EUROPE 600 – Bench-top X-Ray Diffractometer

GNR ANALYTICAL INSTRUMENTS GROUP

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EUROPE 600 is a state of the art BENCH-TOP X-ray diffractometer equipped with all the most modern technical features which grant accuracy, precision, safety and easiness of use.
Thanks to the wide offer of accessories, it is a powerful tool for powder diffraction application.

EUROPE 600 diffractometer components are mounted in a Steel Cabin shielded in accordance to the international X-Ray safety rules, equipped with Lead Glass windows, flushing lamps and safety interlocks.

EUROPE 600 Cabin mounts on board a standard Hydro Kit to control the cooling water circuit for X-Ray tube refrigeration. Any standard commercially available cooling system compliant with requirements can be easily connected.

Goniometer System and Optics

Goniometer system and Optics represent the hearth of any Diffraction system and from their quality depend the quality of the analytical results.

GNR Analytical Instruments offers the most accurate devices and the maximum care.

Mod. Vertical mod.
Type: Theta/Theta. 2 axes independently controlled by two stepper motors and optical encoders.
Measuring circle radius: 150 mm.
Scanning angular range: -15° < 2 theta < + 145° depending on accessories.
Angular reproducibility: 0.001°.
Smallest selectable stepsize 0.001°.
Scanning speed 0.01 – 100°/min.

Variable divergence slits: 0-4°

Variable anti-divergence slits: 0-4°

Variable receiving slits: 0-6 mm

Soller slit: 2.3°

Aluminium sample holders: 20x20x1.9 mm (Through Hole Sample Holder); 20x20x1 mm (Tray Sample Holder)

PMMA sample holder: 20x20x1/0.5/0.2 mm (Tray Sample Holder)

Si low background sample holder: diam.24.7x0.5/0.1 mm (Tray Sample Holder)

Si low background sample holder: 20x20x0.5mm (Tray Sample Holder)

Steel sample holder with X-ray transparent film for air sensitive samples: sample volume: diam. 20 mm; thickness 05/1 mm

Spinner
The purpose of spinning is to bring more crystallites into the diffraction position in order to reduce the influence of particle statistics on the measurements.
Sample size: 24,7 mm dia. maximum.

X-Ray Generation System

High Voltage Supply Unit

- Mod. Compact C06K4PC-RS232.
- On-board microprocessor controlled via a PC RS232 serial port.
- 600W maximum power, 10-40kV and 5-15mA, single phase 220Vac ±10%, 50/60 Hz.
- Voltage increment 1KV; Anode current increment 1mA.
- Stability for HV and anode current <0.01% at 10% mains variation
- Efficiency better than 85%. High stability through precision feedback control circuits.
- Resin encapsulation, no oil. Air cooling.
- Automatic ramp of the high voltage and emission current to preset values.
- Control panel: check lamps for X-Rays on, Filament, Water and Safety circuit.

Safety Devices tripped by:

- Overload
- Overvoltage
- Overcurrent
- Interruption of water flow
- Failure of warning lamps
- Case open

High-voltage Cable / Sockets
0.5 m. Long

Tube shield mod. 1F-L
One linear focus window, with electromagnetic and mechanical safety shutter.

Glass X-ray Tube
Glass X-Ray tube, Cu anode, fine focus, 0.4 x 8.0 mm (FF), short anode, four windows, 1500 Watts, 60 kV. (MAX tube voltage 40 kV, MAX anode current 15 mA).

X-Ray Detector

CeleriX Fast Strip Detector 1D 450

It reduces dramatically the acquisition time of the diffracted beam over a wide angular range.
Features:

Sensor	solid state, no gas
Format	640 strips
Sensitive area	8 x 32 mm^2
Strip width	50 µm
Energy range	5 – 40 keV
Energy resolution	500 eV (For lower energy threshold settings to suppress fluorescence)
Counting rate	1 x 10^6 counts/s/strip
Readout time	0.3 ms
Power consumption	2 W
Cooling	air
Dimensions	38x62x22 mm^3

Modern SAX - Acquisition Software

Written for Windows 7 is the program designed for the control of the GNR Diffractometric Systems. It includes some new features, like the batch programming of a set of measurements. The program can control different kinds of detectors and devices attached to the instrument.
Control panels for scintillation, linear position sensitive detectors and XRF X-GLAB SDD detector are integrated.
Motors: Multiple programmable scans movement (coupled or independent) of the motors of the goniometers and attachments.
Measurements: prepares and executes the measurements. Batch programming. It is possible to program cycles of measurements, using a single or a multiple sample holder.

Modern SAX - Analytical Software.

SAX: written for Windows 7

- FILE I/O: data management on disk. Hard Copy. Data printing (Any type of printer).
- UTILITY: sum and multiply by a constant. Four data buffers available.
- DISPLAY. Scale normalization. Zoom. Graphical windows. Overlap and comparison of diffractograms.

Multiview function. Cursor scan. Creation of graphic files .BMP.

Search and Match software: Match!

- Rietveld refinement (using FullProf)

Match! provides a gentle introduction into Rietveld refinement, from fully automatic operation to the "Expert" mode. With just two mouse clicks, you can easily transfer your data (diffraction pattern and crystal structures) to the FullProf software and run a Rietveld refinement.

- Display and compare multiple diffraction patterns

Additional experimental patterns can now be imported and displayed on top of each other, so that you can compare them to the main experimental pattern.

- Directly view specific phases/entries

You already know that a certain phase is present in the sample, or you would like to check how some compound compares to the experimental diffraction pattern? That's pretty easy with the new version!

- Instant usage of additional information

Additional information about the sample like elements that may be or must not be present, the density etc. can now be applied much easier than in the previous version.

- Saving of selection criteria

Once you have entered a set of selection criteria (e.g. elements, density etc.) that best suits your requirements, you can save it using an appropriate name, and recall it later on with just two mouse clicks.

- Comfortable definition of background

Simply insert, shift or delete control points in the automatically calculated background curve using the mouse, in order to precisely define the background with regard to the raw data.

- Improved zooming facilities

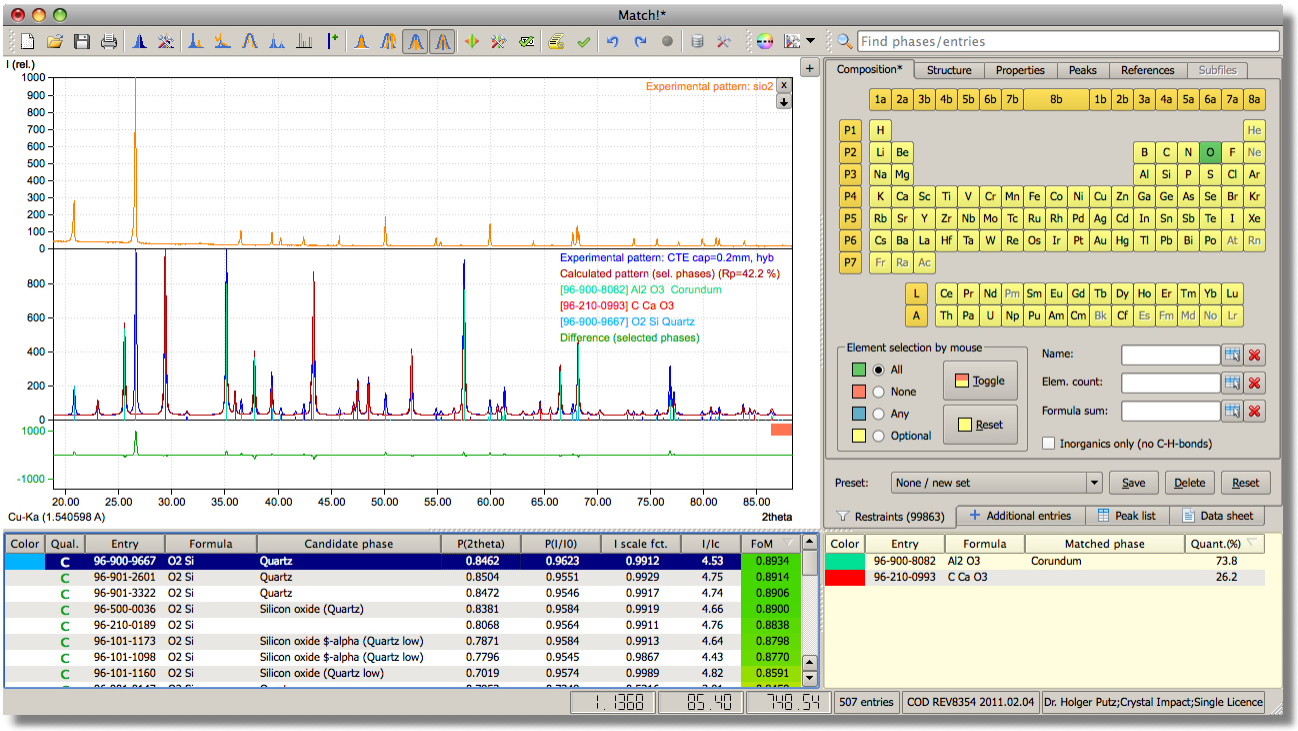
Zoom now also implies zooming on the intensity (and not only on 2theta) axis. In addition, you can now simply use the mouse pointer and wheel to zoom into the area of interest. Of course, it is also possible to zoom to an exactly defined area (2theta/intensity).

- Batch Processing and Automatics

You are a beginner or an expert user? As you like it: Simply adjust your skill level, in order to either give you full control at each single step, let Match! run the complete phase identification automatically, or anything in between.

More functions:

- Fast single and multiple phase identification from powder diffraction data.
- Runs on Windows, Mac OS X and Linux 32-Bit.
- Use free-of-charge reference patterns calculated from the COD (incl. I/Ic), any ICDD PDF database, any ICSD/Retrieve version (released 1993-2002; valid licence required) and/or your own diffraction data (or patterns calculated from crystal structure data (e.g. CIF files)) in phase identification.
- Perform Rietveld refinement calculations, e.g. for quantitative analysis, using the well-known FullProf in the background.
- Flexible handling of reference databases (incl. user databases); you can easily switch between different reference databases without the necessity to perform a new database indexation.
- Create reference databases for X-ray and neutron diffraction e.g. from cif-files.
- Comfortable user database manager for easy maintenance of user data (add/import/edit/delete/sort entries).
- Powerful CIF - and ICSD/Retrieve import, incl. calculation of powder pattern, I/Ic and density.
- Atomic coordinates available e.g. in the ICSD, the ICDD PDF-4+ or free-of-charge reference data are displayed in the data sheets and included in the CIF - or Textfile-exports (e.g. for Rietveld analysis).
- Displaying of Miller indices (hkl) in diffraction patterns and entry data sheets.
- Fully integrated handling of your own diffraction data with PDF data (search-match, retrieval, data viewing).
- Automatic residual searching with respect to identified phases.
- Automatic raw data processing: α2-stripping, background subtraction, peak search, profile fitting, error correction.
- Automatic optimization of peak searching sensitivity.
- Fitting of all (or selected) peak parameters to exp. profile data.
- Comfortable manual editing of peaks (add/shift/delete/fit) using mouse or keyboard.
- Semi-quantitative analysis (Reference Intensity Ratio method).
- Straight-forward usage of additional knowledge (composition, PDF subfiles, crystallographic data, colour, density etc.).
- Integrated database retrieval system and viewer for PDF, COD and user databases.
- Multiple step undo/redo.
- User-configurable automatic operation.
- Automatic d-value shifting during search-match process (optionally).
- Intensity contribution to figure-of-merit can be reduced for preferred-orientation cases.
- Comfortable graphical and tabular comparison of peak data and candidate patterns.
- User-configurable reports (HTML, PDF or text file).
- Online update (automatic or manual).
- Supported diffraction data file formats (automatic detection):
- ASCII profile (start, step, intensities or 2 columns)
- GNR raw data (*.esg) and others



Crystallographic database

Match is delivered ready to be used with crystallographic free database COD. Customers can download the free database by themselves.