

EnvirovisiON

The ideal solution for quantifying the global nitrogen cycle



Ease of use



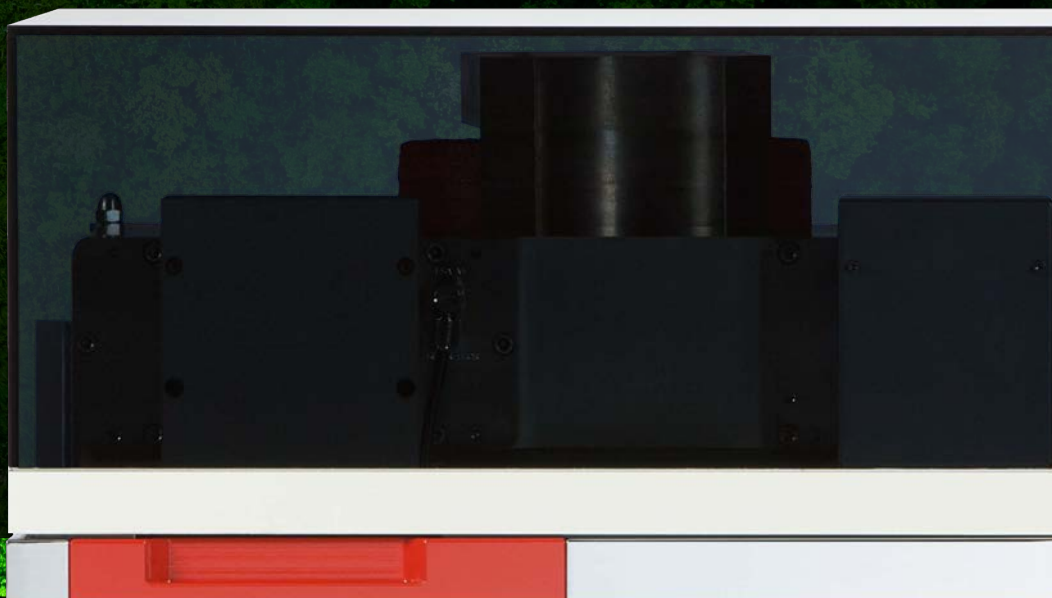
High sample throughput



Great flexibility



High data quality



EnvirovisiON

*Source
or sink?*

KEY FEATURES

- Ideal solution for quantifying the global nitrogen cycle
- Designed for headspace IRMS analysis of dissolved nitrate and greenhouse gases
- Reduced instrument contact time with LyticOS® Software Suite for sample acquisition and data processing
- Analyze 70 dissolved nitrate samples a day using parallel processing giving 40% faster analysis than other systems
- Optional EA-IRMS for analysis of soils and organic materials

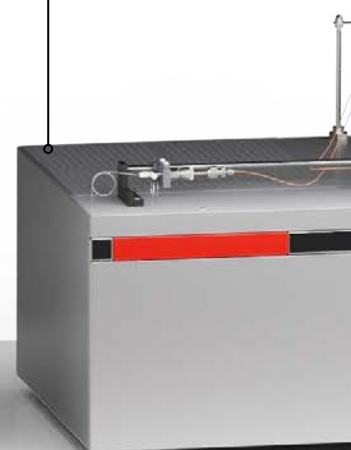
Identifying and quantifying sources and sinks of nitrogen using stable isotope analysis is important for understanding not only global nutrient cycles but also mitigating urban and agricultural pollution, planning water resource management and ultimately optimizing government policy.

EnvirovisiON is the ideal solution for the analysis of environmental samples. Utilizing the effortless operation of the **isoprime visiON** coupled to the iso **FLOW GHG**, the EnvirovisiON delivers high performance analysis of dissolved nitrate and greenhouse gases including N₂O and CO₂. Stable isotopes are a critical tool for climate and environmental research and the EnvirovisiON makes the analysis of these precious samples substantially simpler while maintaining the highest levels of precision and accuracy.

A powerful combination.

➤ Market leading
isoprime visiON
stable isotope analyzer

➤ Market leading
iso **FLOW GHG**
inlet for
headspace analysis



Tailored for IRMS analysis of environmental samples

isoprime visION is a compact, benchtop IRMS which offers market leading performance. Designed for ease of use the **isoprime visION** offers a completely new experience of stable isotope analysis, freeing you from the chores of routine maintenance and allowing you to focus on the science, not the instrumentation. Good-For-Go control and automated inlet switching significantly reduces instrument contact time whilst sleep and wake-up modes ensure low running costs. With pre-configured methods and powerful data processing functionalities for automated data analysis you are guaranteed a strong return on investment.

Enviro**visION** CONFIGURATION

- iso **FLOW GHG** headspace analyzer for cryofocusing of N_2O and CO_2 . Optional furnace configuration for CH_4 analysis.
- **isoprime visION** stable isotope mass spectrometer (IRMS) for ^{13}C , ^{15}N , ^{34}S , ^{18}O & 2H analysis
- Autosampler with options for 70 x 40 ml / 20 ml, 220 x 12 ml and custom vials
- lytic**OS** Software Suite for sample acquisition and data processing
- **ArDB** Cloud License for managing analytical results

isoprime visION is the most elegantly simple stable isotope analyzer ever created.

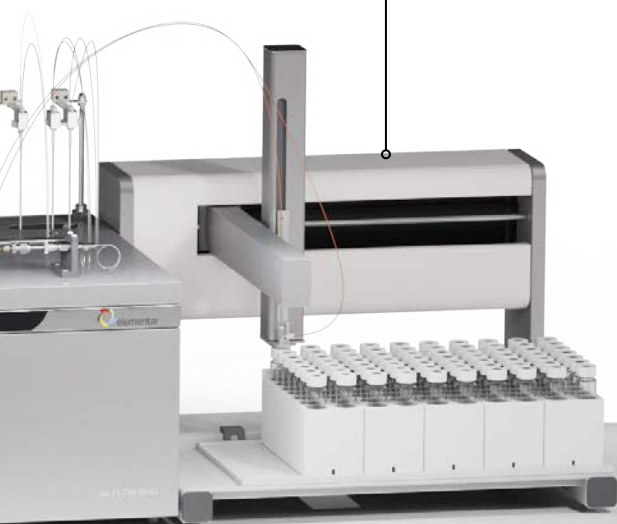
isoprime visION offers a completely new experience of stable isotope analysis. An experience where the user is free from the routine chores of maintenance allowing them to focus on the science, not the instrumentation.



isoprime visION KEY FEATURES

- Thorium dioxide coated iridium filament with improved electron emission and oxidation resistance
- 0–100 V Dynamic Range for easy analysis of a huge range of elemental, isotopic and compound abundances
- Almost 50% smaller instrument than any other currently available
- Significantly reduced consumption of laboratory resources
- Good-For-Go control significantly reduces instrument contact time
- Automated switching between iso **FLOW GHG** and EA inlet systems
- Modern lytic**OS** Software Suite built for Windows operating systems

➤ Gilson Autosampler GX-271 with flexible vial configurations



iso FLOW GHG

*Perfect synergy of
methodology
and technology*

KEY FEATURES

- Dual core needle for dissolved nitrate and gas samples from septum sealed vials
- Autosampler with multiple sample rack options
- Optional automated LN₂ dispenser for extended analytical throughput
- Automated control of all parameters driven by modern LyticOS Software Suite
- Reduced consumption of laboratory resources with sleep / wake-up functionality
- Flexible sample handling options for multiple sample types

Despite the prevalence of stable isotope analysis of dissolved nitrate, the two favored contemporary methods (bacterial denitrifier and cadmium-azide reaction) provide some barriers for uptake in new laboratories. Primarily this barrier is due to the laborious multi-step methods, maintenance of anaerobic bacterial cultures and use of highly toxic chemicals, and has limited the analysis to highly specialized laboratories.

Titanium (III) chloride reduction method

We highlight the performance of the iso **FLOW GHG** headspace analyzer and **isoprime vision** using the new Ti (III) reduction method (Altabet et al., 2019) for one step conversion of nitrate into N₂O for IRMS analysis. This simple method makes dissolved nitrate isotope analysis accessible and affordable to a wide range of users with a smaller investment cost and start-up hurdle.

Simple, one-step reaction

1. Add reagents and sample to 40 ml or 20 ml vial using pipette
2. Leave vials 12–24 hrs to react (conversion of sample nitrate to nitrous oxide)
3. Run samples on Enviro**vision** IRMS system



Complete control

The iso **FLOW GHG** is completely controlled from lyticOS Software Suite making instrument setup and optimization simple. Full readback from the system allows every parameter to be monitored in real time giving you an instant overview of the instrument. The instrument also has comprehensive Sample Loss Prevention strategies ensuring that your precious samples always run in an optimum state.

Automated system checks

Automated system checks, leak checking and system configuration changes makes the instrument easier to run for operators with diverse levels of experience.

Parallel processing

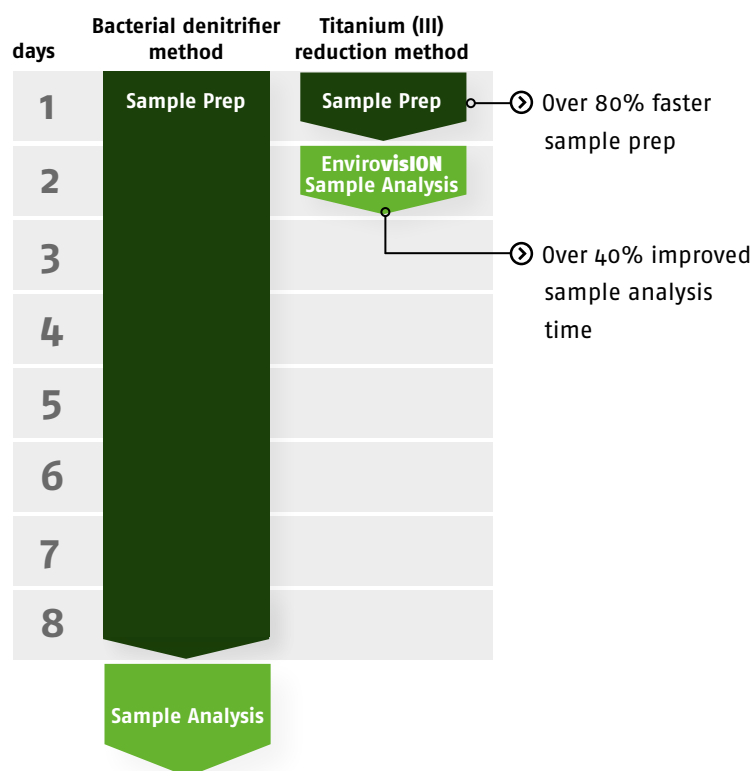
Samples are able to be run efficiently with parallel processing, allowing a second sample to be prepared for analysis as soon as the previous sample has been isolated by the cryofocusing system giving 40% faster sample run time than other systems.

Calculated columns

Eliminate human error and speed up processing time with Calculated Columns so all standard corrections and calibrations can be automatically calculated directly within and exported from lyticOS.

Significantly faster analysis

The titanium (III) reduction method dramatically reduces sample preparation time compared to the widely used bacterial denitrifier method—sample prep reduced from 7–9 days to a single day.



FLEXIBILITY OF METHODOLOGY

The iso **FLOW GHG** offers complete flexibility in the method chosen for nitrate isotope analysis, allowing any of the three recognized methods to be used:

1. Titanium (III) chloride method:
the new simple one-step conversion method. 24 hr conversion of nitrate to N_2O gas via Ti (III) reduction.
2. Bacterial denitrifier method:
the well-established bacterial method. Culturing of denitrifying bacteria over 7–9 days before conversion of nitrate to N_2O gas.
3. Cadmium-azide method:
The azide method is based on chemical conversion of NO_3 into NO_2 by spongy cadmium or activated cadmium powder and finally to N_2O with an azide buffer.

vario ISOTOPE select

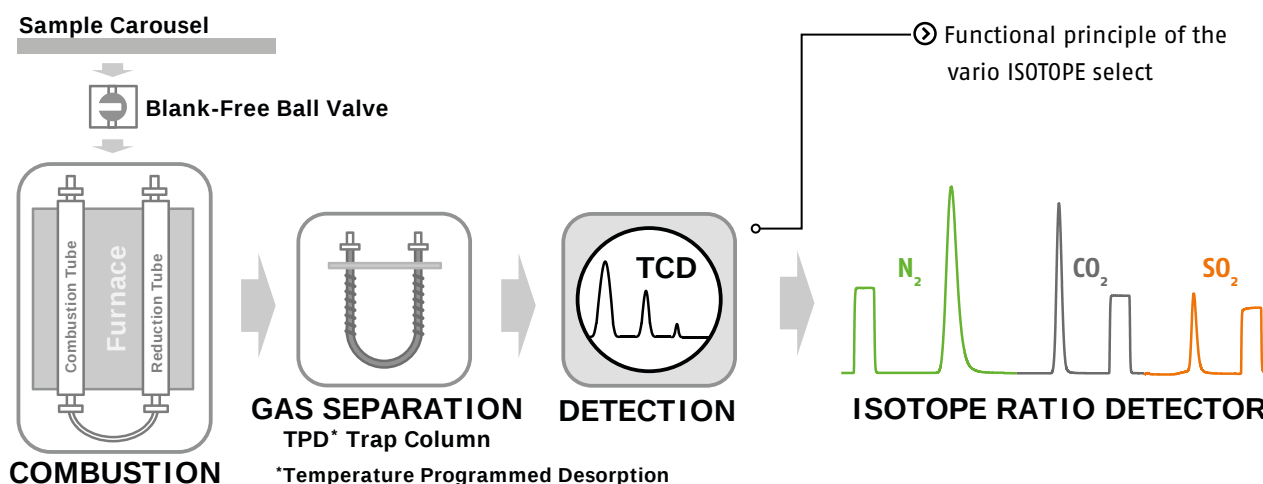
*Unravel the
processes controlling
soil CNS cycling*

KEY FEATURES

- Outstanding robustness – low maintenance
- 10-year guarantee on the high-temperature combustion furnace and the thermal conductivity detector cell of the thermal conductivity detector (TCD)
- Low total cost of ownership and highest data quality
- Reliable results even for sub milligram samples
- Fractionation-free, patented TPD gas separation for high precision and accuracy
- Integrated 120 position autosampler as standard
- Patented ball valve for blank-free sample transfer

The vario ISOTOPE select is dedicated to stable isotope analysis, combining reliable results with outstanding robustness. It utilizes Elementar's proprietary Advanced Purge and Trap technology with a single Temperature Programmed Desorption (TPD)

column. Thus, full baseline resolution during simultaneous CNS isotope ratio analysis is always guaranteed. In combination with the **isoprime vision** IRMS system you will always get the best out of your analyses.



High sample throughput

The vario ISOTOPE select offers the fastest CNS isotope ratio determination with analyses spanning less than 10 minutes. Equipped with a 120 position autosampler for high sample throughput and the most user-friendly operating software on the market, the vario ISOTOPE select is setting new benchmarks.

Simple maintenance

The vario ISOTOPE select is optimized to significantly simplify daily routine operation. Clearly arranged, easily accessible system components as well as a furnace that slides out minimize maintenance efforts. The tool-free clamp connection system ensures a reliably leak-tight instrument at any time.

Flexibility

During operation the sample carousel is accessible and re-loadable at any time so sample runs can be easily extended beyond the standard 120 sample capacity and run unattended overnight.

Reliable results

The vario ISOTOPE select guarantees outstanding precision and accuracy through quantitative combustion via controlled oxygen jet-injection directly into the active zone. This leads to matrix-independent results even for samples which are difficult to combust.

Complete software control

The EA-IRMS system is fully automated with no manual control or optimization required. Sample programming is done quickly through a single software and automated diagnostic functions makes fault-finding simple and effective. Detailed maintenance counters ensure that pro-active intervention maximizes instrument up-time.

Reduced He consumption

For the preservation of finite laboratory resources such as helium the instrument utilizes digital mass flow controllers which enables sleep/wake-up functions to be implemented to further reduce the cost per analysis of the system.

Zero blank analysis

Elementar's unique ball valve sample introduction system flushes each sample individually ensuring that the samples are introduced to the combustion tube with zero atmospheric blank contribution which is essential for low concentration nitrogen isotope analysis.



TEMPERATURE PROGRAMMED DESORPTION (TPD)

Elementar's proprietary TPD technology is a unique high performance chromatographic technique for the determination of non-metal elements. The fractionation-free TPD technology is capable of resolving e.g. C/N and C/S ratios of up to 8000:1. The distinct peak separation assures absolutely reliable and trouble-free data acquisition. The data analysis can therefore be easily automated for larger sample amounts while maintaining highest possible data quality. Elementar's unique TPD columns are optimized to provide unmatched robustness and longevity compared to GC columns. Furthermore, the vario ISOTOPE select can be loaded up to 4-fold higher, resulting in outstanding sample flexibility. The analysis of samples with an absolute carbon content of up to 7 mg is therefore possible in CNS mode. Thus, customers enjoy industry-leading accuracy, sensitivity and versatility.

Make your database work for you with **ArDB**



Centralize



Integration with
Elementar Instruments



Collaborate



Data Security & Trust



Statistics



Visualize

IDEAL SOLUTION FOR

- Universities & Research Institutes
- Commercial Water Quality Laboratories
- Public Water Quality Laboratories

Enviro**vision** includes an **ArDB** cloud license which has been designed for flexible integration into your laboratory workflow, allowing seamless transfer of sample information and results between the database and your instruments.

Bringing together sample results for numerous analytical techniques – IRMS, ICP-MS, TIMS, etc. – it eliminates transcription errors, duplication and inconsistent data handling, offering:

- Hassle-free construction and maintenance of centralized sample databases
- Easy handling of sample meta data, such as names, dates, coordinates, types, etc.
- Straightforward creation of sample run lists for use by instrument control software
- Automatic recording of calibrated analytical results for each sample
- Full audit trail for any changes made to database

Once a database is constructed and analytical results are published, **ArDB** provides an array of sophisticated analytical tools for interrogating and visualizing the data, helping you understand the global nitrogen cycle.



Ease of use

Simple preparation of dissolved nitrate samples using new titanium (III) reduction method in less than 24 hours.



High sample throughput

Analyze 70 samples a day using parallel processing giving 40% faster analysis than other systems.



Great flexibility

Supports any nitrate method you choose to run as well as greenhouse gas analysis.



High data quality

Achieve the highest analytical performance with the most precise instrument available.

Elementar – your partner for excellent elemental analysis

Elementar is the world leader in high performance analysis of organic and inorganic elements. Continuous innovation, creative solutions and comprehensive support form the foundation of the Elementar brand, ensuring our products continue to advance science across agriculture, chemical, environmental, energy, materials and forensics markets in more than 80 countries.

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