



UV/VIS detection – an alternative detection method in ion chromatography

947 Professional UV/VIS Detector Vario

943 Professional Reactor Vario

943 Professional Thermostat Vario

PEOPLE
YOU
CAN
TRUST

UV/VIS Detection – catch the color

The 947 Professional UV/VIS Detector Vario enables reliable and accurate quantification of substances that absorb light in the ultraviolet or visible range. The instrument is operated by the user-friendly MagIC Net software and allows a wide variety of analytes to be determined by direct or indirect detection.

BROAD AREA OF USE

As the flow path of the Metrohm IC instruments, also the measuring cell is completely metal free and made of PEEK. Thus, not only the standard anions and cations, but also transition metal ions and various organic substances can be detected without any problem. Even in complex matrices, e.g., biological samples, good detection limits can be achieved on the basis of the specific absorption properties of many analytes. Depending on the application there is an option to choose either the single- (SW) or the multi-wavelength (MW) detector for analysis.

With additional pre- or post-column reaction (PCR) many additional substances can be transformed into UV-active or VIS-active molecules, which makes these substances also detectable with the 947 Professional UV/VIS Detector Vario. Thus, the range of possible applications is extended even further.

943 PROFESSIONAL REACTOR VARIO FOR DERIVATIZATIONS

For derivatization of all kinds, the 943 Professional Reactor Vario is the ideal complement to your analytical system. The 943 Professional Reactor Vario is the perfect complement to your analytical system for any type of derivatization. Its robust design and reaction temperatures of up to 150 °C open up a diversity of possible uses.

The 947 Professional UV/VIS Detector Vario is an alternative to the well-established conductivity detector and extends the family of intelligent detectors from Metrohm. All Metrohm detectors can be swapped round or combined with each other in a flexible way.

HIGHLIGHTS

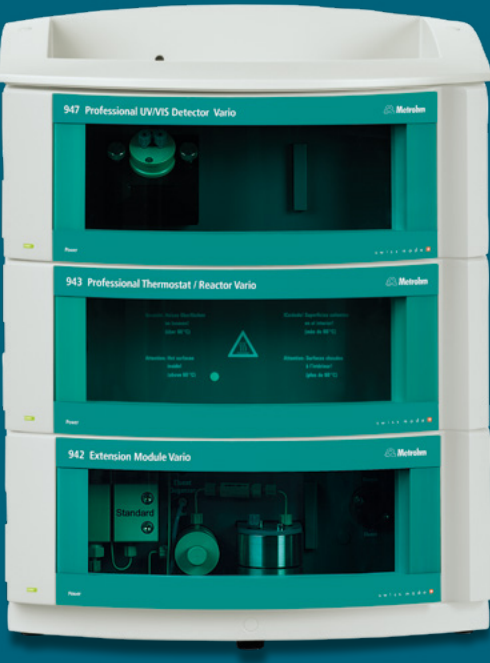
- UV/VIS detector equipped with diode array
- Available as single- or multi-wavelength detector
- Equipped with longlife lamps
- Depending on the application, only the UV lamp or the VIS lamp is necessary
- Up to 8 variable wavelengths*
- Variable band widths and integration times
- Spectrum recording possible at any time*
- User-friendly operation thanks to MagIC Net including monitoring of lamps
- Many options for data evaluation / representation
- Universal use, many combination possibilities
- Robust, heatable reactor for pre- and post-column derivatizations
- iReactor (intelligent derivatization reactor)
- High precision and measuring accuracy
- Low detection limits even in complex matrices

* This refers to the multi-wavelength detector

947 PROFESSIONAL UV/VIS DETECTOR VARIO

Extends the range of use of the intelligent IC series. The 947 Professional UV/VIS Detector Vario can be combined with the 940 Professional IC Vario and the 930 Compact IC Flex.

Very flexible and easy to use



COMPLETE SYSTEM FOR UV/VIS ANALYSIS

The minimum setup consists of a 947 Professional UV/VIS Detector Vario – SW, a 943 Professional Thermostat Vario as column compartment and a 942 Extension Module Vario ONE/Deg.

The diode array detector opens up the possibility to detect a variety of substances across the entire UV/VIS range. Maximum performance in method development is enabled by flexible settings for data recording. For substances with different absorption maxima there are 8 measuring channels and 1 reference channel available. Furthermore, data can be read out via an analog output.

The possibility of connecting a leak sensor makes unattended measuring safer. The UV and the VIS lamp are not included in the scope of delivery. You can select the required lamp for your specific application.

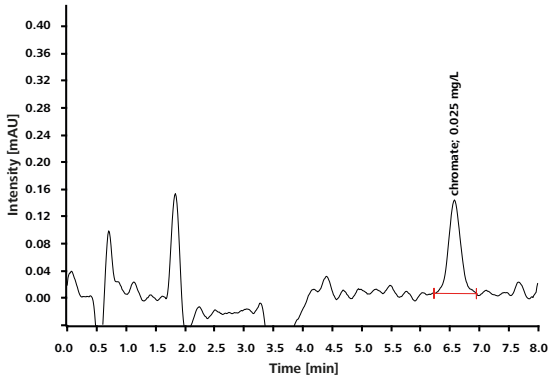
Using the multi-wavelength detector, the extensive range of possibilities for data evaluation allows you to obtain, for example, up to 10 absorption maxima of a spectrum automatically. That makes it easier to choose the optimum wavelength for a particular application.

APPLICATIONS

Direct extinction
Nitrogen compounds NO_2^- , NO_3^- , ...
Sulfur compounds: S^{2-} , $\text{S}_2\text{O}_3^{2-}$, SO_3^{2-} , ...
Halogen compounds: IO_3^- , Br^- , I^- , ...
Organic substances: – organic acids – vitamins – sweeteners – caffeine, melamine
Other ions: CrO_4^{2-} , SCN^- , ...
Postcolumn derivatization
Transition metals, , e.g., Fe^{2+} , Fe^{3+} , Co^{2+} , Ni^{2+} , Cu^{2+} , Zn^{2+} , Cd^{2+}
Chromate
Bromate
Silicate
Cyanide
Ammonium
Aluminum
Amino acids
...
Precolumn derivatization
Complexing agents: EDTA, NTA, PBTC, THPC, ...

CHROMIUM(VI) IN TAP WATER

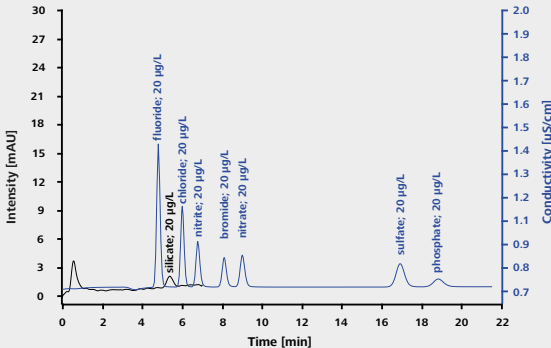
Chromium(VI) is a carcinogenic element where the concentration in leather, toys, packaging, inks or water samples are restricted and need to be monitored. Using a post-column derivatisation method with diphenylcarbazide very low concentrations of chromium(VI) can be determined.



Chromate 0.025 µg/L, column: Metrosep A Supp 17 - 100/4.0, eluent: 70 mmol/L NH_4NO_3 , 7.0 mmol/L NaOH, flow 0.7 mL/min, 45 °C, post-column reagent: 2 mmol/L 1.5 - diphenylcarbazide, 10% ethanol, 0.5 mol/L sulphuric acid, flow 0.22 mL/min, sample volume 1.325 mL, wavelength 538 nm.

TRACE LEVEL ANIONS AND SILICATE IN BOILED FEED WATER

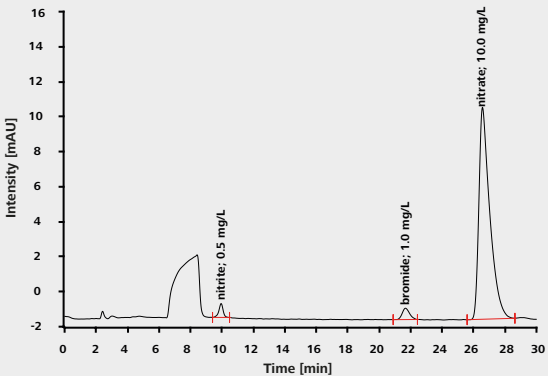
In the power industry, silicate is a water contaminant that should be kept under control to avoid deposits on boiler or steam turbine blades. Silicate can be determined in low µg/L after derivatisation with a molybdate solution. Next to the silicate trace anions impurities can be determined in single analytical determination using conductivity detection.



Silicate next to standard anions (0.02 mg/L), column: Metrosep A Supp 17 - 150/4.0, eluent: 5.0 mmol/L Na_2CO_3 , 0.2 mmol/L NaHCO_3 , flow 0.6 mL/min, 45 °C, post-column reagent: 20 mmol/L Na_2MoO_4 , 200 mmol/L HNO_3 , flow 0.3 mL/min, sample volume 200 µL, wavelength 346 nm.

NITRITE AND NITRATE IN SEAWATER

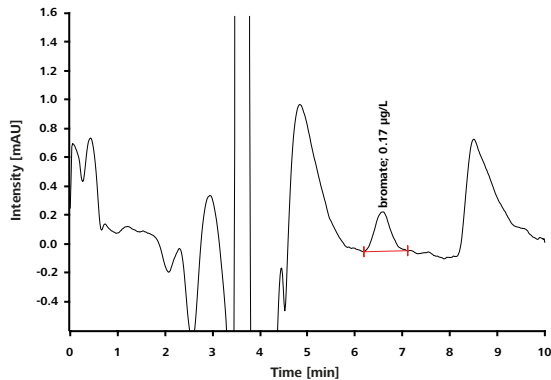
Some ions like nitrite, nitrate, bromide show UV absorption. These characteristics make it possible to detect them next to high concentration of matrix ions like chloride. In conductivity determination, the chloride peak will overlay the peaks of the mentioned ions and they cannot be quantified. Using UV/VIS detection, this problem will be overcome.



Nitrite (0.5 mg/L), bromide (1.0 mg/L), and nitrate (10 mg/L) in artificial seawater (28 g/L NaCl), column: Metrosep A Supp 10 - 250/4.0, eluent: 5.0 mmol/L Na_2CO_3 , 5.0 mmol/L NaHCO_3 , flow 1.0 mL/min, 40 °C, chemical suppression, sample volume 10 µL, wavelength 218 nm.

BROMATE IN TAP WATER

Bromate is classified as a potential carcinogen and needs to be monitored. In tap water the maximum contamination level of 10 µg/L (WHO, EC, EPA regulations) should not be exceeded. For this application, a specific derivatisation procedure using the triiodide method was applied.



0.1 µg/L bromate spiked in tap water sample, column: Metrosep A Supp 16 - 150/4.0, eluent: 100 mmol/L H_2SO_4 , 19.3 µmol/L ammonium heptamolybdate, flow 0.8 mL/min, 45 °C, post-column reagent: 0.27 mmol/L KI, flow 0.15 mL/min sample volume 1200 µL, wavelength 352 nm.

943 Professional Reactor Vario and 943 Professional Thermostat Vario – the ideal supplement to the 947 Professional UV/VIS Detector Vario

The 943 Professional Reactor Vario and the 943 Professional Thermostat Vario are highly flexible. The instrument has metal-free flow paths and can serve as host for other 942 Extension Modules Vario, such as modules with additional pumps or valves. The module can be used both as a heatable pre- and post-column reactor and as a column thermostat. Hence, it is offered in two versions:

943 PROFESSIONAL REACTOR VARIO: REACTOR FOR PRE- OR POST-COLUMN REACTIONS

The 943 Professional Reactor Vario features a rapid heating rate and enables pre- and post-column reactions at temperatures as high as 150 °C. Owing to direct heat transfer it is heated up faster and more precisely than conventional reactors or column ovens. Depending on the requirement of your application, post-column reagent and eluent can be brought to the right temperature beforehand or the residence time in the reactor can be flexibly adjusted.

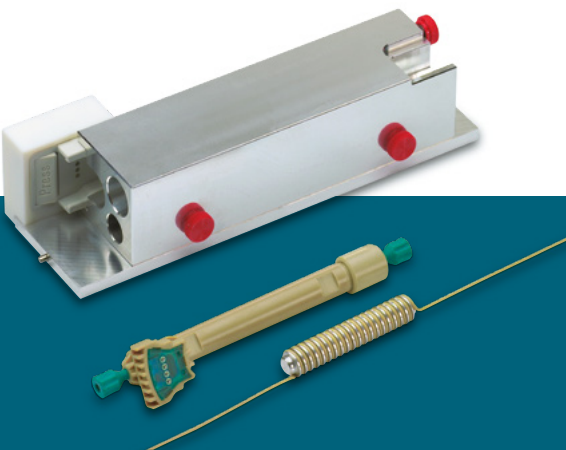


The design of the iReactor enables fast and direct heat transfer.

Traceability and monitoring are guaranteed in the iReactor by means of a data chip. This integral component of the intelligent IC concept minimizes operator errors and improves the reliability of the analysis.

943 PROFESSIONAL THERMOSTAT VARIO: THERMOSTAT FOR COLUMN HEATING

The heated column oven can be operated with temperatures as high as 80 °C. Temperature stability is ensured by a preheating capillary. Up to two columns can be fitted. Monitoring and traceability are also guaranteed in the 943 Professional Thermostat Vario, as a component of intelligent IC.



In the column thermostat it is possible to monitor, for example, an iColumn with its guard column by the column chip. Temperature fluctuations are ruled out by the integral preheating capillary.

Technical information

947 Professional UV/VIS Detector Vario		
Wavelength	190–900 nm	(Increment 1)
Band width	± 1–50 nm	(Increment 1)
Integration duration	10–247 ms	
Measuring duration	50–2'000 ms	
Measuring principle	Diode array with 1024 diodes	
Lamp lifetime long life UV lamp	approx. 2000 h	
Lamp lifetime long life VIS lamp	approx. 5000 h	
943 Professional Reactor Vario and 943 Professional Thermostat Vario		
Temperature stability	< 0.05 °C deviation	
Reproducibility of temperature	< ± 0.2 °C	
Temperature accuracy	< 1 °C	
Heating time	< 10 min. from 20 °C to 40 °C	
Column thermostat	Ambient temperature + 5 °C to 80 °C, adjustable in 0.1 °C steps	
Reactor exchange unit intelligent	Ambient temperature + 5 °C to 120 °C, adjustable in 0.1 °C steps	
Reactor exchange unit high temperature (HT)	Ambient temperature + 5 °C to 150 °C, adjustable in 0.1 °C steps	
Without exchange unit	Ambient temperature + 5 °C to 150 °C, adjustable in 0.1 °C steps	



ORDERING INFORMATION

2.947.0010	947 Professional UV/VIS Detector Vario – SW (single-wavelength)
2.947.0020	947 Professional UV/VIS Detector Vario – MW (multi-wavelength)
2.943.0110	943 Professional Reactor Vario
2.943.0210	943 Professional Thermostat Vario
Accessories for the 947 Professional UV/VIS Detector Vario	
6.2804.120	Halogen lamp II (VIS)
6.2804.110	Deuterium lamp (UV)
Accessories for the 943 Professional Reactor Vario	
6.2744.330	Y connector 3 × UNF 10/32
6.2845.100	Reactor plate, complete, for Professional Reactor
6.2845.110	HT reactor plate, complete, for Professional Reactor
6.2845.200	Reactor, complete, for 6.2845.100
6.2845.210	HT reactor, complete, for 6.2845.110
6.1015.100	Metrosep BP 1 Guard/2.0
Accessories for the 943 Professional Thermostat Vario	
6.1836.020	Preheating capillary with core, 1.44 m
6.2845.600	Column holder, complete, for 943 Professional Thermostat Vario
Peripheral devices and other accessories	
6.2061.100	Bottle holder for Professional IC Vario instruments
6.2061.110	Tray with sensor for Professional IC Vario instruments
6.2061.120	System connector