2060 VA Process Analyzer

Reliable trace metal analysis for online process control

PUSHING THE LIMITS TOGETHER

Ω **Metrohm**
Process Analytics

Monitoring your process 24/7

Maximize profitability, comply with regulations, and increase plant safety

Metrohm Process Analytics is known as a pioneer in process analysis and has become one of the global process industry's preferred solution providers for monitoring key parameters in large scale industrial manufacturing processes.

The first multipurpose process analyzer was developed by Metrohm in the 1970's, with a limited range to handle four sample streams. Since then, Metrohm Process Analytics has continued to push the limits together with our customers by providing the best customized online analytical solution on the market.

The 2060 platform enables online monitoring of industrial processes with multiple parameters and streams. The platform consists of the most versatile analyzers in the Metrohm Process Analytics product portfolio. They enable 24/7 online or atline monitoring of chemical industrial processes, water, wastewater, other liquids, and gases.

Voltammetric analysis goes online

Voltammetric trace analysis (VA) is used for determining the type and amount of electrochemically active substances in a liquid sample on the basis of a current-voltage relationship. These can be inorganic or organic ions, or even neutral organic compounds. This electrochemical technique is mostly used for trace metals analysis in aqueous samples with complex matrices including industrial waste water and sea water.

Voltammetric analyzers, developed based on many years of laboratory experience, are installed online in many industries for fast and efficient process control that an in-house laboratory cannot provide.

Moreover, VA analysis using an online process analyzer offers continuous real-time monitoring of analytes, along with customizable alarm and intervention settings based on the obtained results.

SENSITIVE, ACCURATE TRACE ANALYSIS

The importance of voltammetry is based on its high degree of accuracy and sensitivity, and the possibility of speciation analysis. For many applications voltammetric analysis can quantify substances at sub parts per billion (ppb or µg/L) levels.

The utilities needed for voltammetric measurements is straightforward with most systems requiring only electricity, high-purity rinse water, and insert gas (nitrogen) in some situations. Ventilation, flammable gases and associated safety requirements are no issue. Many of the analysis methods use safe and convenient Hg-free solid state electrodes. When a mercury electrode is needed, Metrohm's Multi-Mode Electrode pro (MME) ensures safe handling with the mercury being contained in a hermetically sealed reservoir.

Reference Electrode (RE)
Working Electrode (WE)
Auxiliary Electrode (AE)
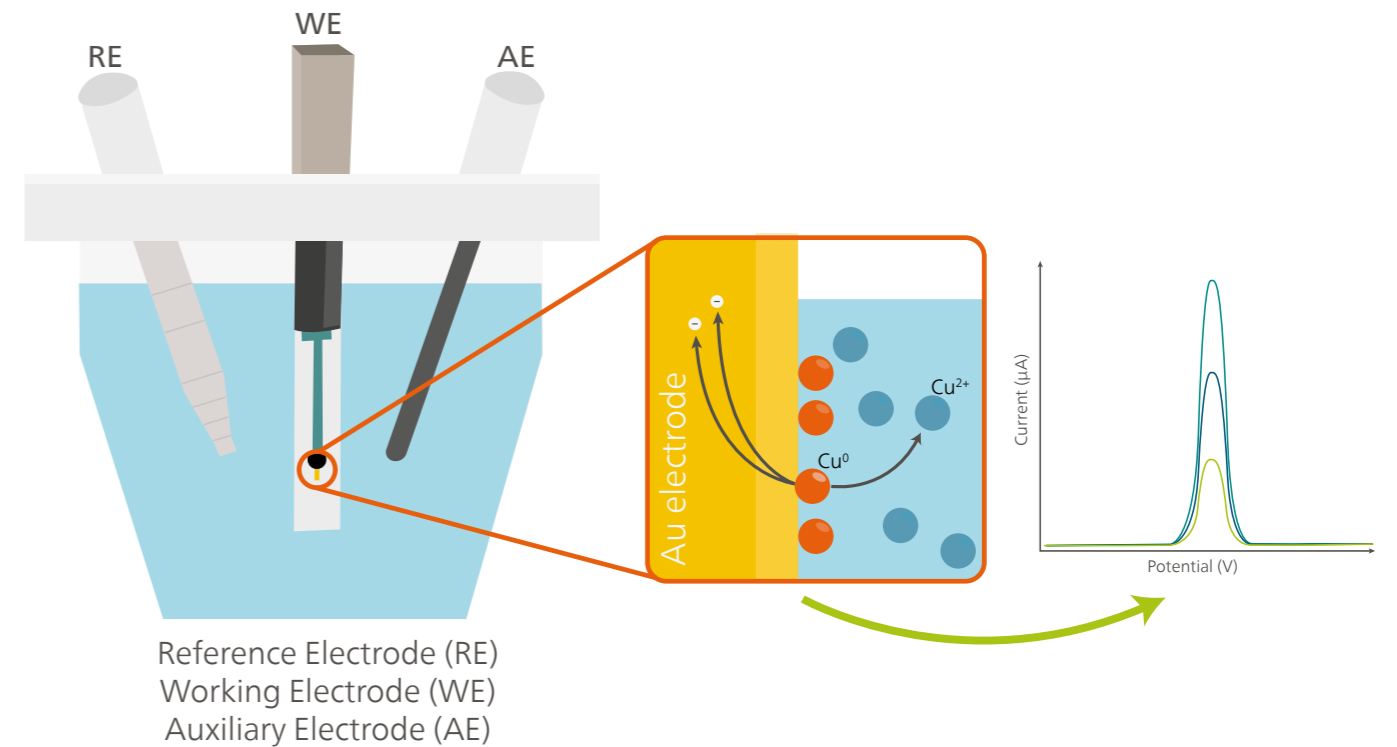
Voltammetry is an electrochemical technique in which the potential at an electrode is varied and the resulting current is measured and analyzed. The current flows as a result of electron transfer taking place during the relevant electrochemical reactions.

This technique has benefited from over a century of research and optimization, resulting in the state-of-the art waveforms and analysis algorithms used in the 2060 VA Process Analyzer.

Stripping voltammetry
By applying a discrete potential over a period of time, metal(s) are deposited on the electrode. In a second step, the potential is swept and the metal is stripped off the electrode surface. The currents measured during the sweep are directly related to the metal concentration in solution.

Due to the fact that a kind of preconcentration step (the deposition of the metal) is used in this process, stripping voltammetry is capable of achieving very low detection limits.

Easily measure chemical speciation
Voltammetry distinguishes between free and bound metal ions, or between their oxidation states, which influences the biological availability of heavy metals. This makes voltammetry into an essential tool for environmental analysis. Comparable insights can only be gained by spectroscopy after complicated separation of the metal species.
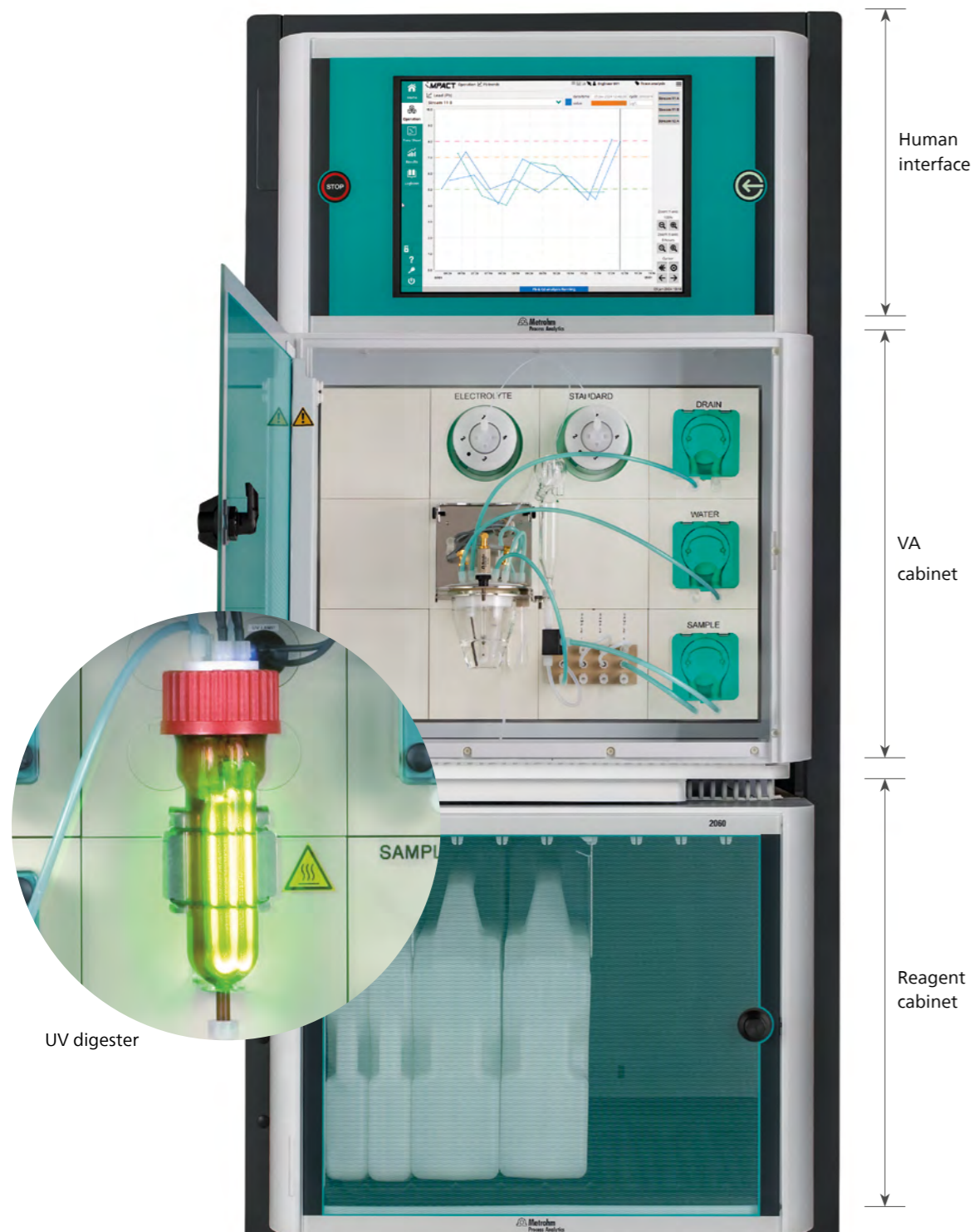
2060 VA Process Analyzer

Human interface

VA cabinet

Reagent cabinet

UV digester

* Wet part cabinet layout may vary

Metrohm is the world market leader in voltammetry. No other method is better suited for online monitoring of metals in water at trace (µg/L) levels.

The 2060 VA Process Analyzer, a family member of the 2060 platform, is specially designed for voltammetric analysis using a variety of electrodes including Metrohm's MultiMode Electrode pro (MME)

Due to its flexible design and versatile selection of electrodes, this analyzer is ideal for many industries:

- Water quality control
- Mining and metal refining
- PCB and semiconductor production
- Wastewater treatment plants

RELIABLE VOLTAMMETRIC ANALYSIS

The 2060 VA Process Analyzer is built in the same rugged housing as our other established and proven multipurpose analyzers. Its analytical heart is the 884 Professional VA system of Metrohm, the most well-known laboratory VA system. This facilitates the transfer of the established analytical methods from the laboratory to the process environment.

SUITABLE FOR A VARIETY OF INDUSTRIES

Depending on the application the so-called wet part can be configured from a selection of robust modules including sampling valves, tubing pumps, dosinos, and more. Depending on the application, the number of burettes may change, or a sample digester (UV or thermal) may or may not be present.

SAMPLE PRETREATMENT WITH DIGESTION

When performing metal analysis, often a part of the metals are bound in (organic) compounds. A digester module is used to release these metals by exposing the sample to heat, or UV radiation, possibly in combination with an oxidizer and acid. Now all metals are determined in a subsequent VA analysis, and the amount of free vs. total metals can be calculated.

ELIMINATE INTERFERING SUBSTANCES

Organic substances, peroxides, and oxygen can interfere with voltammetric measurements. UV or thermal digestion options are available to eliminate interfering species by converting them to inactive molecules like carbon dioxide and water.

Metrohm's history in Voltammetry

METROHM'S HISTORY IN ELECTROANALYSIS GOES BACK TO 1957

Metrohm's history in electroanalysis traces its roots back to the year 1957, marking the start of a journey that continues to shape the landscape of analytical chemistry. Over the years, Metrohm's commitment to excellence has been evident in the development and production of cutting-edge electronics, sophisticated software, specialized electrodes, and innovative methods. Metrohm's team of experts, boasting extensive experience in the field, has played a pivotal role in advancing the realm of electroanalysis.

AUTOMATING ELECTROANALYSIS FOR MORE THAN 3 DECADES

At the forefront of Hg-free applications development, Metrohm stands out as a pioneer in the creation and commercialization of mercury-free electrodes for Voltammetric Analysis (VA).
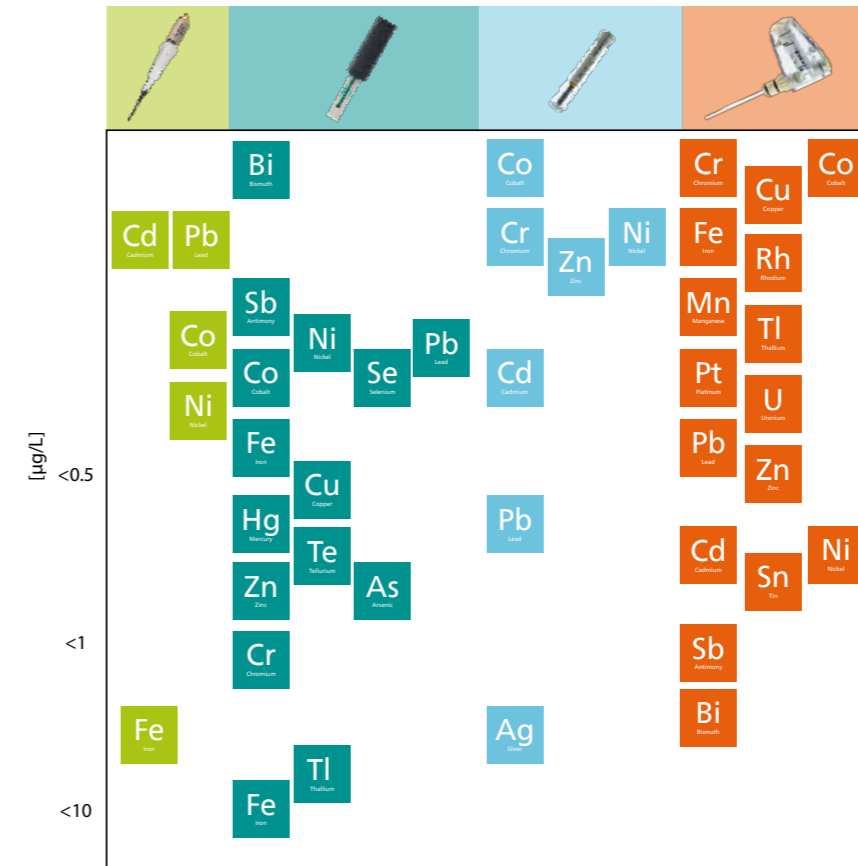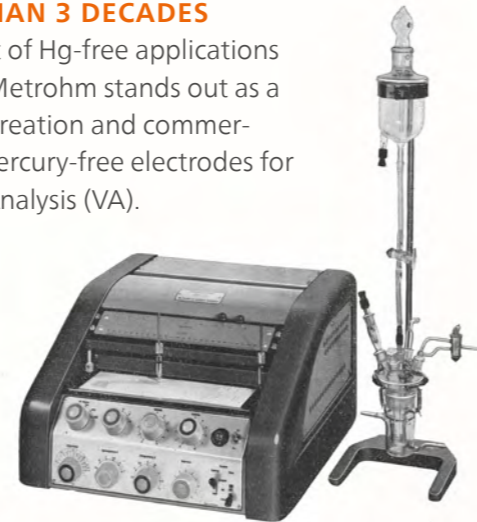
In voltammetry, a well-chosen electrode ensures optimal signal response, enhances detection limits, and minimizes interference, ultimately leading to more precise and meaningful analytical outcomes.

The analyte, matrix composition, and automation requirements all contribute to determining the most suitable electrode for optimal performance.

The 2060 VA Process Analyzer has been designed to be used with a variety of electrodes. From the **scTRACE Gold** electrode, which excels in monitoring As, Bi, Cu, Fe, Pb, Sb(III), Se(IV), Te(IV), and Zn, to the **GC RDE** electrode, specifically designed for Cd, Co, Cr(VI), Ni analysis, and the **Bi drop** electrode tailored for Cd, Cd/Pb, Co, Fe, and Ni applications, this analyzer ensures that voltammetric analyses are executed with the utmost accuracy and efficiency.

Total control, total precision

CLEANLINESS

Trace analysis requires clean conditions that are challenging to maintain in a process environment. 2060 VA Process Analyzer offers an enclosed reagent cabinet, clean and durable FEP and Chem-Durance (TM) tubing, self-cleaning schedules for the electrodes and vessels, and the possibility to add a Type I water purification system.

ANALYSIS

Metrohm's decades of experience and expansive library of voltammetric analysis methods are the starting point for an unimaginable online VA solution. These proven methods are coupled with robust automation practices to deliver maximum accuracy and repeatability.

PROGRAMMING

IMPACT is in complete sync with the 2060 VA Process Analyzer. Thanks to the smart programming features, the analyzer can be used to perform various predictive tasks to make sure the analysis and process are optimized continuously. The IMPACT software provides advanced programming capabilities allowing range adjustments, diagnostic sequences, and intervention to be executed intelligently.

SAMPLE PREPARATION

The 2060 VA Process Analyzer ensures that fluctuation in sample matrix does not affect the measurement by offering automated sample pretreatement steps including filtering, digestion, dilution, and pH buffering.

WORKING ELECTRODE

The working electrode (WE) is the electrochemical sensor in voltammetric measurements. The WE with the best fit for purpose is selected and the monitoring of the health and lifetime of the electrode is automated by the 2060 VA Process Analyzer.

MAINTENANCE

Not only does the **IMPACT software** provide the results from the analysis, it also performs health checks and proactively informs operators of potential issues. Alarms are triggered if hardware faults are detected, or analytical data are trending out of range.

Customized solutions depending on your needs

MULTIPLE TECHNIQUES IN ONE PLATFORM

The 2060 VA Process Analyzer can integrate multiple techniques into a single platform. This process analyzer enables continuous voltammetric analysis, ensuring uninterrupted data collection. Its advanced programming capabilities extend beyond basic analysis, transforming plant safety with distinctive features.

The 2060 VA Process Analyzer incorporates intelligent programming functionalities that mark a new era of process control. Through intelligent conditional actions based on "if" statements, this analyzer assumes a proactive role. It continually monitors critical parameters in real-time, empowering users to make well-informed and precise decisions. If an upcoming sample deviates from established limits, the analyzer responds promptly. It can increase the frequency of measurement, change the dilution factor, execute an electrode health check, or trigger an additional measurements such as titration or photometry for additional insight.

This responsive mechanism enables early detection warnings, allowing for immediate corrective actions before problems escalate. The adaptability of this process analyzer to diverse process conditions enhances productivity, minimizes defects and waste, and ensures consistent process stability.

PARALLEL ANALYSIS TECHNIQUES

When a more thorough analysis is necessary, the 2060 VA Process Analyzer seamlessly incorporates comprehensive techniques such as titration, photometry measurements.

Experience you can trust – Solutions for all major industries

The 2060 VA Process Analyzer is a high-tech online analyzer used in various industries. It can detect trace elements, metal impurities, and measure metal concentrations in water. It is cost-effective and integrates with online systems, making it highly accurate and efficient.
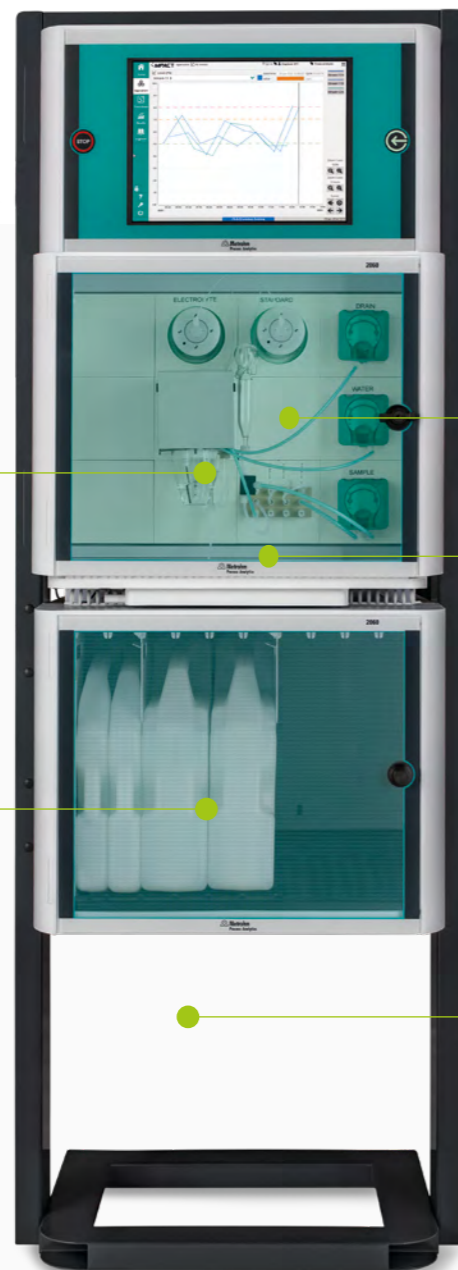
Modular system that facilitates customization.

Inert components and protective cabinets guarantees the cleanliness required for trace analysis.

Monitor up to 10 sample points with customized analysis schedule.

Automated sample pre-treatment: pH adjustment, digestion, dilution.

Possibility to combine multiple analysis techniques (VA/Photometry)

FOOD & BEVERAGE

Monitoring trace levels of metals and micronutrients in water and ingredients.

PETROCHEMICALS & BIOFUELS

Monitoring of low concentartion of heavy metals such as cadmium, zinc, copper and lead during flue-gas desulfurization.

PHARMACEUTICAL

Monitoring of Iron Fe(II) in iron sucrose injections (USP)

ENERGY

Monitoring Fe and Cu in power plants to avoid Flow-accelerated corrosion (FAC)

ENVIRONMENTAL

Monitoring of various transition metal ions in water samples and ultra-trace levels of metal species in sea water

CHEMICAL PROCESSES

Monitoring of trace levels of, e.g., cadmium, lead, nickel, cobalt, or iron, in sea water, salts, and high-purity chemicals

PLATING

Monitor levels of metals like Pb and Au in plating baths for surface finishing and cosmetic coatings.

Metrohm means … Spectroscopy!

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