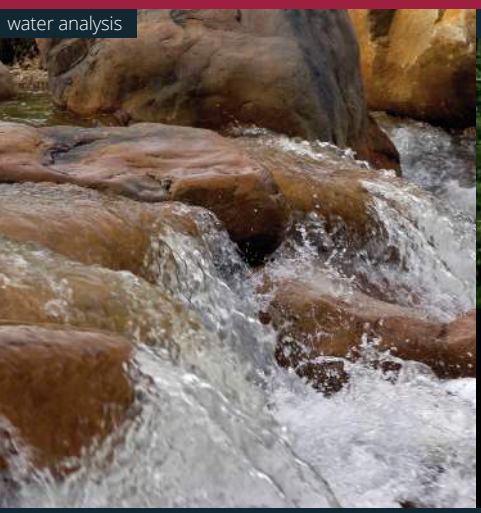
HIDEN ANALYTICAL



HPR-40 DSA

Membrane Inlet Mass Spectrometers for Dissolved Species Analysis

Membrane Inlet MS - Applications


water analysis


environmental monitoring

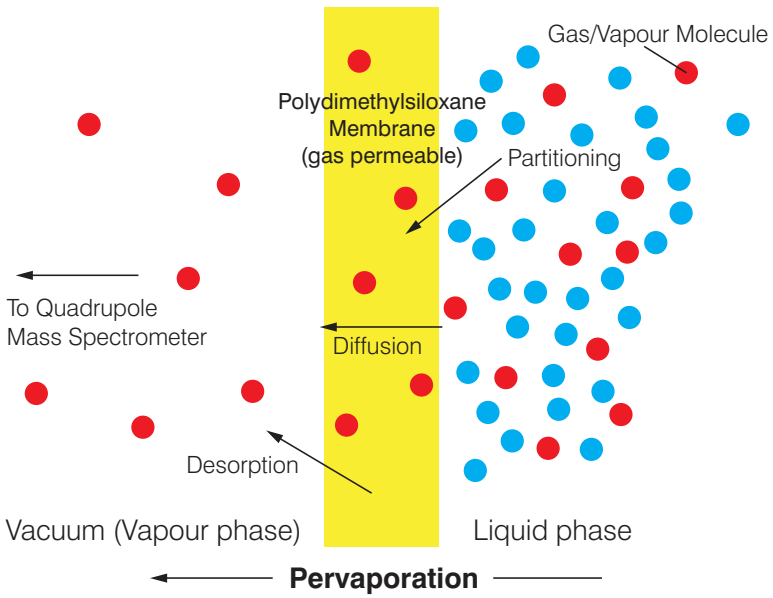

fermentation process analysis

Membrane Inlet Mass Spectrometry (MIMS) enables analyses of dissolved gases and volatile compounds from bulk samples.

Applications:

- Water analysis in Estuary, River or Reservoir (Denitrification)
- Soil core analysis
- Fermentation process analysis
- Groundwater contamination studies
- Methane production control
- Microbiological/Enzyme activity studies
- Environmental monitoring
- Electrochemical Analysis (DEMS)

Membrane Inlet Mass Spectrometry (MIMS)



Example Data

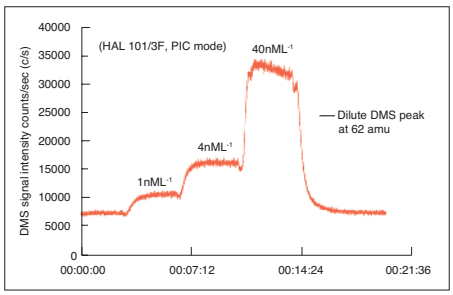
PPT Level Detection of Volatiles in Water

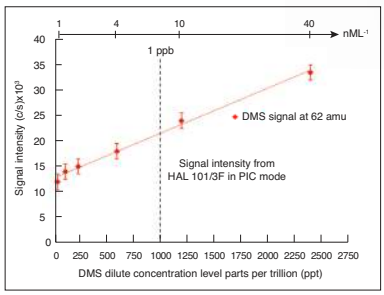
The HPR-40 DSA was used to detect trace amounts of CH_3SCH_3 (Dimethylsulfide DMS) in ocean water. DMS is a naturally occurring substance produced from micro-organisms and related to global climate change and regulation.

The amounts which were detected in this application go down to 60 ppt (parts per trillion), which corresponds to dilute concentrations of DMS of less than 1 nML^{-1}.

The diagrams show the calibration curve and raw data obtained from DMS solutions in different concentrations.



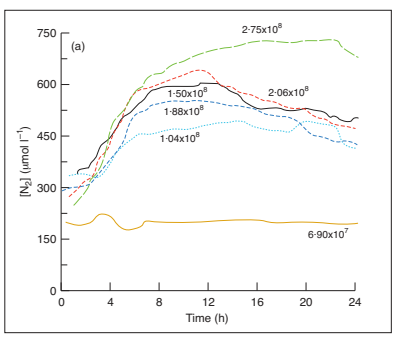


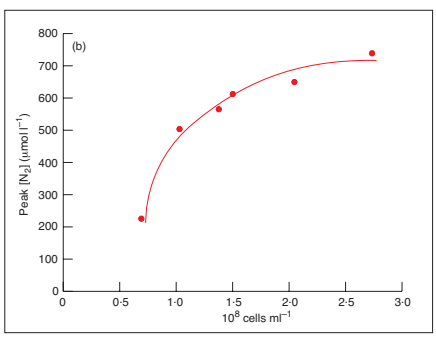


Data obtained with assistance from P.D.Tortell, Department of Botany, University of British Columbia.

Denitrification Studies

The HPR-40 DSA was used to investigate denitrification by Pseudomonas stutzeri in a static lakewater column. Continuous real-time measurement of gases enabled the dynamics of the process to be investigated. Concentrations of 17 mmol/L nitrate and 10 mmol/L nitrite were identified as optimal for denitrification under nutrient-limited conditions (i.e., produced the highest concentrations of N_2). Available carbon was the major rate-limiting factor in lakewater when nitrate or nitrite was present. No stratification of the process with depth was observed, and aerobic denitrification was apparent under all the conditions employed.

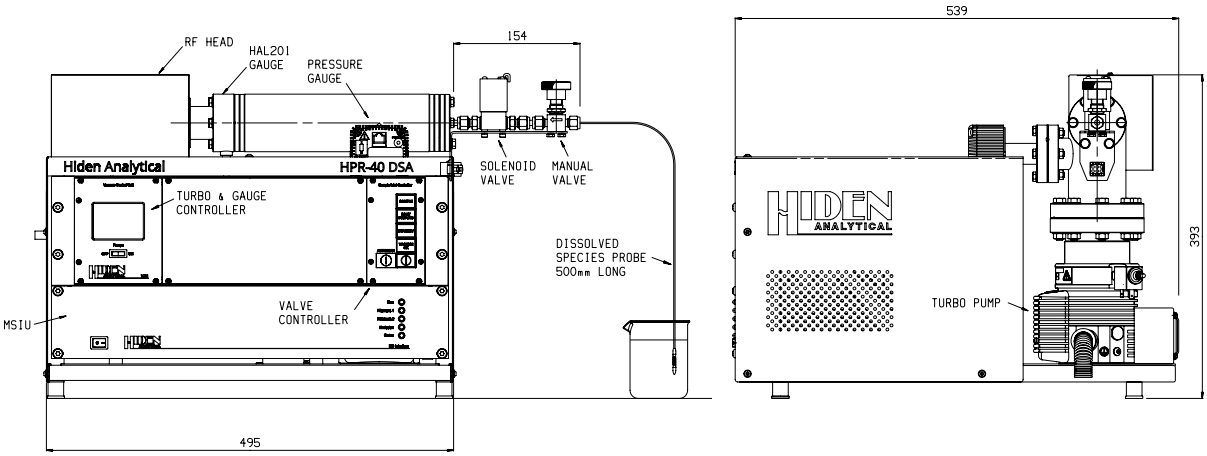




Denitrification by Pseudomonas stutzeri in a sterile lake water microcosm supplemented with succinate and nitrate.

JR Firth and C Edwards, Journal of Applied Microbiology, 88, 853-859.

Technical data



HPR-40 DSA with probe inlet (external membrane backing pump not shown)

Dimensions in mm

Mass ranges, amu:	1-200 / 1-300 amu
Sensitivity:	100% to 60 ppt (species dependent) subject to spectral interference
Speed:	Up to 650 measurements/second
Software:	MASsoft Professional
	Windows 7/8/10 compatible
Interface:	Ethernet/USB/Serial (RS-232) connections
Detector:	Dual Faraday/Channeltron Electron Multiplier
Analogue input:	8x (optional)/16 bit
Analogue output:	8x (optional)/14 bit
Digital input:	8x
Digital output:	8x, 24 V
Further system options:	Application specific inlets
	Multi-stream sampling
Dimensions (L x W x H), mm:	495 x 539 x 393 mm
Weight, kg:	Typically 33 kg and external membrane backing pump 7 kg
Power requirement:	110/220/240 V AC, 50/60 Hz, 1.2 kVA

Inlet options



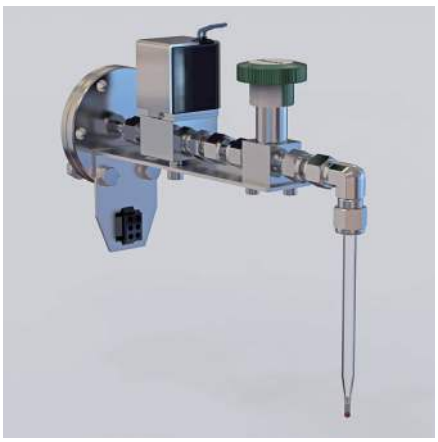
FLOW-THROUGH PROBE

The Flow-through Probe is directly mounted on the MS with two ports to allow flow from an external reservoir. It is used for a wide range of dynamic applications.



CUVETTE CELL

The Cuvette Cell is designed to allow temperature control and illumination of a liquid sample – e.g. for algae studies.



ENZYME KINETICS PROBE

The Enzyme Kinetics Probe was specifically developed to be submerged in enzyme containing samples. All wetted parts are made of glass to avoid sample contamination and side reactions.



TYPE A DEMS CELL*

The Type A DEMS Cell supplies a membrane inlet in close vicinity to an electrode for flexible analyses of electro-chemical reactions or catalysts.



TYPE B DEMS CELL*

The Type B DEMS Cell is designed for optimum performance in analysis of electro-chemical reaction products.



PROBE INLET

The Probe Inlet is a membrane inlet that can be submerged in any liquid or slurry sample. It is used for a wide range of applications.

*For more info on DEMS please see DEMS brochure.

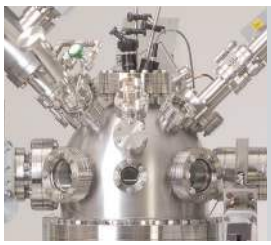
Hiden**APPLICATIONS**

Hiden's quadrupole mass spectrometer systems address a broad application range in:

GAS ANALYSIS

- dynamic measurement of reaction gas streams
- catalysis and thermal analysis
- molecular beam studies
- dissolved species probes
- fermentation, environmental and ecological studies





SURFACE ANALYSIS

- UHV TPD
- SIMS
- end point detection in ion beam etch
- elemental imaging – 3D mapping

PLASMA DIAGNOSTICS

- plasma source characterisation
- etch and deposition process reaction kinetic studies
- analysis of neutral and radical species





VACUUM ANALYSIS

- partial pressure measurement and control of process gases
- reactive sputter process control
- vacuum diagnostics
- vacuum coating process monitoring

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