

COMBINED TECHNOLOGIES - THE NEW ELEMENT IN INDUSTRY

Elemental excellence

Building on years of experience and success with our extensive analytical X-ray portfolio, Zetium is a revolutionary step in materials analysis. A unique X-ray fluorescence (XRF) instrument, with up to three complementary technologies on one multi-functional platform.

Industry editions

The Zetium Industry editions have been expertly chosen to fulfill the application needs of particular industries: **cement, minerals, metals, petrochemicals** and **polymers**. They offer unrivalled price: performance ratios and can be fine-tuned according to your needs.

Next to the 5 industry editions, the **Ultimate edition of Zetium** meets the most demanding requirements regardless of industry. The Ultimate edition represents the most advanced configuration in the Zetium family to deliver unrivalled sensitivity across the periodic table to save time and increasing sample throughput in busy laboratories. With the market-leading standardless analysis Omnia module, qualitative and quantitative elemental analysis are easily made of unknown materials or in situations where calibration samples are not readily available.

Packaged solutions

No matter the task, the modular design of the Zetium platform allows customizable configurations to meet even the most demanding requirements, ensuring the best possible fit into your workflow. The packaged solutions help you configure the right system to deliver:

- Speed and throughput
- Flexibility
- Robustness and uptime
- Performance enhancement.



CEMENT



Are you looking into further improving your process efficiency and increasing the margin of your cement plant? The Cement Edition of Zetium may be your tool of choice. The instrument takes analysis of elemental composition to the next level with robust, highly accurate and fast analysis of incoming raw materials, hot meal, clinker and cement allowing for more stable and optimized processing.

METALS



Strict process and quality control to prevent product failure is essential for the metals industry where excellent elemental analysis is a prerequisite for meeting the strictest process control targets. The Metals edition of Zetium is designed to deliver the most precise and accurate analytical results, from raw materials to final and secondary products. The robust hardware of the Metals Edition of Zetium and a choice of pre-calibrated application solutions ensure fast and reliable results.

MINERALS



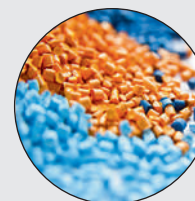
Increased recovery rates and more efficient processing require frequent analysis to obtain detailed knowledge during all steps of the mining process. From exploration samples to mineral concentrates, ores to tailings, the Minerals Edition of Zetium delivers superior flexibility, analytical performance and stability in the most demanding mining environments. Unique advantages for mineral and mining applications include a reduction in analysis times of up to 50 %, identification of unexpected elements and enhanced traceability.

PETROCHEMICALS

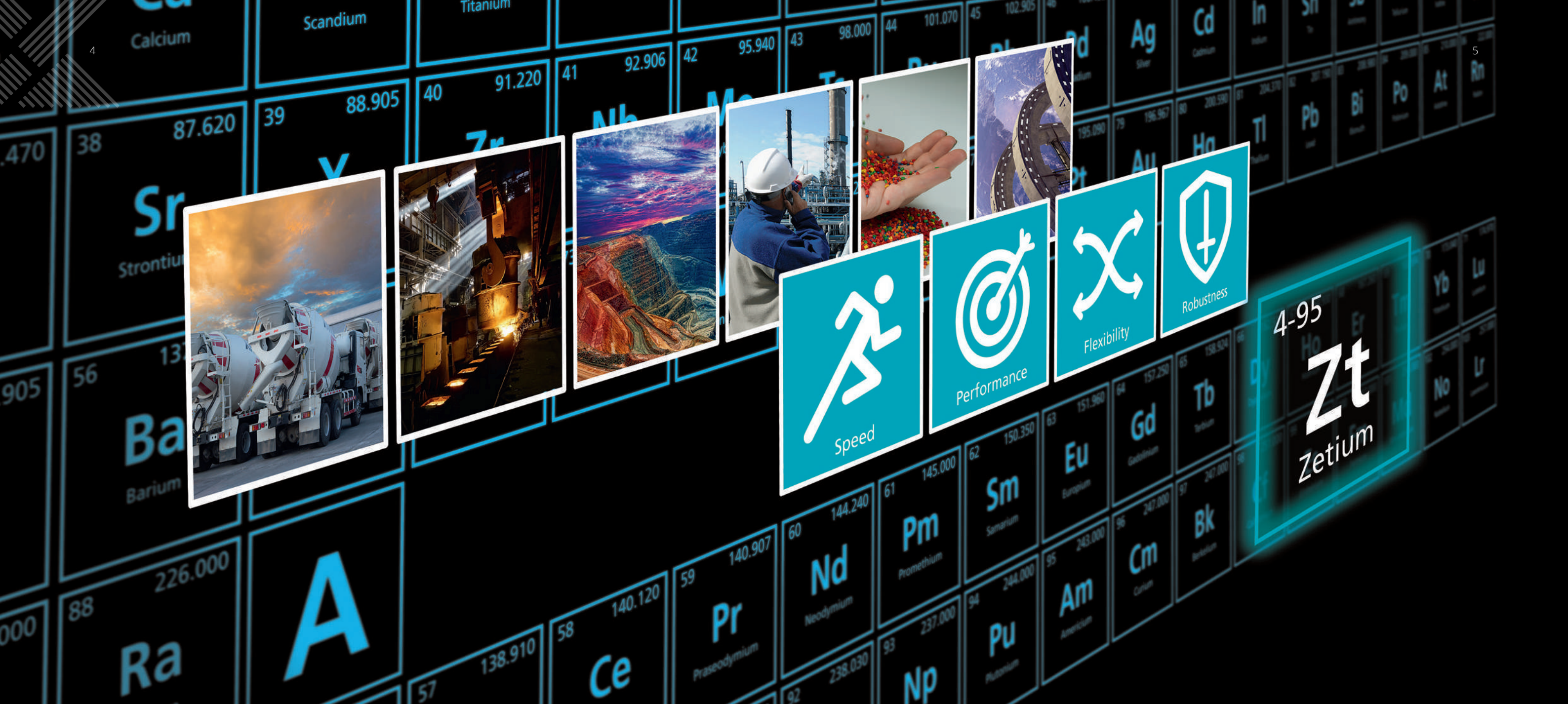


Close monitoring of petrochemical processes allows efficient quality control and early detection of the presence of detrimental elements. The Petro Edition of Zetium delivers accurate and quantitative elemental analysis of oils, fuels, catalysts, pipe-scaling, and other substances found throughout the petrochemical processes. Best-in-class long-term repeatability guarantees compliance with important oils and fuels standard test methods such as ASTM D2622 and others.

POLYMERS



Reproducible and accurate elemental analysis of polymers is essential for safeguarding consistent product quality. The Polymers Edition of Zetium is calibrated with the internationally renowned ADPOL and TOXEL reference materials guaranteeing highly reliable analytical results. The optional addition of small-spot elemental mapping and analysis capabilities allows identification and qualification of spots in off-spec products.



ELEMENTAL EXCELLENCE

ELEMENTAL INNOVATION

Continuous development, improved customer experience

Scientifically-sound, benefits-driven innovations achieved with SumXcore technology on the Zetium platform provide ultimate flexibility, performance and versatility and are on track to revolutionize the world of XRF.

ELEMENTAL INTELLIGENCE

Advanced analytical software for advanced analytical hardware

A quantum step for our renowned SuperQ software gives access to new technology combinations and analytical possibilities. Starring the Virtual Analyst, it enhances the user experience in setting up and operating the system.

ELEMENTAL TECHNOLOGY

60 years of experience and heritage - the ideal starting point

Zetium is the next in a generation of remarkably successful WDXRF spectrometers, including the Axios, the MagiX and the PW2400. This heritage of proven technology has been refined and brought forward providing the foundation to the Zetium platform.

ELEMENTAL SUPPORT

Transparent and reliable support no matter the location

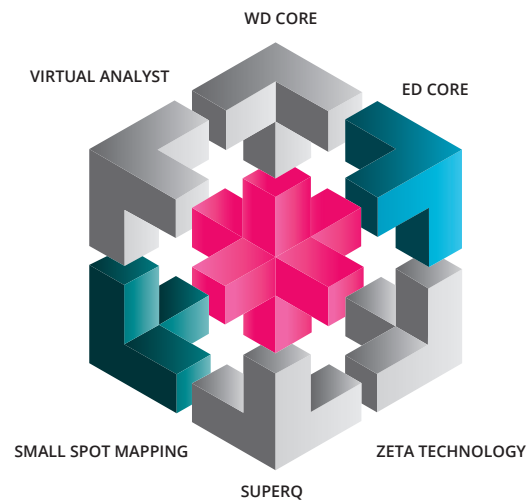
From service to expertise, training to laboratory analysis the user is supported from every angle. With a worldwide network of experienced engineers coupled with the industry's largest pool of application scientists Malvern Panalytical is always on hand to help you meet your analytical requirements.

ELEMENTAL INNOVATION

The Zetium platform embodies SumXcore technology - an integration of WDXRF, EDXRF and XRD. This unique combination of possibilities puts it in a class of its own with respect to analytical power, speed and task flexibility.

Key specifications

- Elemental range of Na - Am.
- Concentration range of ppm - 100 wt%.
- Customized SDD detector for high X-ray flux environment.
- Variable signal attenuation for optimum performance flexibility.
- High count rate capability of up to 1 Mcps.



ENHANCED FLEXIBILITY, PERFORMANCE AND SPEED THROUGH ED CORE INTEGRATION

With SumXcore technology, WD and ED cores are combined on one platform and can be run in parallel maximizing task flexibility and enhancing performance.

Improved analytical performance

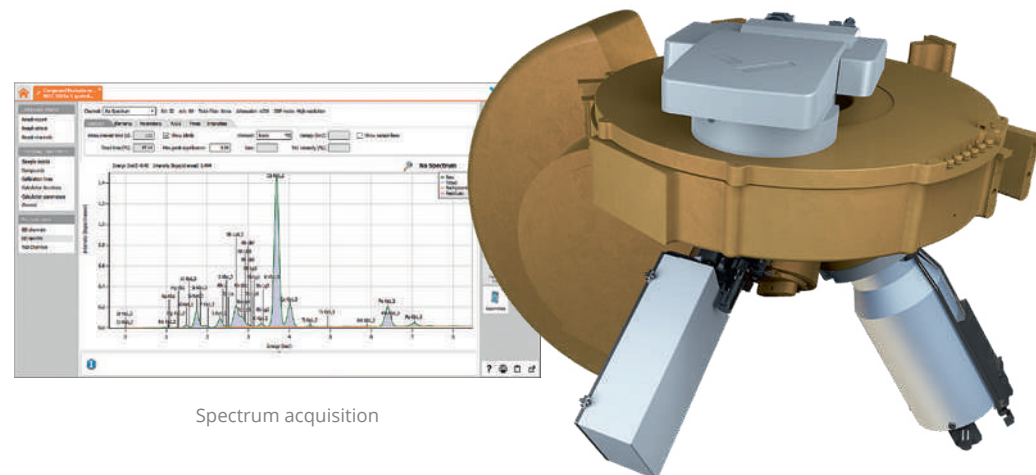
- Dramatically reduced measurement times by up to 50% through simultaneous data acquisition with the SumXcore.
- Obtain target precision faster compared to traditional WDXRF.
- Obtain the lowest LLD across the periodic table faster through SumXcore technology.

See the unexpected

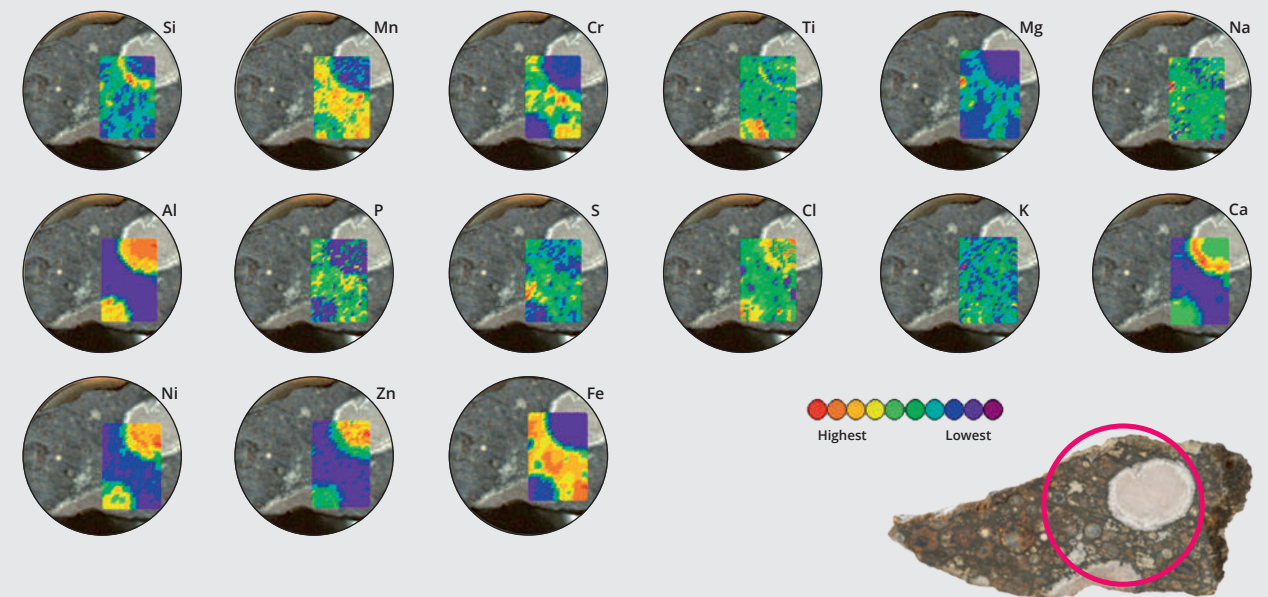
- Track unexpected elements that can affect process element analysis without increasing measurement time.
- Collect the entire spectrum for each sample without compromising accuracy.

Increased confidence in quality

- Dual independent analysis.
- WD and ED norms compliance on one platform.
- Preventive maintenance tool.
- Robust backup analysis.



Spectrum acquisition



COMPREHENSIVE SMALL SPOT ANALYSIS AND MAPPING IN A FRACTION OF THE TIME

Small spot analysis with element distribution mapping is an ideal tool for materials research and production process troubleshooting and makes a valuable addition to a bulk sample analysis spectrometer. No longer confined to research facilities, this technique is now available anywhere you need it.

Applications include conventional calibrated applications for simple inclusion analysis to complex multi-element distribution (quantitative or qualitative analysis) for a wide variety of sample types.

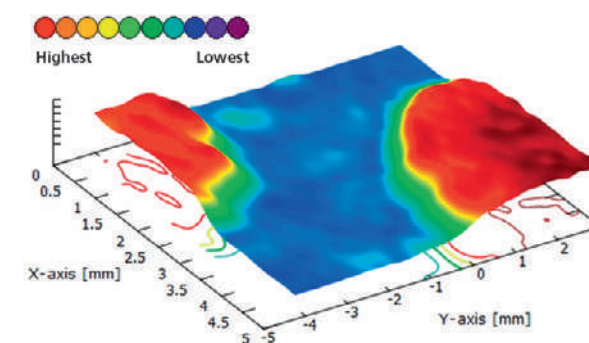
With the regular small spot mapping solution the ED-core is available for both small spot analysis and bulk analyses. The fluorescence collection optics of the HiPer small spot mapping turns the ED core into a dedicated small spot mapping solution with unrivalled sensitivity.

Practical and fast analysis with the ED core

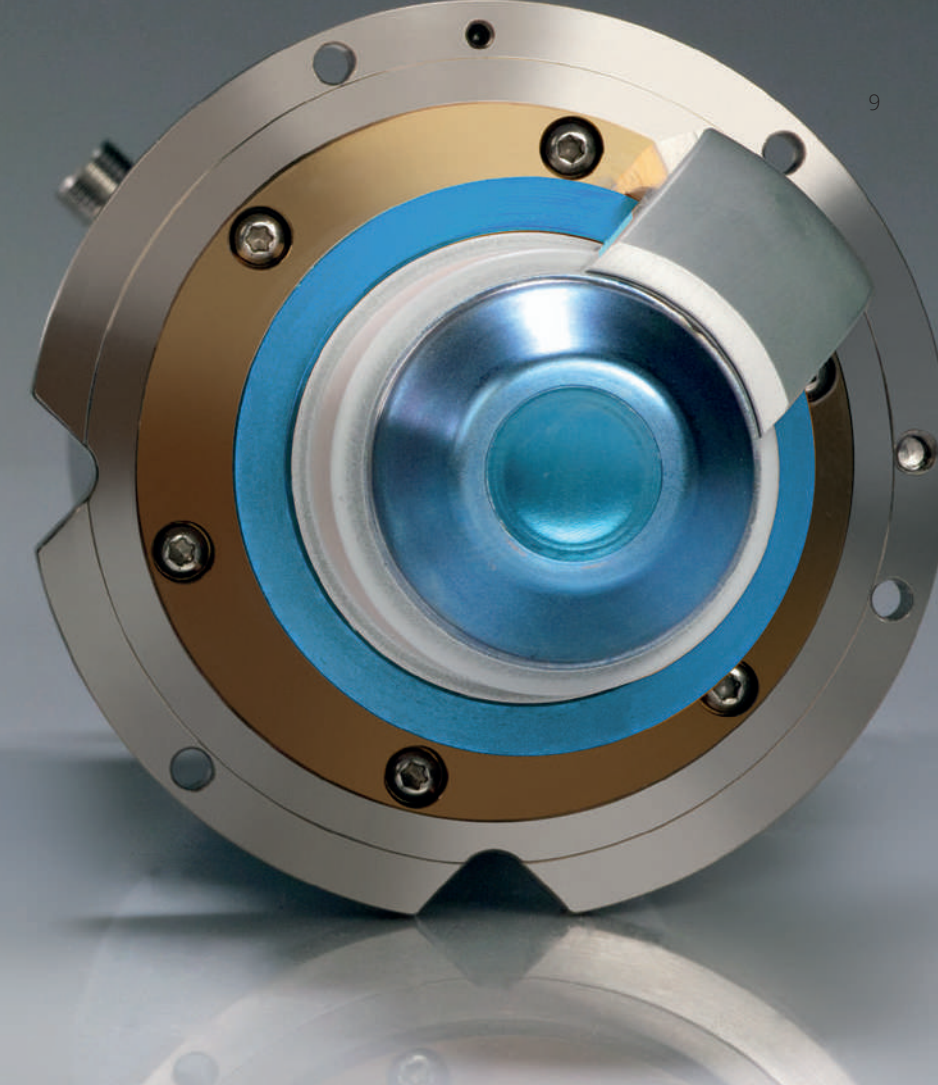
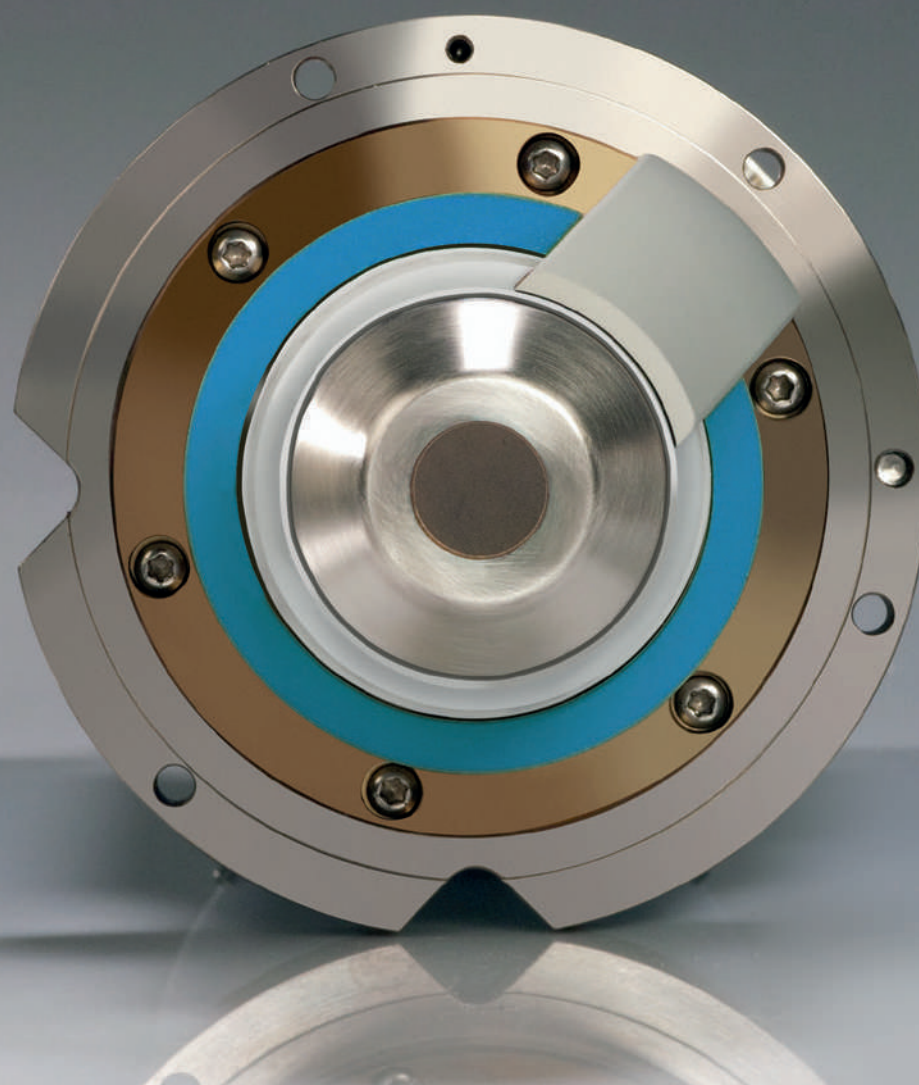
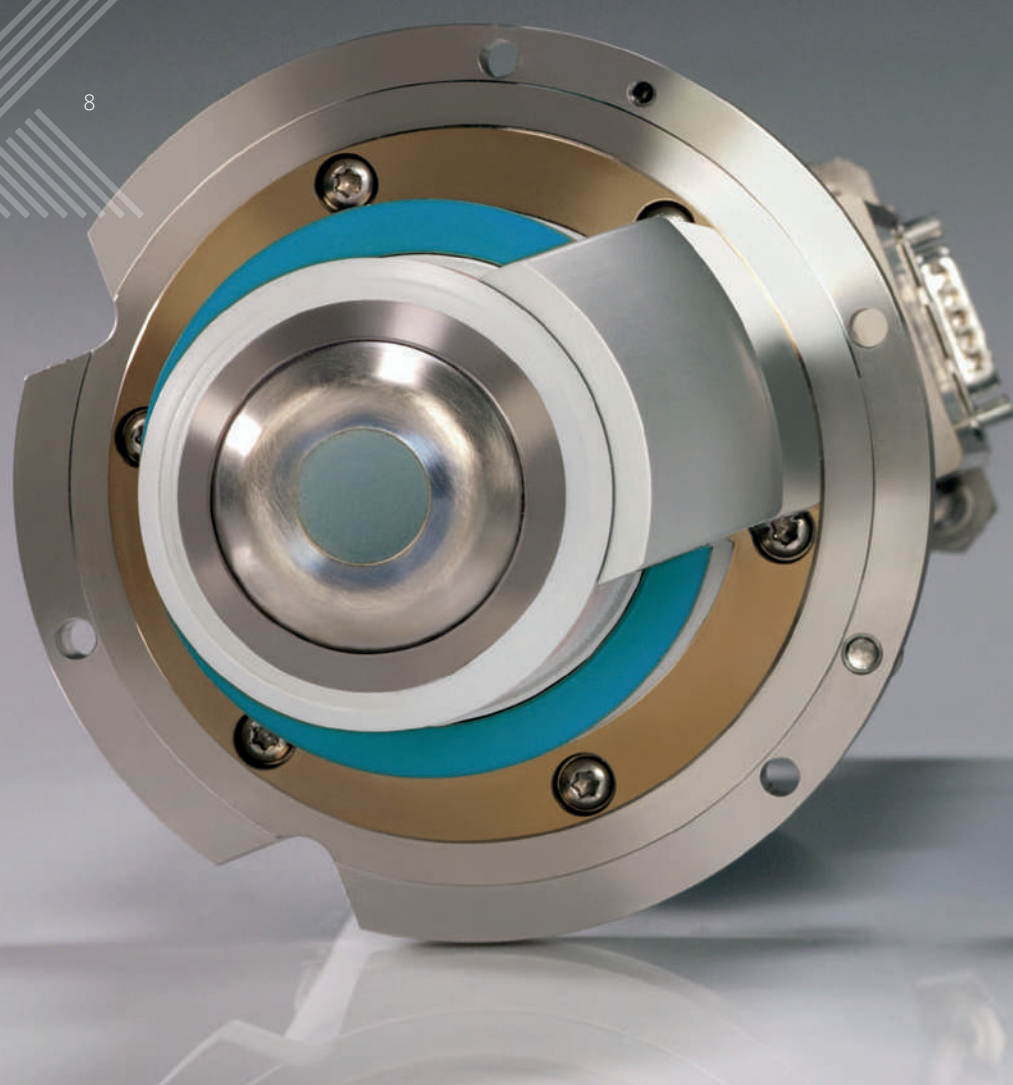
- Close coupling of the optics to the sample.
- Simultaneous multi-element data acquisition, further enabling accurate quantification with FP-based standardless analysis (Omnian).
- No compromise on WD core analysis.

Key specifications

- 35 mm maximum diameter.
- Spot size of 0.5 mm.
- Stepwise positioning of 100 μm .
- Camera and innovative sample translation mechanics.
- Specially designed holder for irregularly shaped samples of varying sizes.



Mapping data for element 'Al' in a meteor



ROBUST AND DRIFT-FREE X-RAY TUBES

Malvern Panalytical is the only manufacturer of analytical X-ray systems that also manufactures high-power X-ray tubes, allowing us to truly optimize the performance of systems we develop. For example, we have specially developed a SST R-Ag tube for the Cement edition of Zetium, which enables the best quantification of free lime in cement clinkers.

We continually innovate X-ray tube design to bring the highest performance and longevity. Our new SST R-mAX X-ray tubes are built on a legacy of innovations spanning over 20 years.

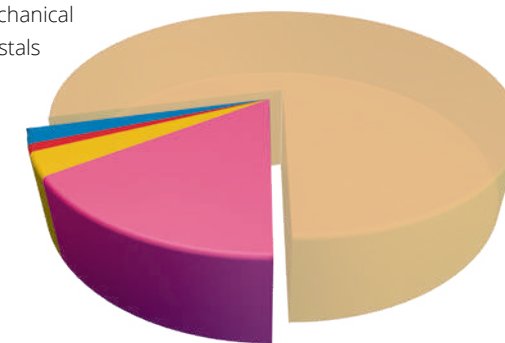
- SST – highest sensitivity due to close-coupled ceramic design.
- SST-mAX with ZETA technology – reduced calibration maintenance by eliminating the single largest source of drift in the X-ray systems.
- CHI-BLUE tube window coating – up to 50 x higher resistance to corrosion and improved vacuum tightness for long-term durability, without impacting the performance of the tube.
- SST-mAX50 – superior light-element sensitivity with a durable 50 µm window solution, capitalizing on ZETA and CHI-BLUE technology.

Designed for full-power operation

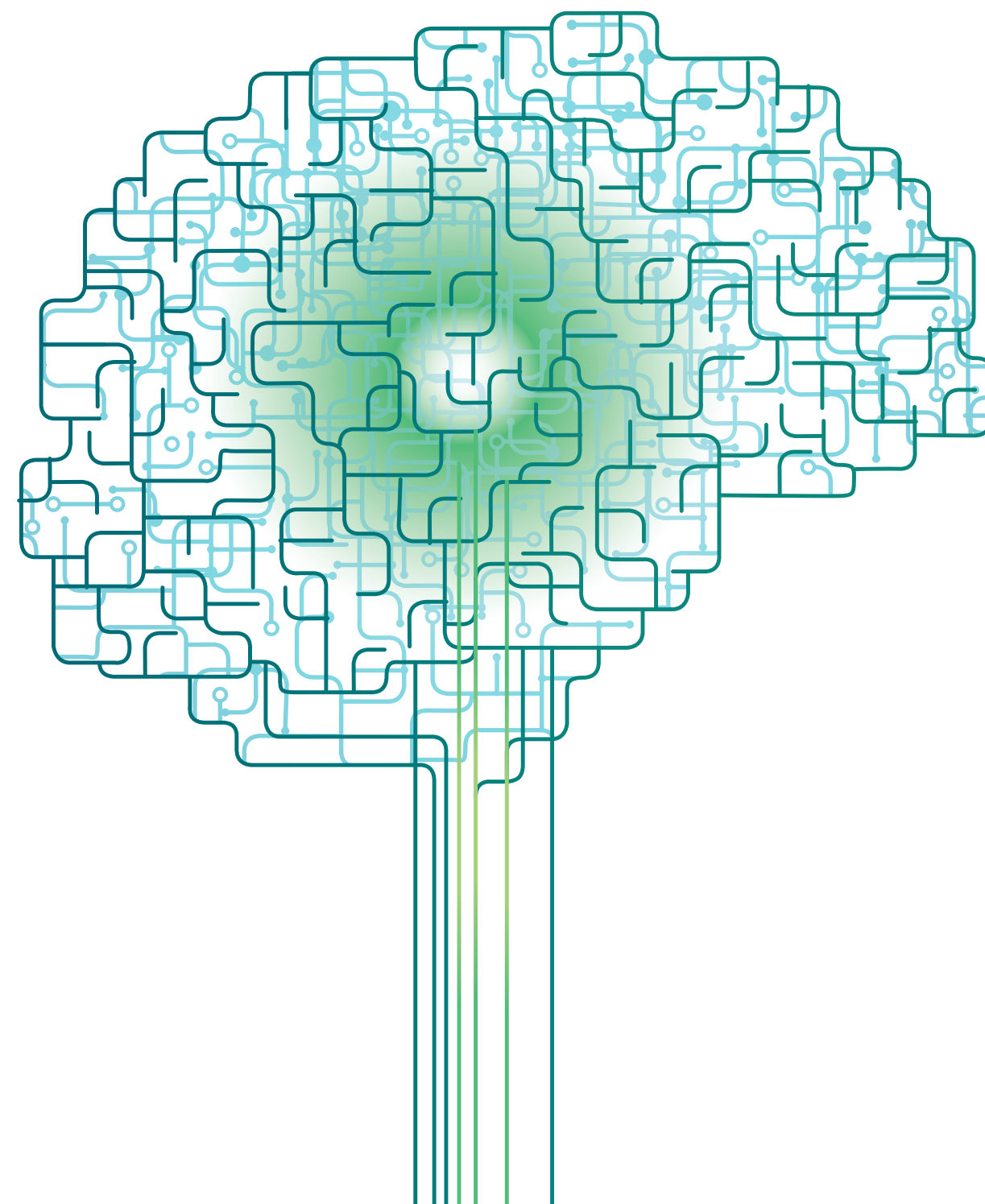
The next innovative step is built into the latest SST R-tubes (SST R-mAX and R-mAX50), which feature a patent-pending design that improves the robustness of the tube anode. Sensitivity and throughput can be customized through different power configurations ranging from 1 kW (chillerless operation) to 2.4, 3 or 4 kW. Performance for specific applications can be enhanced through a range of different anode materials, with selective excitation characteristics for elements of interest. For example, it is possible to achieve detection limits of 20 ppb for the analysis of titanium in polymers using a Cr anode X-ray tube.

The design of the Zetium platform allows continuous, full-power operation of the tube, which maximizes the lifetime of the tube and improves the stability of the spectrometer.

- X-ray tube
- Contamination
- Detectors
- Mechanical
- Crystals



Relative contribution to instrumental drift



VIRTUAL ANALYST

POWERED BY Malvern Panalytical

ELEMENTAL INTELLIGENCE

SuperQ, evolutionary software for a revolutionary platform

SuperQ, our XRF analysis software for WDXRF spectrometers, has proved itself in customer laboratories over the past 20 years. In that time it has evolved into a market-leading software platform that delivers exceptional analytical results in a user-friendly environment. The latest version of SuperQ represents a quantum step in our celebrated software.

- Simple, intuitive interface with a modern task-oriented flow.
- Increased data accuracy from metals to polymers with the latest generation analytical heart incorporating advanced fundamental parameter refinements.
- Access to the power of the new technology, combinations and analytical possibilities of Zetium.
- Seamless integration of different technologies in one software platform.

Virtual Analyst, integrated expertise

Analysis is a complex task with many choices and variables which depend largely on specific sample characteristics, the spectrometer configuration and your analytical requirements. The Virtual Analyst takes information from many sources, for example, standards compositions, actual measurements and the user data objectives to calculate the response of the system, set it up and complete the method. Making the critical choices for you, the Virtual Analyst is like having one of our application specialists available to you, 24/7, 365 days a year. Integrated intelligence that takes the guesswork out of analysis.

Customized calibrations - your challenge, our solutions

From mineral sands to catalysts, ferroalloys to pharmaceuticals, we can deliver customized solutions that exceed expectations in almost every environment.

Contact your local representative to discuss your application requirements.

Optional **software** modules:



Market-leading standardless analysis



Single calibration for petrochemicals



Superior trace analysis



Customizable protection of sensitive data



Advanced layer analysis and composition



Type Standardization: metals composition monitoring and melt correction



OPTIONAL APPLICATION MODULES

- Pro-Trace - unrivalled trace analysis of 40 elements.
- WROXI - majors & minors in mineralogical samples.
- CEMOXI - majors & minors in cement-related materials.
- Low alloy steel - high-strength low-alloy steel.
- NiFeCo - special steels, high-temperature alloys & superalloys.
- Cu-base - brass, bronze & cupronickel.
- ADPOL - additives in polymers.
- TOXEL - toxic elements in polymers.
- RoHS - hazardous substances in electrical equipment.

ELEMENTAL TECHNOLOGY

Every aspect of the Zetium platform has been designed and engineered to deliver unrivalled analytical and operational performance, making it a true asset in environments that rely on accurate and dependable XRF analysis.



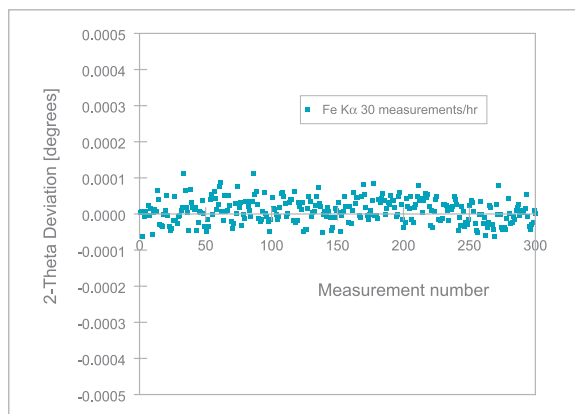
Flexible sample handling

- The Zetium platform features our new ultra-fast sample changer, which is up to 35 % faster than previous models, allowing rapid batch analysis and seamless integration into automated environments.
- A priority sample position, with sample presence detection, allows the user to schedule urgent samples as 'next in line' in an active batch measurement.
- A barcode reader allows rapid error-free sample loading, application designation and manual input entry (e.g. masses or LOI). For example loading and announcing 128 samples (Hi-Cap changer) can be reduced from up to 30 min to less than 2 min.



Intelligent sample introduction

- Samples are initially loaded into an air lock, before being rotated into the measurement position over the X-ray tube. This introduction system has a number of advantages:
- Automatic sample-type recognition protects the spectrometer from inadvertent system contamination.
- A small-volume loading air lock results in fast vacuum cycle times and low He usage.
- An easily serviceable dust removal device integrated in the air lock, actively removes dust before it can reach the optical path, significantly reducing the risk of contamination and improving vacuum stability.
- Stable, continuous full-power operation.
- Optional direct and/or continuous sample loading for high-throughput environments.



Unrivalled accuracy & reproducibility

- A wide range of flat, curved and multi-layer crystals is available for improved resolution and sensitivity to elements from Be to Am.
- State-of-the-art detectors including the duplex and HiPer Scint & counting electronics offer unrivalled data collection speed.
- The inclusion of up to 2 Hi-Per fixed channels allows simultaneous measurement of individual light elements (B to Mg), improving sensitivity and saving you time.
- Direct optical position sensing (DOPS) technology ensures accurate and reproducible goniometer positioning for the entire lifetime of the system, guaranteed.



ELEMENTAL SUPPORT

SERVICE

Worldwide network of experienced engineers backed by regional and headquarter specialists.

Tailor-made support packages with three tiers of support by phone, by remote connection, or on site.

Performance certificates after every service.

Rapid dispatch of spare parts.

Guaranteed 10 year replacement of parts after production of your instrument.

Software and hardware upgrades are available if your requirements change or if new innovations arise.

EXPERTISE

Access to the industry's largest pool of application specialists either by phone, remote connection or on-site visit.

Complete analytical solutions including:

- Sample preparation.
- In-house fusion expertise
- Ready-to-go application solutions.
- Design and integration of automation solutions.
- Method development and optimization.
- Method maintenance to ensure independent validation.
- Multi-laboratory standardization - SOP.

Participation in development of international norms.

TRAINING & EDUCATION

Regular courses worldwide in various languages.

Customized training to cater for beginners and advanced users, delivered on-site or at one of our competence centers.

Access to a wide and expanding published knowledge center.

Regular webinars with on-demand access.

Regional workshops and user days.

ANALYSIS & STANDARDS PREPARATION

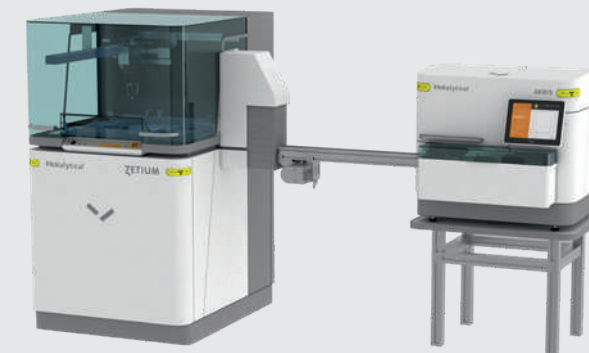
Analytical services to ISO 17025 compliance at a dedicated facility in Nottingham (UK).

Accredited analysis of customer samples e.g. in-house standards.

Production of customized standards.

SEAMLESS INTEGRATION IN AUTOMATION

The combination of a Zetium X-ray fluorescence spectrometer and an Aerie X-Ray diffractometer creates an automated laboratory, capable of both mineralogical and elemental analysis.



THE AUTOMATED LABORATORIUM

The Zetium spectrometer can easily be integrated into an automated laboratory system. Sample loading access to the instrument is possible from either side or from the back of the instrument. An optional sample inverter can be included to ensure the correct orientation of the sample.



Malvern Panalytical has a dedicated Automation Business Unit, which focuses on delivering turnkey laboratory solutions.

An automated laboratory is a multi-disciplinary strategy to increase the productivity and reduce lab process cycle times of our customers by making the best use of technology.

Based on customer needs, the automated laboratory is designed for the customer and with the customer. Our automation projects can cover all steps involved in process control and quality control.

Since 1994 we have built automation projects, surpassing 90 installations worldwide.

