New Products 2018

Instruments and Applications

Metrohm 75 YEARS
PEOPLE YOU CAN TRUST

LET'S CELEBRATE!

MORE THAN AN ENTREPRENEUR

Bertold Suhner was a scientist, a sportsman, a painter, a pilot, a philanthropist – and the founder of Metrohm. We owe him a great company, and we are proud to serve the world with our legendary Swiss made instruments and application know-how – then and now.

Find out more about Bertold Suhner and follow us on our anniversary blog:
blog.metrohm.com

Metrohm

75 YEARS
PEOPLE YOU CAN TRUST

Dear Metrohm Customer,

This year is a very special one for Metrohm, as we are celebrating our company's 75th jubilee. On April 1 in 1943, Bertold Suhner founded Metrohm AG in Herisau, Switzerland.

Our Jubilee motto is **«Metrohm – People You Can Trust»**. We chose this motto, as it sums up best the experience of our customers, employees, partners, and suppliers with Metrohm. All of them have contributed to make us what we are today: a thriving global group serving our customers around the world with top-notch analytical instruments and application know-how.

Of course, our jubilee year marks the launch of many new instruments and applications as well, which we are pleased to present you in a nutshell on the following pages.

Metrohm

OMNIS – a whole new level of performance

04

Superior modularity, functionality, and efficiency!

OMNIS is the modular titration platform that grows with your needs. The OMNIS Titrator is the heart of the OMNIS Titration Platform.

- Upgradeable firmware packages for individual titration needs
  - Endpoint titration (SET)
  - Monotonic (MET) and dynamic (DET) equivalence point titration
  - **NEW:** Volumetric Karl-Fischer titration
  - Up to 5 titrations in parallel
- Magnetic or rod stirrer
- 2, 5, 10, 20, 50 mL cylinders
- 100,000 pulses per cylinder volume

Volumetric Karl Fischer titration safer and more comfortable than ever

OMNIS makes volumetric Karl Fischer titration safer and more comfortable than ever – due to these innovations:

- **NEW:** Automatic titration start: OMNIS starts the titration automatically after adding the sample
- **NEW:** OMNIS Solvent Module: manual or software controlled solvent exchange – no exposure to Karl Fischer reagents at any time!

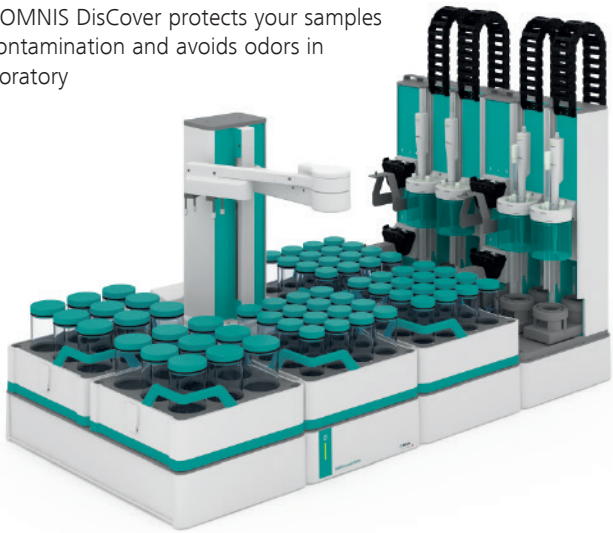
Safe, Smart, Secure – OMNIS Liquid Adapter with 3S Technology

- Safe: Contact-free exchange of reagents
- Smart: Reagents are automatically identified to prevent errors
- Secure: Information about the reagent is automatically transferred into the method

OMNIS Sample Robot – maximize your sample throughput

The OMNIS Sample Robot allows you to prepare and analyze up to 175 samples completely unattended!

- Modular platform with three extension levels S, M, and L
- Beaker sizes 75, 120, 200, and 250 mL
- Enables up to four fully automated analyses at 4 work stations (parallel titration)
- Racks with completed samples can be exchanged while the system keeps analyzing
- **NEW:** OMNIS DisCover protects your samples from contamination and avoids odors in the laboratory



FDA compliance for the Ti-Touch titrator family

06

Full compliance with FDA 21 CFR Part 11

The 915 KF Ti-Touch (for volumetric Karl Fischer titration), the 916 Ti-Touch (for potentiometric titrations), and the 917 Coulometer all meet the FDA's requirements for software in regulated environments.

916 Ti-Touch potentiometric titrator

- Options: built-in magnetic stirrer or rod stirrer
- Endpoint (SET), monotonic (MET), dynamic (DET) equivalence point titration
- **NEW:** STAT titrations and compliance with FDA 21 CFR Part 11
- PDF reports and network connection for data archiving (e.g., LIMS)
- Start methods at the touch of the screen

810 Sample processor – higher sample throughput on your Ti-Touch

Increase sample throughput on your 916 Ti-Touch or 915 KF Ti-Touch using the new 810 Sample Processor. This sample processor features one workstation and a built-in membrane pump for the unattended analysis of small to medium series of samples.

New meters and electrodes

Combined ion-selective electrodes

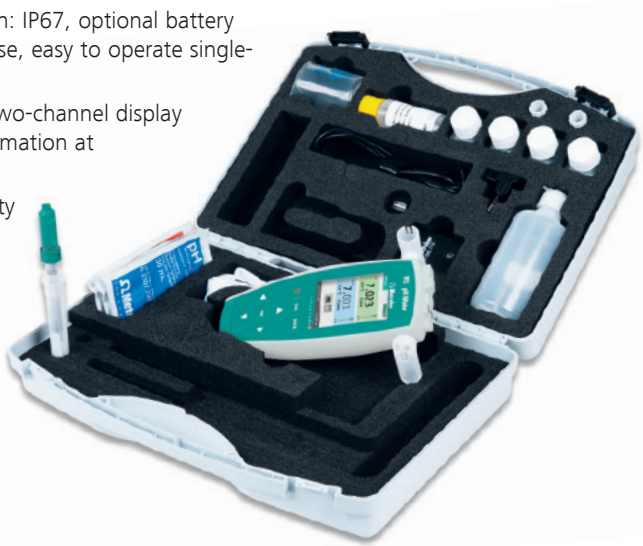
Our new ion-selective electrodes for titration, direct measurement, or standard addition of aqueous solutions combine outstanding Swiss quality and superior performance.

- Space-saving electrode for greener analysis: less sample, less waste
- Robust design with plastic shaft and shock-protected membrane
- For titration, direct measurement or standard addition of aqueous solutions
- Available for Ca^{2+}, K^{+} or NO_3^{-}

Robust meters for field & laboratory use

The 912 Conductometer, the 913 pH meter, and the 914 pH/Conductometer are portable instruments excelling in the field just as well as in your laboratory.

- Robust & ergonomic design: IP67, optional battery operation mode for field use, easy to operate single-handed.
- Color user interface with two-channel display (multilingual) and key information at a single glance
- Monitoring of sensor quality and PIN-protected dialogs for expert or routine users
- GLP-compliant reports, comprehensive data export and management options



New products for ion chromatography

08

Eco IC – get started in the world of ion chromatography

- Compact entry-level system for water analysis and education
- Everything you need at an attractive price
- Focus on the essential: Anion and cation analysis made easy
- Optional automation and Inline Ultrafiltration

Metrosep A Supp 17 – new column for water analysis

- Robust anion column with smart self-monitoring features
- Optimal separation of the standard anions at room temperature
- Three different lengths guarantee fast results for all your applications
- Outstanding value for money

Metrosep C Supp 2 – sensitive cation analysis

- Highest sensitivities for sequential suppressed cation analysis
- Long column lifetime and smart self-monitoring features
- Excellent separation of sodium and ammonium for analysis of difficult matrices
- Analysis of amines, cations, and transition metals in one analysis

MagIC Net 3.2 – even more flexibility and convenience

- Compatible with the new Eco IC, cation suppression, and all new columns
- Enhanced flexibility for application development for Combustion IC
- More options to qualify calibrations
- Compatible with Windows 10

MagIC Net

New products for Vis-NIR and Raman spectroscopy

10

Vision Air 2.0 – modern software for Vis-NIR spectroscopic analysis

- Intuitive operation with clear presentation of results and event highlighting
- Network server allows you to distribute SOPs to multiple instruments all over the world and to store and access data centrally
- Database for highest data security
- Complies with regulatory requirements (audit trail, user administration, two-level signature)

DS 2500 – designed for solids, optional for liquids

- Compact and robust spectrometer for quality control along the entire production process
- Full scanning range from visible (400–800 nm) to near-infrared (800–2,500 nm) guarantees best sample analysis
- **NEW:** Rotational multisampler allows measurements of up to 9 consecutive samples
- **NEW:** Heightened lid allows measurements of samples in vials of max. 75 mm height

Mira DS – safe in-field identification of explosives and illicit substances

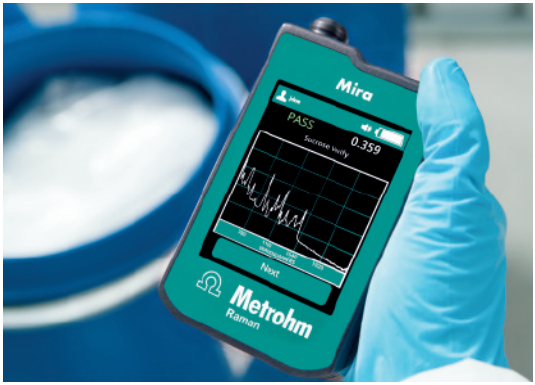
Mira DS is our handheld Raman system for the military and first responders. Life-saving decision making in the palm of your hand!

- MILSTD 810G and IP67 certified for the toughest conditions
- Maximum flexibility due to multiple sampling attachments: Contact Ball Probe, Standoff, Right Angle, and Universal Attachment
- Intuitive user interface features Scan Delay and Mixture Matching Results with a simple touch of the screen
- Use the Android app to transfer data, acquire a spectrum, or obtain information via the HazMasterG3 App

Mira P for pharma – the right tool for the right job

Mira P is our handheld Raman system for incoming goods inspection and quality assurance in the pharmaceutical industry.

- **NEW:** The 6" (15 cm) ball probe allows easy testing in many situations
- **NEW:** Calibration and Verification SmartTip for quick and easy calibration and verification with polystyrene
- Outstanding 8–10 cm^{-1} resolution
- Meets FDA 21CFR11, USP ⟨1120⟩/⟨1858⟩, EP 2.2.48 regulations



New products for electrochemistry

946 Portable VA Analyzer – heavy metal analysis goes mobile

- Determination of trace levels of arsenic, mercury, copper, and lead in water in the field
- Portable battery-powered analyzer for full mobility – perform your analysis anywhere and get results quickly
- Straightforward operation: predefined methods, low-maintenance scTRACE Gold sensor
- Accurate results suitable for analysis in accordance with WHO guideline values
- Complete package with all accessories you need to get started: Bottles, pipettes, cell, and sensor – all in a convenient carrying case

New features make NOVA software even more powerful

- Improved user interface displays distinctively-colored command tiles for data and procedure files
- **NEW:** *Procedure Information* command tile to facilitate the linking of user-defined experimental information to exported data files
- User-requested refactored *Open Circuit Potential (OCP)* command tile which now stores measurement running time for long-term OCP monitoring

SPELEC NIR – spectroelectrochemistry NIR instrument

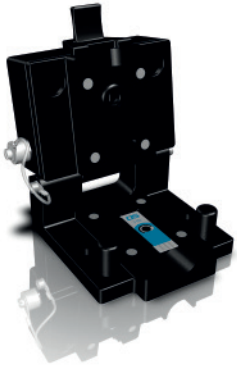
A Lightsource VIS-NIR (400-2,500 nm), a Bipotentiostat/Galvanostat, and a Spectrometer NIR (900-2,200 nm, InGaAs photodiode array) for spectro-electrochemistry NIR measurements combined in one instrument!

- Flexibility thanks to different measurement modes: counts, absorbance, reflectance and transmission
- Suitable for DropSens Screen-Printed Electrodes and for any conventional spectroelectrochemical set up

SpectroECL – spectro-electrochemiluminescence instrument

A portable Bipotentiostat/Galvanostat and a microspectrometer integrated in an innovative cell for SPEs are combined in this new instrument.

- Full spectra acquisition in the visible range (340–850 nm).
- Multi-analyte quantification using different luminiscence species is now possible thanks to the microspectrometer integrated in the cell.
- Compatible with the already available Si-Photodiode ECL Cell.



DropView SPELEC Software will run the new SpectroECL and SPELEC NIR equipments combining simultaneous optical and electrochemical results.

14

202X Series – new, versatile single-method process analyzers

These single-method analyzers are available in three basic versions (titration/ISE, pH, and photometry and can be configured for various applications in all types of industries.

- Can monitor 1 or 2 sample streams with one analyzer
- Compact footprint for tight industrial spaces: 326 × 273 mm
- Remote access and control via Ethernet and Modbus TCP/IP, with USB for data export
- 7" Full color touchscreen

2026 Titrolyzer – for titrations or ISE measurements

- A great match for industries ranging from chemicals to petrochemicals, mining, steel/metal, and water
- Selected applications include acid/base titrations, chloride, hardness, cyanide, copper, hydrogen fluoride, and more

2026 pH Analyzer

- Provides online pH measurements with automatic cleaning and calibration
- A great fit for industries where glass is a hazard (such as food & beverage)

2029 Process Photometer

- Ideal for industries such as industrial wastewater, environmental monitoring, energy/power, and more
- Key applications include phosphate, silica, chlorine, nickel, copper, chromium, ammonia, and more

2060 Multipurpose Process Analyzer

This multipurpose analyzer combines different measuring technologies in a single process analyzer.

- Monitors up to 6 sample streams per wetpart, with a maximum of 4 wetparts (12 modules in each)
- Compact dimensions (690 × 625 mm) mean that several older analyzers can be replaced in a smaller footprint
- Modular system of wetparts can be expanded to include extra reagent cabinets, preconditioning panel, and more, giving endless application possibilities
- Remote access and control via Ethernet and Modbus

NIRS XDS Full Range Analyzer – single point

This inline analyzer enables non-destructive near-infrared (NIR) analysis of liquids and solids enabling seamless process monitoring, optimization, and automation.

- Vis-NIR range (400–2,200 nm)
- Single Si-InGaAs detector
- Expands application range significantly to colored solutions and analytes such as bromine
- Real-time analysis of multiple parameters (up to 32)
- Includes new I/O box hardware and I/O Controller software

General chemistry

Application Examples 	Titration	Ion Chromatography	Electrochemistry	Process Analysis	Spectroscopy
Anions in acids, bases, and brines		■		■	
Chromate in textiles, toys, and leather		■			
Alkali and carbonate in brines (e.g., chlor-alkali electrolysis)	■			■	
Isocyanate, acid, amine, epoxide, and saponification index/number	■			■	■
Water content in solvents, laquers, dyes, and liquefied gases	■			■	■
Anions in ionic liquids		■		■	
Nickel in 50% sodium hydroxide solution			■	■	
Quality control of fine chemicals	■	■	■	■	■
Surfactant content of detergents and cleaning baths	■			■	
Iodide in brines (e.g., chlor-alkali electrolysis) with electroanalysis			■	■	
Identification and QC of raw materials				■	■
Metal organic compounds, (e.g., Gringard-reagents, buthyl lithium compounds)	■				

Pharmaceutical

	Titration	Ion Chromatography	Electrochemistry	Process Analysis	Spectroscopy
Enzyme activity (e.g., lipase, amylase)	■				
Photometric titration (aqueous, nonaqueous)	■			■	
Water content (e.g., in tablets, capsules, ingredients, propellants according to USP <921> Method I, Ph. Eur. 2.5.12, Ph. Eur. 2.5.32)	■			■	■
Acid-base titrations (aqueous, nonaqueous)	■			■	
Anions (e.g., F^-, Cl^-, NO_2^-, NO_3^-, SO_4^{2-}, PO_4^{3-})		■		■	
Cations (e.g., Li^+, Na^+, K^+, NH_4^+, Mg^{2+}, Ca^{2+})		■		■	
Sugars (e.g., glucose, fructose, sucrose)		■		■	■
Amino acids (e.g., cystine, cysteine)		■	■	■	■
Anions in infusion solutions		■		■	
Chloride in different matrices	■	■		■	
APIs in tablets, capsules, etc.				■	■
Ascorbic acid in vitamin tablets	■	■	■	■	■
Identification and QC of raw materials and final products					■
Conductivity according to USP <645>	■			■	

Application Examples 	Titration	Ion Chromatography	Electrochemistry	Process Analysis
Fully automatic determination of the permanganate index according to EN ISO 8467	■			■
Bromate in drinking water (According to EPA 300.1, EPA 326.0, and DIN EN ISO 11206)		■		■
Anions, cations, and heavy metals in drinking water and wastewater		■	■	■
Anions and cations in seawater		■		■
Standard-compliant determination of the p and m value (fully automatic)	■			■
Fully automatic analysis of drinking water combining titration and ion chromatography (TitrIC Vario pro)	■	■		
COD value in wastewater (fully automatic according to DIN 38409-44)	■			■
Chloride and sulfate in various types of dust		■		
Chromium in wastewater	■	■	■	■
Arsenic(III) and arsenic(V) in water		■	■	■
Calcium, magnesium, and water hardness in drinking water	■	■		■
Cadmium, lead, and uranium in trace levels in drinking, river, and sea water			■	■
Anions, cations, and heavy metals in gases and aerosols		■	■	■

Metal and electronics

Application Examples	Titration	Ion Chromatography	Electrochemistry	Process Analysis
Trace amounts of anions and cations		■	■	■
Chloride, sulfate, and borate in galvanic nickel baths	■	■		■
Sulfate in chromic acid		■		■
Hydrofluoric acid/nitric acid mixtures in etching and pickling baths	■	■		■
Hydrogen peroxide in etching baths	■			■
Lead, antimony, bismuth, and iodate in electroless nickel baths			■	■
Ni, Cu, Zn, Cr, Sn, Ag, Au, Al, Fe with acid and alkali in electroplating, etching, and degreasing baths	■	■	■	■
Zinc, lead, nickel in zinc phosphating baths			■	■
Water in hydrofluoric acid and wafer coatings	■			■
Sulfite and sulfate in gold electroplating baths			■	■
Cadmium, cobalt, and lead in concentrated zinc sulfate solutions			■	■
Free and total acid, accelerator, zinc, and fluoride in zinc phosphating baths	■			■

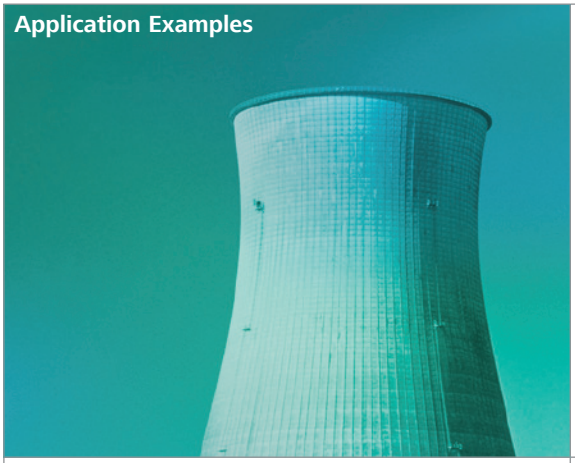
Automotive and petrochemistry

Application Examples	Titration	Ion Chromatography	Electrochemistry	Process Analysis	Stability measurement	Spectroscopy
Anions in fuels		■				
Amines, organic acids, and sulfur compounds in process water		■		■		
Anions in cooling liquids		■		■		
Chloride in brake fluids	■	■		■		
TAN/TBN in petroleum products according to ASTM D664, D8045, D974, ISO 3771, ISO 6618, EN 12634	■			■		■
Water content of oils and fuels	■			■		■
Quality control of fuels, biofuels and biofuel blends	■	■	■	■	■	■
Elemental sulfur in gasoline		■	■			
Preparation of standards with defined octane or cetane number	■					■
Chloride and sulfate in bioethanol		■		■		
Aromates in petroleum products				■		■
Halogens and sulfur in polymers by CIC		■				
Water in LPG	■					
Hydrogen sulfide and mercaptans according to ASTM D3227, ISO 3012, UOP163	■			■		
Bromine number and bromine index according to ASTM D1159, D5776, D2710, ISO 3839	■					
Hydroxyl number according to ASTM E1899, EN ISO 4629-2	■					
Halogens and sulfur in LPG by CIC (according to ASTM D7994)		■				

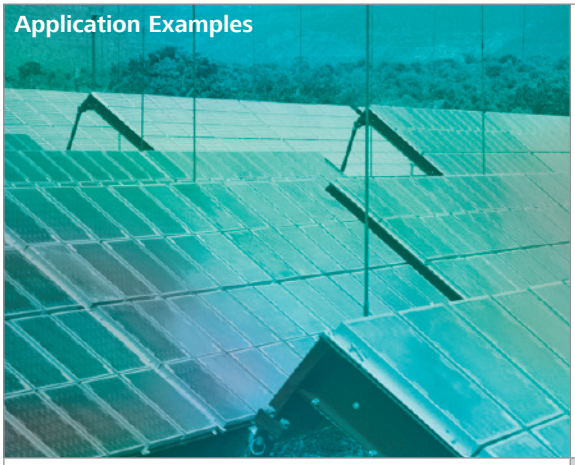
Biofuels

	Titration	Ion Chromatography	Electrochemistry	Process Analysis	Stability measurement	Spectroscopy
Volumetric determination of the water content of bioethanol in accordance with ASTM E203	■			■		
Coulometric water determination in biofuels in accordance with EN 12937, EN 15489, and ASTM E1064	■					
Chloride (ASTM D512, EN 15484)$_{pot}$ and sulfate (ASTM D7318)$_{pot}$ in bioethanol (ASTM D7319, D7328, and EN 15492)$_{IC}$	■	■		■		
Determination of the oxidation stability of biodiesel and biodiesel blends using the Rancimat method in accordance with EN 14112, EN 15751, and EN 16568					■	
Determination of copper in an ethanol-gasoline mixture by anodic stripping voltammetry			■	■		
Determination of the total acid number (TAN) in biodiesel according to ASTM D664	■			■		
Determination of Li^+, Na^+, NH_4^+, K^+, Ca^{2+}, and Mg^{2+} in ethanol and biodiesel		■		■		
pH (ASTM D6423, EN 15490) and conductivity determination (DIN 51627-4) in bioethanol	■					
Determination of the iodine value of biofuels in accordance with EN 14111	■			■		
Anions in a gasoline-bioethanol mixture determined by inline matrix elimination		■		■		
Determination of the glycerol content of biodiesel by amperometric detection in accordance with ASTM D759		■				
Methanol, ester, glyceride, glycerol, iodine value, and water in biodiesel				■		■
Coulometric water detemination in dimethyl ether	■					

Energy and power plants

Application Examples 	Titration	Ion Chromatography	Electrochemistry	Process Analysis
Anions and cations in the primary circuit of conventional nuclear power plants		■		■
Anions and cations in the secondary circuit of nuclear power plants		■		■
Fully automated determination of boric acid in nuclear power plants	■			■
FOS/TAC determination in liquid manure or silage (biogas analysis)	■			■
Organic acids in liquid manure or silage (biogas analysis)		■		
Water in transformer oils	■			
Anions in wastewater of flue gas desulfurizing plants	■	■		■
Chloride in ash of flue gas desulfurizing plants	■	■		
Hardness of cooling water in nuclear power plants	■			■
Fuel cell research			■	
Copper and iron in cooling water and boiler feed water			■	■
P/M value in cooling waters				■

Photovoltaics



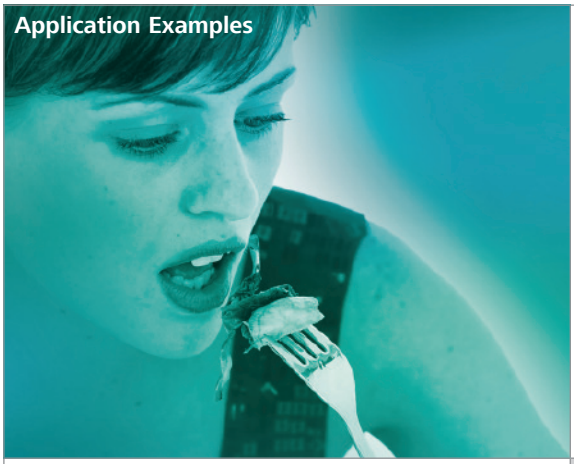
Application Examples	Titration	Ion Chromatography	Electrochemistry	Process Analysis
Determination of hydrogen fluoride, nitric acid, and hexafluorosilicic acid in etching baths	■	■		■
Characterization of dye-sensitized solar cells and organic solar cells	■		■	
Monitoring of baths for thin layer solar cells (CIS/CIGS cells)			■	
Determination of additives in electroplating baths for the production of silicon solar cells			■	■
Determination of copper and chromium in etching baths			■	■
Determination of fluoride, nitrate, phosphate, and sulfate in etching agents		■		■
Determination of phosphoric, nitric, and acetic acid blends used for etching of aluminum in the production of semiconductors	■			■
Mineral acids and silicon in solar cell production	■	■		■

Plastics

Application Examples	Titration	Ion Chromatography	Electrochemistry	Stability measurement	Spectroscopy	Process Analysis
Antimony, cobalt, and titanium in PET			■			
Water in plastic granules	■				■	
Phosphate and sulfate in polymers after inline dilution and inline dialysis		■				
Fluoride, chloride, nitrite, nitrate, benzoate, and sulfate in PVC		■			■	■
Acid number, hydroxyl number, and isocyanates in raw materials	■				■	■
Thermal stability of PVC				■		
Carboxyl and amino end groups in polyesters and polyamides	■				■	■
4-carboxybenzaldehyde in terephthalic acid			■			■
Epoxide number of plastics	■					
Free styrene in polystyrene			■		■	■
Nickel, cobalt, iron, chromium, manganese, and titanium in terephthalic acid			■			■
Monitoring of polymerization processes					■	■
Identification of polymers					■	
Water content in liquefied monomers, e.g., 1.3-butadiene, vinylchloride, propene	■					

	Titration	Ion Chromatography	Electrochemistry	Spectroscopy	Process Analysis
Platinum in urine			■		
Sodium, potassium, and calcium in an infusion solution containing amino acids		■			
Acid/base titration of blood and blood plasma according to Joergensen and Stirum	■				
Simultaneous determination of amino acids (e.g., cystine and cysteine)		■	■		
Determination of chloride, nitrite, nitrate, phosphate, sulfate, and thiocyanate in saliva		■			
Determination of ammonium using the ion-selective electrode	■				
Determination of the depolymerase activity – enzymatic degradation of bioplastic	■				
Glycerolphosphate in amino acids		■			
Determination of anions and cations in human urine		■			
Aluminum in protein lyophilisate after digestion			■		
Monitoring of fermentation processes		■		■	■

Food

Application Examples	Titration	Ion Chromatography	Electrochemistry	Process Analysis	Spectroscopy	Stability Measurement
						
Salt and acid content of different foods	■			■		
Sodium in food	■	■		■		
Alpha acids in hops and hop products	■					
Organic acids in wine and beer		■				
Formol number and acid content of juices	■			■		
Vitamin C in food	■					
Water content of chocolate	■					
Acid number, iodine number, peroxide number, saponification number in edible oils and fats (palm oil)	■			■	■	
Cadmium, lead, and copper in wine after UV digestion			■	■		
Degree of acidity in milk and yogurt	■			■		
Cystine and cysteine in dairy products		■	■			
Bromate in mineral water		■		■		
Acetate, chloride, and sulfate in mayonnaise		■		■		
Lactose in lactose-free milk products		■				
Oxidation stability of different vegetable oils (e.g., olive oil, rapeseed oil, sunflower oil, soybean oil)						■

Follow us on our jubilee world tour!

In 2018, we are celebrating 75 years of Metrohm. On this occasion, our scientific editor Stephanie Kappes will visit Metrohm companies, customers, and partners all around the world. Follow Stephanie blogging about her world tour to 37 countries at **blog.metrohm.com**

Metrohm

Subject to change
Layout Ecknauer+Schoch ASW, printed in Switzerland by Metrohm AG, CH-9100 Herisau
8.000.5254EN – 2018-03