



PANalytical  
get insight



# ZETIUM

Elemental excellence





## Industry editions

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

- Cement
- Minerals
- Polymers
- Metals
- Petrochemicals
- Ultimate

## 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
- Robustness and uptime
- Flexibility
- Performance enhancement



Zetium  
 'Zeto': to search or inquire  
 'ium': element



## 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 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 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.

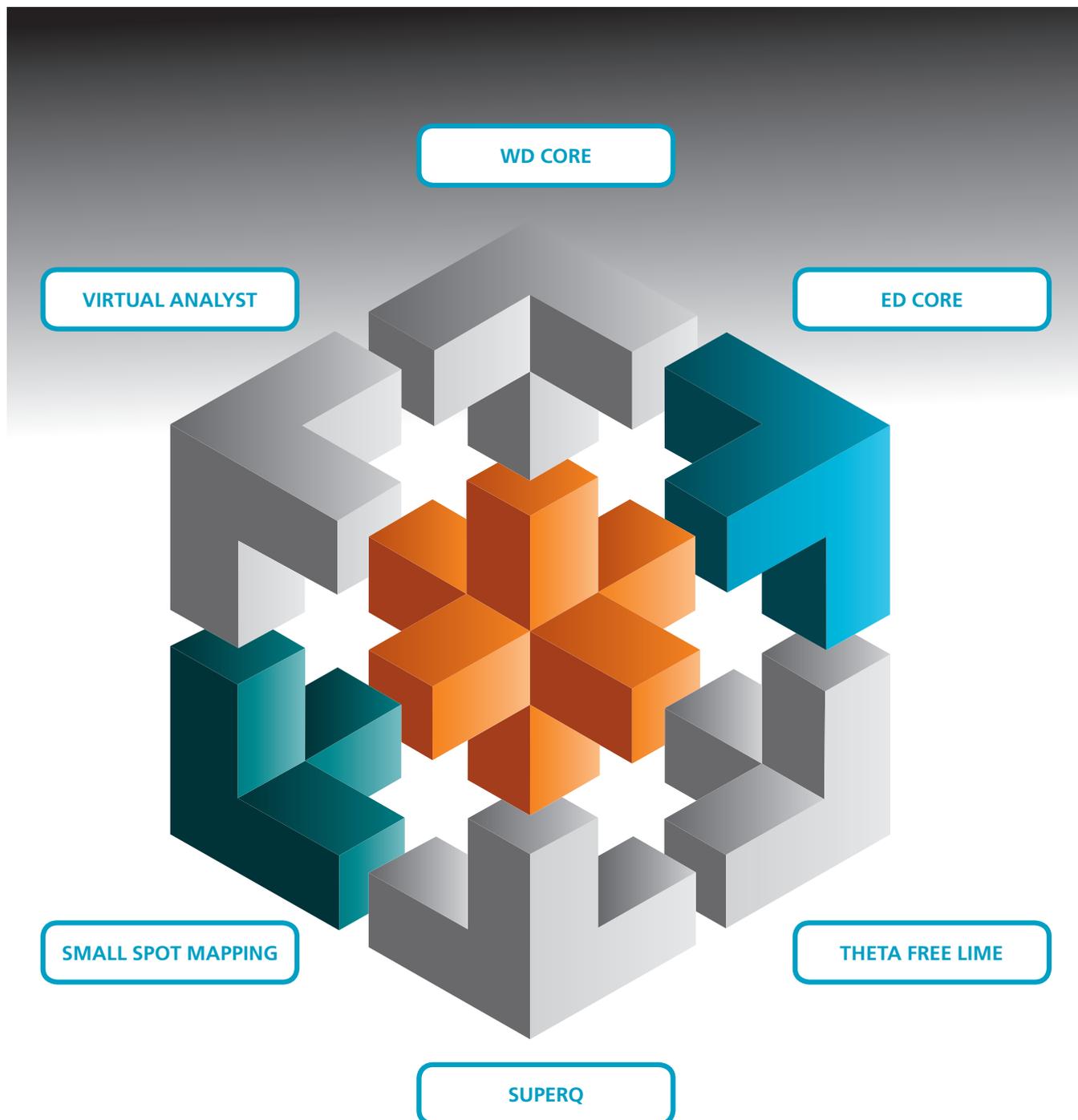
## Elemental support

### **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 PANalytical is always on hand to help you meet your analytical requirements.

# Elemental innovation

Building on years of experience and success with our extensive analytical X-ray portfolio, Zetium is a revolutionary step in materials analysis. 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.



# 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

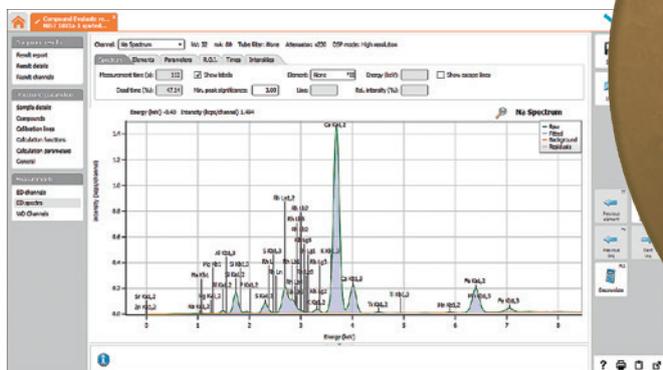
- Track unexpected elements that can affect process element analysis without increasing measurement time
- Collect the entire spectrum for each sample without compromising accuracy

## Increased confidence in quality

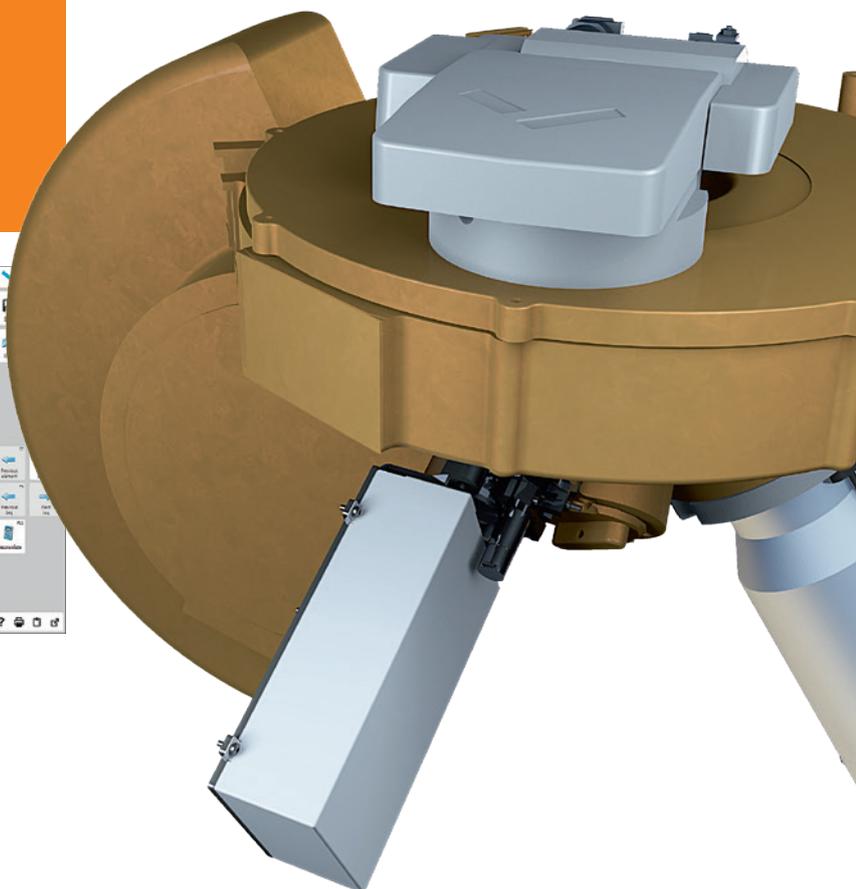
- Dual independent analysis
- WD and ED norms compliance on one platform
- Preventive maintenance tool
- Robust backup analysis

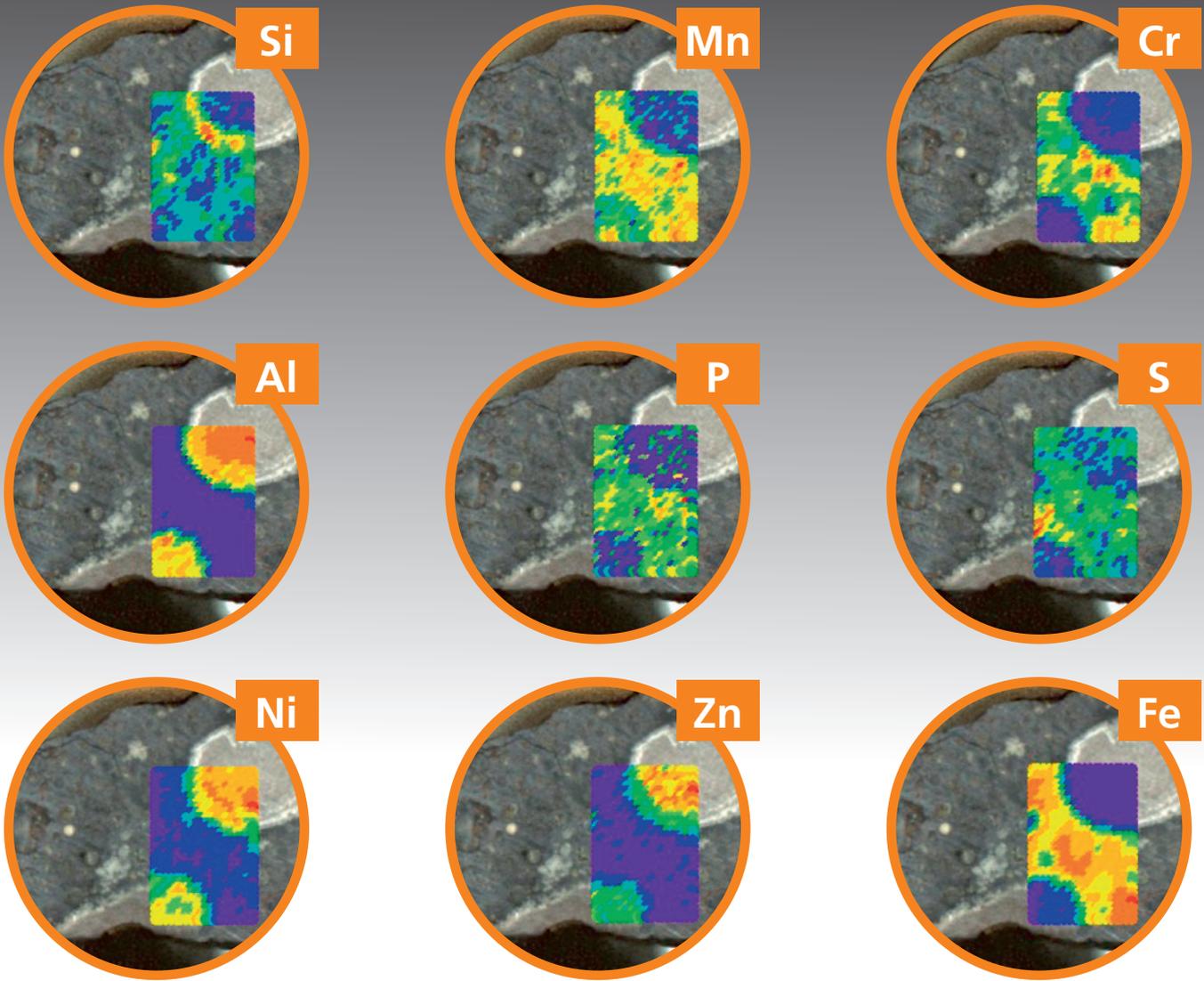
## Key specifications

- 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



Spectrum acquisition





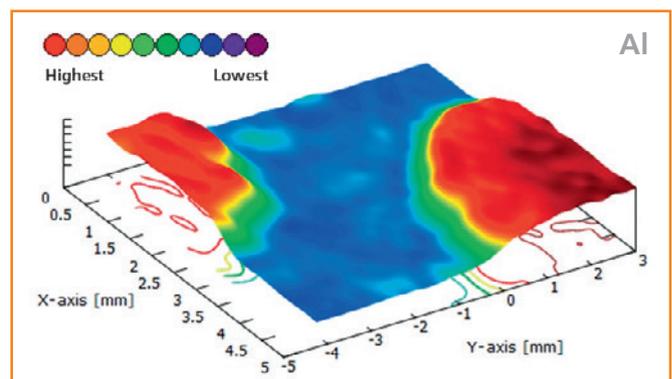
## Comprehensive small spot analysis and mapping in a fraction of the time

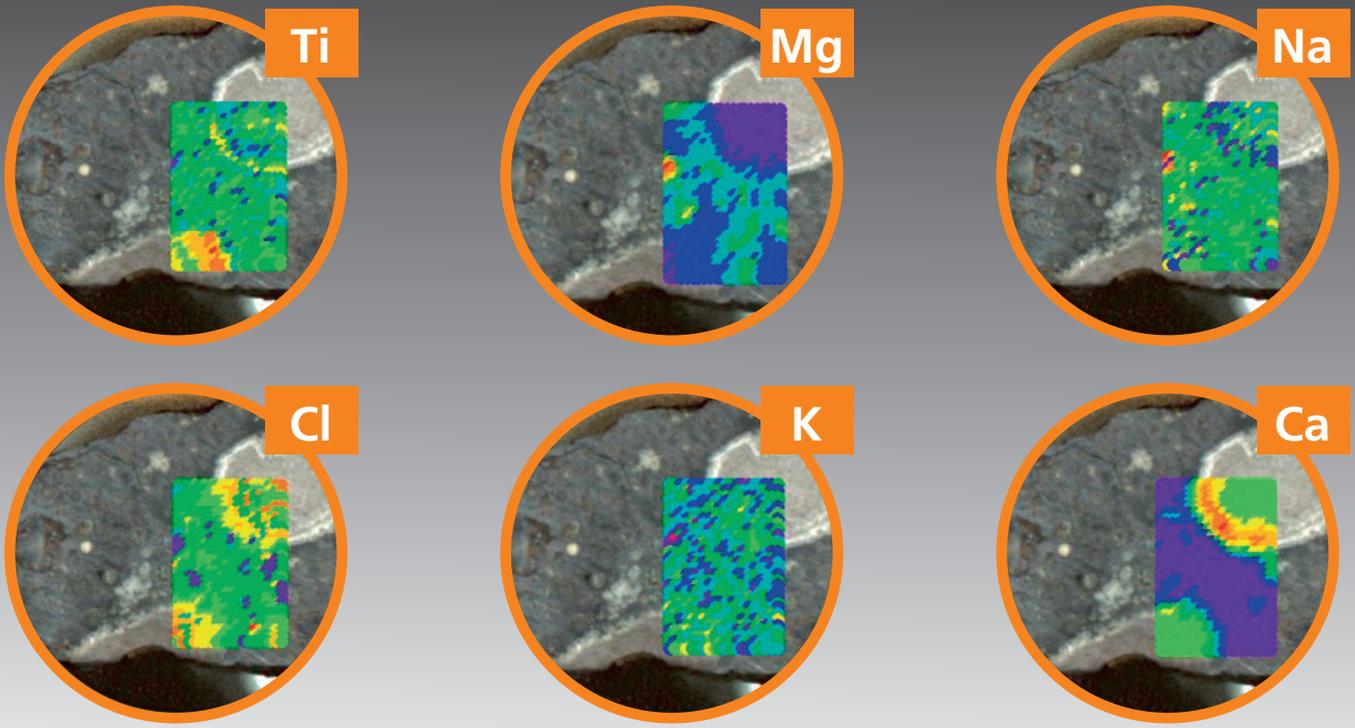
Small spot analysis with element distribution mapping is an ideal tool for materials research and production process troubleshooting and makes a valuable addition to a bulk sample analysis spectrometer. No longer confined to research facilities, this technique is now available anywhere you need it.

### 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

Mapping data for element 'Al' in a meteor





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.

As a consequence of using the ED core for small spot analysis and mapping, bulk analysis is also possible, ensuring maximum task flexibility.



## Key specifications

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

# THETA free lime, because accurate results save you money

Monitoring the free lime concentration in cement kilns is a key process to optimize energy consumption and quality of the end product.

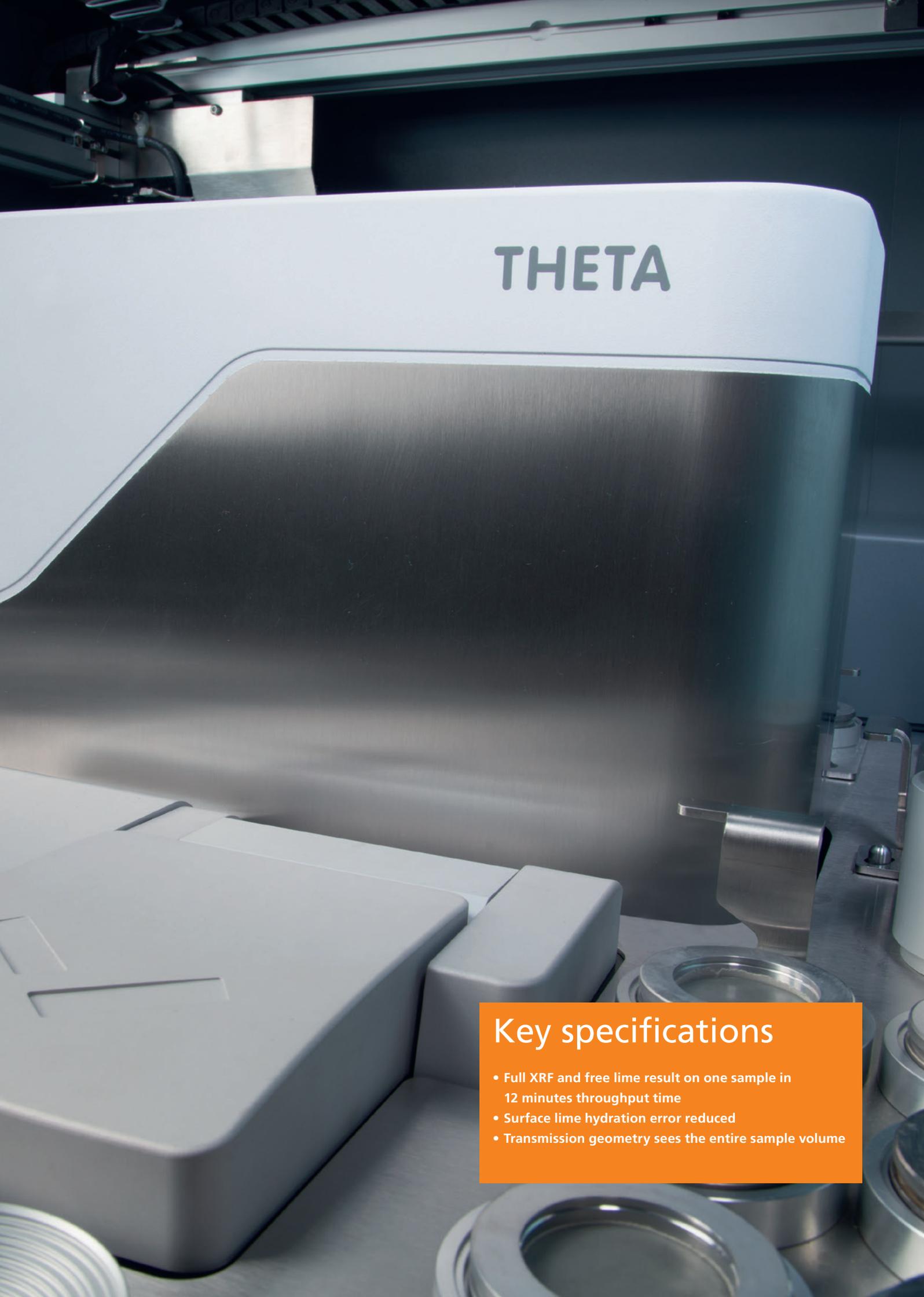
Traditionally free lime is measured using wet-chemical methods, which are time-consuming, operator-dependent and make use of expensive and hazardous chemicals.

## **An integrated diffraction solution**

XRD analysis of free lime in clinker offers a robust alternative to wet-chemical methods. The Cement edition of Zetium incorporates a THETA XRD free lime analysis core alongside the sequential WD core for elemental analysis by XRF. This combination ensures cost-effective and reliable data for process optimization.

The THETA core analyzes a large volume of sample, approximately 750 times greater than reflection geometry XRD techniques. This large sample volume makes the method relatively insensitive to surface lime hydration and ensures a representative analysis of the sample.

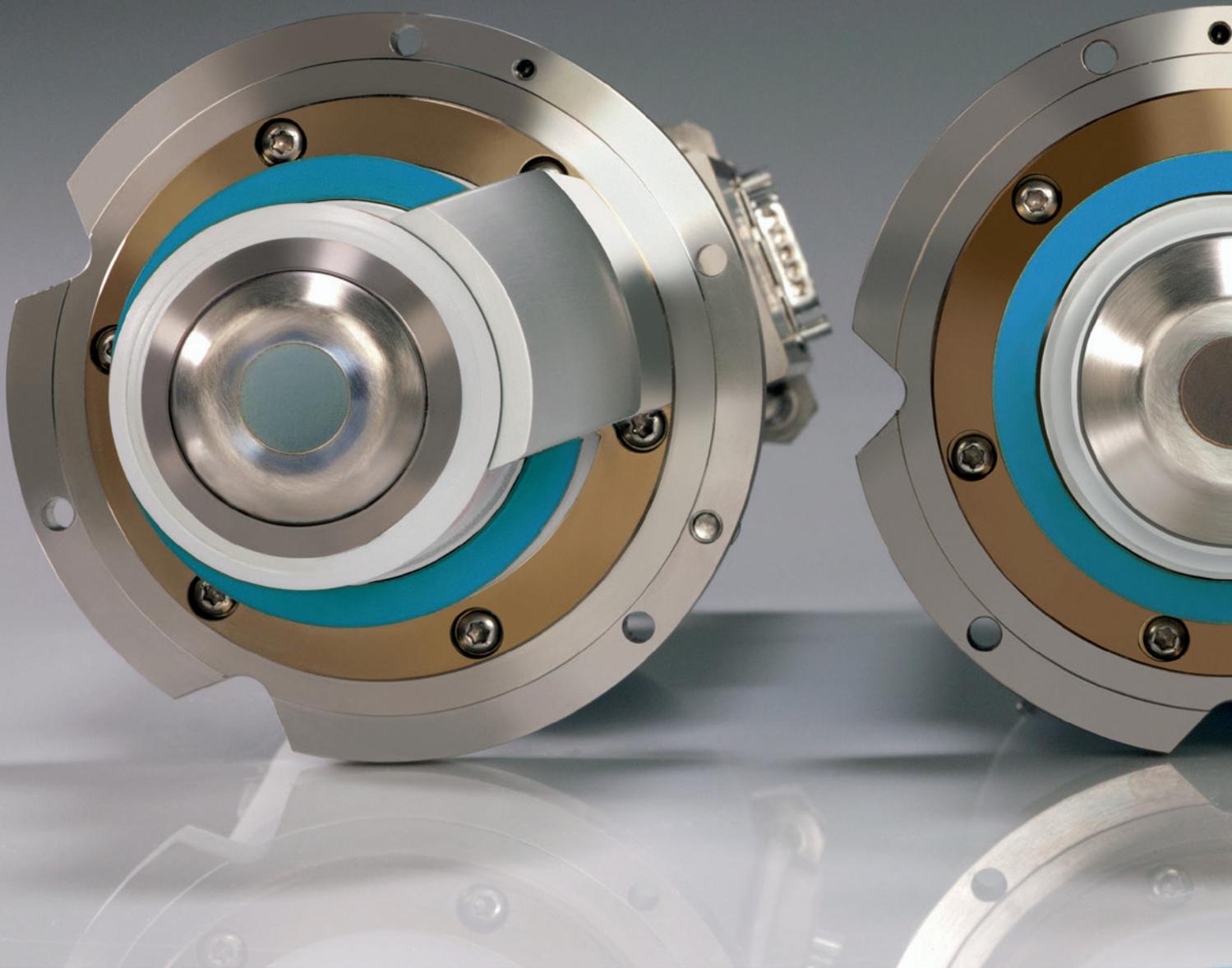




THETA

## Key specifications

- Full XRF and free lime result on one sample in 12 minutes throughput time
- Surface lime hydration error reduced
- Transmission geometry sees the entire sample volume



## Robust and drift-free X-ray tubes

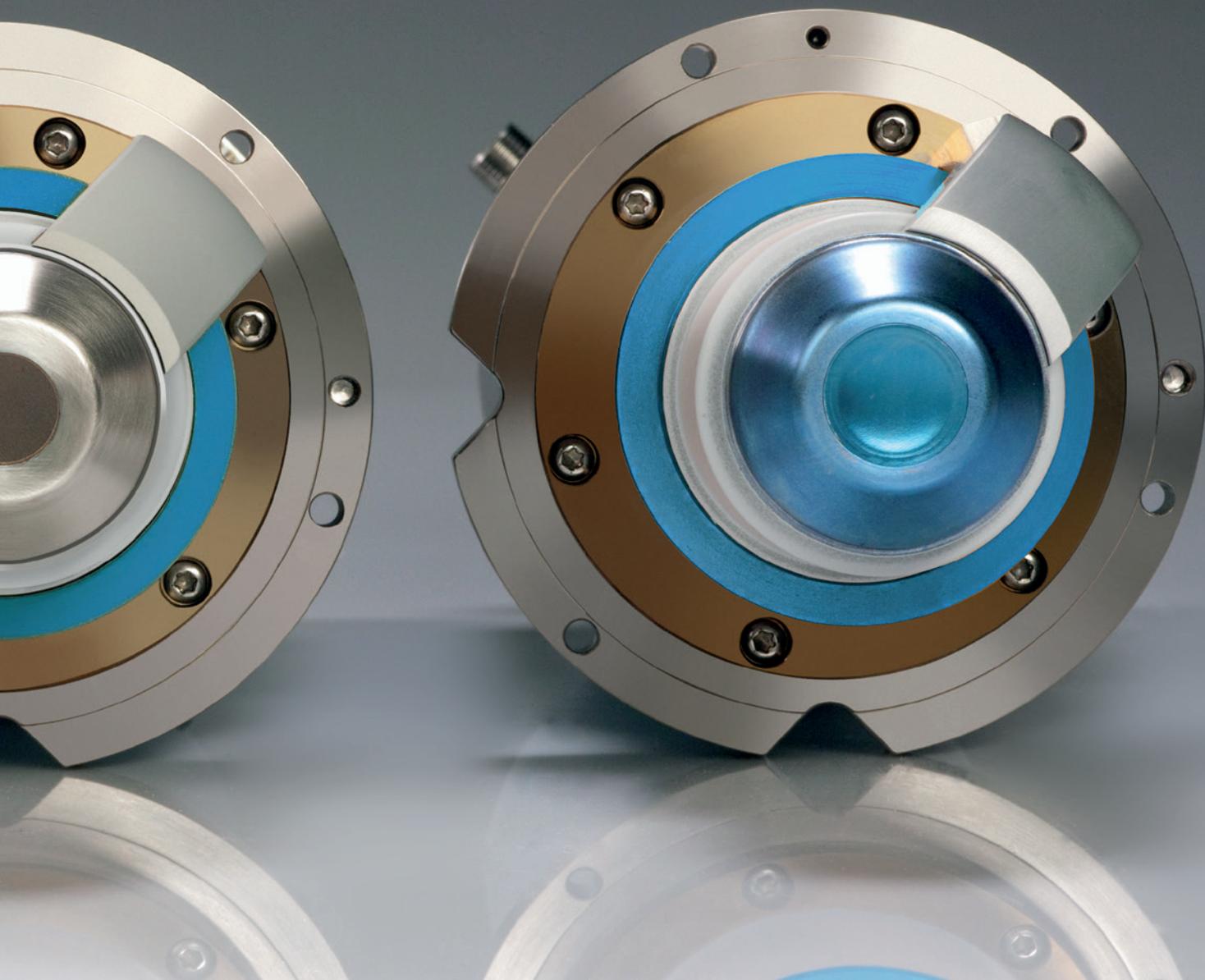
PANalytical is the only manufacturer of analytical X-ray systems that also manufactures high-power X-ray tubes, allowing us to truly optimize the performance of systems we develop. For example, we have specially developed a SST R-Ag tube for the Cement edition of Zetium, which enables the best quantification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

We continually innovate X-ray tube design to bring the highest performance and longevity.

**The new SST R-mAX X-ray tubes build on a legacy of innovations spanning over 20 years.**

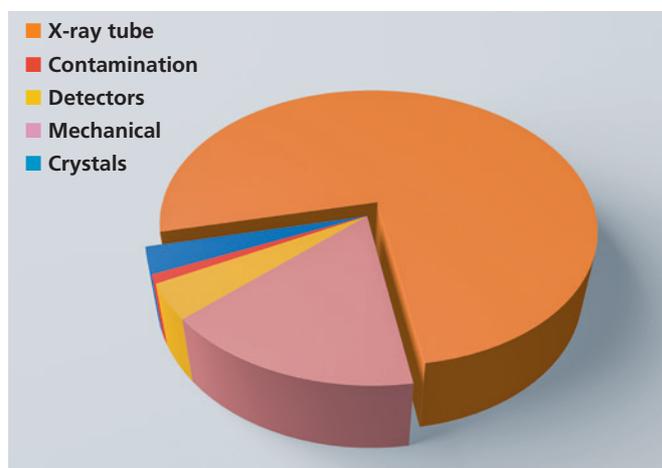
- SST – highest sensitivity due to close-coupled ceramic design
- SST-mAX with ZETA technology – reduced calibration maintenance by eliminating the single largest source of drift in the X-ray systems.
- CHI-BLUE tube window coating – up to 50 x higher resistance to corrosion and improved vacuum tightness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

The next innovative step is built into the latest SST R- tubes (SST R-mAX and R-mAX<sup>50</sup>), which feature a patent-pending design that improves the robustness of the tube anode.

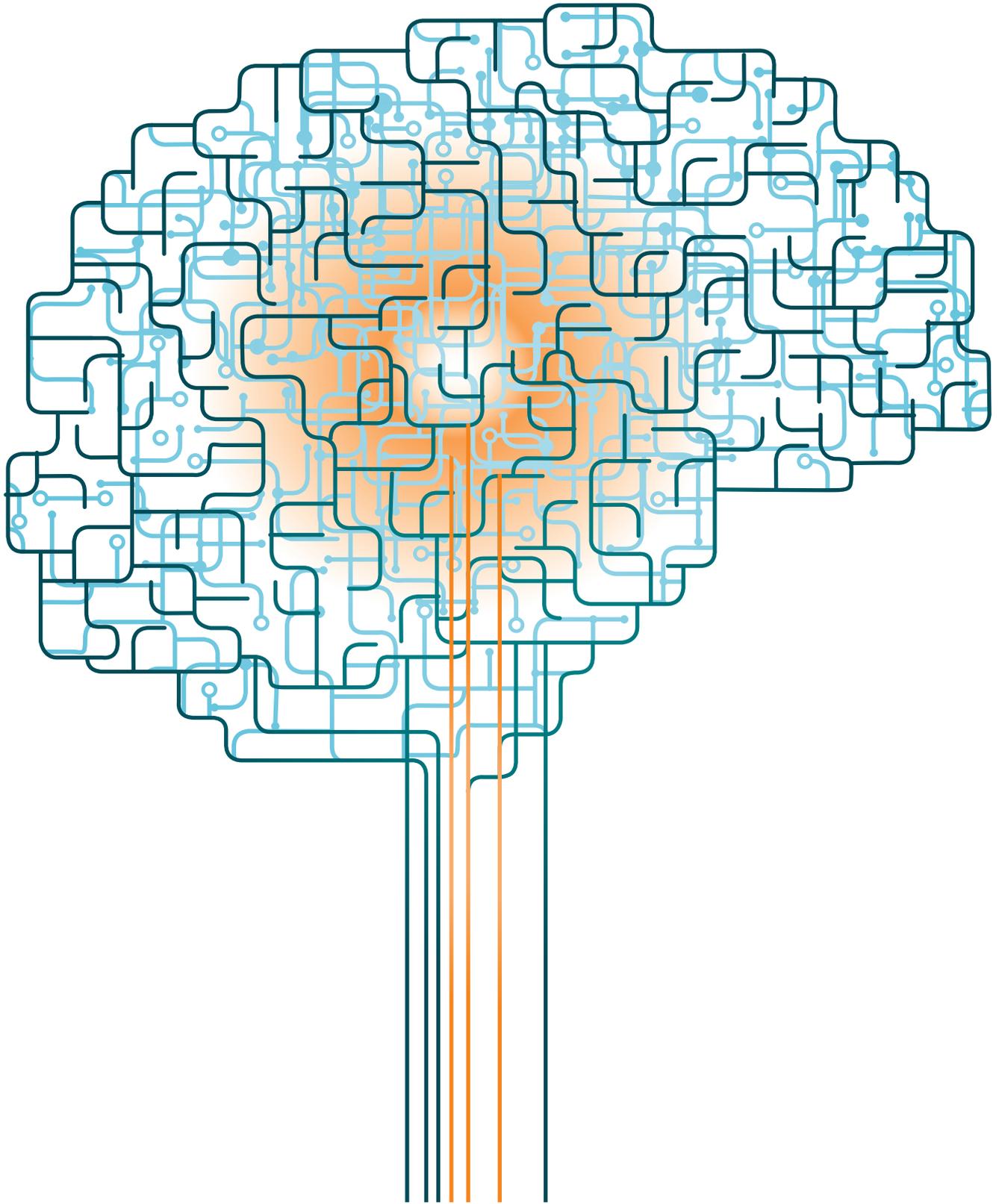


Sensitivity and throughput can be customized through different power configurations ranging from 1 kW (chillerless operation) to 2.4, 3 or 4 kW. Performance for specific applications can be enhanced through a range of different anode materials, with selective excitation characteristics for elements of 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.



Relative contribution to instrumental drift



# VIRTUAL ANALYST

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POWERED BY 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 PANalytical representative to discuss your application requirements.

## Optional software modules:



**Market-leading standardless analysis**

OMNIAN



**Advanced layer analysis and composition**

STRATOS



**Single calibration for petrochemicals**

OIL-TRACE



**Type Standardization: metals composition monitoring and melt correction**

TYPE STANDARDIZATION



**Superior trace analysis**

PRO-TRACE



**Customizable protection of sensitive data**

DATA SECURITY

## 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.



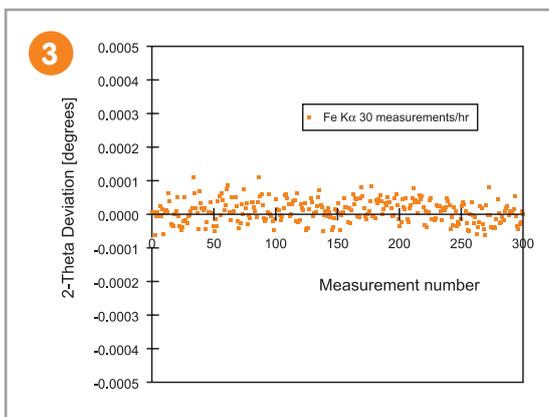
## 1 Flexible sample handling

- 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.



## 2 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.



## 3 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



## 1. 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.

## 2. 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

## 3. 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

## 4. ANALYSIS & STANDARDS PREPARATION

Analytical services to ISO 17025 compliance at a dedicated facility: PANalytical Nottingham

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

Production of customized standards

# Automation integration

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.





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.



## About PANalytical

PANalytical's mission is to enable people to get valuable insight into their materials and processes. Our customers can be found in virtually every industry segment, from building materials to pharmaceuticals and from metals and mining to nanomaterials. The combination of our software and instrumentation, based on X-ray diffraction (XRD), X-ray fluorescence (XRF) and near-infrared (NIR) spectroscopy as well as pulsed fast thermal neutron activation (PFTNA), provides our customers with highly reliable and robust elemental and structural information on their materials and is applied in scientific research and industrial process and quality control.

PANalytical employs over 1,000 people worldwide. The company's headquarters are in Almelo, the Netherlands. Fully equipped application laboratories are established in Japan, China, the US, Brazil, and the Netherlands. PANalytical's research activities are based in Almelo (NL) and on the campus of the University of Sussex in Brighton (UK). Supply and competence centers are located on two sites in the Netherlands: Almelo (X-ray instruments) and Eindhoven (X-ray tubes), in Nottingham, UK (XRF applications and standards), in Quebec, Canada (fusion sample preparation) and in Boulder CO, US (near-infrared instruments).

PANalytical is active in all but a few countries of the world. This worldwide sales and service network ensures unrivalled levels of customer support.

The company is certified in accordance with ISO 9001 and ISO 14001.

Visit [www.panalytical.com](http://www.panalytical.com) for more information about our activities.

PANalytical is part of Spectris plc, the productivity-enhancing instrumentation and controls company.

### Compliance and safety



## Global and near



[www.panalytical.com/zetium](http://www.panalytical.com/zetium)

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