



# 2060 XRF Process Analyzer

Reliable x-ray fluorescence  
analysis for online process  
control

**PUSHING  
THE  
LIMITS  
TOGETHER**



 **Metrohm**  
Process Analytics



# Monitoring your process 24/7

A photograph of an industrial facility, likely a water treatment plant. In the foreground, a large, circular, metallic structure with a radial pattern is suspended by a black metal frame. Below it, there are several large, rectangular tanks filled with water. The facility has a high ceiling with a grid of metal beams and large windows in the background. The overall scene is industrial and functional.

**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 customized 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.



# X-ray fluorescence goes online

X-ray fluorescence (XRF) is a non-destructive analytical technique used to determine the elemental composition of materials. It involves exposing a sample to high-energy X-rays, which cause the atoms to emit characteristic fluorescent X-rays. By measuring these X-rays' energy and intensity, the XRF analyzer identifies the elements and their concentrations in the sample.

This spectroscopic method is valued for its rapid analysis capabilities and non-destructive nature, making it a powerful tool for process optimization, and quality control.

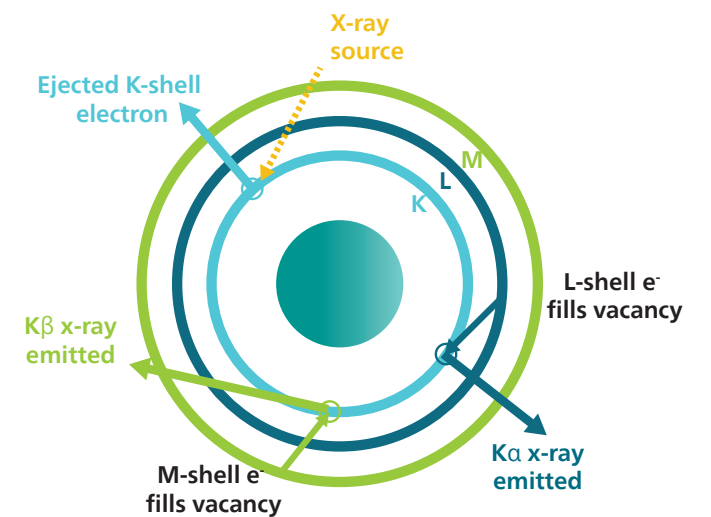
## BENEFITS FOR XRF IN PROCESS ANALYSIS

- **Non destructive analysis** – Allowing further testing due to samples being unaltered
- **Ease of use** – Minimal sample preparation required
- **High sensitivity** – Element analysis at low concentration levels (mg/L) is possible
- **Wide range of applications** – from heavy to light elements
- **Reagent-less technique** – Faster return on investment

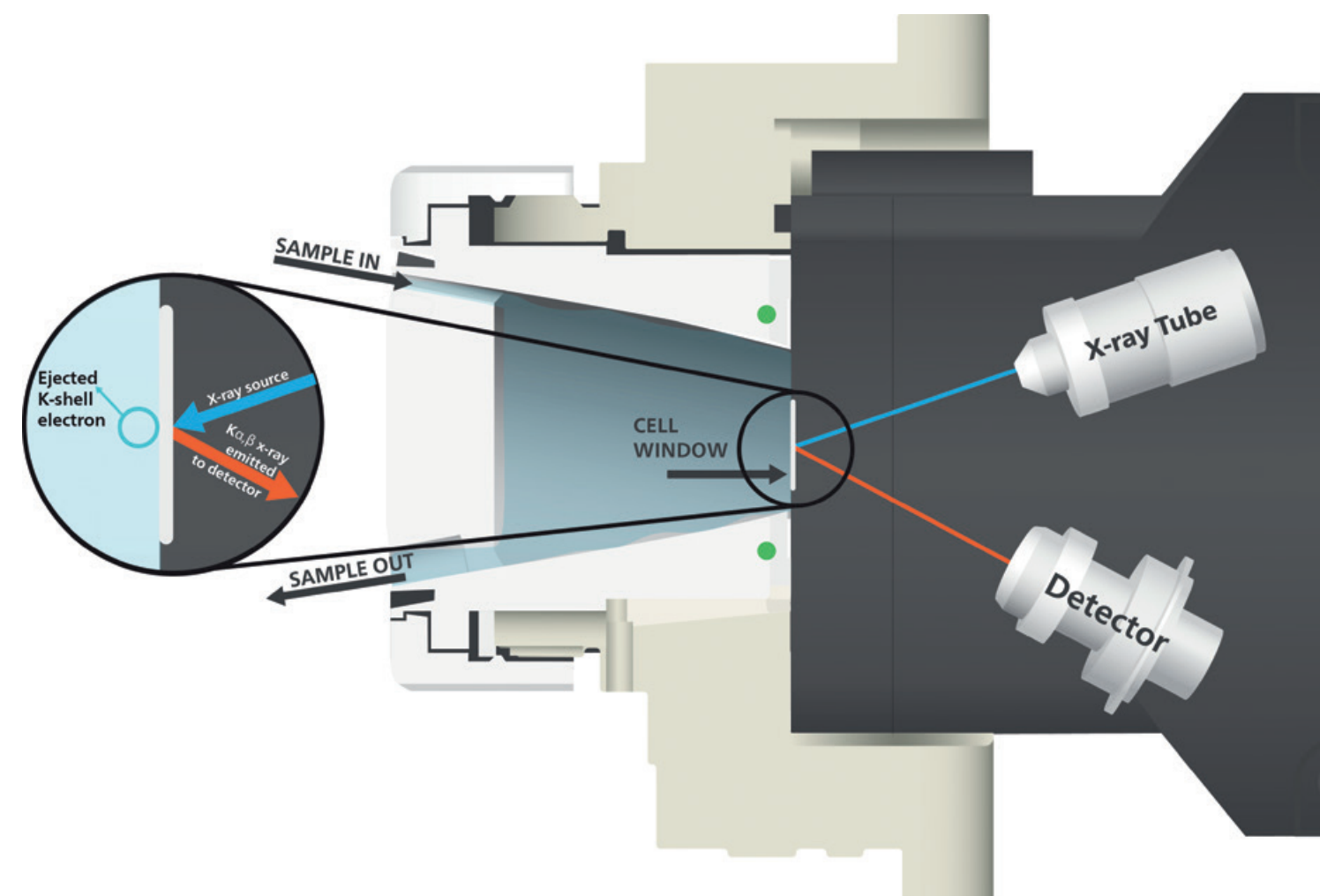
## HOW DOES XRF WORK?

When a sample is exposed to high-energy X-rays, the inner electrons in the atoms are displaced from their orbits, creating temporary voids. The unstable atoms then quickly fill these voids by capturing outer electrons.

During this process, the excess energy is emitted as fluorescent X-rays with characteristic energy levels unique to each element. A silicon drift detector (SDD) captures these emitted X-rays, and the count rate is directly proportional to the concentration of the specific element of interest in the sample. This non-destructive method is widely used in various industries for elemental analysis.



## SUITABLE FOR A WIDE RANGE OF APPLICATIONS

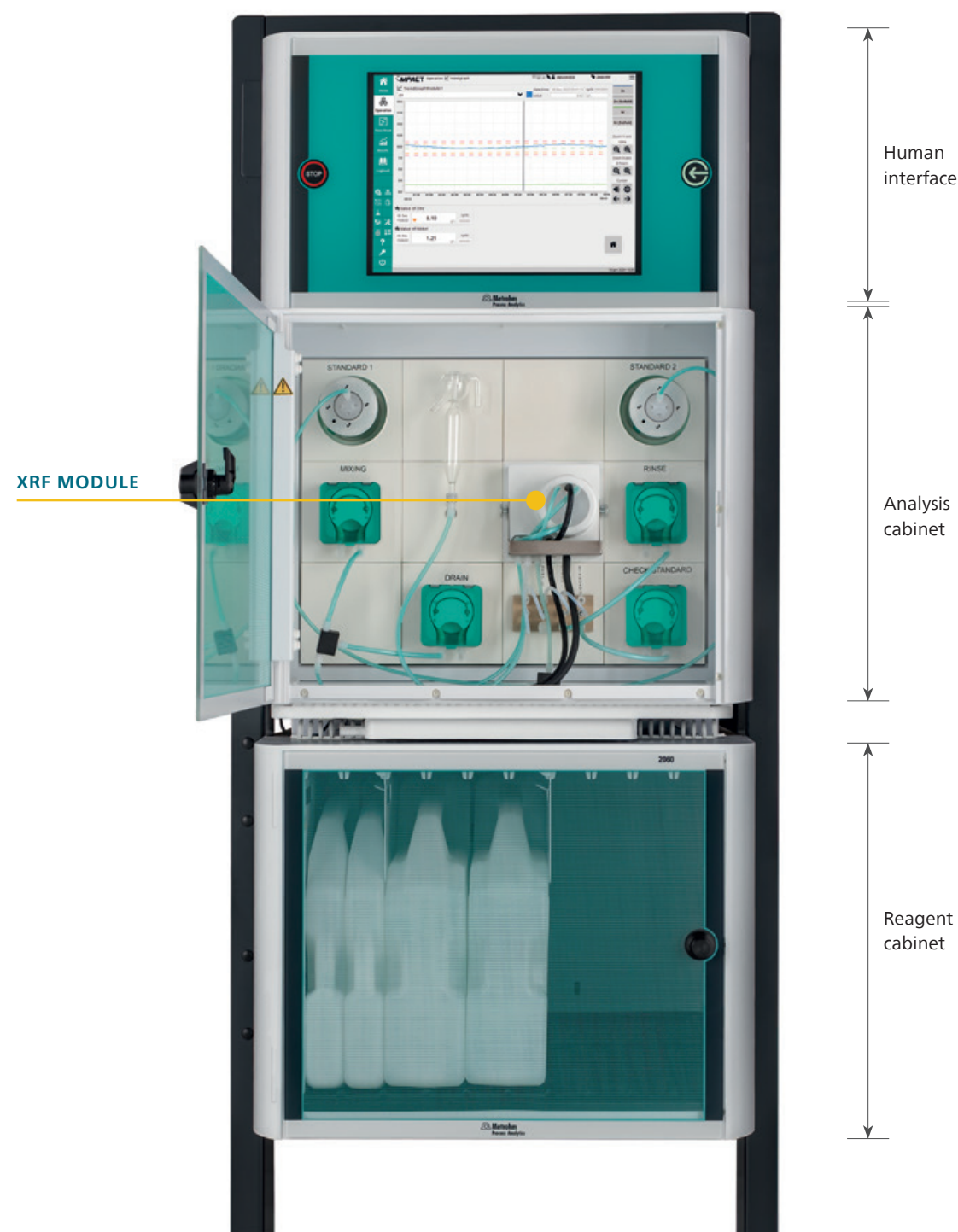


# 2060 XRF Process Analyzer

Renowned for their modular configuration concept, Metrohm Process Analyzers have elevated flexibility to a new level with the introduction of the 2060 XRF Process Analyzer. Built on the 2060 platform, this analyzer offers a fully customizable solution for online monitoring of high and light elements.

Thanks to integrated liquid handling and sampling preconditioning possibilities, process monitoring has been simplified to the press of a button with the 2060 XRF Process Analyzer. The analytical cabinet within the system allows you to configure up to **twelve wet part modules**, granting unmatched application flexibility. Besides XRF, these modules can be utilized for tasks like titration, photometry, sample preconditioning, or connecting up to 20 additional sample streams.

«Meticulously crafted in compliance with strict regulatory standards, the 2060 XRF Process Analyzer ensures user safety during analysis by providing shielding against X-rays»



## PARALLEL ANALYSIS TECHNIQUES

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

## OPTIMAL PERFORMANCE

The 2060 XRF Process Analyzer is integrated with a high resolution (large) silicon drift detector (SDD) and proven Axon Technology™ for accurate and repeatable results. The Axon Technology pushes the boundaries of X-ray detector performance with its unique ultra-low-noise electronics, resulting in more X-ray counts per second (cps) and quicker, more accurate findings.

## FASTER SERVICE

Thanks to the easily accessible wet part modules, the 2060 XRF Process Analyzers offers fast serviceability and minimal downtime in any circumstances.

## MULTIPLE SAMPLE TYPES

Capable of conducting element analysis ranging from Magnesium to Uranium, with concentrations spanning from mg/L, parts per million (ppm), to percentage levels, in **liquid** samples.

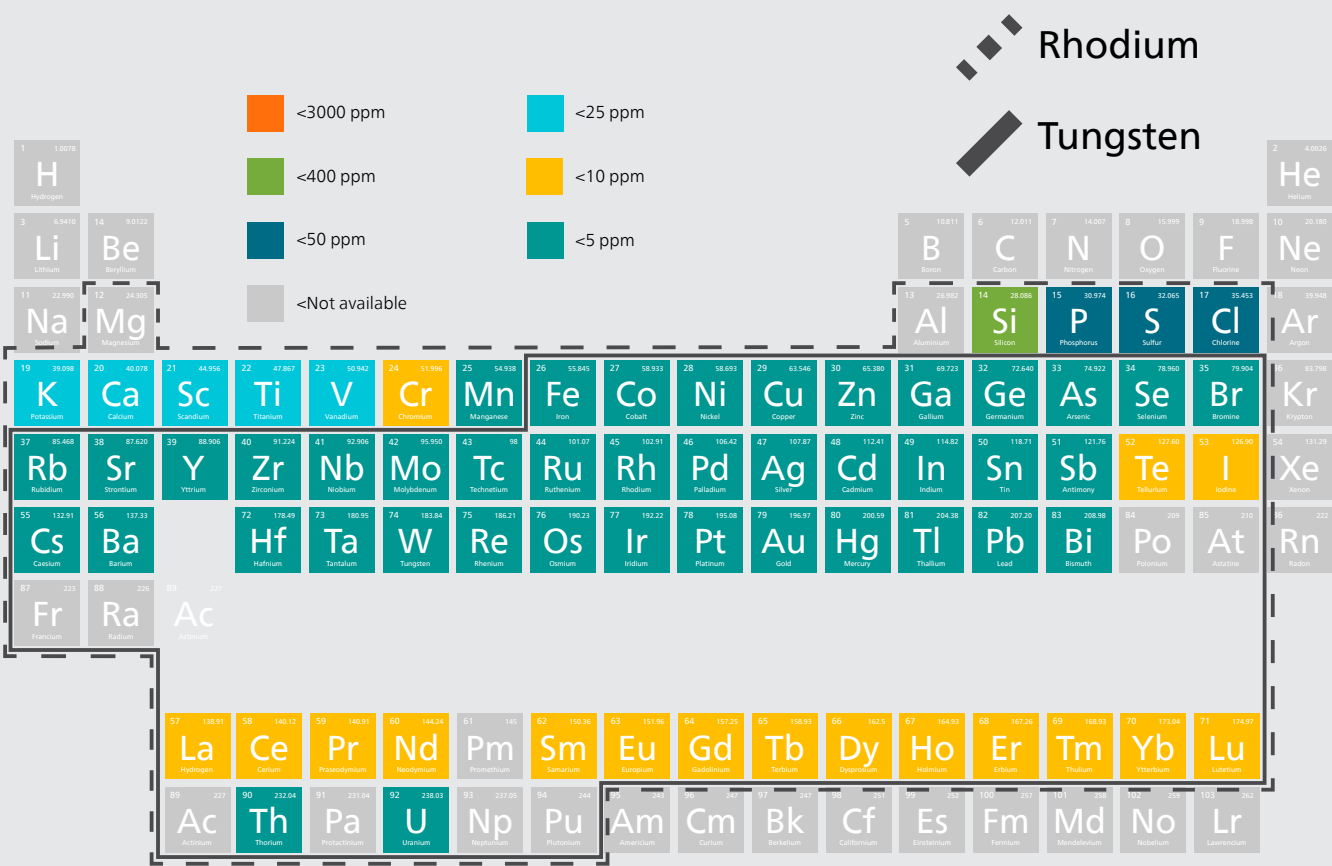
# A testament to safety and innovation

The 2060 XRF Process Analyzer, employing Energy Dispersive XRF (EDXRF) technology, provides versatile element analysis from magnesium to uranium. Engineered with a strong focus on customer safety, it incorporates an automatic shutdown mechanism that activates instantly upon cover removal, demonstrating a proactive approach to accident prevention.

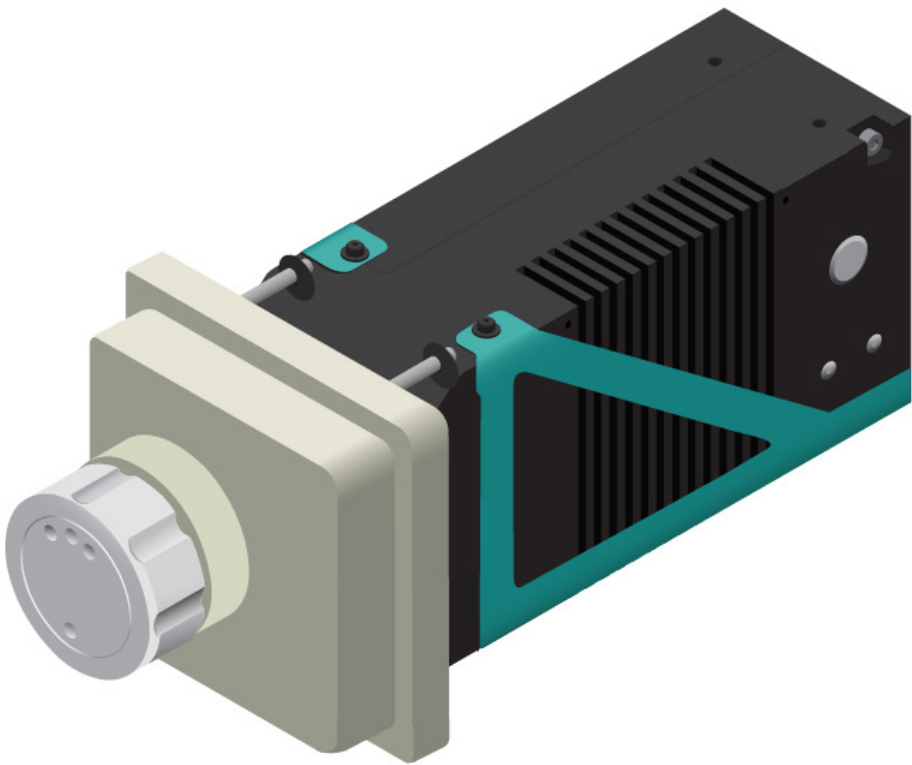
Within the realm of XRF technology, two primary excitation sources stand out: Rhodium (Rh) and Tungsten (W) X-ray tubes. Tungsten tubes emit characteristic X-rays with higher energy, suitable for analyzing heavier elements, while Rhodium tubes are better suited for lighter elements due to their characteristic X-ray energy. However, it is crucial to handle and use these sources properly to avoid unintended exposure to ionizing radiation.

### BENEFITS FOR 2060 XRF PROCESS ANALYZER

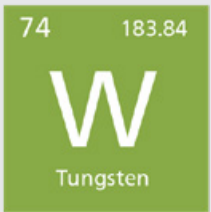
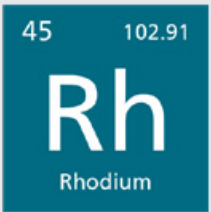
- Multiple analysis techniques in one platform (XRF with titration, photometry)
- Versatility to accommodate multiple and diverse process streams and conditions (20 sampling points)
- Multiple analysis of a broad spectrum of chemical elements, spanning from magnesium to uranium (z=12 to 92)
- Outstanding precision and accuracy even at low detection limits (from mg/L to weight percent (wt%) concentrations)
- Rapid response, durability, minimal upkeep, non-destructiveness, and reagent-less operation



\*The Limits of Detection (LOD) are dependent upon the sample composition, and they are presented as approximates



3D model representation of the XRF module of the 2060 XRF Process Analyzer.



Experience fast analysis times tailored to your specific needs thanks to the 2060 XRF Process Analyzer. An average XRF analysis usually requires 30 to 40 seconds (excluding sample preparation), delivering results near real-time.

Excitation source types.



# Parallel analysis techniques

With this innovative process analyzer, XRF analysis operates seamlessly around the clock, ensuring uninterrupted data acquisition. Its advanced programming capabilities go beyond basic analysis, revolutionizing plant safety with unique features.

The 2060 XRF Process Analyzer features smart programming functionalities that introduce a new era of process control. Through intelligent conditional actions based on "if" statements, the analyzer takes on a proactive role. By continuously

monitoring critical parameters in real-time, users are empowered to make informed and smart decisions.

If an upcoming sample deviates from set limits, the analyzer responds quickly. It either increases analysis frequency for heightened precision or sends a signal to perform titration, photometry, or standard addition measurements for more detailed analysis for cross validation.

This agile response mechanism facilitates early detection warnings, enabling immediate corrective measures before issues escalate. This process analyzer's adaptability to varying process conditions enhances productivity, reduces defects and waste, and guarantees consistent process stability. The 2060 XRF Process Analyzer serves as more than a process analyzer; it acts as a guardian for intelligent process control, establishing a fresh benchmark for efficiency, precision, and safety in industrial operations.



## Vanta™





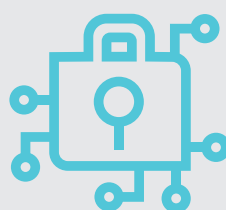


## «REAL-TIME» DATA

Knowledge is key, and the **IMPACT software** is ideal for superior process monitoring. XRF data are collected and displayed in «real-time» on the HMI. Operators can at any moment have an overview of the XRF predictions for each of the sample streams, so they can be up to date at all times.

## TAILORED PROGRAMS

With **IMPACT software**, advanced programs can be tailor-made to perfectly match each application. As each program is independent, **IMPACT** can be programmed to monitor multiple measuring points at the same time or control a sample conditioning system (SCS).



## DATA INTEGRITY

Your data are safe with us. The **IMPACT software** has been designed to store XRF results in an encrypted database. All collected data are fully traceable, preventing data tampering. The power buffer and the controlled shutdown sequence prevent data corruption, and the operating system is embedded, preventing user accessibility as another layer of protection.

## MULTILEVEL ACCESS

Different access levels can be configured to make even the routine user feel at ease with the **IMPACT software**. Advanced users can have a deeper access to the software and change/edit parameters.



## CUSTOMIZABLE OPERATION SCREENS

**IMPACT software** can be configured to show multiple operation screens. These screens can be defined to control programs (start, stop, loop, cycles, status...) and to display results in different formats (charts, histograms, tables...). Each user can have their own operation screen defined based on their personal requirements.

## ALARMS AND DIAGNOSTICS

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



The intelligent and proprietary Metrohm Process Analytics **IMPACT software** (Intelligent Metrohm Process Analytics Control Technology) is used across the 2060 platform. **IMPACT** is a complete solution offering a wide range of possibilities for process monitoring and automation.

It facilitates the acquisition of analytical data from Metrohm process analyzers, displays and transfers results to any Distributed Control System or Programmable Logic Controller (DCS, PLC), seamlessly connects to external systems (e.g., sensors), and smoothly executes advanced programs.





# Experience you can trust – Solutions for all major industries

The 2060 XRF Process Analyzer is capable of performing a wide variety of applications, be it monitoring of amines during synthesis or the determination of anions and cations in a waste water stream. Even applications which are already used in the laboratory can be transferred directly to the 2060 XRF Process Analyzer without any problem.



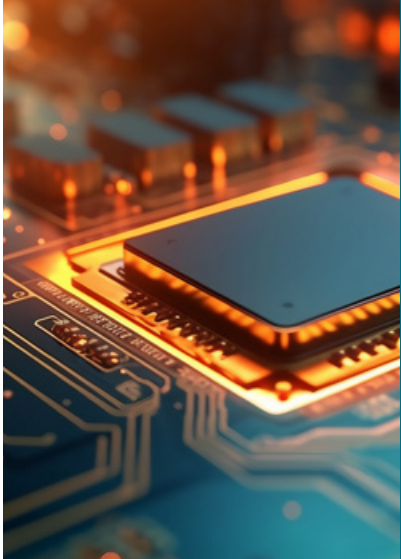
Fast analysis time (<60 s)

Up to 10 sample points  
can be connected

Broad range of analytical  
concentrations (mg/L–%) mini-  
mizing the need for dilution

Measure elements from  
Magnesium (Mg) to  
Uranium (U)

Multiple analysis techniques  
combinations



## SEMICONDUCTOR

Analysis of copper in  
electrowinning at  
Back-end of line  
(BEOL)



## WOOD TREATMENT

Lumber quality  
control by copper  
analysis



## MINING AND MINERAL PROCESSING

Monitoring the  
elemental composi-  
tion of samples in  
various stages of the  
process, such as  
leachates, liquors,  
and process waters



## POLYMER & PLASTICS

Analysis catalyst  
levels (cobalt, bromine  
and manganese)  
during Polyethylene  
terephthalate (PET)  
manufacturing



## ENVIRONMENTAL MONITORING

Monitoring waste-  
water and effluent  
streams for compli-  
ance with environ-  
mental regulations



## BATTERY

Cobalt/Nickel/  
Magnesium recycling,  
and cathode active  
material (CAM)  
slurries monitoring



## CHEMICAL PROCESSES

Analysis of feed-  
stocks, intermedi-  
ates, and finished  
products for a wide  
range of elements,  
including metals,  
halides, sulfur, phos-  
phorus, and silicon



## SURFACE TREATMENT

Analysis of electro-  
plating solutions for  
various metals, such  
as nickel, chromium,  
copper, gold, silver,  
and other metals



