Vario one.

Liquid Analyzer

Product Brochure

VARIOLYTICS

Making the invisible visible.

Vario one. | Liquid Analyzer

Overview

The Vario one. is a user-friendly as well as compact quadrupole membrane inlet mass spectrometer (MIMS), with which the concentrations of all volatile components from liquids can be measured in real time and in continuous operation without sample preparation. The liquid analyzer is perfectly suited for process integration and masters any measurement task where measurements are taken from liquids. For example, wastewater monitoring, fermentation, pollutant analysis and environmental monitoring.

Advantages of the Vario one.

1 SENSITIVE

High detection sensitivity from the low ppb to the 100% range

2 MULTIPARAMETER

Measure all volatile substances simultaneously & without delay

3 ONLINE

Problem-free integration into industrial processes without interfering with the process

4 ROBUST

Perfectly suited for continuous operation & with minimal maintenance requirements

What is MIMS Technology?

Membrane inlet mass spectrometry (MIMS) was invented about 50 years ago in order to introduce samples to a mass spectrometer. The goal was to monitor concentrations of gases and volatile organic compounds (VOCs) in a biological process without disturbing it and with no sample preparation.[1]

1 Nier et al. (2015). The Encyclopedia of Mass Spectrometry: Volume 9: Historical Perspectives, Part A: The Development of Mass Spectrometry. Elsevier Science.

The Perfect Membrane Inlet for your Measuring Task

Variolytics inlets

The Variolytics membrane inlets allow stable multi-parameter measurements from the liquid. The membrane module contains a hydro- and organophobic membrane. At the interface of the membrane, volatile components present in the liquid are continuously transferred through the membrane into a vacuum. Then these parameters are measured directly in the mass spectrometer. The membrane inlets are easily autoclavable and can be easily replaced if necessary.

Flow Cell

- ✓ Bypass from the reaction site to the flow cell
- ✓ No probes need to be inserted directly into the process (no disturbance by measuring)
- ✓ Can influence measurement purposefully for ex. by setting a specific temperature

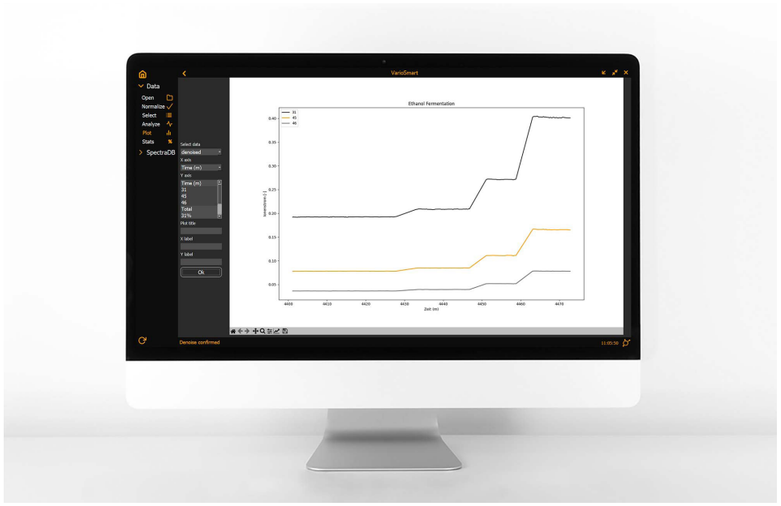
In-Situ Sensor

- ✓ Measuring directly in the process, does not need a bypass
- ✓ Faster response times than the flow cell & no time delay in measurements
- ✓ Particularly suitable for measuring dissolved gas concentrations

Latest Software Architecture

Ideal for problem-free process integration

Tired of outdated software? So are we! The Vario one. offers a software architecture that can be easily integrated into process control systems or other hardware via common interfaces. A modern user interface and smart functions make it easy to use. Automated rotans even allow “stand-alone” operation for continuous measurements.



Practical hardware

Technical Specifications

	Specifications
Measuring speed	4 ms / amu
Measuring range	100 ppb -- 100%
Mass ranges	0,5 to 100, 200, 300 and 512 amu possible
Dimensions	approx. 434 x 526 x 519 mm (W x H x D)
Weight	~ 60 kg
Inlets	Membrane flow cell, in-situ sensor (temperature adjustable from 4°C to 94°C)
Ion source	Gas-tight cross beam electron impact ion source
Electrical connection	230 V/AC, 50 Hz, 8 A; Power consumption <1.2 kVA
Calibration interval	Automatic or manual
Sample intake	Automated and continuous via integrated peristaltic pump
Mass filter	Hyperbolic quadrupole mass filter for better filter performance
Software	IPI-QMS System- and User-Software • System settings permanently stored in the hardware for reproducible measurement data • Auto tuning for RF adjustment enables optima & energy efficient operation • User-friendly visualization between total ion current of the associated spectra and individual ion traces • Export to third party software such as Chromstar 7 SCPA & OpenChrom

Application Areas

Perfect for integration into the process

Variolytics offers a variety of powerful, flexible and ready-to-use analytical solutions. Our focus is especially on the selection and integration of measurement technology into the process so that the measurement data can be used online. For us, the application is in the foreground.

Wastewater Monitoring

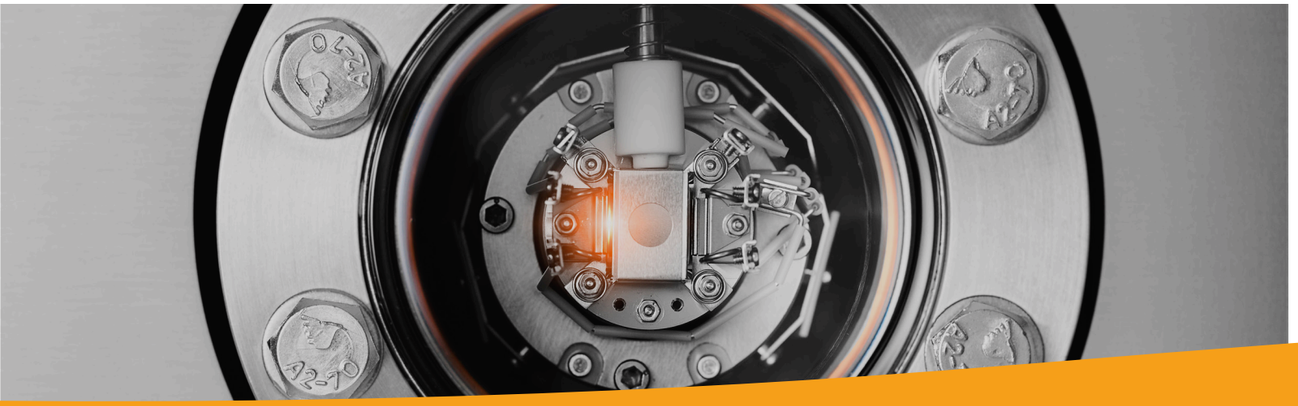
Fermentation Control

Gas Analysis

Catalysis Monitoring

Pollutant Analysis

Food Analysis



Application Sheet

Monitoring ethanol production in a bioreactor

The starting materials for bioethanol are the sugars (carbohydrates) contained in plants, which ferment with the help of enzymes from microorganisms or yeast fungi to produce ethanol (potable alcohol). Fermentation is complete when either the sugar is consumed or a maximum alcohol concentration is reached.

Measurement
Ethanol Fermentation

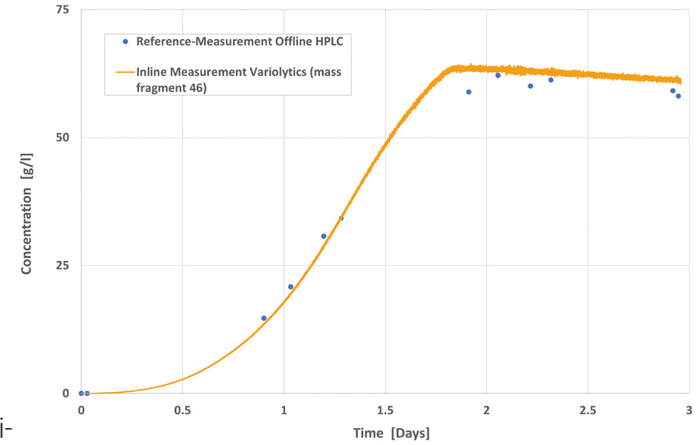
Sector
Bioethanol Production

Device
Vario one.

Inlet
in-situ sensor

Measurement Task

The ethanol concentration was measured with the Vario one. Liquid analyzer in the bioreactor in continuous operation. This is an inline measurement process, so that measurements were taken in real time without any sampling or sample preparation. Here, an in-situ sensor was used. The course of the ethanol concentration can be easily followed directly on the screen in real time. In the reference measurement, the ethanol concentration was determined using HPLC as offline analytical method. Here, in contrast to inline measurement, samples are taken, then subjected to sample preparation in a laboratory and subsequently measured.



Conclusion

The measurement results of the Variolytics technology, which were generated in real time in a fermenter, are confirmed by the reference measurement using (offline) HPLC. This shows that Variolytics‘ MIMS technology delivers the same results as long-established analytical methods. The Variolytics measurement method has a lower time consumption, as no sampling and sample preparation is necessary. In addition, measurement is performed in real time so that the process can be directly controlled with the generated measurement data.

Variolytics

About us

Variolytics is a leading service provider in the field of real-time analytics. With our measuring instruments and our consulting services, we enable industrial customers to map their processes more accurately and to control them better.

Through our close cooperation with research institutes, we are always up to date with the latest measurement methods in the fields of chemistry & biotechnology, process industry, as well as environment & water analysis. It is our ambition to transfer new measurement methods into industrial applications in order to always offer our customers the best measurement technology.

Supported by

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Zusammen. Zukunft. Gestalten.

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