Malvern Panalytical
a spectris company

Zetium

Elemental excellence

A revolutionary step forward in materials analysis

Process control and R&D applications have demanding requirements. For years, X-ray fluorescence spectrometry (XRF) has helped meet them – enabling elemental analysis on solids, liquids and loose powders.

Now, we've developed the next step forward in XRF, building on years of success with our analytical X-ray portfolio. The Zetium is a unique XRF instrument: one multi-functional platform with up to three complementary technologies.

Elemental innovation

Continuous development, improved customer experience

SumXcore technology has enabled us to achieve game-changing innovation on the Zetium platform. The flexibility, performance, and versatility it provides are set to revolutionize XRF.

Elemental intelligence

Advanced analytical software for advanced analytical hardware

Now, our SuperQ software is enabling even more technology combinations and analytical possibilities for the Zetium. Its Virtual Analyst also makes setting up and operating the system simpler.

Elemental technology

60 years of experience: The ideal starting point

Zetium follows a long line of wavelength-dispersive XRF spectrometers, including Axios, MagiX, and PW2400. Over the years, we've fine-tuned this technology – providing a strong foundation for the Zetium platform.

Elemental support

Reliable support – whatever the location

From service and training to laboratory analysis, we support you all the way. With a worldwide network of experienced engineers, plus the industry's largest pool of application scientists, we're always here to help.

Which edition is right for me?

Every industry has different needs. That's why we offer five Zetium Industry editions to meet specific application requirements: **cement, minerals, metals, petrochemicals** and **polymers**. Not only do these instruments have unrivaled price-performance ratios, they can also be finetuned to your individual needs.

Need to meet the most demanding requirements regardless of industry? Then the **Ultimate edition** is for you. With the most advanced configuration in the Zetium family, it delivers unrivaled sensitivity across the periodic table, saving time and increasing your sample throughput. Its market-leading, standardless analysis Omnian module makes qualitative and quantitative elemental analysis easily – even if you've got unknown materials or calibration samples are not readily available.

Need a customized solution?

Whatever your task, Zetium's modular design allows customizable configurations to ensure the best possible fit with your workflow. These packaged solutions deliver:

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

Cement

Need to improve process efficiency and margins at your cement plant? The Zetium Cement Edition can help. It takes elemental composition analysis to the next level, with robust, accurate, fast analysis of raw materials, hot meal, clinker, and cement. Say hello to more stable and optimized processing!

Metals

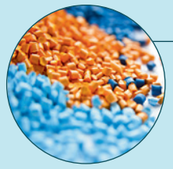
In the metals industry, rigorous process and quality control is essential – and excellent elemental analysis can help meet the strictest targets. With robust hardware and choice of pre-calibrated application solutions, the Zetium Metals Edition is designed to deliver the most accurate analytical results fast – from raw materials to final and secondary products.

Minerals

For recovery and processing, you need detailed knowledge throughout. This requires frequent analysis, often in highly demanding environments. With analysis times up to 50% shorter, unexpected element identification, and enhanced traceability, the Zetium Minerals Edition delivers superior flexibility, analytical performance, and stability – for exploration samples, ores, tailings, and more.

Petrochemicals

When you monitor your petrochemical processes closely, you benefit from efficient quality control and early detection of detrimental elements. The Zetium Petro Edition provides quantitative elemental analysis of oils, fuels, catalysts, pipe-scaling, and more. What's more, its long-term repeatability guarantees compliance with test methods such as ASTM D2622.



Polymers

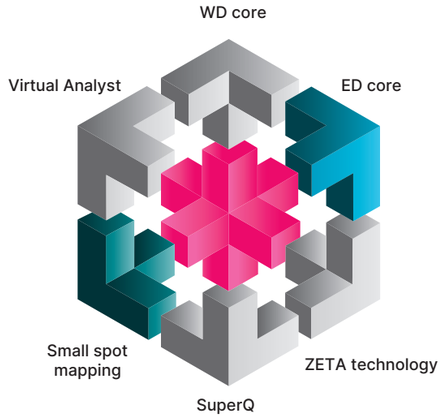
For consistent product quality, you need accurate, reproducible elemental analysis of your polymers. That's why the Zetium Polymers Edition is calibrated with internationally renowned ADPOL and TOXEL reference materials, guaranteeing reliable results. You can even add small-spot elemental mapping and analysis to identify anomalies in off-spec products.

Core integration: for flexibility, performance, and speed

The Zetium uses **SumXcore technology** – where wavelength-dispersive XRF (WDXRF), energy-dispersive XRF (EDXRF), are combined on one platform and can be run in parallel. This unique combination puts it in a class of its own in analytical power, speed, and flexibility.

SumXcore: Key specifications

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



Improved analytical performance

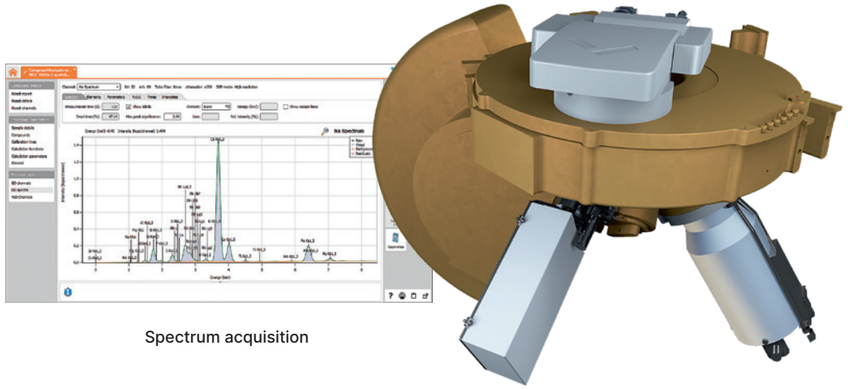
- Measurement times up to 50% shorter through simultaneous data acquisition
- Faster target precision than traditional WDXRF
- Quickly obtain the lowest lower-limit of detection (LLD) across the periodic table

See the unexpected

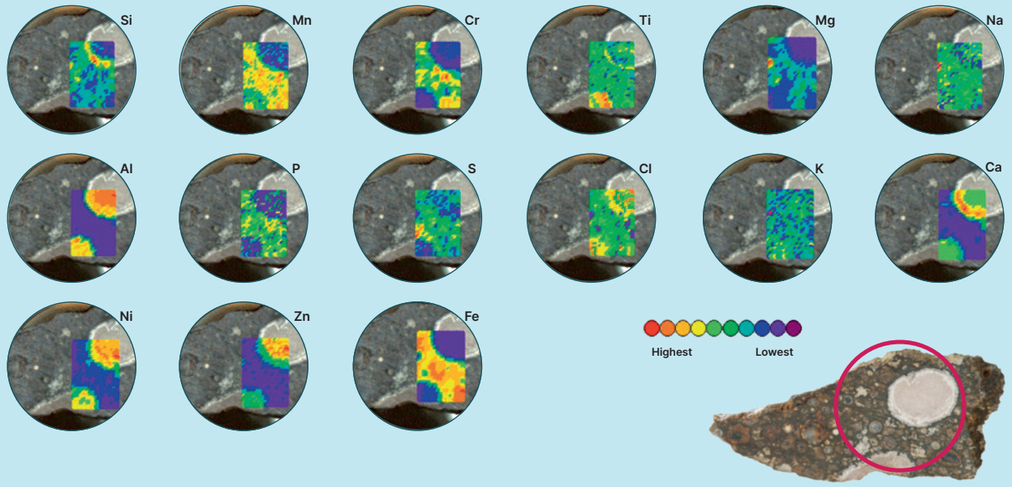
- Track unexpected elements that could affect your analysis – without increasing measurement time
- Collect the entire spectrum for each sample without compromising accuracy

Increased confidence in quality

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



Spectrum acquisition



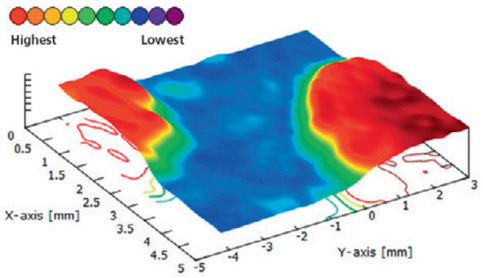
ED core: Comprehensive small-spot analysis and mapping in a fraction of the time

Need to troubleshoot your production process or materials research? Small-spot analysis with element distribution mapping is the ideal tool – and it's now available wherever you need it.

The Zetium's ED core supports both small-spot analysis and bulk analyses. Using HiPer fluorescence collection optics, it becomes a dedicated small-spot mapping solution with unrivalled sensitivity.

This enables practical, fast analysis – whether it's simple inclusion analysis for calibrated applications or complex multi-element distribution – for a wide variety of sample types.

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



ED core: Key specifications

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

Robust and drift-free X-ray tubes

Successful analysis doesn't just depend on your spectrometer, but on your X-ray tubes too. Malvern Panalytical is the only manufacturer that makes both analytical X-ray systems and high-power X-ray tubes, allowing us to truly optimize our systems.

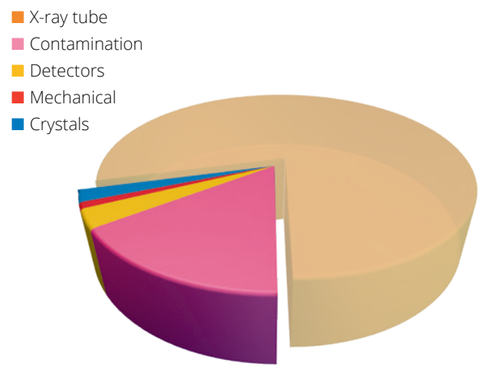
We continually innovate in X-ray tube design for the highest performance and longevity. Our latest tubes build on an innovation legacy of over 20 years:

- SST – close-coupled ceramic design delivers maximum sensitivity
- SST-mAX with ZETA technology – single largest source of drift in X-ray systems eliminated, reducing time spent on calibration maintenance
- CHI-BLUE tube window coating – corrosion-resistance made up to 50x higher and vacuum tightness improved for long-term durability, without impacting tube performance
- SST-mAX50 – durable 50 µm window solution delivers superior light-element sensitivity, drawing on ZETA and CHI-BLUE technology.

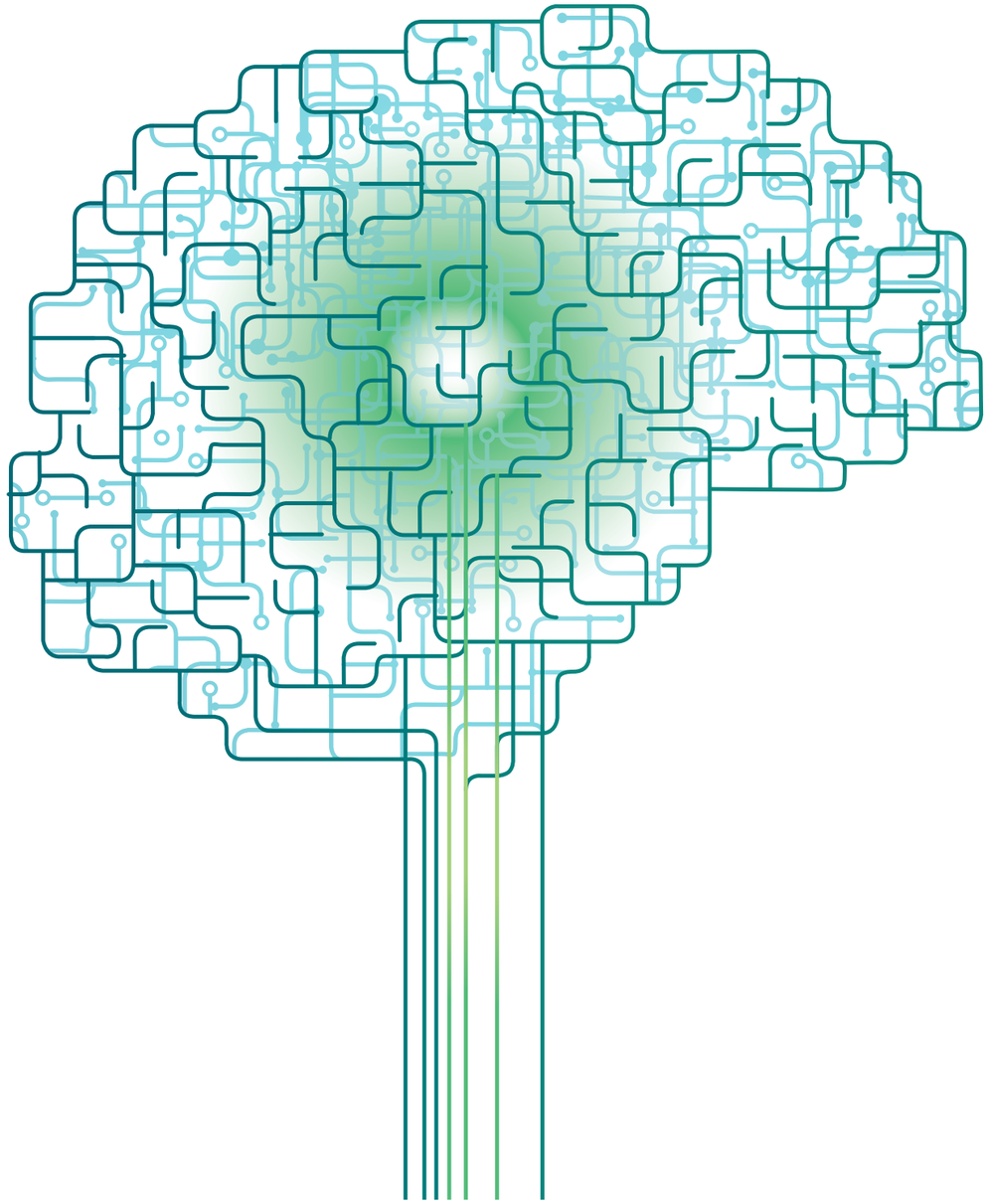
Designed for full-power operation: SST R-mAX and R-mAX50

Our new SST R-mAX X-ray tubes (SST R-mAX and R-mAX50) feature a patent-pending design with improved robustness in the tube anode. The Zetium's design allows continuous, full-power tube operation, maximizing tube lifetime and improving the stability of the spectrometer.

With power configurations ranging from 1-4 kW, you can customize the tubes' sensitivity and throughput. You can also enhance performance for specific applications through a range of different anode materials. For example, you could achieve detection limits of 20 ppb for titanium analysis in polymers using a Cr-anode tube.



Relative contribution to instrumental drift



VIRTUAL
ANALYST

POWERED BY Malvern Panalytical

SuperQ, evolutionary software for a revolutionary platform

SuperQ is our XRF analysis software for WDXRF spectrometers. Over the past 20 years, it's evolved into a market-leading software platform that delivers exceptional analytical results in a user-friendly environment. The latest version of SuperQ takes yet another leap forward:

- Simple, intuitive interface with modern task-oriented flow
- Latest-generation analytical heart with advanced parameter refinements – delivering higher data accuracy for multiple materials
- Access to Zetium's new technology combinations and analytical possibilities
- Seamless integration of multiple technologies in one software platform
- Stratos: Advanced layer analysis and composition
- Type standardization: Metals composition monitoring and melt correction

Got specific application requirements?
Contact us today!

Virtual Analyst: Wave goodbye to guesswork

Analysis is a complex task with many critical choices and variables. SuperQ's Virtual Analyst tool can help you make those choices – just like having one of our application specialists available 24/7. Taking information from standard compositions, actual measurements, and user data objectives, it calculates the system's response, sets it up, and completes the method. No more guesswork!

Customized calibrations: Your challenge, our solutions

From mineral sands and catalysts to ferroalloys and pharmaceuticals – you can customize SuperQ to exceed expectations in almost every environment. Optional software modules include:

- Omnian: Market-leading standardless analysis
- Oil-trace: Single calibration for petrochemicals
- Pro-trace: Superior trace analysis
- Data security: Customizable protection of sensitive data

Optional **software** modules:

OMNIAN — Market-leading standardless analysis

OIL-TRACE — Single calibration for petrochemicals

PRO-TRACE — Superior trace analysis

DATA SECURITY — Customizable protection of sensitive data

STRATOS — Advanced layer analysis and composition

TYPE STANDARDIZATION — Type Standardization: metals composition monitoring and melt correction

Optional application modules

- Pro-Trace - unrivaled 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, and cupronickel
- ADPOL - additives in polymers
- TOXEL - toxic elements in polymers
- RoHS - hazardous substances in electrical equipment

Outstanding technology

Tough environments call for tough XRF methods. That's why we designed and engineered the Zetium to deliver unrivaled, reliable performance.

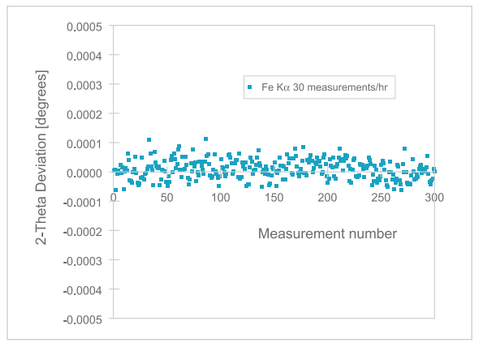
Flexible sample handling

- New, ultra-fast sample changer – up to 35% faster than previous models – enables rapid batch analysis and seamless integration into automated environments
- Need to schedule urgent samples next in an active batch measurement? You can do just that with the Zetium's priority sample position, with sample presence detection.
- A barcode reader enables rapid error-free sample loading, application designation, and manual input entry. Loading and announcing 128 samples could go from 30 minutes to less than two.

Smart sample loading

Samples are initially loaded into an air lock, before being rotated into the measurement position over the X-ray tube. This has several advantages: 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.
- A dust removal device in the air lock actively removes dust before it reaches 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.



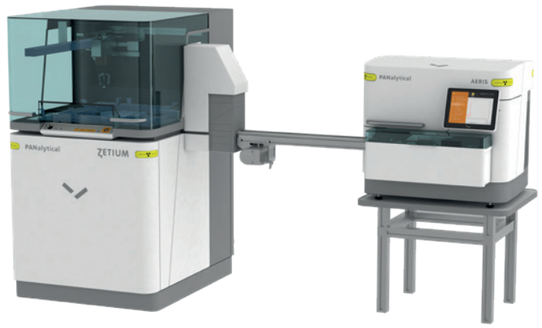
Unrivalled accuracy and reproducibility

- A wide range of flat, curved and multi-layer crystals: for improved resolution and sensitivity to elements from Be to Am.
- State-of-the-art detectors: unrivalled data collection speed.
- Up to two HiPer fixed channels: simultaneous measurement of individual light elements (B to Mg), improving sensitivity and saving you time.
- Direct optical position sensing (DOPS) technology: accurate and reproducible goniometer positioning for system's lifetime, guaranteed.

Seamless integration in automation

What do you get when you combine a Zetium XRF spectrometer and an Aeris X-Ray diffractometer? An automated lab that supports both mineralogical and elemental analysis. And that means higher productivity and lower process cycle times.

At Malvern Panalytical, our dedicated Automation Business Unit focuses on turnkey laboratory solutions –designed for the customer, with the customer. Since 1994, we have installed over 90 automation projects worldwide. These projects cover all the steps in process and quality control.



The automated laboratorium

The Zetium spectrometer can easily be integrated into an automated lab system, with sample loading accessed from either side or from the back. We can also include an optional sample inverter to make sure your sample is oriented correctly.

SMART MANAGER, SMART ZETIUM

Meet your new trusted team member

This cloud-based ‘control room’ connects all your Zetium instruments. In this way, it gives you a clear picture of their performance – and therefore the quality of your measurements – wherever they are in the world. So you can keep on top of performance, optimize usage, reduce downtime, and unleash the potential of your data. Just like having a new, trusted member of your team!

Maximum data security

And rest assured: all your data remains yours, and is only visible to Malvern Panalytical. Smart Manager uses the latest Microsoft Azure cloud technology, ensuring that your data is safe and secure at all times. We don’t collect data from your own samples unless you explicitly request it.

Count on our support

Service

- Worldwide network of experienced engineers backed by regional and headquarter specialists.
- Tailor-made support packages with three tiers of support: phone, remote connection, or onsite.
- 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 available if requirements change or new innovations arise.

Expertise

- Access the industry's largest pool of application specialists – by phone, remote connection or on-site visit.
- Complete analytical solutions, including:
  - o Sample preparation
  - o In-house fusion expertise
  - o Ready-to-go application solutions
  - o Design and integration of automation solutions
  - o Method development and optimization
  - o Method maintenance to ensure independent validation
  - o Multi-laboratory standardization - SOP
- Participation in development of international norms.

Training & education

- Regular courses worldwide in various languages.
- Customized training for beginners and advanced users. On-site or at one of our competence centers – you choose.
- Access to a continuously expanding published knowledge center.
- Regular webinars with on-demand access.
- Regional workshops and user days.

Analysis & standards preparation

- Dedicated analysis and standards production facility in Nottingham, UK.
- Accredited to ISO 17034 as Certified Reference Materials Producer.
- Analytical services accredited to ISO 17025.

Malvern Panalytical
a spectris company

Why choose us?

When you make the invisible visible, the impossible is possible.

Our analytical systems and services help our customers to create a better world. Through chemical, physical and structural analysis of materials, they improve everything from the energies that power us and the materials we build with, to the medicines that cure us and the foods we enjoy.

We partner with many of the world's biggest companies, universities and research organizations. They value us not only for the power of our solutions, but also for the depth of our expertise, collaboration and integrity.

With over 2200 employees, we serve the world, and we are part of Spectris plc, the world-leading precision measurements group.

Malvern Panalytical. We're BIG on small™

Service & Support

Malvern Panalytical provides the global training, service and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment with us, and ensure that as your laboratory and analytical needs grow, we are there to support you.

Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response and maximum instrument uptime.

- Local and remote support
- Full and flexible range of support agreements
- Compliance and validation support
- Onsite or classroom-based training courses
- e-Learning training courses and web seminars
- Sample and application consultancy

www.malvernpanalytical.com/zetium

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