



# EMPYREAN ALPHA-1

Unrivalled data quality from a laboratory XRD system



# ENGINEERED TO BE THE BEST

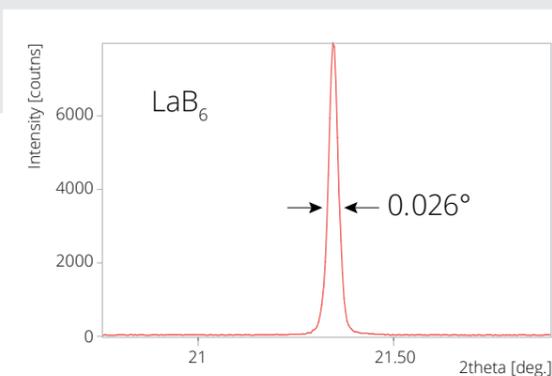
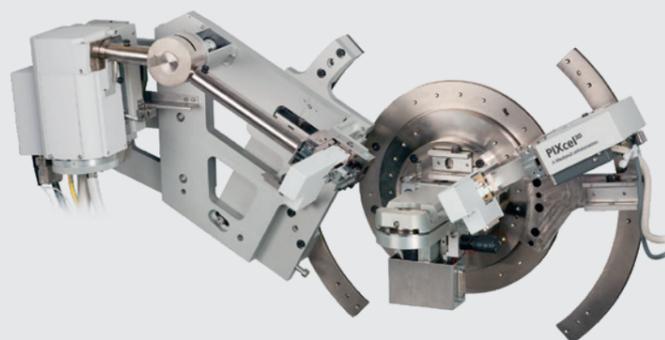
The Empyrean Alpha-1 is a member of Malvern Panalytical's family of Empyrean X-ray diffraction systems. In the Alpha-1, a unique symmetric Johansson monochromator provides data with unrivalled resolution, excellent peak symmetry, and ultra-low background - perfect for structural analysis needs.

## Superior Johansson monochromator design

Whereas some Johansson monochromators use an asymmetrically cut crystal, Malvern Panalytical employs a symmetrically cut, curved Ge (111) crystal to deliver superior resolution and spectral purity.

The  $K\alpha_1$  X-ray beam is concentrated on the virtual line focus position of the Bragg-Brentano geometry.

Malvern Panalytical's unique monochromator positioning motor allows easy fine-tuning of the monochromator alignment without the need for outdated practices which compromise the safety of the system.



## Copper or cobalt X-rays – your choice

The Alpha-1 system can be set up with either a copper (Cu) or a cobalt (Co) X-ray tube, depending on the type of materials analyzed most frequently. For iron and cobalt bearing materials, the use of Co radiation instead of Cu results in higher peak intensities and therefore a much improved peak-to-background ratio when analyzing these materials.

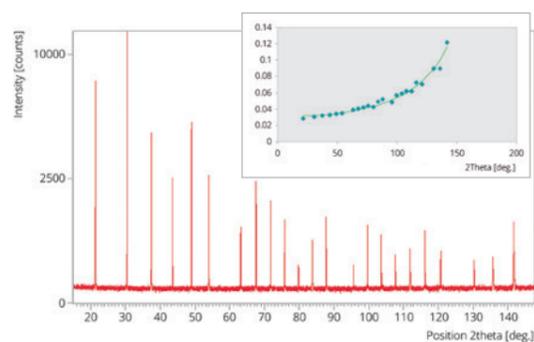


Figure 1. SRM660a lanthanum boride plotted on square root scale, exhibiting an exceptionally low (32 counts) and flat background, and an unsurpassed resolution of 0.026° FWHM of the first reflection.

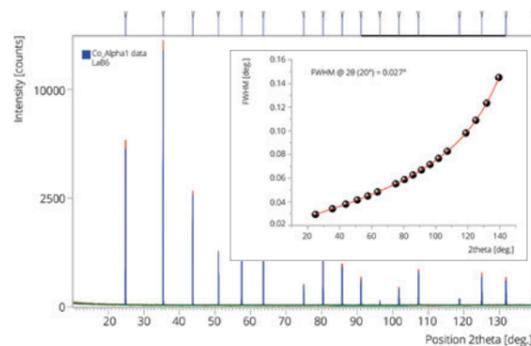
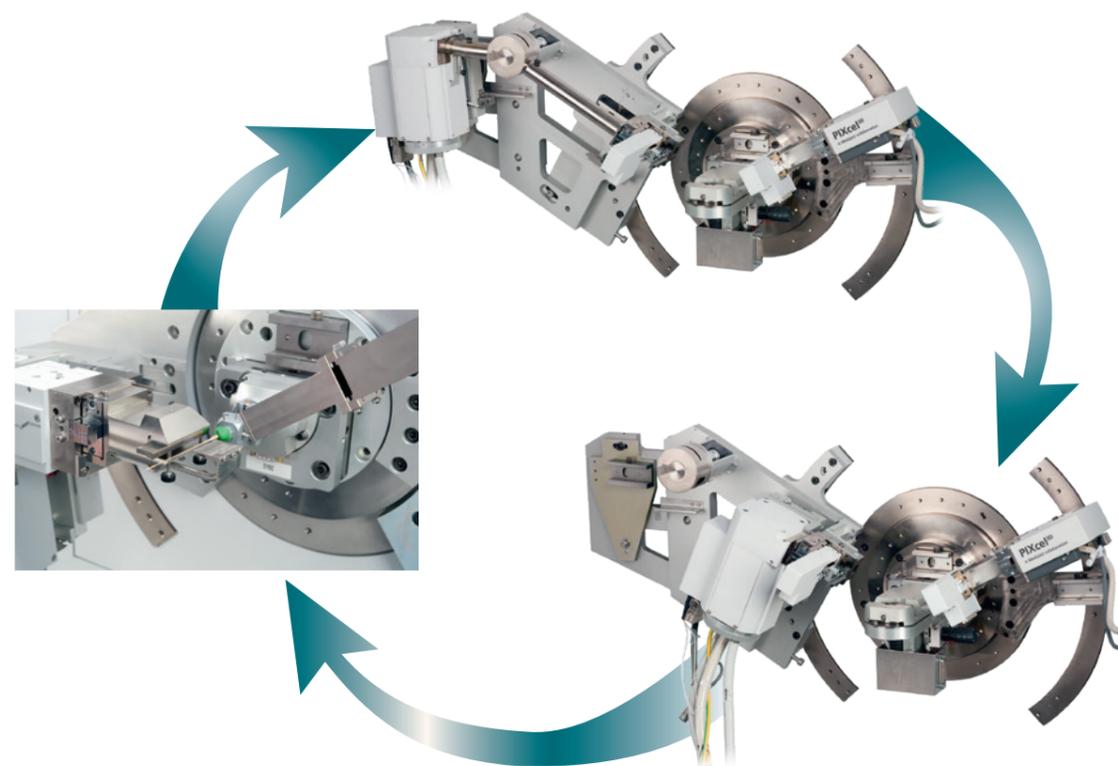


Figure 2. Measurement of LaB<sub>6</sub> using cobalt  $K\alpha_1$  radiation. The FWHM is as low as 0.027° when extrapolated to  $2\theta = 20^\circ$ .

# PreFIX: TRUE FLEXIBILITY FOR ALL OF YOUR CRYSTALLOGRAPHIC NEEDS

The key to the Alpha-1's flexibility is its ingenious use of Malvern Panalytical's PreFIX (Pre-aligned Fast Interchangeable X-ray) technology. This kinematic mounting system is applied to optics, stages and even the tube housing, and allows the diffractometer to be reconfigured in minutes without realignment.

In five minutes or less, the high-resolution Alpha-1 diffractometer becomes a multipurpose diffraction system ready to tackle a variety of analytical challenges.



## Conclusion:

The Empyrean Alpha-1 is ideal for:

- solving structures from powder data
- searching for polymorphic phases where peak overlap is a hindrance
- studying nanomaterial peak profiles to extract crystallite size, dislocation densities, and residual stress
- preparing materials for synchrotron beam time



## 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.

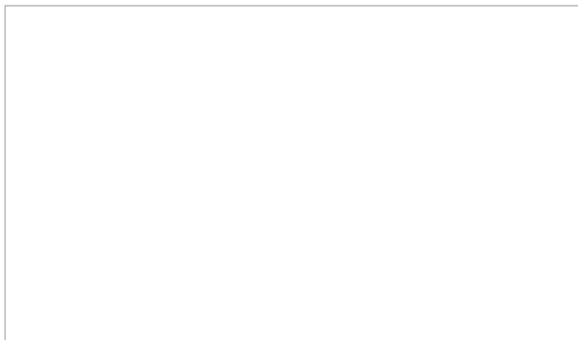
[www.spectris.com](http://www.spectris.com)

## 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



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