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XRDynamic 500:
Automated Multipurpose Powder X-ray Diffractometer

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XRDynamic 500 is the new automated multipurpose powder X-ray diffractometer from Anton Paar. As a next-generation floor-standing diffraction platform, it is intuitive to use and highly efficient, while delivering best-in-class data quality. It offers maximum flexibility in how you measure, with optimized solutions for powder XRD, non-ambient XRD, PDF analysis and SAXS.

Introduction

XRDynamic 500 is a powerful powder diffractometer driven by the TruBeam™ concept. It delivers both outstanding measurement speed and resolution, without any compromises. Born out of our long experience in the field of X-ray analytics, it sets a new benchmark in XRD.

XRDynamic 500 is suitable for:

- Powder XRD
- Grazing incidence XRD
- Non-ambient XRD
- PDF analysis
- Small-angle X-ray scattering (SAXS)

Figure 1. The XRDynamic 500 automated multipurpose powder X-ray diffractometer.

TruBeam™: Truly revolutionary, truly unique

The TruBeam™ concept is unique in XRD, bringing you higher measurement resolution, improved signal-to-noise ratio, increased efficiency, and more options. It describes the entire beam conditioning concept and beam path integrated in XRDynamic 500. Examples of the outstanding data quality that TruBeam™ delivers are shown in Figure 3. The Table below shows the features that make up TruBeam™ and the benefits that it provides.

TruBeam™ Feature	Benefit
Large goniometer radius	Best-in-class measurement resolution in standard Bragg-Brentano configuration (FWHM = 0.021° for 1st peak of LaB_6 with Cu radiation)
Evacuated beam path	Outstanding signal-to-noise ratio with minimal measurement background
Switch between up to three different beam geometries	Measure completely different samples sequentially with no user input and no exchanging of parts
Automation of all optical components	Reduce chances of possible set up errors and increase measurement efficiency
Instrument and sample self-alignment routines	Perform an automatic alignment whenever needed without a service visit – enjoy maximum instrument uptime and reduced ownership costs

Maximum flexibility

A wide range of ambient and non-ambient sample stages, plus a variety of different sample holders, means XRDynamic 500 offers versatile instrument configurations with optimized solutions for everything related to powder XRD. Non-ambient measurement configurations are easy to set up thanks to a built-in control unit that works with all Anton Paar non-ambient attachments (see Figure 2) and convenient connections in the instrument housing for cooling water, vacuum, gas supply, etc.

XRDynamic 500 Specifications	
X-ray source	Primux 3000 – ceramic sealed-tube X-ray source
Goniometer configuration	Vertical θ/θ
Goniometer radius	360 or 400 mm
Maximum usable angular range	-95° to 162.5° 2θ
Minimum step size	0.0001°
2θ linearity	≤0.01°
Detector	Pixos Si- or CdTe-based photon counting detectors (0D and 1D modes)
Sample stages	Sample spinner, capillary spinner, XY stage (incl. sample changer), EVAC module Extensive range of non-ambient attachments
Software	XRDdrive: Instrument control software XRDanalysis: Data processing and analysis software for qualitative and quantitative phase analysis, profile fitting, microstructure analysis, and Rietveld refinement.

Figure 2. The TruBeam™ concept features a large goniometer radius together with evacuated and automated optics units.

Figure 3. The data quality that can be achieved with TruBeam™. Left: Measurement resolution that can be achieved showing the FWHM of the 1st LaB_6 peak in Bragg-Brentano geometry (Cu radiation). Right: Comparison of the signal-to-noise ratio from an α-lactose sample when using TruBeam™ and measured in air. Also shown is data with TruBeam™ plus the EVAC Module with the full beam path from source to detector evacuated.