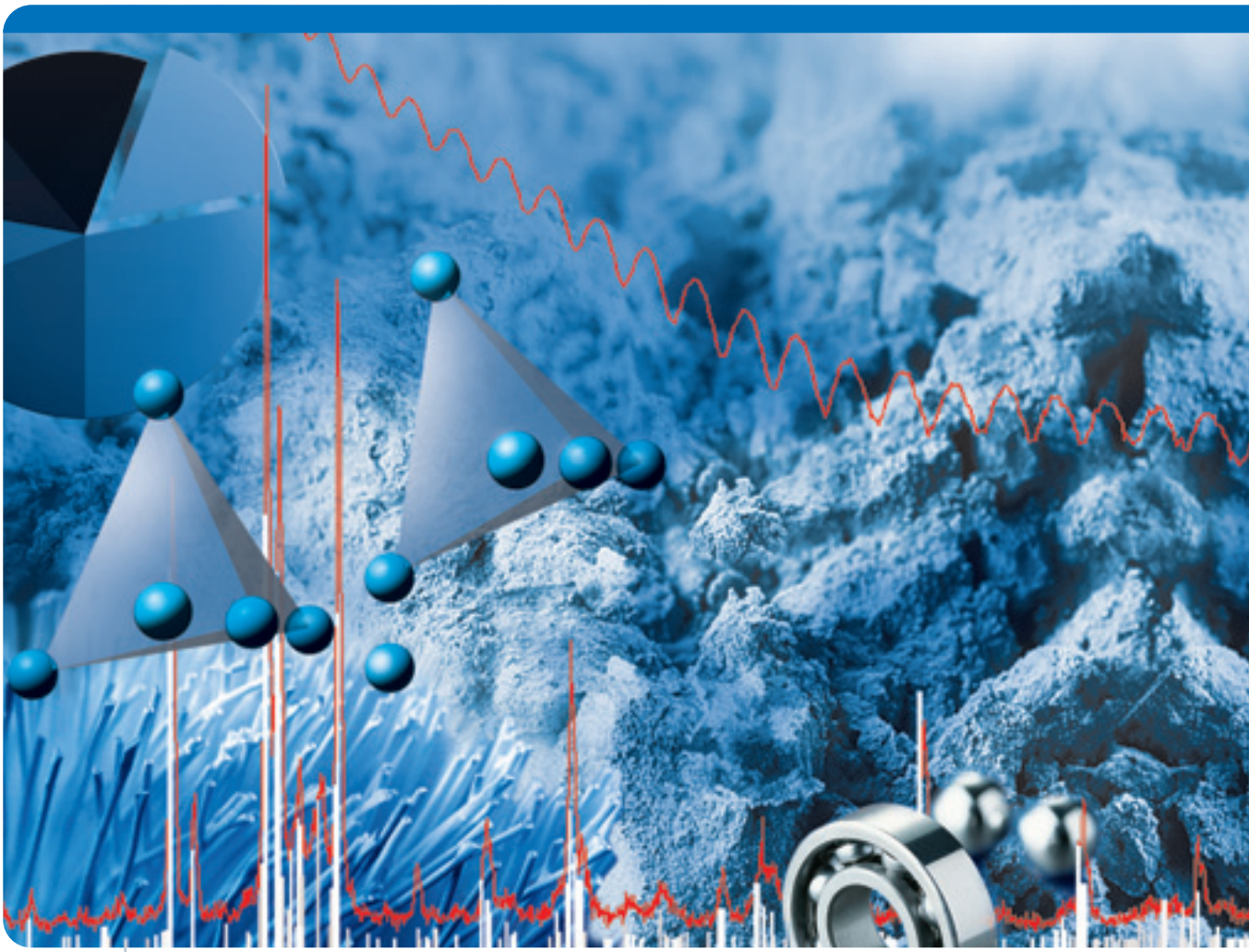


D8 ADVANCE

- Diffraction Solutions

XRD

Innovation with Integrity

Small sample amounts

Pharmaceuticals

Loose powder

Fibers

Epitaxial multilayers

Coating and films

Machined items

Inclusion

Suspension

Filters

D8 ADVANCE – the future-proof solution in X-ray diffraction

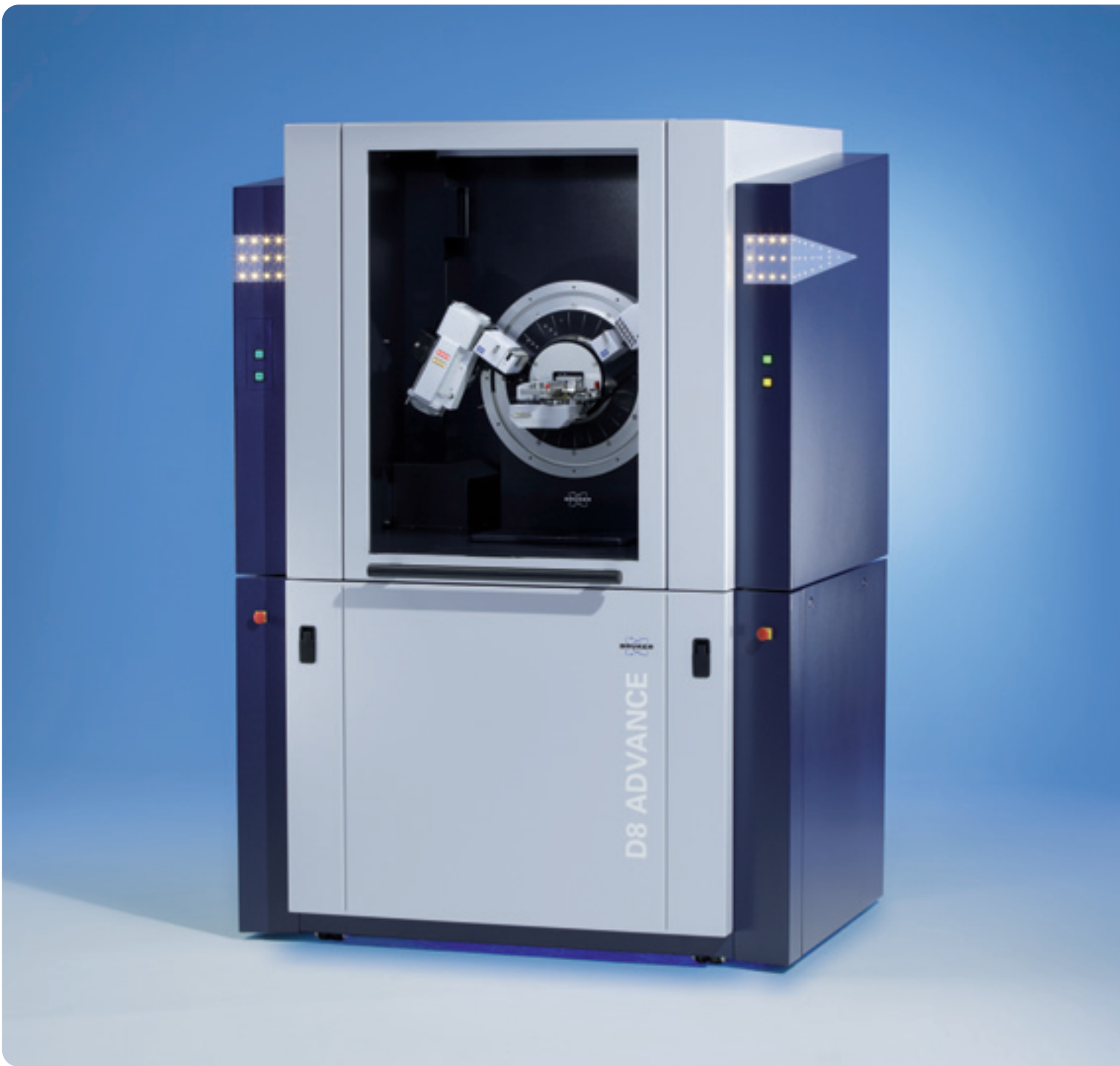
X-ray diffraction (XRD) is the method of choice for extracting structural information from virtually any type of sample, regardless of shape, size or composition, under ambient or non-ambient conditions.

Consequently, the most important demands on a state-of-the-art X-ray diffractometer are an absolutely open design and unrestricted, uncompromising modularity, coupled with maximum user-friendliness, operating convenience and safe handling.

That is our D8 ADVANCE!

The D8 ADVANCE unifies cutting edge technology with comprehensive ergonomics and maximum flexibility. It is a system that guarantees superior-quality results, the shortest possible measurement time and the highest analytical performance. It is the most capable instrument for your analytical needs and ready for taking on new challenges whenever they arise.

D8 ADVANCE – the name says it all!


D8 ADVANCE

Obtained sample characteristics

- Phase composition
- Crystal structure
- Texture
- Residual stress
- Short-range order
- Microstructure
- Lattice parameters & mismatches
- Layer thickness

D8 ADVANCE – understanding the sample behind the signal

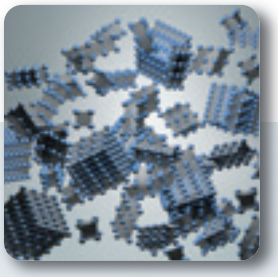
X-rays are the ideal, non-destructive probe for examining all types of samples!

XRD enables crystalline phases to be identified, quantified, and their crystal structure determined, while the general process of X-ray scattering probes the nanostructure, and provides information on the short-range arrangement in materials. Characterizing a sample with a complex composition is a daunting challenge for any analytical method – except XRD. With XRD, every detail in the diffractogram is meaningful and ultimately enables the full characterization of a sample. A diffractogram consists of peak positions, intensities, oscillations and other shapes, which are characteristic for a specific sample. Using this data, one can deduce the sample properties in detail.

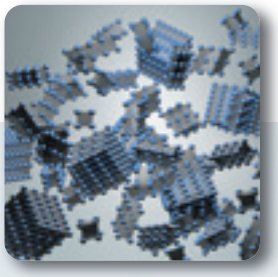
The D8 ADVANCE is supplied together with our DIFFRAC.SUITE. This latest and most comprehensive software package opens all analytical doors for you. Thanks to DIFFRAC.SUITE, you are in a position to meet any task from the very beginning, and achieve the desired results. It is unparalleled in terms of speed, simplicity and reliability.

The key to complete characterization of your sample: D8 ADVANCE with DIFFRAC.SUITE!

Microstructure

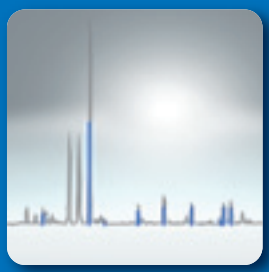


Randomly oriented crystallites

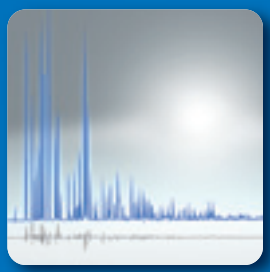


Randomly oriented crystallites

Application



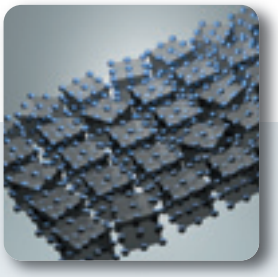
Qualitative & quantitative phase analysis



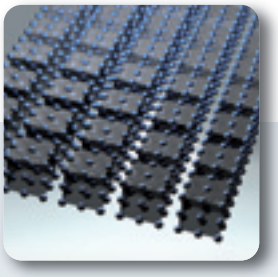
Structural analyis

Information

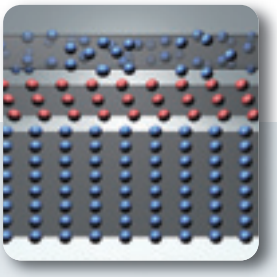
- Phase composition
- Phase transition
- Amorphous content
- Percent crystallinity
- Crystallite size
- Lattice parameters
- Crystal structure
- Symmetry
- Coordination
- Order/disorder



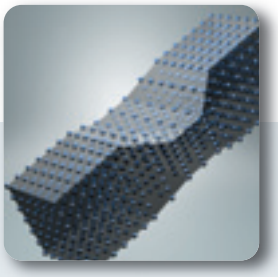
Oriented crystallites



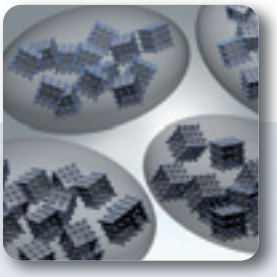
Almost perfectly oriented crystallites



Layered structures

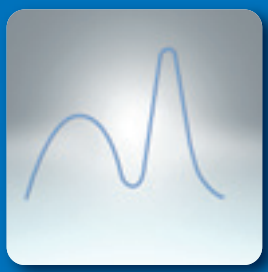


Shaped or machined samples

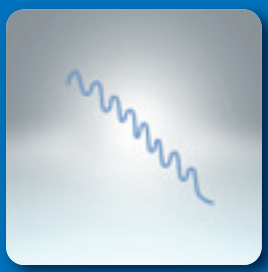


Nanoparticles

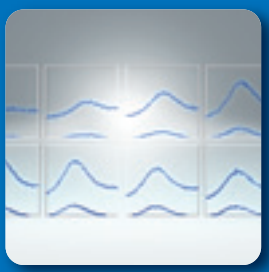
Texture analysis



High-resolution X-ray diffraction analysis



Reflectometry analysis



Residual stress analysis

Small angle X-ray scattering analysis

- Qualitative & quantitative preferred orientation
- Pole figures, ODFs
- Texture components

- Lattice parameter
- Composition
- Strain & relaxation
- Epitaxial relation

- Layer thickness
- Roughness at surfaces and interfaces
- Density

- Strain
- Deformation
- Compressibility
- Stress tensor

- Size & size distribution
- Shape
- Particle distances
- Inner surface

DAVINCI.MODE – real-time component recognition

- Instant component registration with all specific properties
- Fail-safe component positioning
- True plug'n'play

DAVINCI.SNAP-LOCK – changing components without tools

- Fast and easy
- Alignment-free: optics retain their alignment

DIFFRAC.DAVINCI – the virtual goniometer

- Real-time component recognition and status display
- Push-button switch between different beam paths
- Detection of missing, misplaced or unsuitable components
- Choice between all components configured for the present system

Smart solutions à la DAVINCI

- For switching tube focus orientation
- For mounting small or irregular samples
- For accurate sample positioning
- Any many more...

DAVINCI design – uncompromised ease-of-use

DAVINCI.MODE

In DAVINCI.MODE, the D8 ADVANCE monitors and controls itself in every detail. The system knows its own state at any time. Each component, each component replacement, and each change of status is automatically recognized. Every component registers itself with its specific characteristics on the system and is then configured automatically. Thanks to DAVINCI.MODE, it is no longer necessary to make any adjustments after exchanging a component.

DAVINCI.SNAP-LOCK

DAVINCI.SNAP-LOCK is our unique, high-precision SNAP-LOCK mechanism, which enables all of the optics to be exchanged within just a few seconds, without tools and – due to DAVINCI.MODE – without any adjustments. All optics return to perfect alignment every time. Our TWIN and TRIO optics incorporate multiple beam paths that can be switched by software, without even touching the instrument. Never before has it been so easy, fast and reliable to change instrument configurations.

DIFFRAC.DAVINCI

DIFFRAC.DAVINCI is a graphical representation of the actual goniometer showing all beam path components plus their status and provides automatic validation of the instrument configuration with real-time conflict detection.

Smart solutions à la DAVINCI

DAVINCI design comes with many smart solutions, all dedicated to making your daily work easier. For example, attachments for mounting non-uniform or small samples, a bench for the alignment-free mounting of a camera or a dial indicator or our unique Motorized Anti-Scatter Screen, the collision-free design of our Double-Laser unit for accurate sample positioning, and many more.

D8 ADVANCE with DAVINCI design: intuitive – fail-safe – smart

Da Vinci in mind

"Leonardo da Vinci is revered for his technological ingenuity and his extraordinary powers of invention. Leonardo developed a unique new attitude towards machines. He reasoned that by understanding how each separate machine part worked, he could modify them and combine them in different ways to improve existing machines. Leonardo set out to write the first systematic explanations of how machines work and how the elements of machines can be combined."

Real-time component recognition

Real-time status display

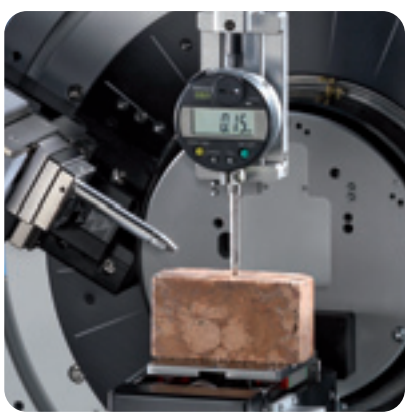
Push-button switch of optics

SNAP-LOCK change of optics

Push-button switch of optics –TWIN

Push-button switch of optics –TRIO

TWIST-TUBE



Dial indicator for sample height alignment

Clamp holder

Metals-ceramic sealed tube

TWIST-TUBE

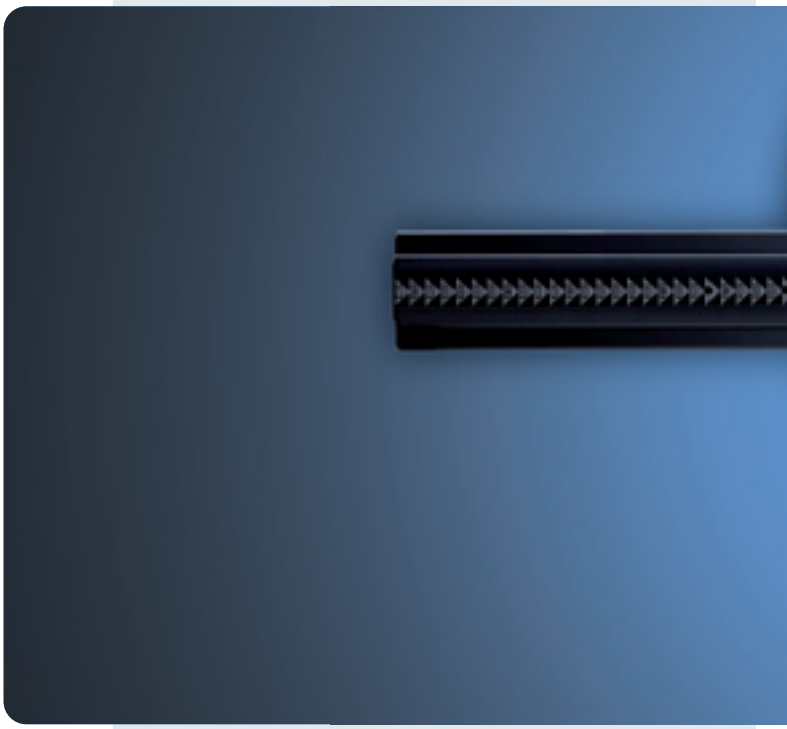
X-ray sources

- Industry-grade sealed tube
- Patented TWIST-TUBE
- Anode materials: Ag, Mo, Cu, Co, Cr, others on request
- Spot and line focus

D8 ADVANCE – the art of modularity

The D8 ADVANCE is a uniquely modular system, incorporating all parts of the beam path without any restriction. From the X-ray tube, through the optics, to the sample stages, and to the detectors, any user – even a novice – is capable of changing from one beam geometry to another or exchanging individual components right away.

Our D8 ADVANCE offers unparalleled adaptability to any conceivable application in X-ray diffraction – period!



Primary optics

- Fixed & motorized slits
- Parallel-beam and focusing Göbel mirrors
- TWIN optics
- TRIO optics
- Johansson monochromator
- POLYCAP lens
- MONTEL mirror
- Universal Beam Concept (UBC) collimators
- Soller slits

TWIN optics

Fixed slits

Compact UMC stage

Compact Cradle^{plus}

Sample stages

- Rotating sample stage
- AUTO-CHANGER
- Compact UMC stage
- Compact Cradle^{plus}
- > 20 non-ambient chambers
- Capillary stage
- FLIP-STICK

LYNXEYE XE-T

PILATUS3 R 100K-A

Detectors

- LYNXEYE
- LYNXEYE XE
- LYNXEYE XE-T
- PILATUS3 R 100K-A
- VÅNTEC-1
- SSD 160
- Scintillation counter

Accessories

- Motorized Anti-Scatter Screen
- Double-Laser unit
- Huge variety of sample holders
- Clamp holder for bulk samples
- Vacuum chuck
- Knife Edge Collimator
- Tilt stage
- Spinner
- Wobbler
- Battery cell

Dome-type sample holder

Clamp holder

Secondary optics

- Fixed & motorized slits
- Equatorial Soller
- TWIN optics
- Graphite and LiF secondary monochromators

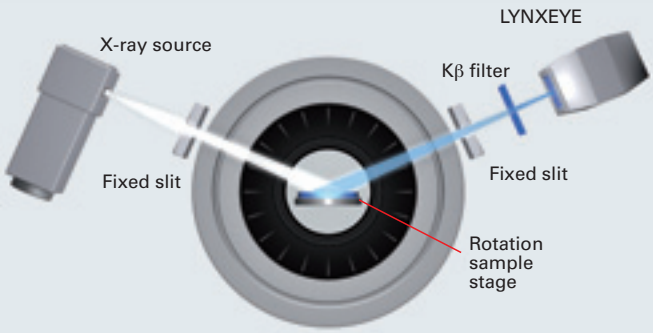
Fixed slits

Motorized slit with Rotary-Absorber

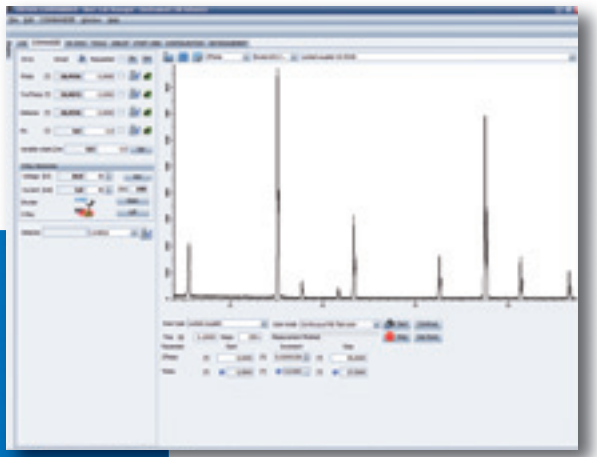
- Unlimited flexibility and upgrade-ability thanks to DAVINCI design
- DIFFRAC.SUITE software for instrument control and data evaluation
- High speed data collection with LYNXEYE detector
- Choice of all D8 ADVANCE optics and detectorss

Main Applications:

Phase identification
Phase quantification
Structural analysis
Residual stress



Bragg-Brentano geometry with LYNXEYE detector



Data acquisition
with DIFFRAC.COMMANDER

Instrument setup planning
with DIFFRAC.WIZARD

Phase identification
with DIFFRAC.EVA

D8 ADVANCE – everything is possible

Whatever your analytical question is, it all comes down to measuring the position, the intensity and the shape of the diffraction peaks. Our D8 ADVANCE provides the best possible data quality in shortest time – for all applications.

No matter how varied your applications, tasks and samples may be, analysis is very simple with our D8 ADVANCE. Thanks to its modularity, you can always configure a D8 ADVANCE to exactly satisfy your analytical needs!

This is how you use DAVINCI design: Define the task, select the desired beam geometry, optics, sample stage and detector. Put your desired configuration together in a few steps – and it's done! The rest: component identification, configuration and adjustment are carried out completely without user intervention by DAVINCI.MODE.

Regardless of the instrument configuration, setting up measurements and subsequent data analysis builds on our intuitive DIFFRAC.SUITE software platform. This software suite combines an extensive collection of modern and powerful algorithms for data processing and evaluation with a workflow that is simple and flexible. Seamless integration of each step in the visualization, data reduction and analysis process ensures ease-of-use and accurate results. Many operations can run automatically to maximize throughput, or interactively for expert control.

X-ray diffraction has never been so simple, flexible and reliable – D8 ADVANCE with DIFFRAC.SUITE

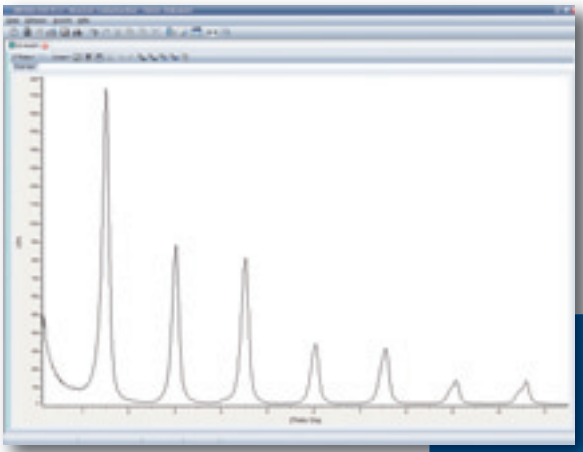
More, faster, and better – D8 ADVANCE

Many tasks require fast data collection with best sensitivity. Our D8 ADVANCE offers optimized solutions to collect best quality data, faster.

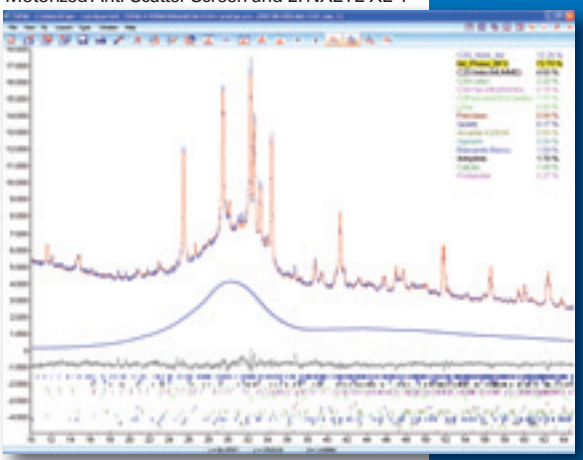
Fast data collection is a must for increasing sample throughput. Modern detectors efficiently speed up data collection. Another key to higher sample throughput is data quality, most importantly the peak-to-background ratio. A lower background enhances sensitivity for minor phases, or reduces measurement time. Our energy-dispersive LYNXEYE XE-T detector combines both virtues, offering fast data collection combined with unprecedented filtering of fluorescence and Kβ radiation. No need for costly, intensity-killing optics such as mirrors, monochromators or filters.

Air scatter strongly contributes to the background at low angles, in particular below 10° 2Theta. Many materials, such as pharmaceutical or clay samples, show diffraction peaks in this angular range. The LYNXEYE XE-T's unique Variable Active Detector Window™ feature in combination with the Motorized Anti-Scatter Screen eliminates parasitic low-angle background scattering.

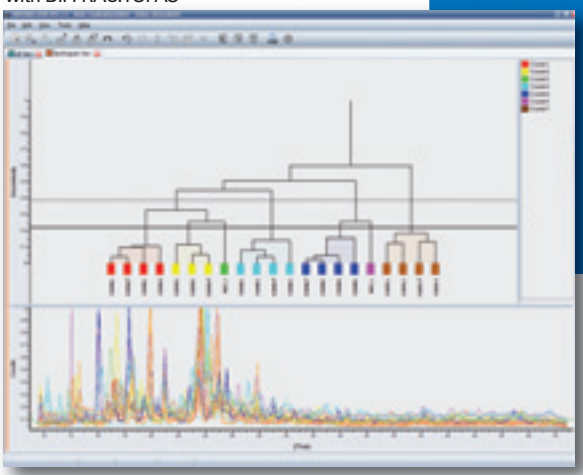
Higher sample throughput also calls for efficient sample handling. The multisample stages FLIP-STICK and AUTO-CHANGER meet this requirement. They can be used in reflection and transmission mode with almost any type of sample: powder, bulk, suspensions, small sample quantities, air-sensitive samples, …



Low angle data collected on silver behenate with Motorized Anti-Scatter Screen and LYNXEYE XE-T



Quantitative phase analysis with DIFFRAC.TOPAS



Cluster analysis with DIFFRAC.EVA

LYNXEYE XE-T:

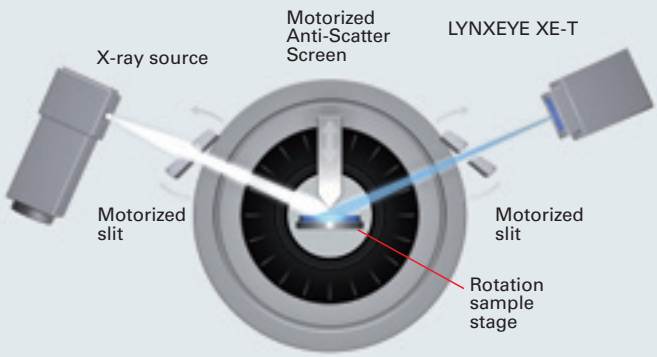
- High-speed data collection
- Superior energy resolution better than 380 eV making Kβ filters and secondary monochromators unnecessary
- Unique Variable Active Detector Window™ feature to suppress low-angle background scattering
- Operation with all common characteristic X-ray wavelengths (Cr, Co, Cu, Mo and Ag radiation)

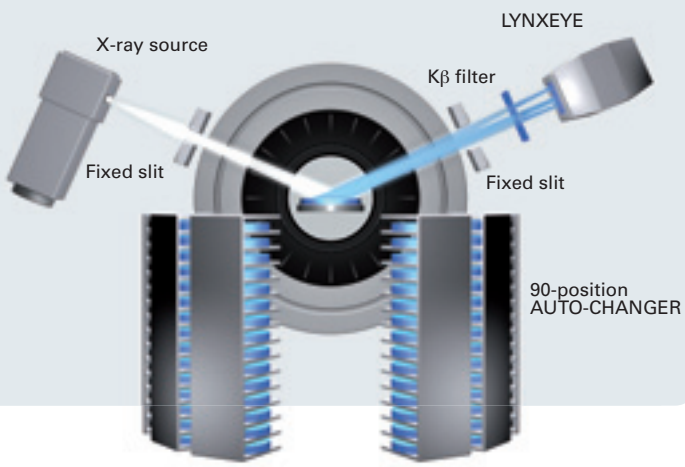
Intelligent sample handling:

- 9-position FLIP-STICK and 90-position AUTO-CHANGER for reflection and transmission
- Sample loading at any time
- Definition of sample priority
- Automatic resumption of interrupted measurements

Bragg-Brentano geometry with energy-dispersive
LYNXEYE XE-T detector and Motorized Anti-Scatter Screen

High-throughput diffraction with
LYNXEYE detector and AUTO-CHANGER



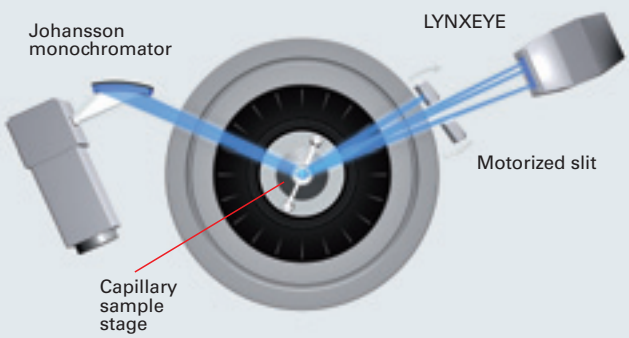


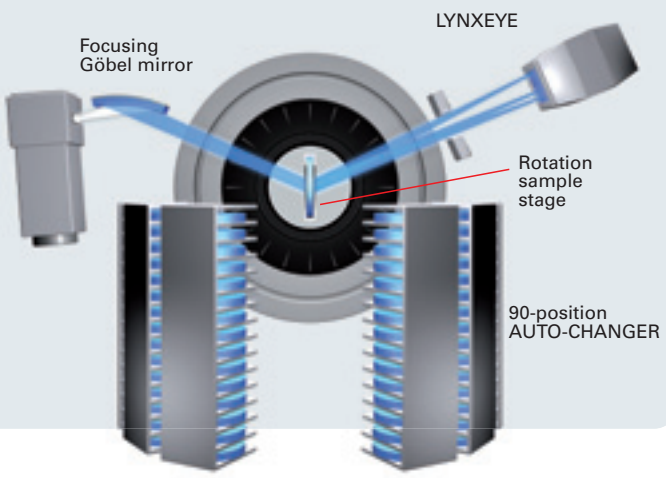
Capillary furnace

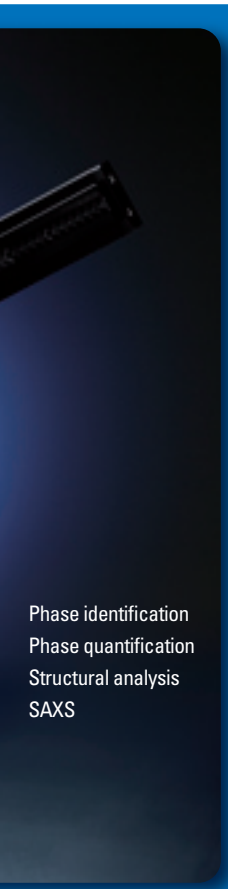
- Johansson monochromators for most common wavelengths (Co, Cu and Mo radiation)
- Best data quality with parallel and focusing Göbel mirrors for all common wavelengths (Cr, Co, Cu, Mo and Ag radiation)
- Software-controlled switch between reflection and transmission with parallel-beam Göbel mirrors
- Unmatched crystal structure and nano structure analysis

Capillary geometry with Johansson monochromator for pure Kα1 radiation and LYNXEYE detector

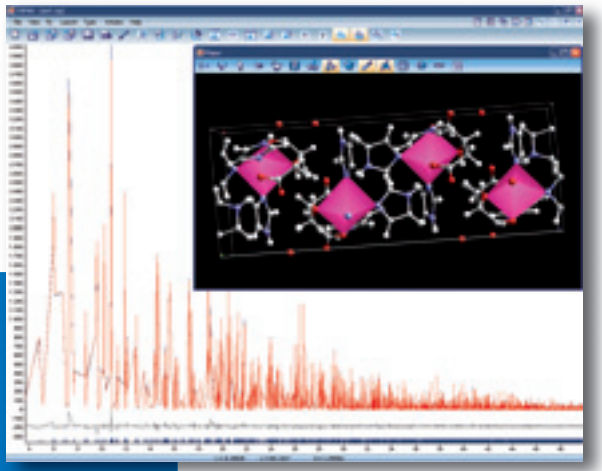
High-throughput diffraction with LYNXEYE detector and AUTO-CHANGER



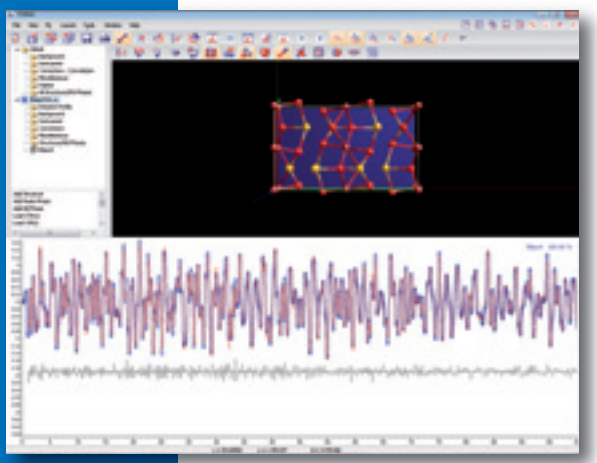




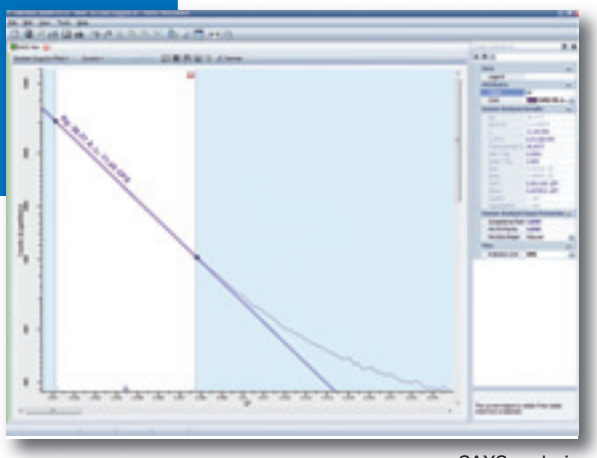
Phase identification
Phase quantification
Structural analysis
SAXS



Crystal structure determination
with DIFFRAC.TOPAS



PDF analysis
with DIFFRAC.TOPAS



SAXS analysis
with DIFFRAC.SAXS

Easy transmission with D8 ADVANCE

Sample properties and type of application determine which instrument geometry is best, transmission or reflection. With D8 ADVANCE you can have both.

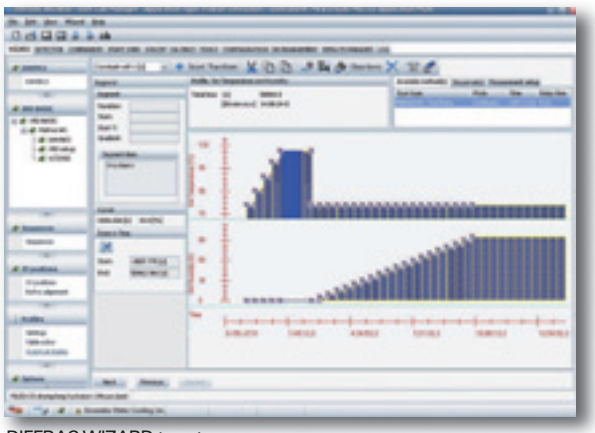
For small sample quantities, preferred orientation, materials with low absorption coefficients, sensitive samples, etc. measurements in transmission geometry are the best choice. Samples can be solid, powder, or suspensions – prepared in capillaries, in-between foils, or measured as-is. Measurements can be done at high or low temperatures, as well as under controlled humidity.

Transmission geometry is also preferable in advanced applications like structure determination, Small Angle X-ray Scattering (SAXS), and Pair Distribution Function (PDF) analysis.

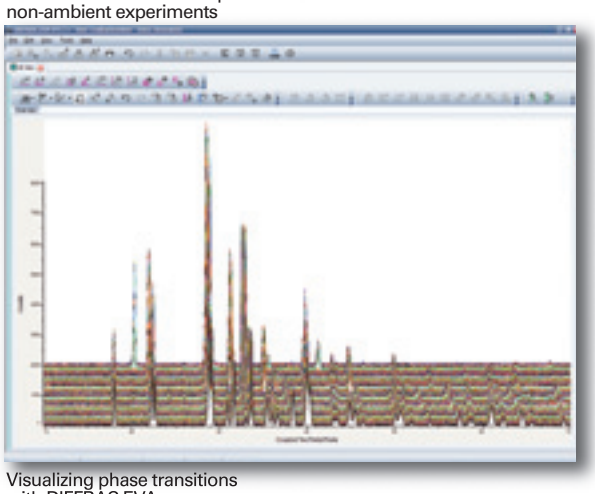
These particular applications benefit from tailored solutions. Transmission measurements are best done with dedicated optics that focus on the detector. Our focusing Göbel mirror provides highest intensity, whereas our primary monochromator provides pure Kα1 radiation. Both types of optics standard Cu radiation (SAXS), as well as for hard radiation (PDF). Regardless of the wavelength (Mo,Ag), our LYNXEYE and LYNXEYE XE-T detectors perform high-quality transmission measurements in minutes.

Also, subsequent data evaluation is top notch with our benchmarking DIFFRAC.TOPAS software for advanced crystal structure determination and PDF analysis, or our DIFFRAC.SAXS suite for comprehensive SAXS analysis.

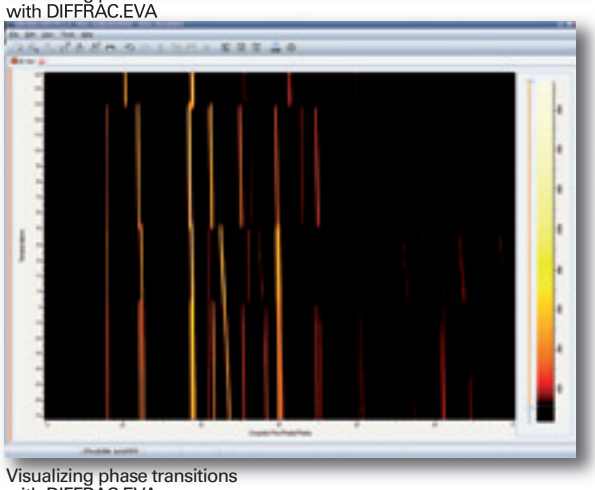
Meet the D8 ADVANCE in transmission.



DIFFRAC.WIZARD to set up non-ambient experiments



Visualizing phase transitions with DIFFRAC.EVA



Visualizing phase transitions with DIFFRAC.EVA

D8 ADVANCE – your sample under control

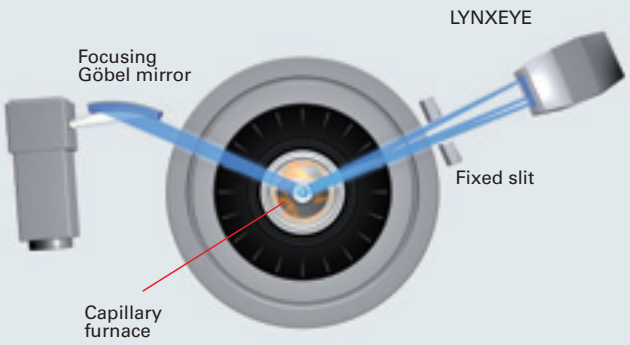
The properties of your samples can change under the influence of temperature, pressure, atmosphere or humidity.

Knowing what exactly happens is essential for optimizing industrial processes, performing quality control, or for conducting research. What could be more obvious than to simulate these conditions and to equip the D8 ADVANCE with one of the many non-ambient stages to study the impact "in situ" in the laboratory?

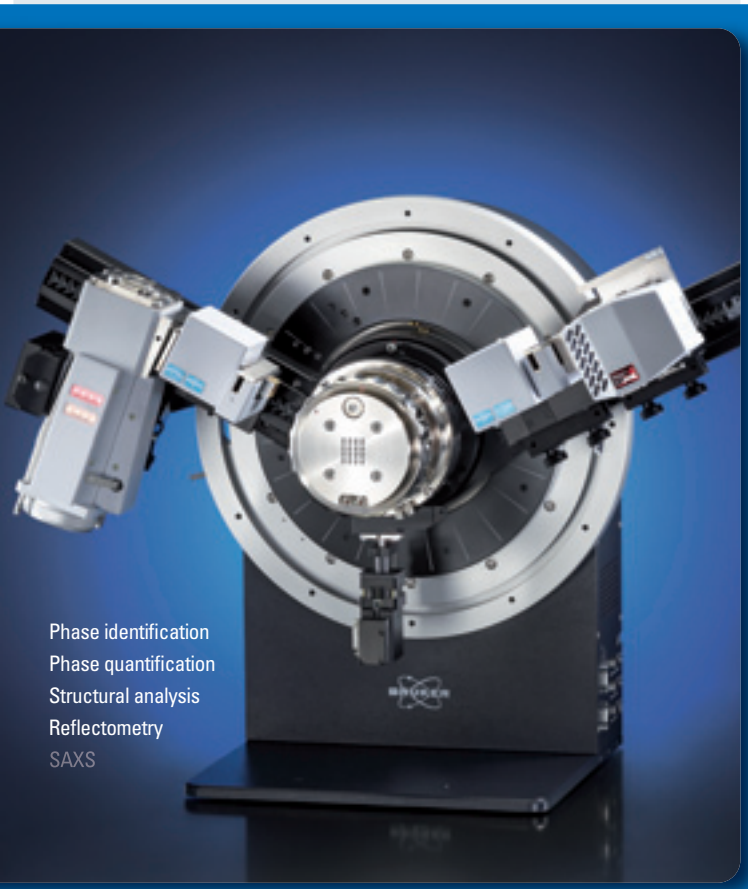
The D8 ADVANCE comes with the largest portfolio of in-house and third-party solutions, covering a vast range of non-ambient conditions for different sample types. Our family of MTC chambers features a uniquely modular, platform-based design that accommodates different heating technologies. Within minutes you can convert one chamber type into another that better suits your experimental needs. In addition, the D8 ADVANCE can be equipped with a large selection of application optimized non-ambient solutions, e.g. for the combined control of different non-ambient parameters.

All our non-ambient solutions are an integral part of the DAVINCI design. Exchange with other sample stages is fast and reproducible thanks to the bayonet interface. Each chamber is automatically identified when mounted. A manual or motorized height adjustment brings the sample to the center of the goniometer. The motorized version even enables automatic compensation of the sample height displacement due to thermal expansion.

As you may expect of our integrated solutions, they are fully software supported in our DIFFRAC.SUITE: from setting up the measurement to the final data evaluation.

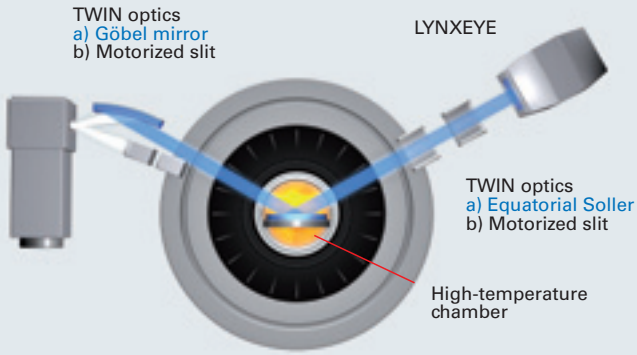


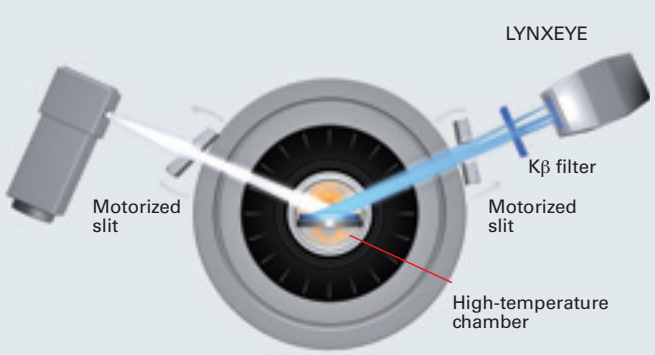
- Non-ambient experiments in reflection, capillary and foil transmission geometry
- Temperature range from –193 °C up to 2,300 °C
- Reactive atmospheres and high-pressure experiments up to 100 bar
- Humidity experiments from 10 °C up to 80 °C
- Dedicated non-ambient Reflectometry from –180 °C up to 800 °C



MTC-HIGHTEMP chamber with motorized height alignment

HTK 1200N oven-type chamber with sample spinner





Exclusively by Bruker AXS
Primary TWIN Patent
US 9,665,372
DE 1 014 1958
Secondary TWIN Patent
EP 2 194 375 A1
US 7,983,389 B2

TWIN/TWIN – one for all!

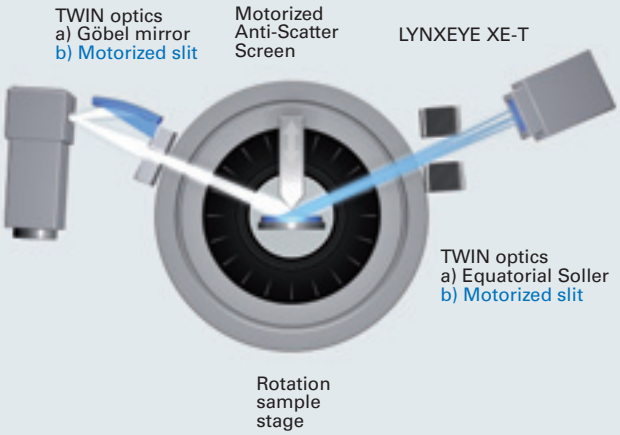
The majority of samples you come across are of polycrystalline nature. Polycrystalline samples can take different shapes. They can be a powder, a massive sample, a coating, a fiber, a suspension etc. Depending on the sample shape and the sample properties you want to investigate, different instrument setups may be more appropriate.

Imagine you could have the optimum instrument setup without manual reconfiguration and alignment for such diverse applications as phase ID or X-Ray Reflectometry (XRR), or between Grazing Incidence Diffraction (GID) and microdiffraction (µXRD), or between investigations of residual stress and structure determination … without even touching the optics. That is exactly what our D8 ADVANCE with TWIN/TWIN setup has been made for, the synthesis of modularity.

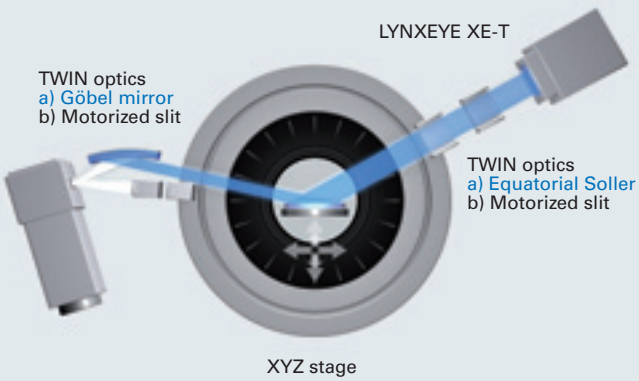
With the primary TWIN you can switch with motor support between Göbel mirror for parallel-beam geometry and a motorized divergence slit for Bragg-Brentano geometry. With the secondary TWIN, you can change between an equatorial Soller slit and a variable slit. Consequently, you can switch between different instrument geometries by a simple mouse click, failure-proof and alignment-free. A great advantage for multi-user environments!

The TWIN/TWIN setup is compatible with all sample stages available for the D8 ADVANCE.

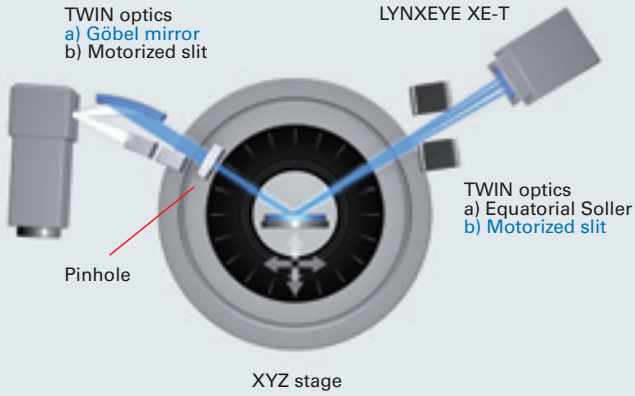
D8 ADVANCE with TWIN/TWIN – always the best instrument, without instrument reconfiguration and alignment!



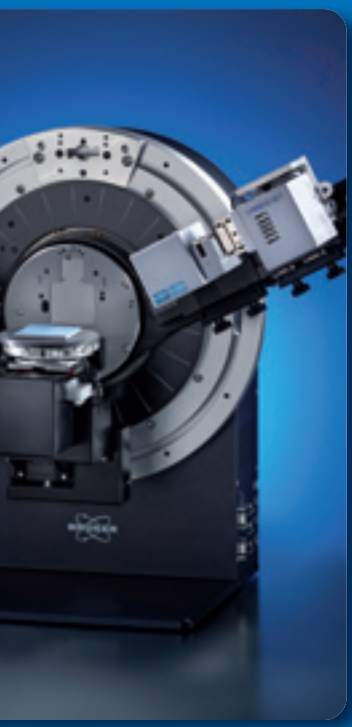
TWIN/TWIN setup with Motorized Anti-Scatter Screen in Bragg-Brentano geometery



- Perfect Bragg-Brentano geometry for unparalleled powder diffraction
- Software-controlled motorized switch of both primary and secondary optics for ultimate ease-of-use



- Micro-diffraction with LYNXEYE XE-T detector to speed up data collection with unrivalled energy resolution
- Compatible with all DAVINCI optics to respond to any changing application demands

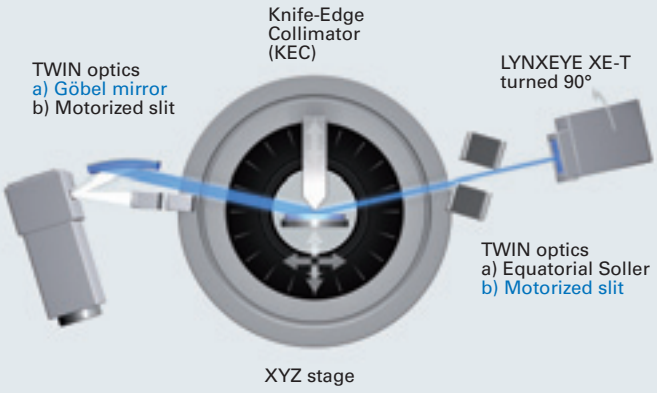


Grazing Incidence Diffraction
TWIN/TWIN setup

Microdiffraction
TWIN/TWIN setup

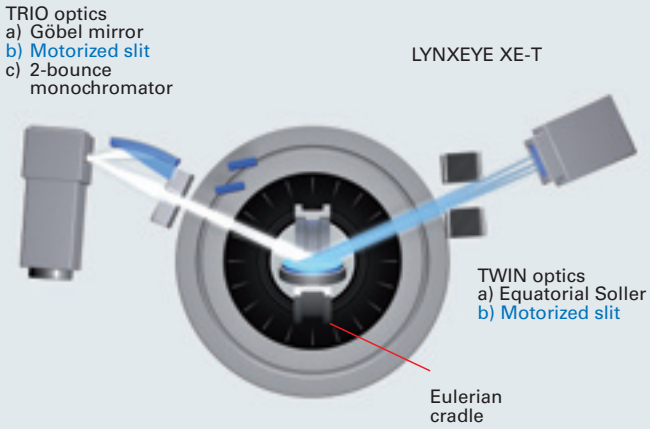
Reflectometry TWIN/TWIN setup
with LYNXEYE XE-T detector in 90° mode

- Grazing incidence geometry for optimum polycrystalline thin film diffraction
- Alignment-free switch between Bragg-Brentano and parallel beam geometry for matching analytical requirements defined by the sample



- XRR to determine film thickness from 0.1 nm up to 150 nm
- Bruker proprietary Göbel mirror on prefigured substrate for ultimate flux and beam divergence

- Perfect Bragg-Brentano geometry for unparalleled powder diffraction
- Alignment-free switch between Bragg-Brentano, parallel beam and high-resolution geometry for matching analytical requirements defined by polycrystalline and epitaxial samples

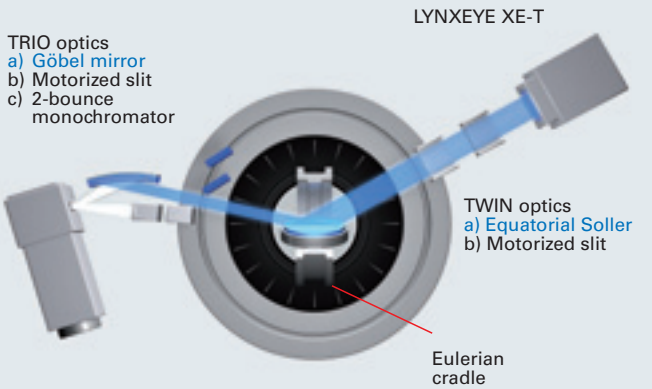


- 2-bounce channel-cut monochromator offering superb resolution at high intensity on epitaxial samples
- Up to six fully automated beam path geometries integrated into a single setup for ultimate ease-of-use

TRIO/TWIN setup in Bragg-Brentano geometry

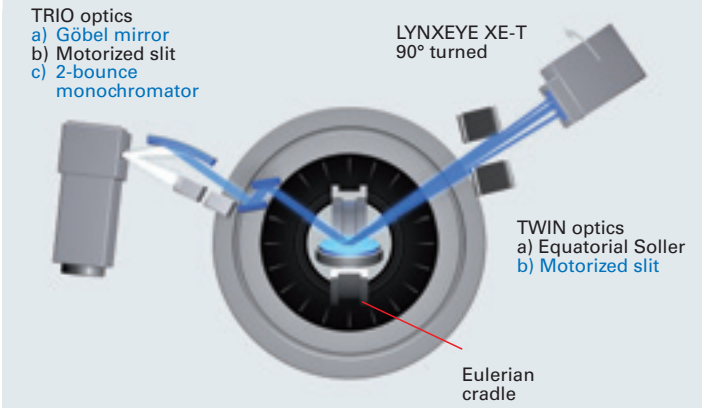
Grazing incidence diffractionTRIO/TWIN setup

- Grazing incidence geometry for optimum polycrystalline thin film diffraction
- Compatible with all DAVINCI optics to respond to any changing application demands



- XRR to determine film thickness from 0.1 nm up to 250 nm
- Bruker proprietary Göbel mirror on prefigured substrate for ultimate flux and beam divergence

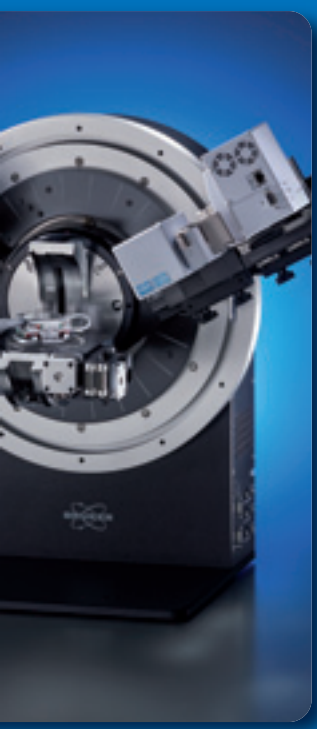
Exclusively by Bruker AXS
Primary TRIO Patent pending
Secondary TWIN Patent
EP 2 194 375 A1
US 7,983,389 B2



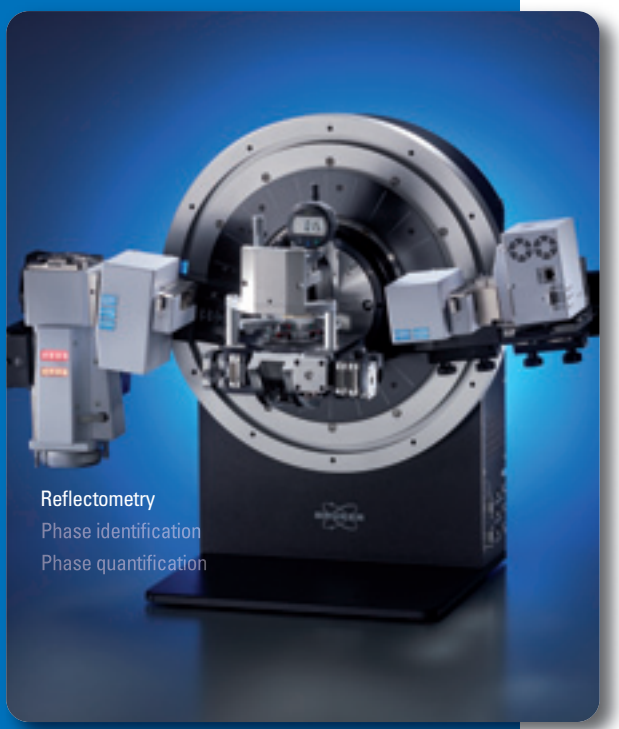
TRIO – resolution at your command

In addition to polycrystalline types of samples, there also exist almost perfect single crystal samples such as epitaxial thin films, which are used in Light Emitting Diodes, microelectronics, power devices, etc. In such samples you need to measure very small differences in lattice parameters with extremely high accuracy. This requires enhanced angular resolution by a highly monochromatic X-ray beam with low beam divergence. Such demands on X-ray beam quality call for a channel-cut monochromator.

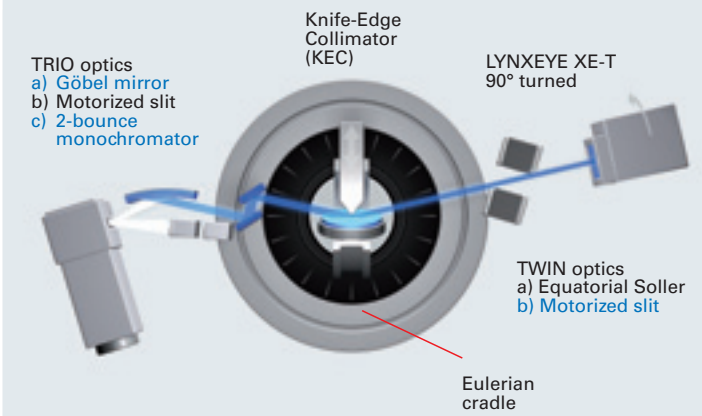
With our TRIO optics you can – with a simple mouse click – alter the instrument resolution to perfectly match the analytical requirements of your sample, whether polycrystalline or epitaxial. TRIO uniquely enables motorized switching between three different primary beam paths: a motorized divergence slit for Bragg-Brentano geometry, a Göbel mirror for grazing incidence diffraction and X-Ray Reflectometry, and a high resolution beam path with Göbel mirror and channel-cut monochromator. In combination with our secondary TWIN you can instantly realize any instrument geometry, and consequently measure each and every sample with the optimum instrument setup, failure-proof and alignment-free.



TRIO/TWIN in HR-XRD setup



Reflectometry TRIO/TWIN setup with LYNXEYE XE-T detector in 90° mode



TRIO and TWIN, an innovative benchmark in ease-of-use!

TRIO forms a perfect combination with our Compact Cradle[plus] for powder, bulk, and thin film applications. The optics is also compatible with all other sample stages available for the D8 ADVANCE.

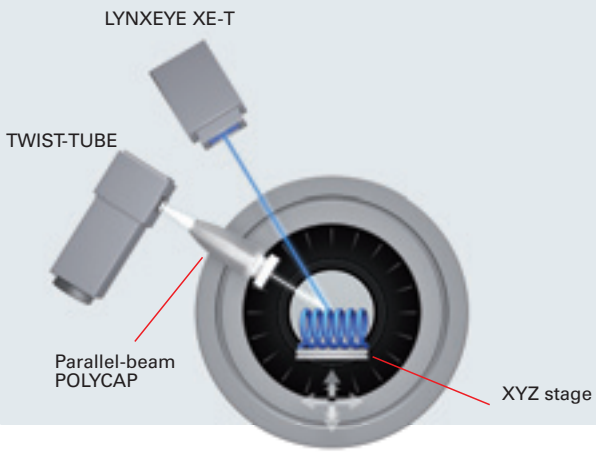
D8 ADVANCE with TRIO – embrace the full power of X-ray diffraction!

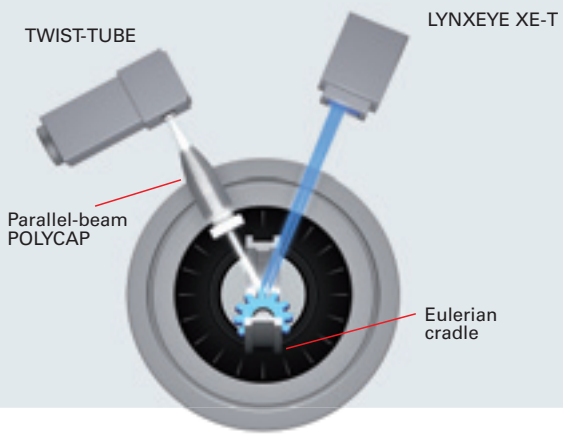
- Patented TWIST-TUBE design compatible to standard tube dimensions
- No realignment and automatic focus orientation detection thanks to DAVINCI.MODE
- Fast and accurate sample positioning with Double-Laser system
- All common wavelengths for residual stress in accordance with EN 15305
- Traditional sin²(psi) method as well as the multiple hkl evaluation method
- Texture determination based on the component method or the traditional spherical harmonics method
- Retained austenite determination based on both the traditional RIR and Rietveld method for complex alloys

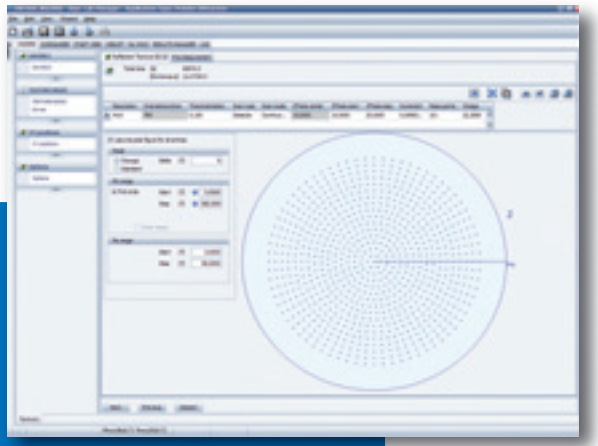
TWIST-TUBE

Stress measurements in iso-inclination (omega) mode

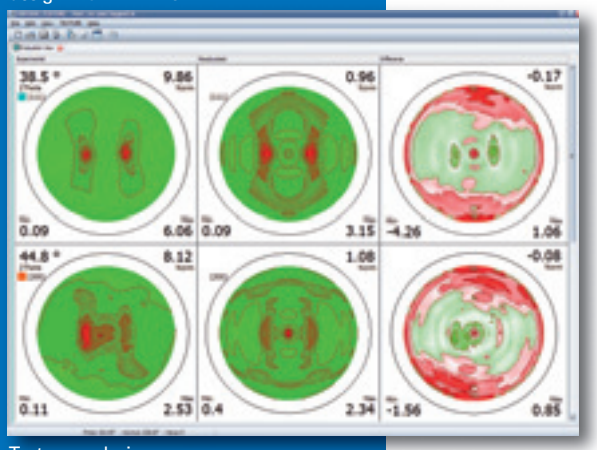
Texture or stress measurements in side-inclination (psi) mode



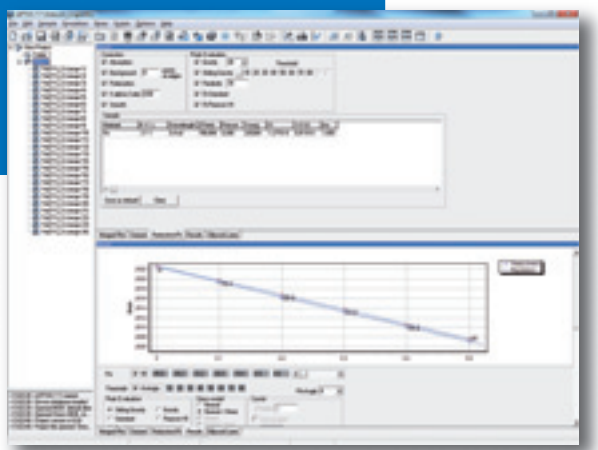




Straightforward texture measurement design with DIFFRAC.WIZARD



Texture analysis with DIFFRAC.TEXTURE



Residual stress analysis with DIFFRAC.LEPTOS

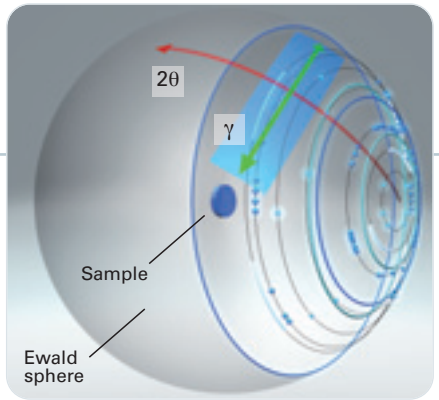
D8 ADVANCE – the expert for texture and stress

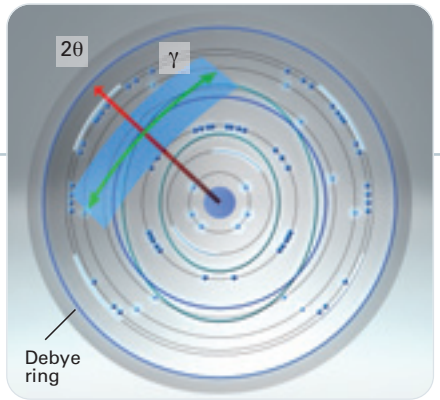
When examining stress and texture, you analyze the crystallite deformation and orientation distribution locally. This requires accurate sample alignment and maximum intensity at the point of interest on the sample.

Accurate sample positioning is straightforward thanks to our Double-Laser system. Simply click the points of interest in the software and the sample is automatically aligned. Our compact UMC stage provides controlled alignment and mapping of samples in all directions. With our Compact Cradle^{plus}, you can automatically rotate and incline your sample (phi, chi). Smart solutions à la DAVINCI facilitate mounting of non-uniform and thin film samples on both stages.

For texture as well as for many stress measurements, spot focus is more appropriate than standard line focus. Hence fast and easy switching between line and spot focus is a demand for a truely all-purpose diffractometer. Thanks to TWIST-TUBE technology, designed and patented by Bruker AXS, you can switch between both focus orientations without disconnecting cables or unscrewing tubes. Even more stunning, there is no alignment required at all. If measurement time matters, our POLYCAP optics direct all intensity efficiently from the X-ray spot focus and boosts intensity on the sample.

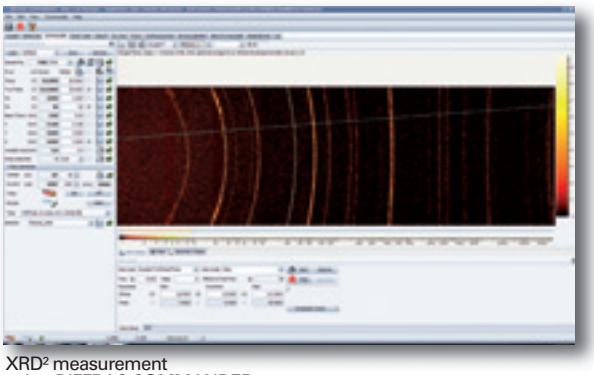
DAVINCI design – clever components make your job easier



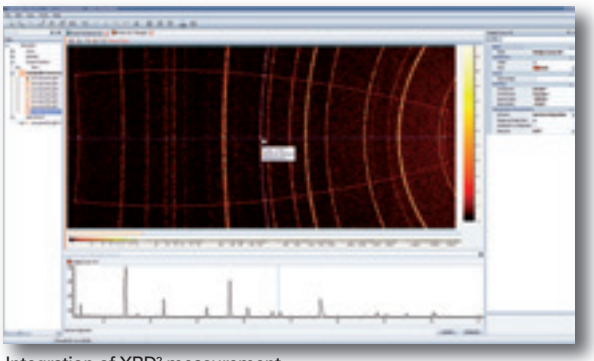


2Theta (2θ) direction
Gamma (γ) range

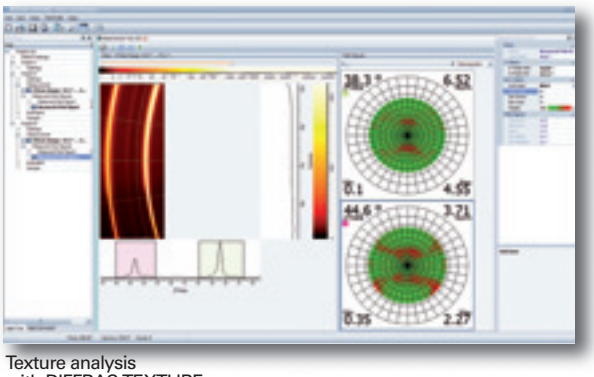
XRD² – see more in less time



XRD² measurement using DIFFRAC.COMMANDER



Integration of XRD² measurement using DIFFRAC.EVA



Texture analysis with DIFFRAC.TEXTURE

XRD² – X-ray diffraction data collection in two dimensions, 2Theta (2θ) and Gamma (γ), is an extremely powerful method that perfectly matches the requirements of structural characterization in modern materials research. By acquiring data along the γ -direction you get additional information about the properties of your crystalline samples: stress, texture, grain size analysis and epitaxial relations. Our LYNXEYE XE-T – turned by 90° – provides XRD² data with ultimate energy resolution for best peak-to-background and sensitivity for minor phases. Sample fluorescence and Bremsstrahlung are completely suppressed.

Equipped with our patented TWIST-TUBE and PILATUS3 R detector the D8 ADVANCE becomes a powerful and flexible XRD² solution. This 2-D detector covers a large solid angle in 2θ and γ in a single measurement, reducing data collection time dramatically. Time-critical experiments under ambient and non-ambient conditions become possible. Due to their design our LYNXEYE XE-T and the PILATUS3 R extend the XRD² capabilities of the D8 ADVANCE to all common characteristic X-ray wavelengths, especially high energy radiation, which is required for diffraction on materials with high-Z elements or PDF analysis.

The extremely high count rate capability of the PILATUS3 R enables you to perform measurements in the direct beam, e.g. SAXS or alignment scans – without any need for attenuators. Furthermore you can vary the sample-to-detector distance to perfectly optimize the 2θ- and γ-coverage and resolution to your analytical needs. Fully integrated into DIFFRAC.DAVINCI and DIFFRAC.SUITE, the detector always remains perfectly calibrated.

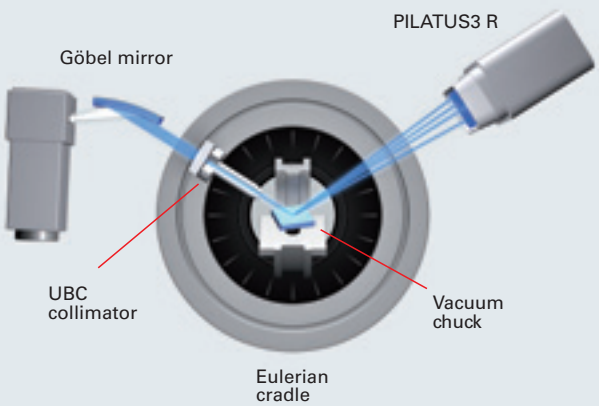
D8 ADVANCE: Built on more than 30 years of continued excellence in XRD².

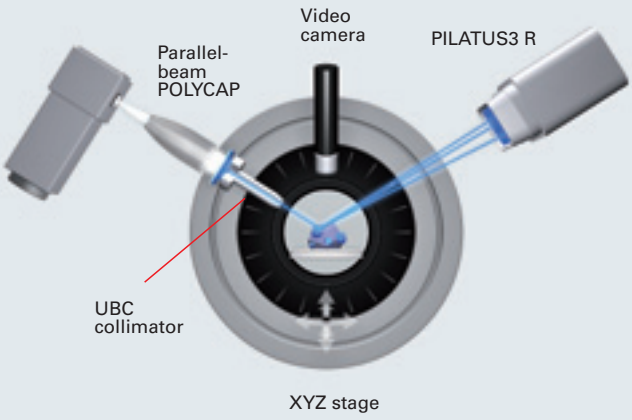
- Patented LYNXEYE XE-T turned 90° for 2-D data collection with ultimate energy resolution
- PILATUS3 R 100K-A from Dectris with alignment-free, variable sample-to-detector distance
- Seamlessly integrated into DIFFRAC.SUITE
- 0-D mode for sample alignment
- For all common characteristic X-ray wavelengths

LYNXEYE XE-T in 90° mode for 2-D measurements

Stress measurement in side-inclination (psi) mode using PILATUS3 R 100K-A

µXRD measurement with PILATUS3 R 100K-A





D8 ADVANCE: ultimate safety and quality

The D8 ADVANCE fully complies with all current EU directives, therefore establishing and guaranteeing the world's highest standards for analytical X-ray equipment including X-ray safety, machine safety, electrical safety, and electromagnetic compatibility. Illustrative for these highest standards is the fact that the D8 ADVANCE has been granted type approval for X-ray safety by the German National Metrology Institute (PTB). This significantly minimizes efforts to obtain approval by your national authorities.

The D8 ADVANCE is prealigned and comes with a unique alignment guarantee that is verified against the internationally accepted standard reference material SRM1976 by the National Institute of Standards and Technology (NIST). This SRM standard is included with every system, enabling you to monitor and document instrument performance at any time. Our solid and maintenance-free goniometer is one of the key parameters to maintain this superior performance throughout the instrument's lifetime.

At Bruker AXS our commitment to quality goes far beyond the instrument itself.

All hardware and software is always developed following a formal design process and product development life cycle compliant with latest ISO and cGAMP processes and procedures. The D8 ADVANCE thus perfectly integrates in cGxP/21CFR Part11 regulated environments.

A network of highly experienced application experts provides additional added value, helping you get the best out of your instrument. Our worldwide service organization supports you locally, maximizing instrument uptime.

D8 ADVANCE – quality you can rely on.

X-ray tube LED status display


Smart screen keys for instrument status display

Goniometer accuracy

You commonly find instrument quality reduced to some goniometer accuracy, underpinned by direct beam measurements or some reproducibility measurements in a limited angular range. Albeit a prerequisite, this is not sufficient to ensure that the instrument is working properly over the entire angular range.

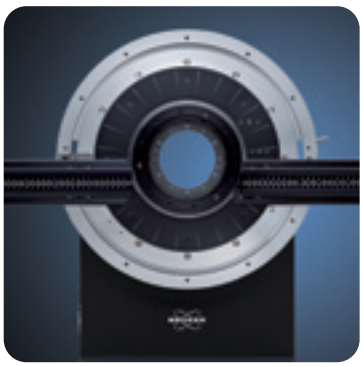
That is why Bruker AXS additionally guarantees an unparalleled instrument alignment equal or better than ±0.01° 2Theta over the entire angular range, verified against the most recent NIST standard reference material SRM1976.

Why is this important? Accurate, precise and verifiable instrument alignment is a prerequisite for accurate and reliable data and results. Only verification against an internationally accepted standard reference material ensures that the entire system is working properly.

Safety and certificates:

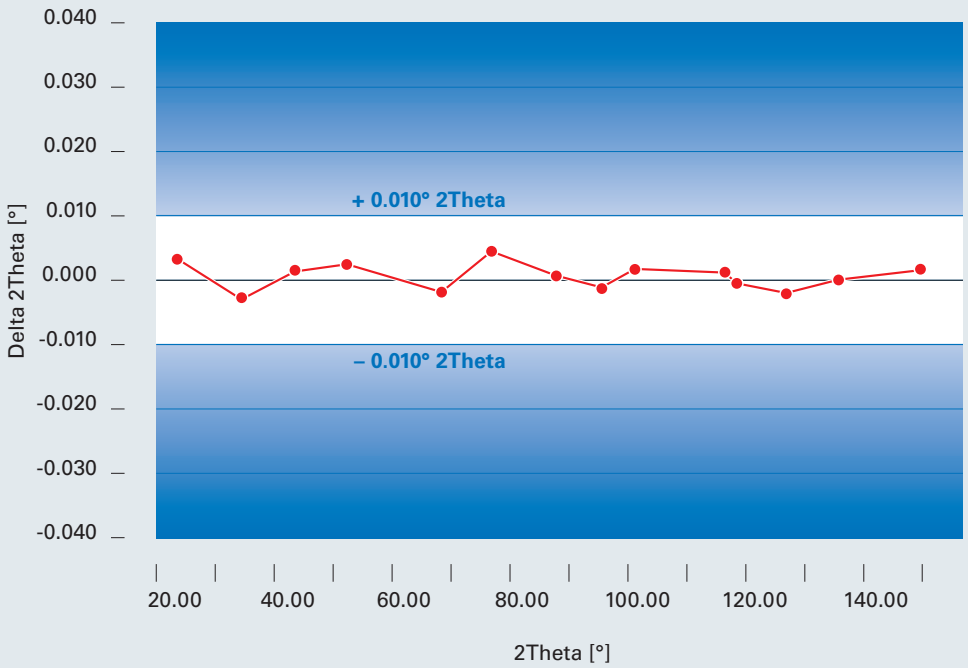
- Ultimate X-ray, machine and electrical safety in compliance with the latest EU directives
- Instrument performance verification with the most recent NIST corundum standard SRM 1976
- Solid and maintenance-free goniometer design ensures instrument performance throughout its lifetime
- Optional IQ/OQ procedures for regulated industries such as the pharmaceutical industry

Instrument ON status



Ultra-high precision goniometer

Instrument alignment – a sound base for accuracy!



Technical Data

Technical data and information		
Configurations	Vertical goniometer, Theta/2Theta or Theta/Theta geometry	
Measuring diameter (depending on setup)	Predefined at 500 mm and 560 mm or any intermediate setting	
Angular range (without accessories)	360°	
Max. usable angular range (depending on accessories)	–110° < 2Theta ≤ 168°	
Angle positioning	Stepper motors with optical encoders	
Smallest addressable increment	0.0001°	
Instrument alignment (at constant climate)	Equal or better than ± 0.01°; most recent NIST SRM1976 always included	
Max. angular speed (depending on accessories)	20°/s	
Detectors	0-D detector	scintillation counter
	1-D detectors	LYNXEYE, LYNXEYE XE and LYNXEYE XE-T; VÅNTEC-1; SSD 160
	2-D detectors	LYNXEYE XE and LYNXEYE XE-T (turned 90°); PILATUS3 R 100K-A
General space and infrastructure requirements		
Exterior dimensions (height x width x depth)	1,868 x 1,300 x 1,135 mm 73.5 x 51.2 x 44.7"	
Weight (without optional electronics)	770 kg 1,697 lbs	
Cooling water supply (without optional internal water chiller)	Min. 4 l/min, pressure 4 bar to 7.5 bar, no pressure on outlet side, temperature: 10 °C to 25 °C	
Power supply	Single phase	208 to 240 V
	Three phase	120 V, 230 V, 240 V; 47 to 63 Hz
Max. power consumption (without controllers for optional equipment)	6.5 kVA	

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