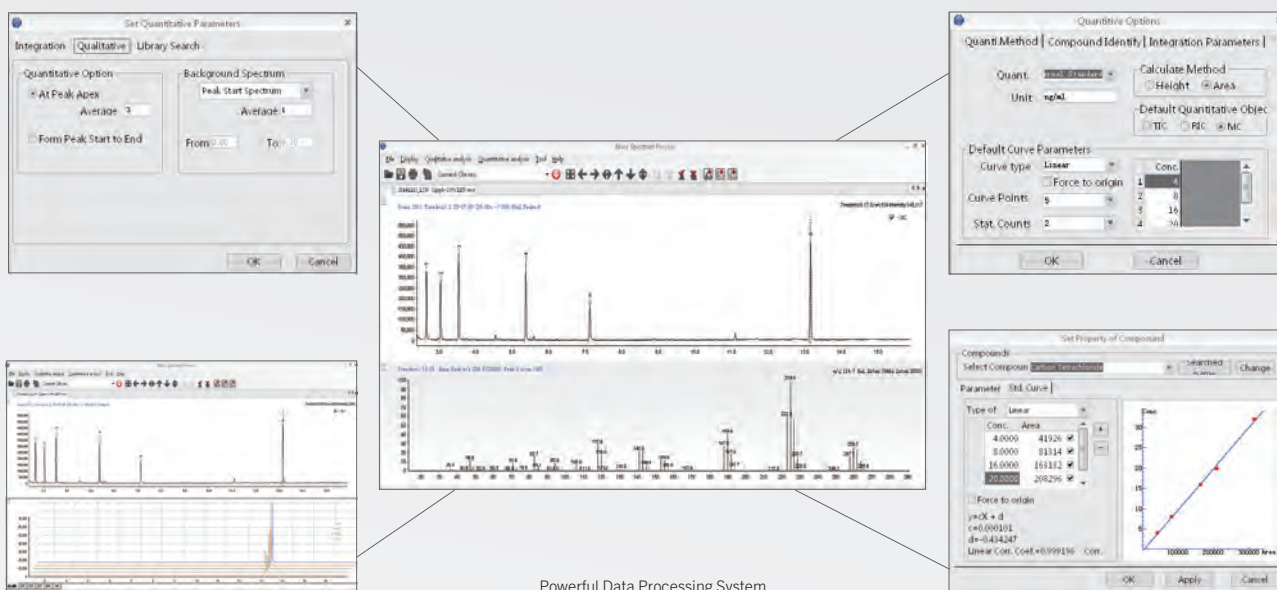
MS3200RT Real-time high-speed data acquisition software

MDQ & MS3200 Software & Data Processing Suite

- **Intuitive Multi-Pane Dashboard:** Chromatograms, mass spectra, parameters, and instrument status are displayed simultaneously in a clean, unified interface. Total Ion Chromatograms (TIC) and mass spectra can be viewed side-by-side (as processed bar graphs or raw data), with a convenient one-click "snap" transfer that instantly imports real-time files into the processing suite.
- **Flexible Acquisition & User Modes:** Supports versatile scanning modes (Full Scan, SIM, and simultaneous Scan/SIM). The interface caters to all skill levels with a standard menu structure for beginners, shortcut command keys, and prominent action buttons for experienced users.
- **Comprehensive Tuning & System Safety:** Offers both automated and manual tuning for resolution, sensitivity, and abundance ratios, allowing advanced users to observe real-time parameter changes. Seamlessly switch between EI and CI modes, toggle calibration compounds, print tuning reports instantly, and utilize automated vacuum leak checks and low-vacuum protection to safeguard sensitive components.
- **Advanced Diagnostics & Custom Automation:** Actively monitors instrument status within the tuning interface for maximum safety, backed by global remote diagnostics for rapid technical support. Personalized script programming enables cross-network scheduled standby, automated heating, energy-saving cycles, and timed control of detector gain and filament switching.
- **Multi-Chromatogram Visualization (MS3200P):** Displays TIC, mass spectra, single-ion chromatograms (SIC), and multi-ion chromatograms (MIC) on a single screen for clear peak purity recognition and comparison. A 3D rendering function intuitively maps retention time, intensity, and mass number within a unified coordinate system.
- **Flexible Qualitative & Quantitative Suite:** Customizes qualitative report density and compound match limits. Supports a full array of quantification methods—including external standard, internal standard, normalization, and corrected normalization—with integration capabilities across TIC, SIC, and MIC data.

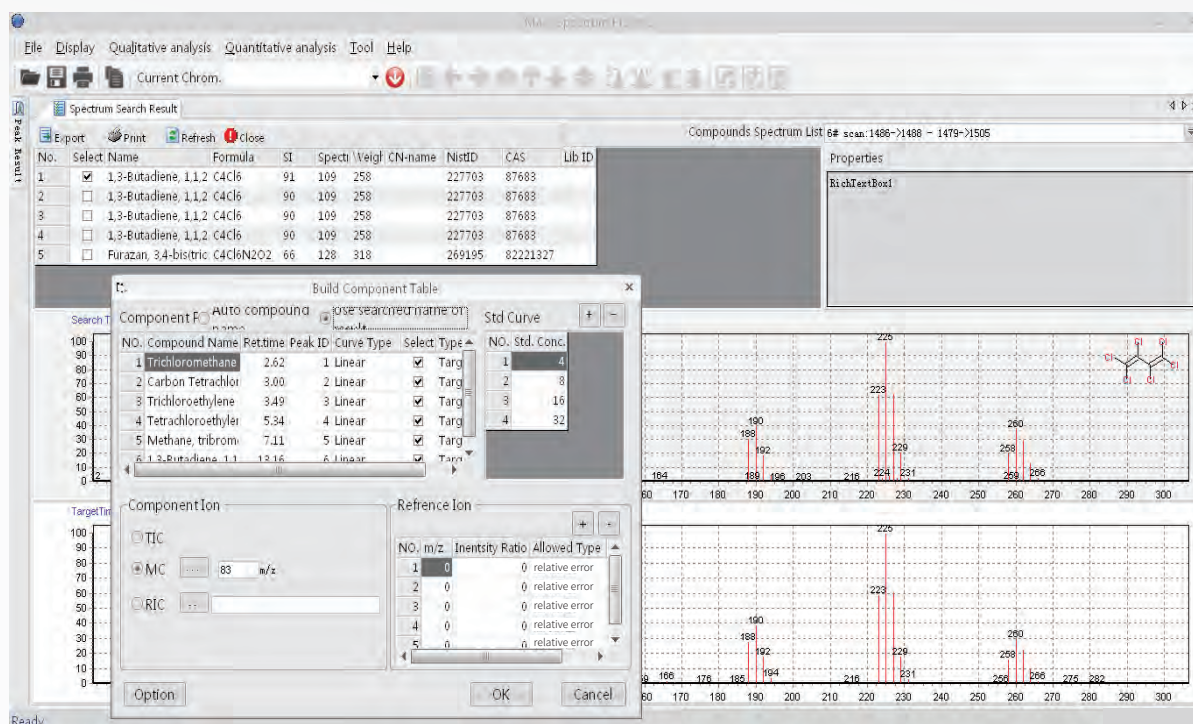


Comprehensive Auto Tuning Interface



Specialized Petroleum Tools, Advanced Data Processing, & Connectivity

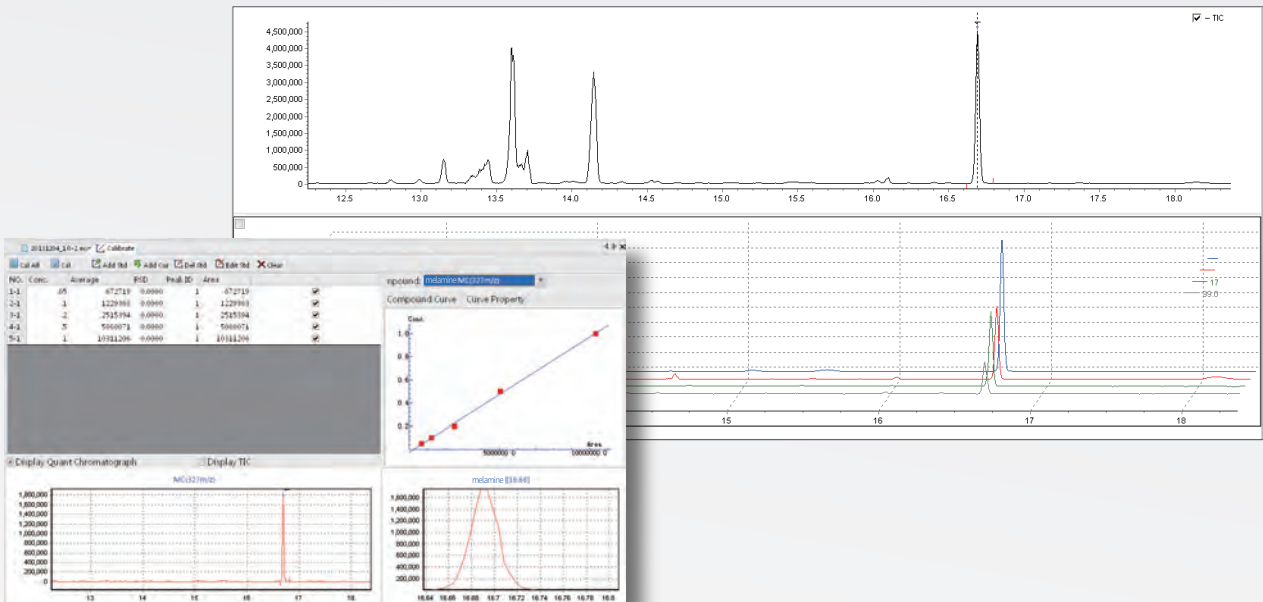
- **Dedicated Petroleum Analysis Suite:** Built-in professional tools for rapid quality process control of petrochemical products, featuring automated spectrum calculation, compound group screening, group composition export, and an on-demand Signal-to-Noise (SNR) performance evaluation tool alongside spectrum addition/subtraction for background noise correction.
- **Flexible Libraries & Data Compatibility:** Includes a comprehensive standard spectra library for manual single-component or batch queries, supports custom user-defined libraries, and exports standard data files in NetCDF format for seamless cross-platform compatibility.
- **Advanced Batch Processing & Multi-Curve Calibration:** Features powerful batch processing with automated quantitation, multi-method support for unattended continuous online analysis, and a multi-curve merging function that combines multiple calibration curves within a single method.
- **Enterprise Connectivity & Reporting:** Powered by a TCP/IP data communication service package compatible with LIMS software and common data upload formats. Generates fully customized reports in PDF, HTML, TXT, and other personalized formats.



Applications

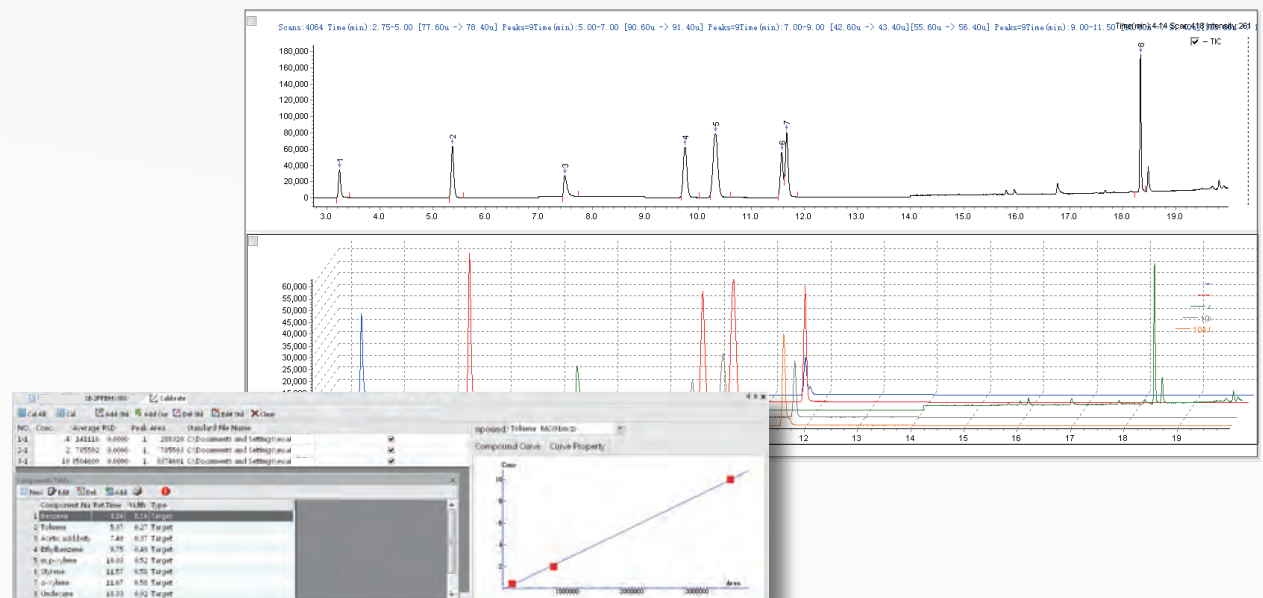
The excellent performance of the Aludra Next makes it suitable for applications in various fields including food safety, environmental safety, chemicals, and others.

• Detection of Melamine in Milk



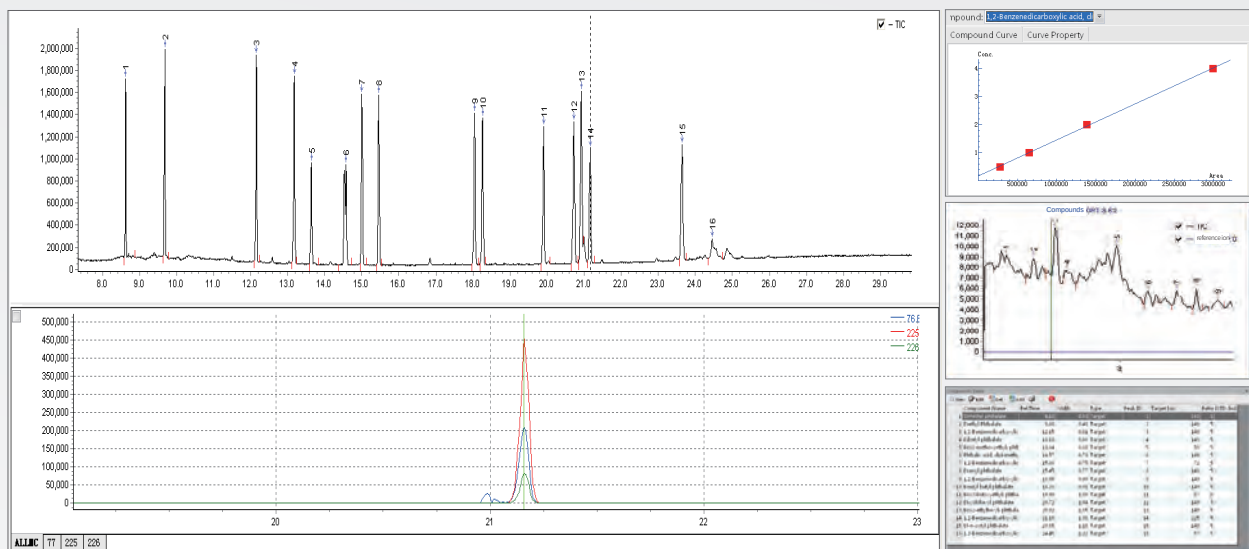
The detection limit is stable at 0.01 mg/kg. Linearity remains excellent between 0.05 - 50 mg/L. Recovery of added standard is between 85% - 108%. Relative standard deviation is less than 5%. Correlation coefficient is above 0.999. Results comply with GB / T 22388-2008 standard.

• Analysis of Volatile Organic Compounds (VOC) in Drinking Water or Surface Water



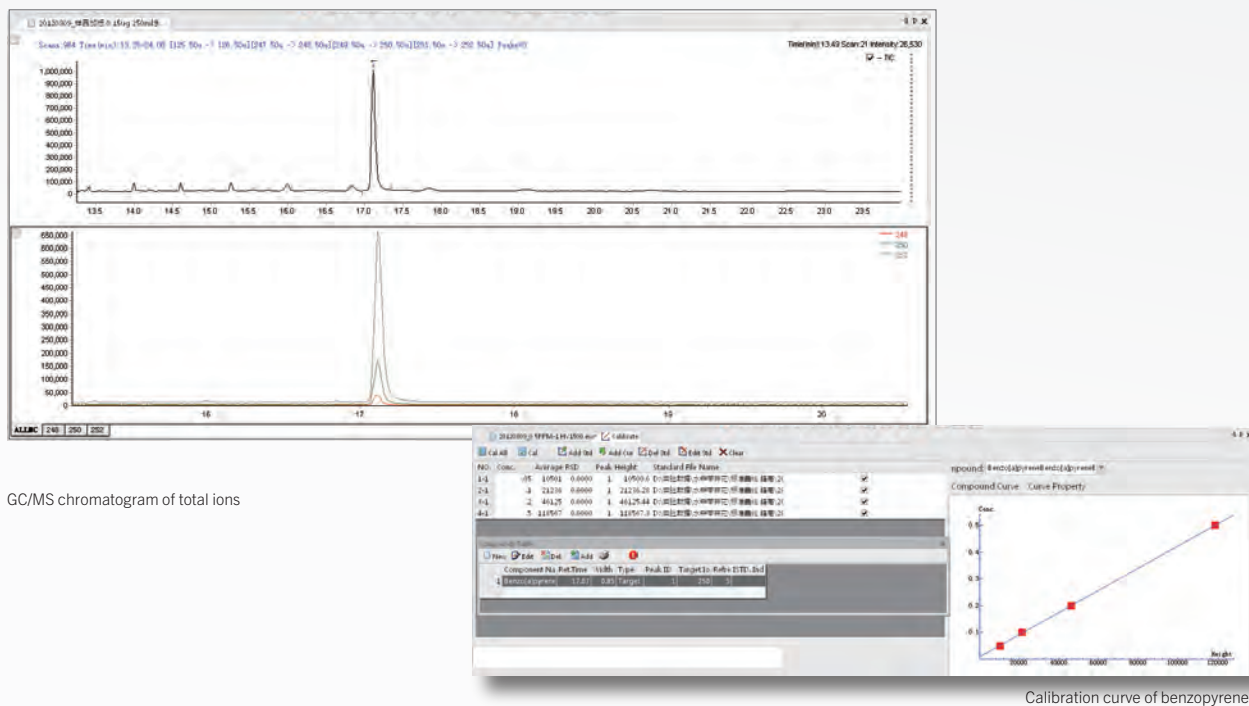
Using external standard method, range of linearity is 0.5 - 100 µg/L. Correlation coefficient of each component is between 0.993 ~ 0.9992. The lowest detection limit is 0.001 mg/L for vinyl chloride. The instrument shows excellent performance in VOC analysis of drinking water in compliance with EPA method 502.2 and GB5749-2006.

• Detection of Plasticizer in Liquors



16 types of phthalates in liquor are analyzed simultaneously. Range of linearity is 0.08 - 1.6 µg/mL. Recovery of added standard is between 70% - 119%. The lowest detection limit achieved is 1.06 µg/kg for DEP. Shows excellent contamination resistance. After 1 month of continuous use, background signal remains within spec.

• Trace PAHs Detection

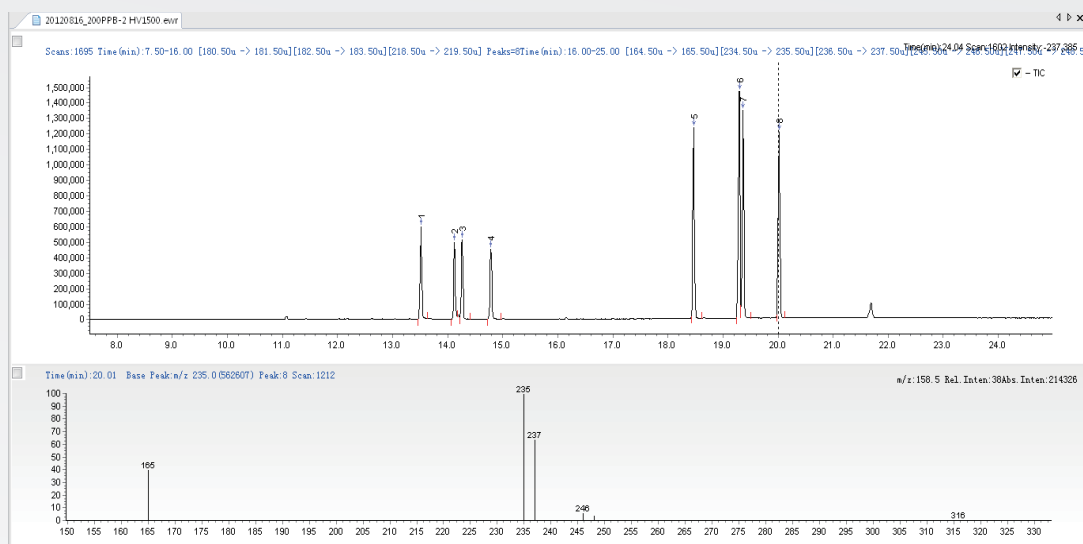


GC/MS chromatogram of total ions

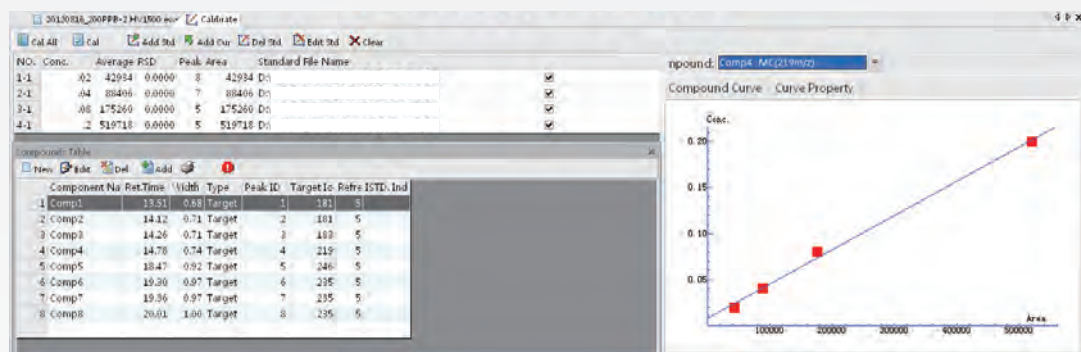
Calibration curve of benzopyrene

Linear correlation coefficient is more than 0.999 in the concentration range of 0.05 - 0.5 µg/mL. Relative standard deviation is less than 6%. The lowest detection quality for benzopyrazole is 0.05 ng.

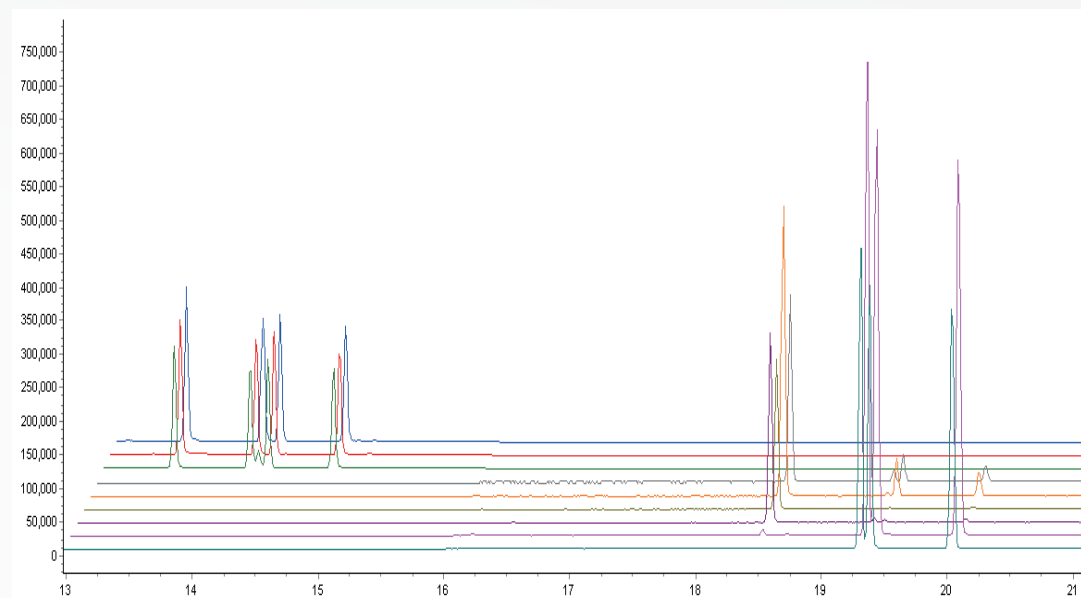
• Detection of Organochlorine Pesticide



Total ion chromatogram of organochlorine pesticide in the sample



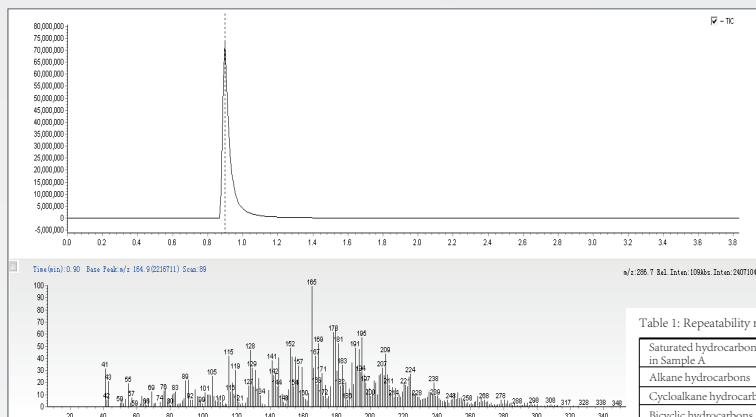
Calibration curve of eight types of analytes



Three-dimensional mass chromatogram of target ions

In ion monitoring mode, the analysis of organochlorine pesticide provides reliable data. Range of linearity is 0.012 - 0.2 $\mu\text{g/mL}$. Relative standard deviation is less than 10%.

• Rapid Semi-quantitative Analysis of Hydrocarbons



GC/MS rapid test spectra of light oils

Test results

Table 1: Repeatability results of saturated hydrocarbons in Sample A

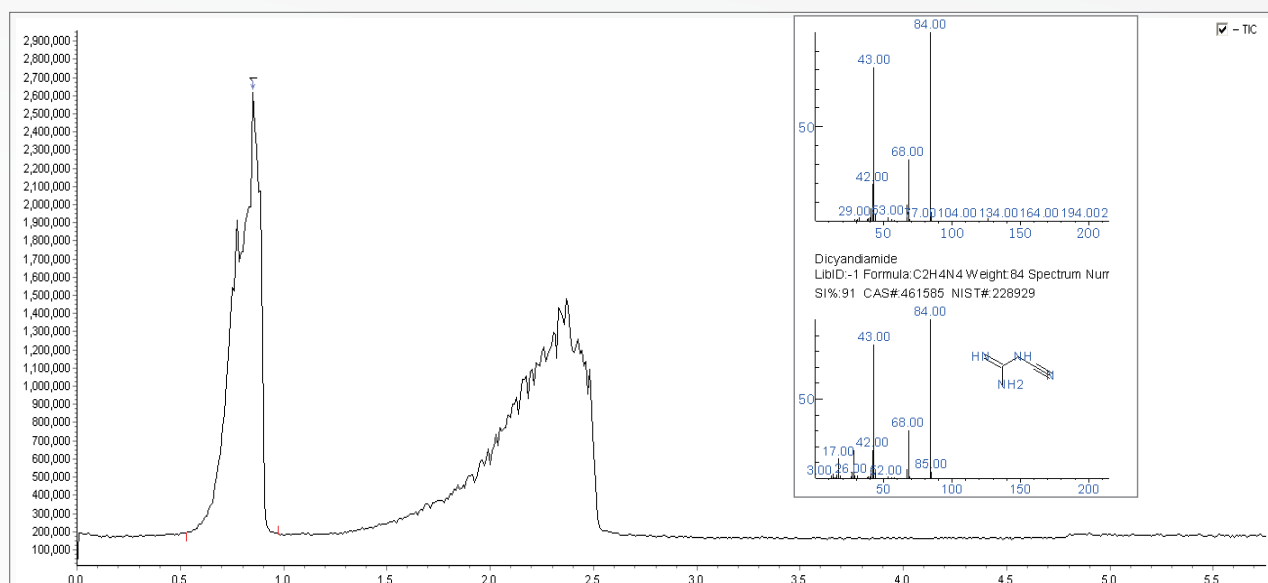
Saturated hydrocarbons in Sample A	1	2	3	4	5	6	Average	RSD
Alkane hydrocarbons	54.8	56.5	54.1	55.5	55.2	56.9	55.50	1.89%
Cycloalkane hydrocarbons	18.6	18.5	17.9	18.7	19.7	17.5	18.48	4.08%
Bicyclic hydrocarbons	17.1	15.8	18.1	16.4	15.8	16.2	16.57	5.38%
Tricyclic hydrocarbons	7.3	7.1	7.5	7.3	7.1	7.2	7.25	2.09%
Alkylbenzenes	2.2	2.1	2.4	2.1	2.2	2.2	2.20	4.98%

Table 2: Repeatability results of aromatic hydrocarbons in Sample A

Aromatic hydrocarbons in Sample A	1	2	3	4	5	6	Average	RSD
Alkane hydrocarbons	0	0	0	0	0	0	0	0
Cycloalkane hydrocarbons	4.5	4.6	4.3	4.3	4.3	4.2	4.37	3.45%
Alkylbenzenes	18.1	16.6	17.8	17.1	17.3	16.7	17.27	3.45%
Indan or Tetralin	15.5	15.7	15.5	15.9	15.6	16.5	15.78	2.42%
Indene or C ₁₂ H ₁₀	14	12.8	13.5	13.8	13.5	13.3	13.48	3.09%
Naphthalene	0.68	0.7	0.65	0.62	0.72	0.75	0.69	6.88%
Naphthalene compounds	18.7	18.6	18.7	18.8	18.6	18.8	18.70	0.48%
Acenaphthene or C ₁₂ H ₁₀	13.2	13.7	13.7	13.3	13.3	13.3	13.42	1.66%
Acenaphthylene or C ₁₂ H ₁₀	9.9	10.6	10.2	10.2	10.5	10.7	10.35	2.91%
Tricyclic aromatic hydrocarbons	5.3	6.4	5.2	5.6	6	5.6	5.68	7.90%

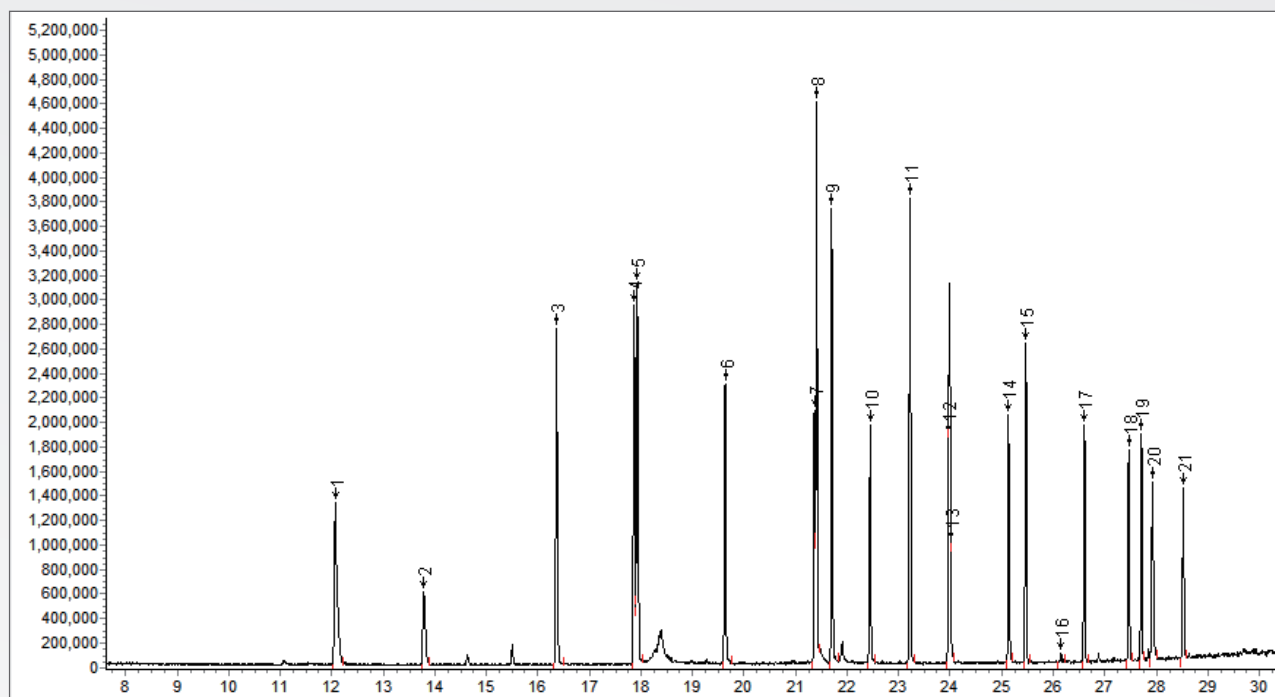
By using a 10 m hollow column combined with crude oil analysis software and rapid GC column oven heating, quantitative results of hydrocarbon group compositions can be obtained within 2 min.

• Qualitative Analysis of Unknown Samples Using Direct Injection Probe



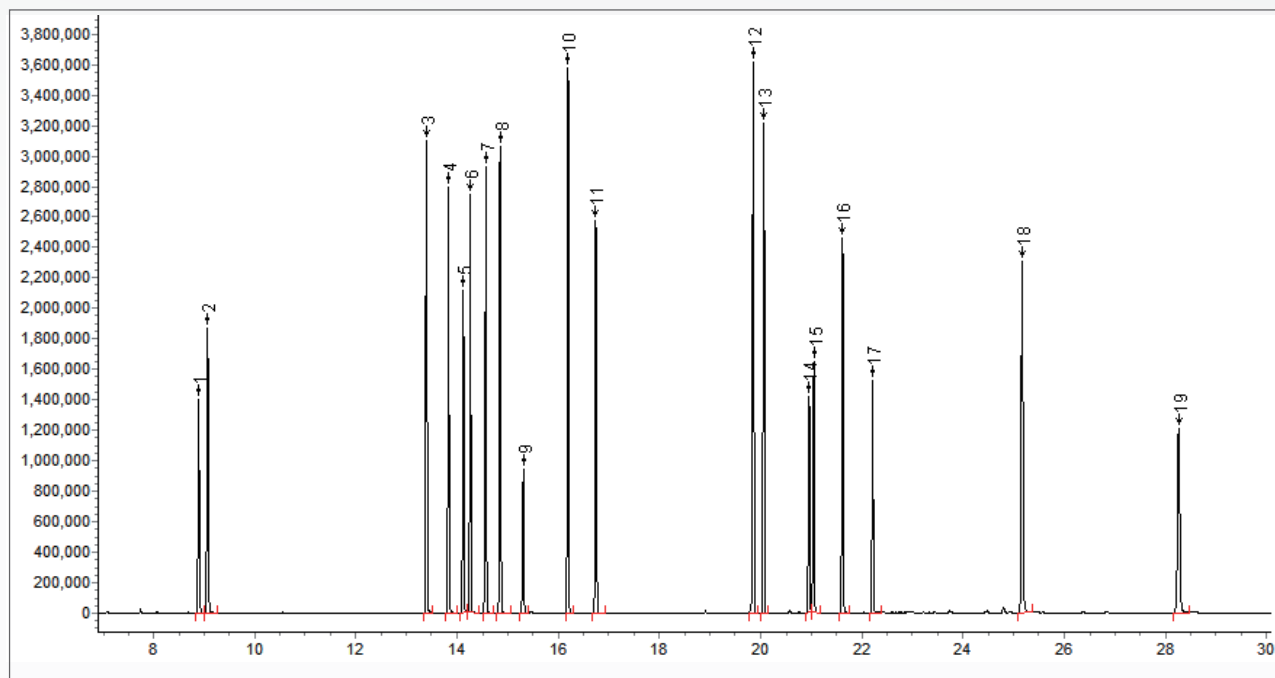
Rapid qualitative analysis of dicyandiamide using DIP

- **Determination of Aniline Compounds in Water**



Standard Spectra of Aniline Compounds

- **Determination of 18 Photoinitiators**



Chromatogram of 18 Photoinitiators

Flexibility and Expandability

Flexible Configurations

- **The following configurations are applicable to water quality testing**

(applicable to EPA Method 502.2)

Purge and trap analyzer + Aludra Next + MS3200 software package + DB-624 (30 m × 0.25 mm × 1.4 µm) fused silica capillary column

Headspace sampler + Aludra Next + MS3200 software package + DB-624 (30 m × 0.25 mm × 1.4 µm) fused silica capillary column

Applicable to quantitative detection of volatile organic compounds in surface water, drinking water and reservoir water.

- **Economical configuration applicable to ambient air quality monitoring**

EW-3TD thermal desorption device + Aludra Next + MS3200 software package + equivalent DB-5MS column (30 m × 0.25 mm × 0.25 µm) moderately polar column

Applicable to air quality testing in indoor environments and public spaces. Provides high sensitivity for TVOC and other common harmful gases.

- **Typical configuration applied to conventional laboratory analysis**

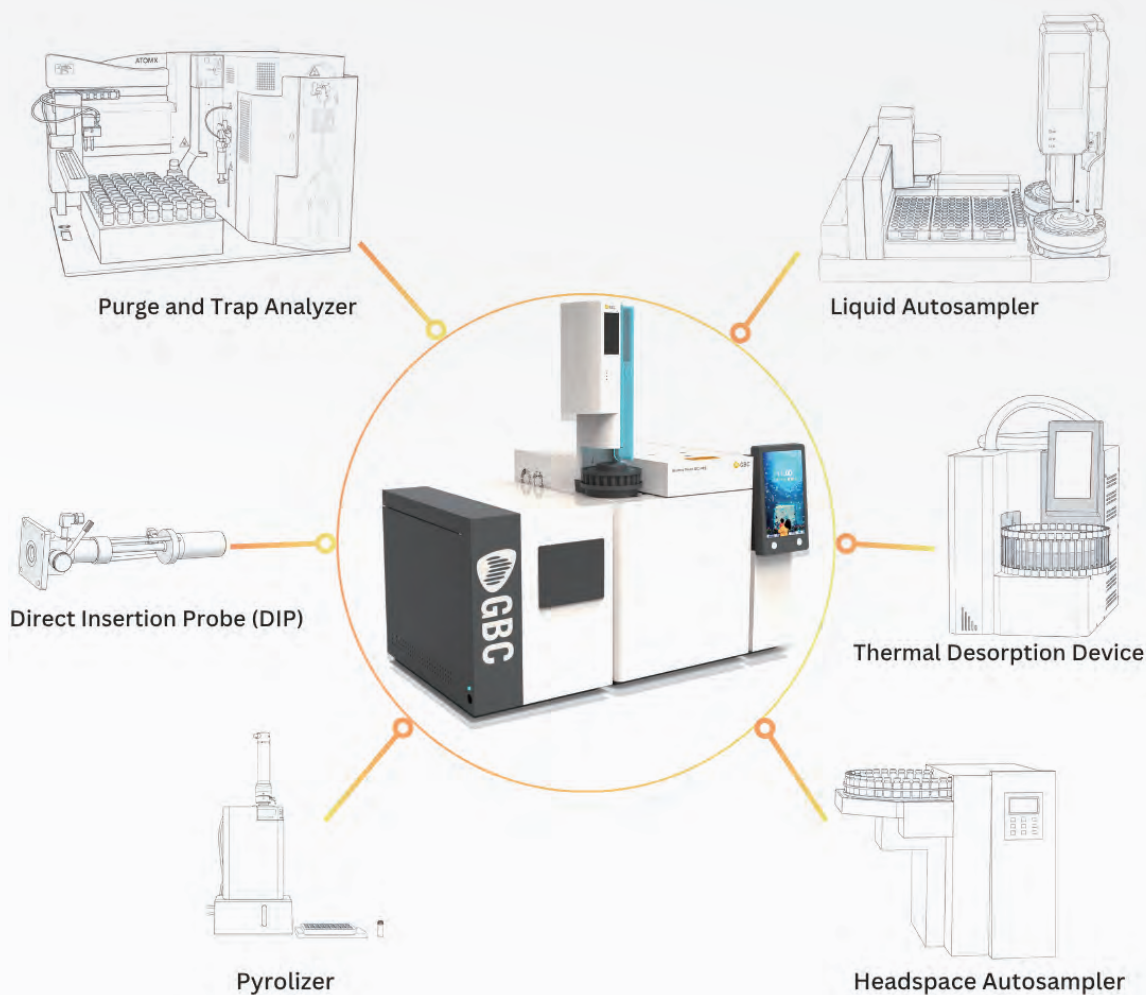
Autosampler + Aludra Next + MS3200 software package + DB-5MS (30 m × 0.25 mm × 0.25 µm) fused silica capillary column

Suitable for qualitative and quantitative analysis of most organic compounds such as spices and perfumes, pesticides, batch sample analysis of PAHs.

- **Configuration applicable to quality control in a chemical synthesis process**

DIP100 + Aludra Next + MS3200 software package + DB-5MS (30 m × 0.25 mm × 0.25 µm) fused silica capillary column

Applicable to rapid qualitative analysis of chemical synthesis intermediates and final products and quantitative analysis combined with GC sample introduction.



Ordering Information

99-0806-00	Aludra Next Gas Chromatograph - Mass Spectrometer (Quadrupole) GC-MS
99-0735-00	Aludra Gas Chromatograph - Mass Spectrometer (Quadrupole) GC-MS
99-0805-00	Aludra Plus Gas Chromatograph - Mass Spectrometer (Quadrupole) GC-MS

Accessories

99-0736-00	Autosampler EW-AS 800 basic version 19 position
99-0737-00	Autosampler EW-AS 810 156 position
96-0325-00	NIST Spectrum Library
96-0338-00	Vacuum lock
96-0326-00	PCI chemical ionization source kit
96-0327-00	Add FID (Aludra)
96-0328-00	Air circuit electronic flow control-EPC
96-0330-00	DIP-110 direct injection system
96-0331-00	OI Eclipse 4760 purging, trapping and concentration instrument – applicable to water quality samples
96-0332-00	Headspace sampler model EW-2HS semi-automatic with 10 sample positions
96-0333-00	Headspace sampler model EW-3HS automatic 12 vials
96-0334-00	Headspace sampler model EW-5HS fully automatic 40 vials
96-0329-00	Headspace sample model EW-6HS fully automatic 36 vials
96-0335-00	Headspace sampler model EW-7HS semi-automatic 9 vials
96-0336-00	Headspace sampler model EW-8HS fully automatic 20 vials
96-0337-00	Analytical tube activator JH-1

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GBC Scientific Equipment
Manufacturer of world-class scientific instruments and accessories
— AAS, HPLC, ICP-OES, ICP-TOFMS, UV-Vis, GC, GC-MS and XRD

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