



**Malvern  
Panalytical**  
a spectris company

# AERIS

## Powering the next generation of XRD



## ON A JOURNEY TOGETHER

### It's good to be here with you

Today's materials landscape is changing faster than ever. In academia, more researchers are joining the race to push scientific frontiers. In business, speed-to-market is essential for getting ahead. And when it comes to pharmaceuticals, food, or the environment, regulations are tightening. Whatever your organization's challenges, streamlined, cost-effective processes can help you face them confidently.

At Malvern Panalytical, we learn about your needs from you: some of the brightest minds in academia and most successful businesses in the world. Your input informs our output. In partnership, we create the solutions you need to achieve success.



### Meet the next-generation Aeris

How can you best explore and optimize your materials? What do you need to adjust to move your research forwards? How quickly can you qualify and ship your product?

X-ray diffraction is a well-established, non-destructive way of getting to the heart of crystalline materials and finding the answers to these questions. So you might not think it could be improved. But a fresh look, smart design, and advanced technology always make for a good upgrade.

So, building on over 70 years of experience, we're proud to present Aeris – our super-compact, fully capable X-ray diffractometer. Aeris continually raises the bar for powder X-ray diffraction – and, with its new flexibility in measurement and automation, it's sure to provide solutions for you.

*Want to know more? Take a closer look...*

## MAXIMIZE EFFICIENCY

Measurement is easy with Aeris. It combines one-step external sample loading with clear, simple operation. What's more, it runs from your standard mains supply – no extra infrastructure needed. Its precision, reproducibility, and robustness make it a real asset to your lab.



## WORK SAFELY

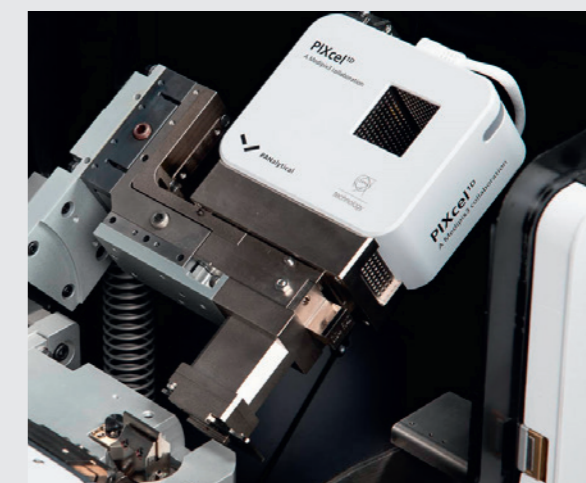


Aeris lets you choose how to introduce new samples: manually or via automated systems. You can load your samples safely and precisely on its positioning stations, and change them without disturbing ongoing measurements.

## TARGET YOUR MEASUREMENTS

Aeris has a configuration for any material – so you can choose the measurement that best suits yours:

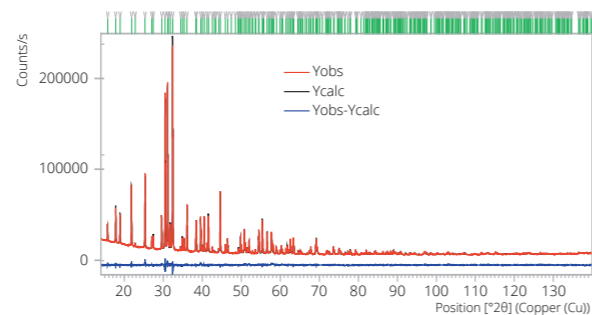
- Bragg-Brentano reflection powder diffraction.
- Transmission diffraction through foils or in capillaries.
- Grazing incidence diffraction for thin films and coatings.



# HIGHER-QUALITY DATA

## Reflection

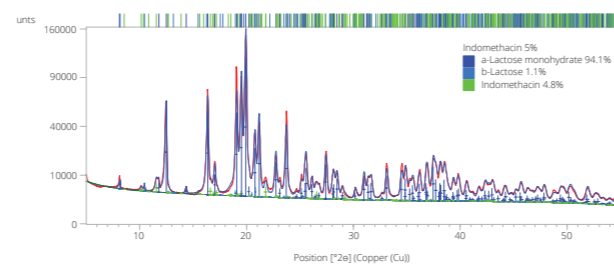
Combining low noise, high resolution, and true reproducibility, **Bragg-Brentano** results reveal new insights into your materials' structure-property relationships. This data can take you all the way from phase identification to crystal structure solution.



Rietveld refinement of synthesized and heat-treated  $\text{AgCaVO}_4$ ,  
Ref: G. Nénert, Z. Kristallogr. 2017; 232(10)

## Transmission

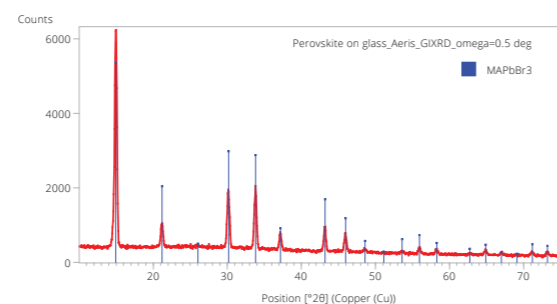
**Transmission** measurements let you minimize preferred orientation effects. They are an especially great match for low-absorbing organic materials in pharmaceutical industry.



Transmission XRD measurements and quantitative analysis of an Indomethacin formulation prepared between mylar foils.

## Grazing Incidence

With **grazing incidence X-ray diffraction**, you can now explore your samples' surfaces. The result? Better measurement of crystallographic properties in thin films and coatings.



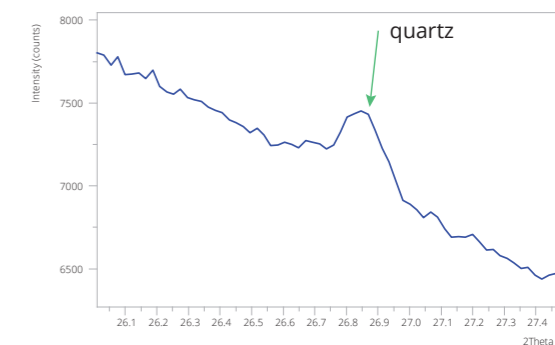
A 36 min GIXRD measurement of a MAPbBr<sub>3</sub> Perovskite layer deposited on a glass substrate.

# ...AND MORE INDEPTH INSIGHTS

## Identify potential hazards in mineral mixtures

Low detection limits help make sure you're complying with environmental regulations. And Aeris can reliably quantify even a few micrograms of hazardous substances – such as respirable silica, asbestos, and rutile – in minimal time.

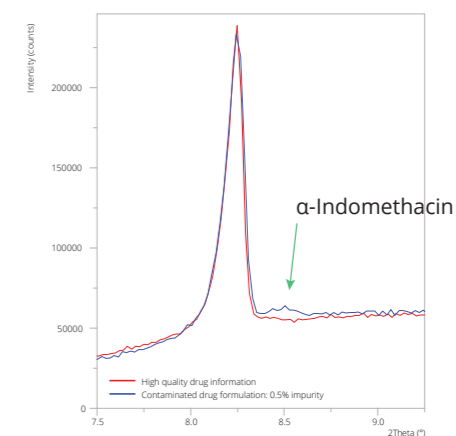
This figure shows part of a 20-minute reflection scan of a polyvinyl chloride filter with 0.0047mg of quartz – the most common polymorph of respirable silica. The quantification limit determined from peak-to-noise ratio for the scan is 0.0036mg. Aeris can push the quantification limit below 0.005mg in less than 10 minutes.



## ...reduce contamination in pharmaceuticals

When you're working with pharmaceutical formulations, it's essential to pick up on potential polymorph contamination. Thanks to Aeris' high sensitivity, you can do just that, improving your product quality and preventing unnecessary risks.

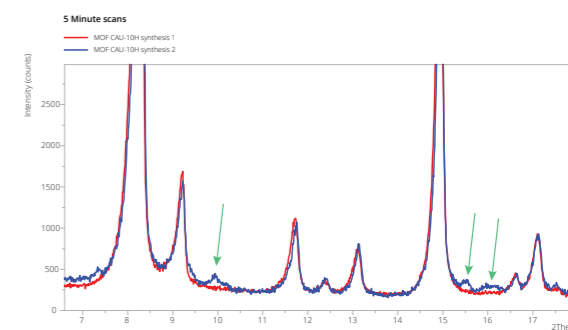
This figure shows 2 reflection scans revealing 0.5% α-Indomethacin contamination in a drug formulation. With low background and high resolution, Aeris lets you routinely screen your materials.



## ...or identify the best process for your advanced materials

To refine your processing parameters, you need to analyze them quickly. With Aeris, even five-minute scans can immediately show whether a processing parameter is affecting crystalline phase purity.

This figure shows two five-minute reflection scans of 2 MOF materials processed under different conditions. Using Aeris, you can rapidly optimize these processing parameters, for the best quality material – every time.



## CHOOSE TO AUTOMATE

Aeris gives you a full range of sample loading options, from fully manual to fully automated. So you can start small and scale up.

It's also designed to plug into your automated environments for maximum convenience. Need support incorporating it into your LIMS system? Our expertise group can help!



Choose from:

- 1-position sample loader.
- Integrated 6-position sample station with automatic sample handling.
- A connection for belt automation (operated via UAI interface).
- Bespoke automation solutions with large- capacity sample loading.
- Full integration into multi-system automated labs.

## ACHIEVE REPRODUCIBILITY

We all know how important accurate sample handling is – but the right sample holder is equally essential.

Aeris supports a range of robust, full-sized sample holders. They're precision-made to reduce height alignment errors and prevent contamination through spillage. This means you can learn and perfect a reproducible sample preparation method, and use it every time for consistent, reliable results.

Your samples can be powders, solids, liquids, or slurries. Their quantities can range from standard-sized pressed pellets to micrograms. And if you've got air-sensitive or potent samples, we've got sealed holders for them. Whatever your application, there's a holder to suit it – talk to us to find it!



*In your lab – do it your way*

## GET INSTANT RESULTS

Achieving routine measurements and high turnaround just got easier, with our onboard automated analysis package: RoboRiet.

RoboRiet automates the entire measure-analyse-report sequence, providing rapid quantitative-phase analysis.

What's more, our expertise team can also develop operating procedures for you – from screen setup and sample preparation advice, to method setup, automated analysis, and reporting formats.

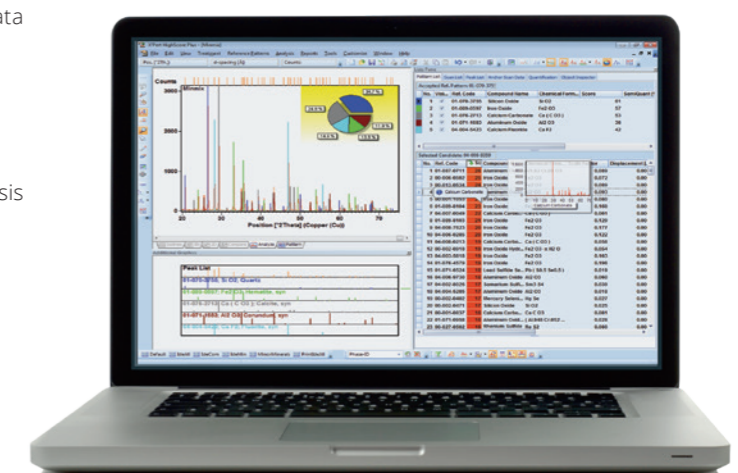


## MAKE NO COMPROMISES

Aeris doesn't compromise on compatibility. Its xrdml data files can be used with all our industry-leading analytical software solutions – including HighScore, HighScore Plus, Stress, and Industry. It also supports straight-line calibration for rapid quality control.

In other words, you'll have access to a full suite of analysis capabilities, including:

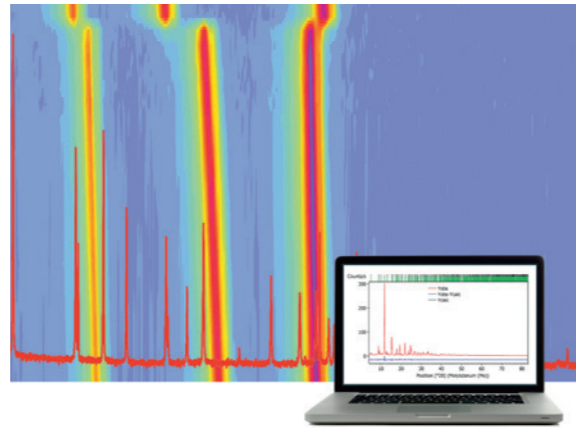
- Phase identification
- Phase quantification
- Crystal structure refinement
- Crystallinity
- Size, strain, and stress analysis
- Statistical clustering
- ...and more



## TEST THE BOUNDARIES

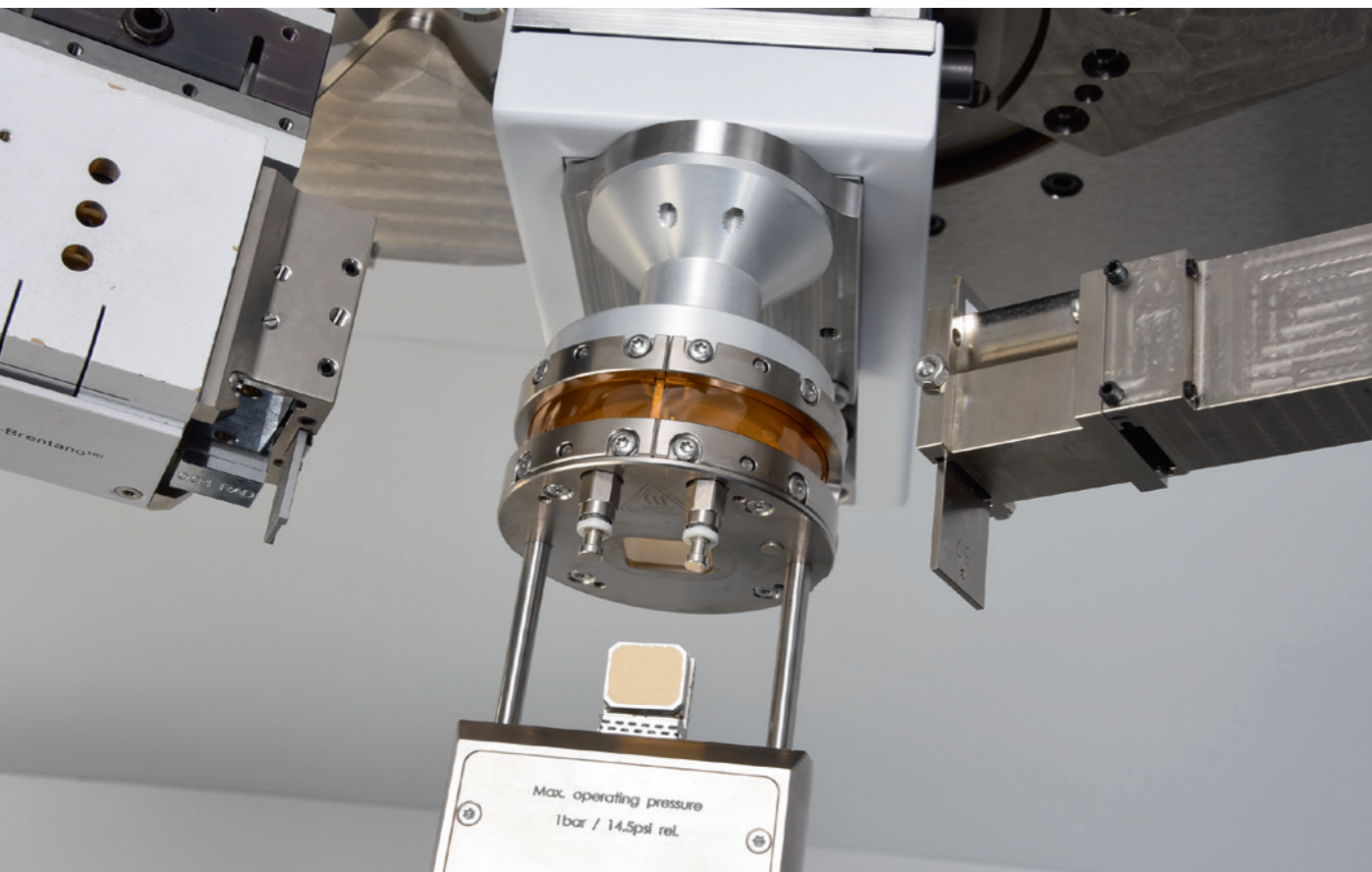
You've found a process or material that works for you – but how much can you change its process or composition parameters before it becomes less effective? With Aeris, you can investigate a range of material variants to see how processing, non-ambient, and composition changes affect performance.

**HighScore** and **HighScore Plus** are designed to process, analyze, and display large data sets. This lets you identify and optimize key stages in your processes, and unique properties in your materials.

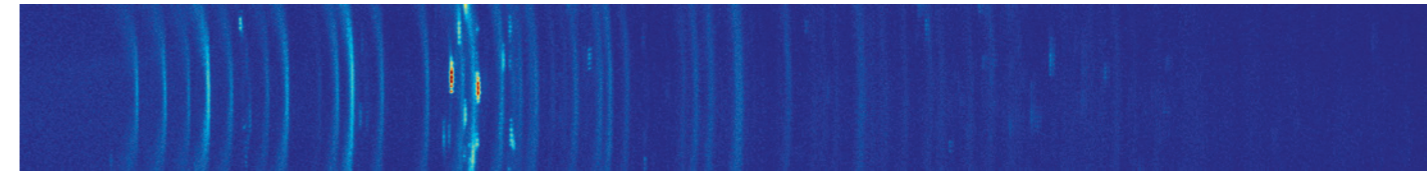


At the same time, an **integrated non-ambient stage** lets you model your material's robustness in tough operating conditions.

Talk to us about options for your research!



## EXTEND YOUR VISION



Simple 2D diffraction measurements are the ideal way to visualize your material and plan further investigations. They also provide much better peak shapes for low-angle data, and are a great choice for MOFs, clays, and pharmaceuticals.

With Aeris 2D, incorporating our high-resolution PiXcel<sup>3D</sup> detector, you can easily perform these 2D measurements. You'll instantly see whether your crystallites are smaller or larger, and whether they have a random or a preferred orientation.



## BE ASSURED

### Omnitrust

From instrument qualification to compliance and auditing, we understand how important data integrity is – and we're here to help you minimize risk. In particular, our OmniTrust software provides validation for several systems, including Aeris.

Designed in collaboration with industry experts, OmniTrust ensures record accuracy and best practices in

data integrity. How? By restricting users to only necessary auditable actions. Its system controls help prevent user errors and data falsification, enabling you to comply with all relevant regulations. And, if there is a potential integrity issue, OmniTrust will quickly put it at your fingertips. So you can save time and say goodbye to stress.

*Traceability and control  
at your fingertips*

## BE A WINNER

With Aeris, you'll have **state-of-the art X-ray powder diffraction data** – whatever the type of polycrystalline sample.

You'll have **peace of mind** in the lab, thanks to a unique internal interlocked enclosure providing complete radiation protection.

**External loading** will protect components from tampering, spillage, or accidents across the entire optical path.

Thanks to **multiple user management levels**, even users with minimal training can contribute.

A true uncoupled theta-**2theta goniometer** will keep samples horizontal, ensuring flexibility and top-quality measurements.

By providing the data quality of a floor-standing system in a compact instrument, Aeris will deliver **unrivalled cost savings**.

And you can do all this at the push of a button.

## SO, WHAT ARE YOU WAITING FOR?

You've seen the options available – so why not put them together to make a unique instrument for your unique requirements?

That's the benefit of a Malvern Panalytical diffractometer. Built for you, with total versatility, and the right data just when you need it.

*Talk to us today!*





## WHY CHOOSE MALVERN PANALYTICAL?

We are global leaders in materials characterization, creating superior, customer-focused solutions and services which supply tangible economic impact through chemical, physical and structural analysis.

Our aim is to help you develop better quality products and get them to market faster. Our solutions support excellence in research, and help maximize productivity and process efficiency.

Malvern Panalytical is part of Spectris, the productivity-enhancing instrumentation and controls company.

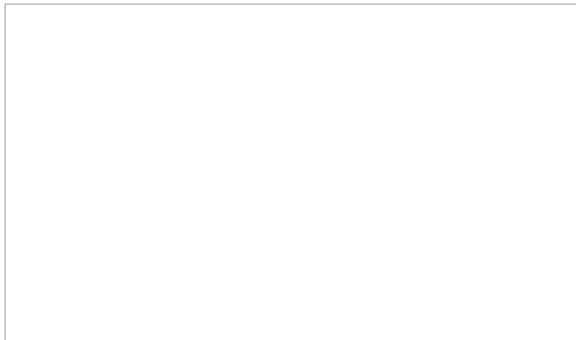
[www.spectris.com](http://www.spectris.com)

## 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



## MALVERN PANALYTICAL

Groveswood Road, Malvern,  
Worcestershire, WR14 1XZ,  
United Kingdom

Tel. +44 1684 892456  
Fax. +44 1684 892789

Lelyweg 1,  
7602 EA Almelo,  
The Netherlands

Tel. +31 546 534 444  
Fax. +31 546 534 598

[info@malvernpanalytical.com](mailto:info@malvernpanalytical.com)  
[www.malvernpanalytical.com](http://www.malvernpanalytical.com)

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