Multiplelabs™
Turnkey Laboratories Solutions

Analytical®
Technologies Limited

XRD-3035

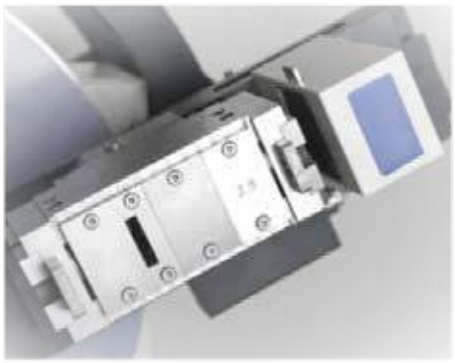
X-Ray Diffractometer

EPCC / PRODUCTS / APPLICATION / SOFTWARE / ACCESSORIES / CONSUMABLES / SERVICES

Analytical Technologies Limited

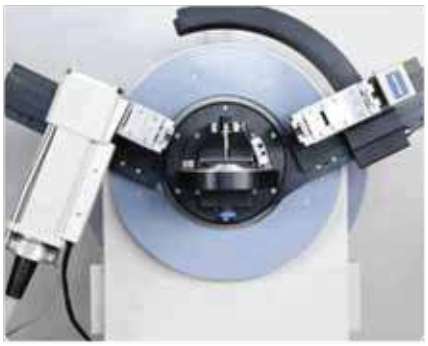
An ISO 9001 Certified Company

www.analyticalgroup.net



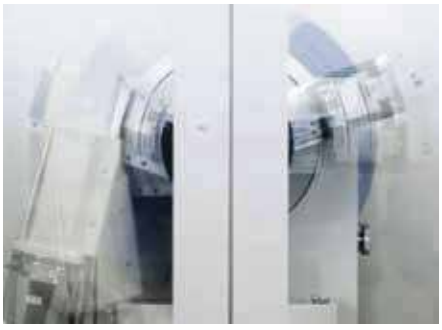
Matrix Detector Top class performance

Hollow shift Goniometer for transmission



PLC control for excellent stability

Closed loop vector drive servo poistioning technology



Triple interference free isolation

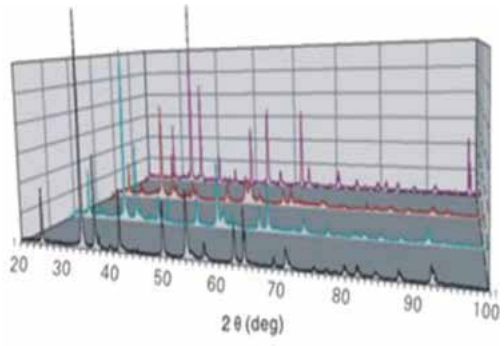
High frequency High voltage X-ray Generator, low power comsumption

Plug & play optics

Mini cooling system

Metal Ceramic X-ray Tube

Graphite monochromator



Multi funtion Analysis Software

Automatic sample stage with 6 Sample Holders

Benchtop Multi-Purpose Powder X-ray Diffractometer is one of the world's smallest desktop X-ray diffractometers

* Plug&Play
* Modular design and standardized interface technology solution
* Advanced high frequency and high voltage power supply technology enables the whole machine consume less power.
* The highly integrated desktop cooling water system enables the perfomance of the equipment more reliable

ATL Series Multi-function XRD

High stability X-ray generator :

* The use of programmable controller (PLC) control circuit greatly reduces the instrument failure rate, greatly improves the perfo mance of the instrument and improving the power consumption of the instruments X-ray generator, meeting the needs of some sp cial users to test special samples with high power; The Design structure applies optical isolation technology to truly achieve electr cal isolation between the high voltage control unit and the system management unit and each I/O interface module.

High-precision multi-function goniometer

* Both the XRD-3070 and XRD-3050 use a vertical (Øs-Ød) goniometer. Sampling imported high-precision bearing transmission, motion control is completed by a set of high-precision full-closed vector drive servo system. The intelligent drive includes 32-bit RISC microprocessor and high-resolution magnetic encoder, which can automatically correct the small motion pos tion error. It can ensure the high precision and high accuracy of the measurement results, the angle reproducibility can reach 0,0002º and the minimum step angle can reach 0,0001º.
* The XRD-3070 X-ray diffractometer uses the Øs-Ød goniometer. The Øs-Ød goniometer means that the sample is placed horizontally and fixed, and the X-ray source as well as detector rotate at a ratio of 1:1 Goniometer. The development of this kind of structure goniometer can meet the requirements of special samples, such as liquid samples, sol-state samples, viscous samples, loose powder samples, bulk solid samples etc, in addition to the measurement of con ventional samples.
* Patented hollow shaft technology goniometer device.
* Support for transmission scanning
* The XRD-3070 X-ray diffractometer supports the data scanning mode of the conventional refle tion mode and also supports the data scanning mode of the transmissive mode. Both transmi sion and reflection modes have advantages and disadvantages, The resolution of transmission mode is much higher than that of reflection mode. It is suitable for structural analysis and other fields. The reflection mode has strong diffraction signal and is more suitable for routine phase identification in laboratory. In the transmission mode, the powder sample may be a small amount, which is suitable for data acquisition when the sample amount is relatively small and the sample preparation requirements of the reflection mode are not satisfied.

ATL Series XRD | Reliable, Stable, Efficient

Plug and play optical system :

* Fully pre-collimation design, allowing users to apply the least amount of manual intervention in different aspects

* Semiconductor matrix detectors and unique PI-IA channel design. High resolution and very low background diffraction patterns are available

Vertical goniometer structure :

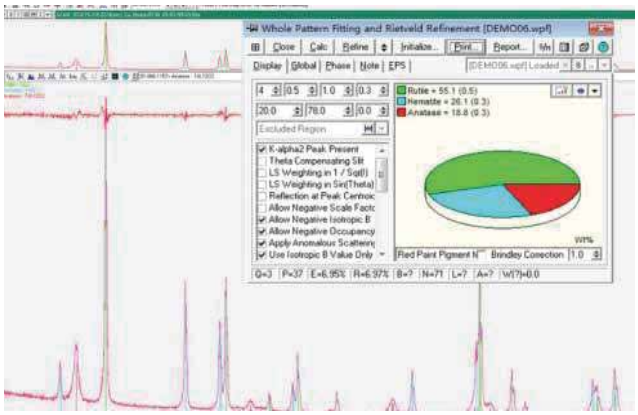
* The sample stage is horizontally stationary, allowing measurement of both solid and liquid samples.

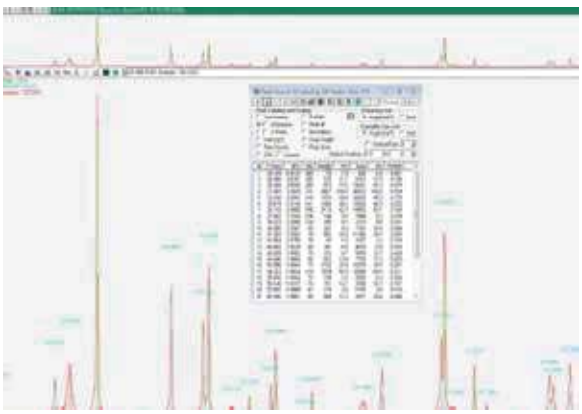
* Siemens programmable controller automation system solution (PLC) The new industrial modular design concept is integrated into the product design (invention patent), which makes the system performance more stable and reliable, the maintenance is simple and convenient.

Metal Cermic tube :

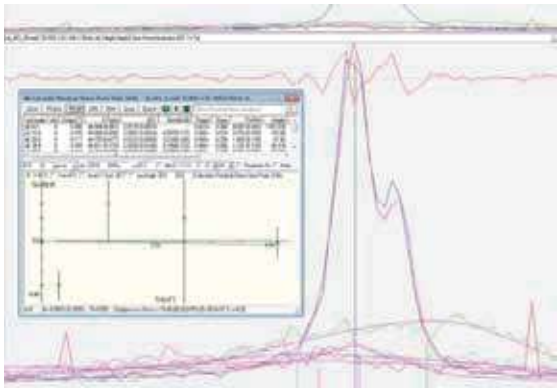
* Reduces X-ray operating temperature, extending service life

* High precision closed loop vector drive servo positioning technology can improve the positioning accuracy of the goniometer by an order of magnitude, able to overcome the angular error of the goniometer caused by the gear in the past.

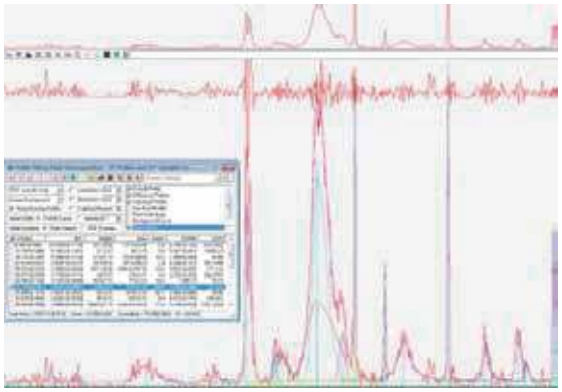




Quantitative Analysis

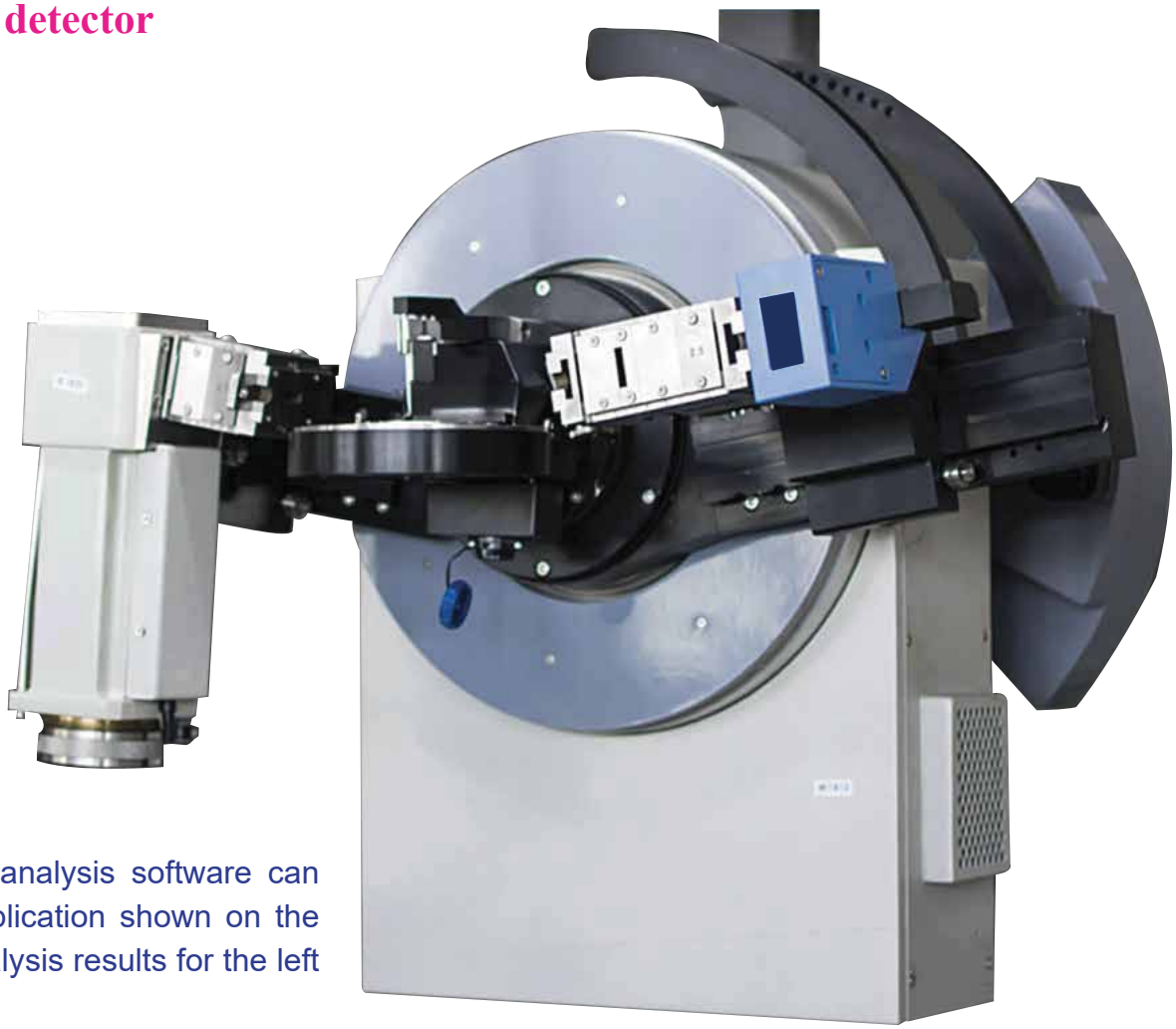


Crystallinity/grain size



Stress analysis

XRD-3070 Hollow shaft goniometer for transmission and high performancematrix detector



The feature-rich analysis software can complete the application shown on the right, and the analysis results for the left spectrum show:

The qualitative and quantitative analysis results of unknown samples are:

* Phase identification
* Precision calculation of unit cell parameters
* Crystallinity, grain size and distortion
* Rietvild crystal structure analysis
* Quantitative analysis
* Residual stress analysis
* Texture test
* Paralympic test
* In situ test
* Particle size distribution
* Micro area test
* Multi-purpose film testing, etc.
* Transmission

Rutile:	55.1%
Ferric oxide:	26.1%
Anatase:	18.8%

ATL Series XRD Is an ideal non-destructive analysis method

* ATL series multi-function X-ray diffractometer (XRD) is an analytical instrument for studying and identifying the composition and crystal structure of materials and materials by X-ray diffraction principle. It can reveal the chemical composition and crystallization of various types of natural and artificial materials. Details such as learning the microstructure

* ATL provides comprehensive technical solutions for X-ray diffraction applications. The products are fully capable in the fields of material analysis and production inspection.

* The newly designed ATL Series X-Ray Diffractometer combines fast analysis, easy operation and user safety, with a modular hardware architecture and a software system tailored to the customer's needs,

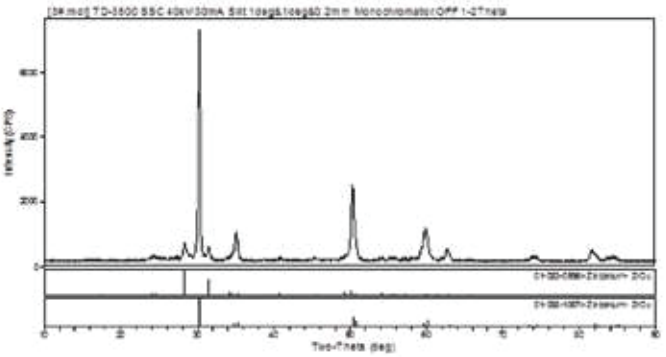
Main Application Field :

* Clay minerals, cement building materials, environmental dust, food inspection, chemical products, pharmaceutical testing, asbestos, polymers, steel, non-ferrous metals, machinery, shipbuilding, welding, automotive, silicate, ceramics, cement, glass, catalysts, electrical appliances Components, electronic materials, magnetic materials, superconducting materials, building materials, fiber, paper, agricultural chemistry, dyes, pigments, coatings, ecological materials, petroleum, coal, electricity, ore, soil, rock, environment, etc.

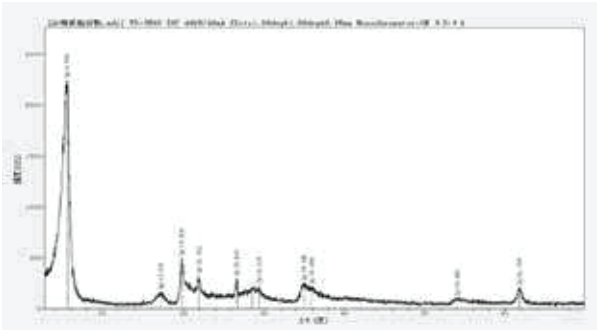
* Metal smelting, casting in addition to the performance analysis of the finished product, at the same time has high requirements for process equipment under high temperature conditions, when the molten steel temperature reaches 1300°C, the performance of refractory material is particularly prominent.

* Analysis and application of refractory materials in the steel industry

Name: Zirconia
Molecular formula Zr02
Crystal system: square I single oblique
Content: 79.9%/20.1%



Quantitative analysis of zirconia

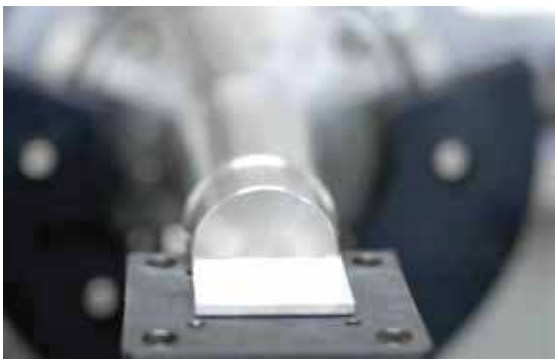


Qualitative analysis of montmorillonite

Medicine, pharmaceutical intermediates,cosmetics industry. The purity requirements of raw materials are extremely high, and QA is an analytical system that requires high performance and reliable identification results ATL X-ray diffractometer is fully capable of providing the best analytical and identification solutions

Pharmaceutical factory montmorillonite test results. The requirements of montmorillonite in the pharmaceutical and cosmetic industries are very demanding. It is close to the montmorillonite identification In the field of scientific research, and its product content needs to be qualitatively and quantitatively analyzed by X-ray diffractometer.

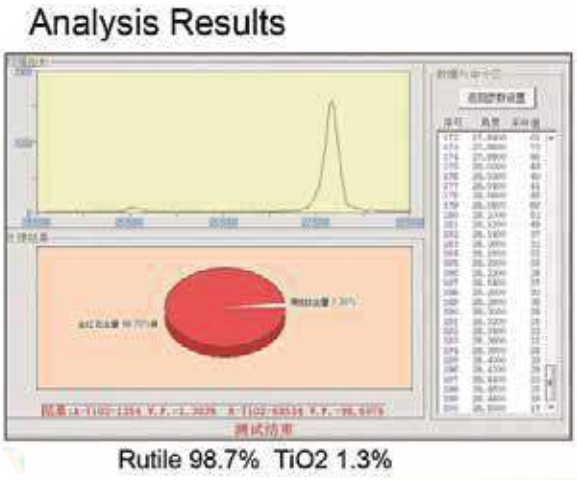
The application of ATL series diffractorneter in titanium dioxide, ATL developed a set of Ti02 analysis software for the Titanium dioxide industry, the detection is fast and accurate, and is highly praised by theTitanium dioxide industry.



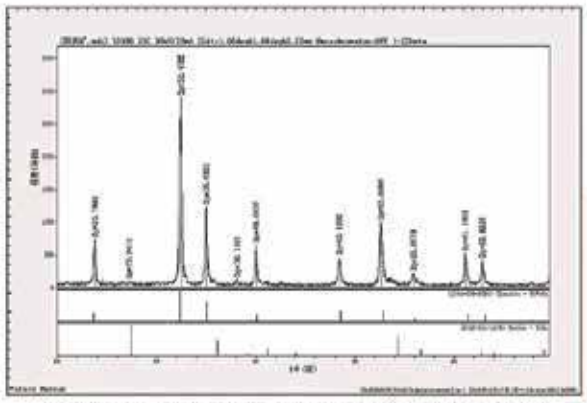
Analysis and identification of titanium dioxide following formal operation procedures

Fixed titanium dioxide sample on the sample stage

Titanium dioxide (Ti02) is an important inorganic chemical product, which has important appl cations in coatings, inks, paper, plastics, chemicals, ceramics and other industries. The following example performs a comprehensive analysis on this sample.



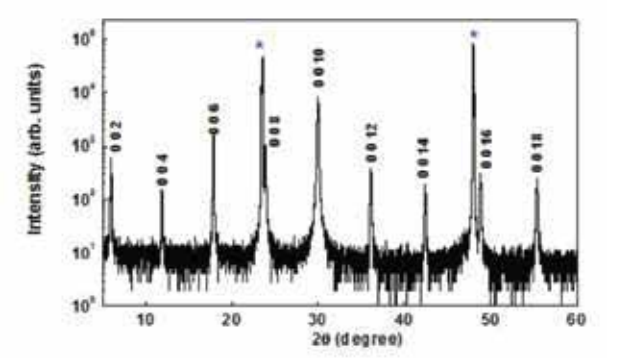
Rutile 98.7% TiO2 1.3%



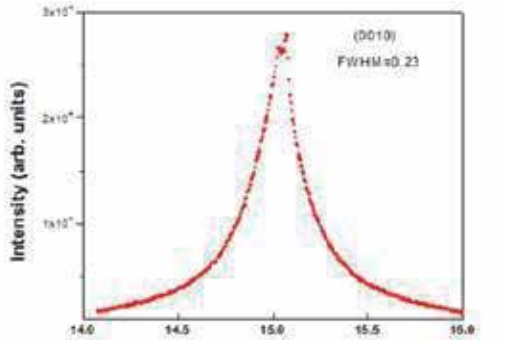
FeTiO3 94.9% TiO2 1.5% rest impurities 3.6%

Line width and grain size after addition of BaSO4 sample in nano-sized TiO2

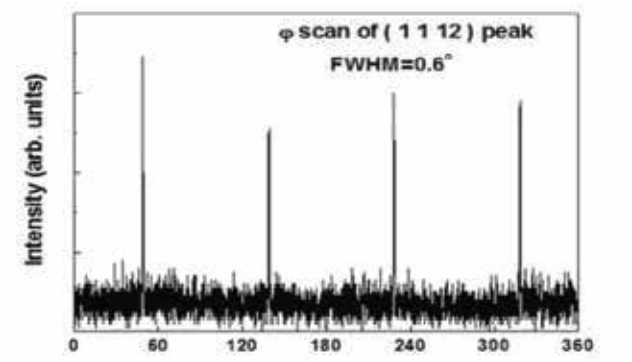
Sample composition	Ti02-A
Content	94.29%
Angle	25.28
Line width	0.55
Grain size	15.8nm



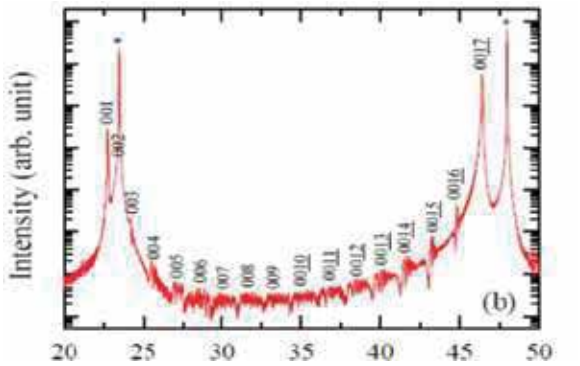
In the figure, the * mark is the substrate peak, and the other peaks are the diffraction peaks of the film (001) face. Test requirements: required to accurately determine the offset angle of the substrate



w scan of the film (also known as rocking curve test w scan of diffraction peak of film (0 0 10)



Ø scan test of film



XRD spectrum of thin film superlattice

The crystal structure of the film material is a monoclinic structure, so the in-plane Ø scan shows quadruple symmetry.

ATL Multi-Function Integrated Measurement Accessory

Features:

Polarography test using transmission or reflection Stress testing can be performed using the tilting method or the same tilting method, Film testing (in-plane rotation of the sample)

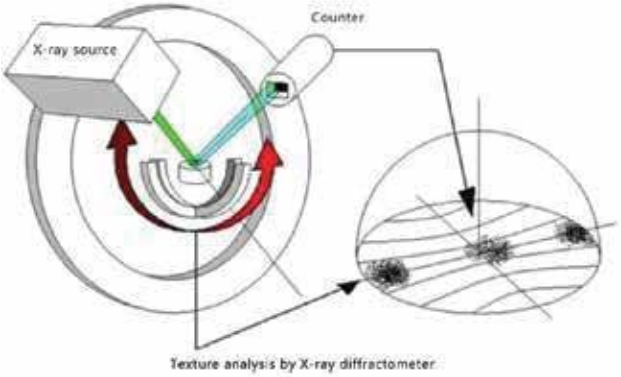
Application :

* Evaluation of metal assembly structures such as rolled sheets
* Evaluation of ceramic orientation
* Evaluation of the preferred orientation of the film sample crystal
* Residual residual stress of various metal materials and ceramic materials
* Test (evaluation of wear resistance, chip resistance, etc.)
* Residual stress test of multilayer film (evaluation of film peeling, etc.)
* High temperature superconducting material film, metal plate and other surfaces
* Analysis of oxidation and nitride films Glass, Si, multilayer film on metal substrate
* Analysis (magnetic film, metal surface hardening film, etc.)
* Analysis of electroplating materials such as macromolecular materials, paper, and lenses
* Pole diagram measurement
* Stress measurement
* Film measurement

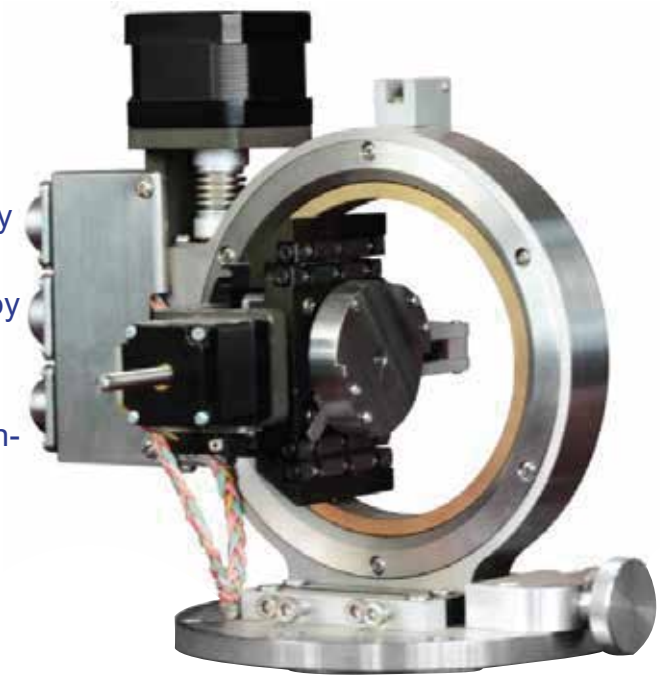
* Texture analysis is usually measured by X-ray diffraction. The intensity of the X-ray from a particular diffraction plane is measured while the sample is stepped through a series of orientations to complete the pole figure. As shown on the right

* Texture analysis is widely used in the field of materials, and its existence is universal, Therefore, general materials inevitably have different degrees of texture problems, which affect the performance of materials.

* The representation method should also select the appropriate pattern as needed. The figure on the right provides a graph of the results of several texture analyses.



Texture analysis by X-ray diffractometer

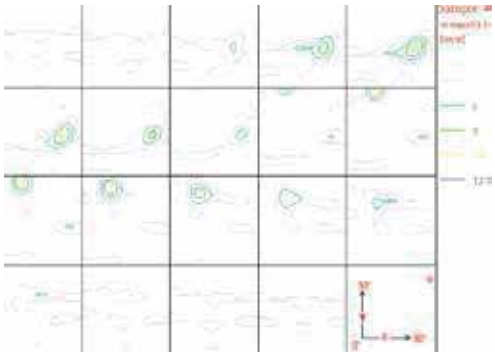


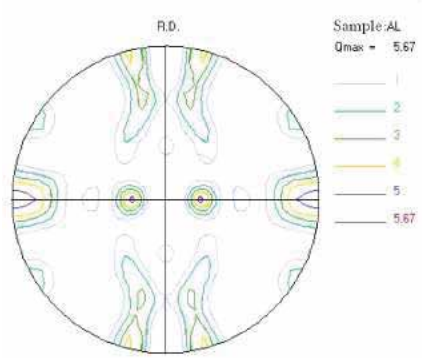
* ATL Multifunction Integrated Measurement Accessory

* Excellent mechanical porperties can be observed by texture analysis of aluminum samples

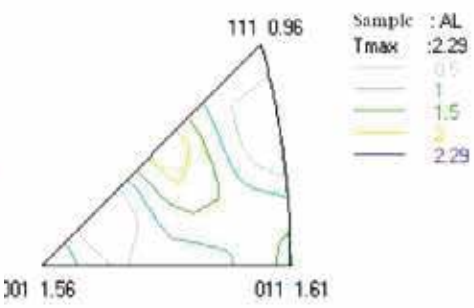
* The ODF notation is a more advanced graph represntation method.

Three way of distribution function notation


AI ODF constant Ø section view



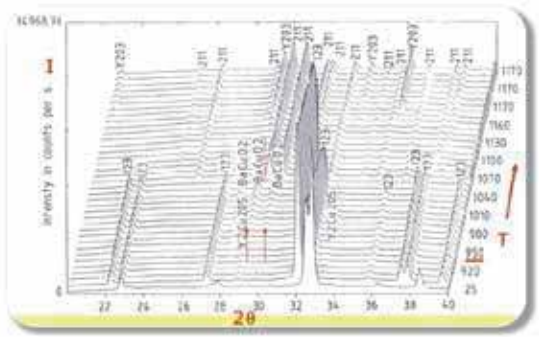
Pole diagram representation



Anti-polar graph representation

Expand your application needs Mastery Technology has made the most complete hardware combination for you.

* Not every user has the same requirements for standard equipment, because the different requirements generated by the industry must be complemented by hardware supplements. The ATL multi-function integrated accessory mentioned above was designed and manufactured to greatly expand the needs of user applications. The following provides users with more choices:



* A device mounted on a wide-angle goniometer for understanding the crystal structure change of a sample during high-temperature heating or the mutual dissolution of various substances during high-temperature heating. Depending on the type of temperature sensor selected, the temperature range is from -196 °C to 1600 °C. The TGW-1 high/low temperature accessory makes this application possible.

* It can be seen from the figure that will be decomposed violently at higher temperatures, which provides an effective method for the research and improvement of superconducting materials. Similar applications can be achieved by the high temperature accessories provided by ATLTechnology

Rotating sample stage :

* The sample can be rotated in its own plane to facilitate the error caused by coarse grain, and the sample with texture and crystal is measured to ensure good reproducibility of the diffraction intensity.

Specification :

* Rotation mode: axis (sample plane)
* Rotation speed: 1-60rpm
* Minimum step width: 0.1w
* Operating mode: Constant speed rotation for sample scanning (step continuous)

Automatic sample changer

* The autochanger is designed for users who need batch measurement of samples. It can load 6 samples at a time for continuous measurement.

X-ray tube for analytical instruments

* Domestic or imported corrugated ceramic tubes, cermet tubes, and glass tubes are suitable for various types of XRD, XRF, crystal analyzers, and orientation instruments at home and abroad.

Specification

* Optional target type: Cu, Co, Fe, Cr, Mo, Ti, W, etc.
* Focus type: 0.2x 12mm or 1 x 10mm or 0.4x 14mm (fine focus)
* Maximum output power: 2.4kW or 2.7kW

Detector - the core of the X-ray diffractometer

* The detector is used to record the diffraction spectrum and is therefore one of the most important components in polycrystalline diffraction equipment. The proportional counter and the scintillation counter replace the Geiger counter and become the most widely used detector. As human beings become more and more aware of nature, they are getting more and more deep, and the requirements for experiments are getting higher and higher. The more diverse, simple proportional or scintillation counters can not meet different experimental requirements, so many develop one after another. Different detectors.
* Domestic X-ray diffractometers are always in the phase of proportional and scintillation detectors.
* This is far from meeting the needs of the times. ATL Technorogy has launched a new generation of high-end X-ray diffractometer XRD-3070. And it is equipped with advanced

High precision semiconductor microstrip detector! !

* The high-precision semiconductor microstrip detector is composed of 640 semiconductor microstrip strips, Compared with the traditional scintillation detector or proportional detector, it can increase the diffraction calculation intensity by more than 100 times, and can obtain complete in a short sampling period, High sensitivity, high resolution diffraction pattern and higher count intensity.
* High-precision semiconductor microstrip detector single-channel counting dynamic data range 24-bit, counting 16777216 detector counting up to 1X10^9cps; at the same time with DCS controller readout time is only 89μs

Comparison of technical parameters of ATL series multifunction X ray diffractometer

	ATL-3070	ATL-3035	ATL - 3020
X-ray Tube (domestic or irtiporred)	Target Optional targets such as Cu. Fe. Co, Cr, Mo, W (metal or ceramic optional) Focus Size: 1 x 10 mm 2 or 0.4 x 14m m2 Rated power 2.4kW or 2.7kW (ceramic tube or metal cermic tube technology)	Target Optional targets such as Cu. Fe. Co, Cr, Mo. W (metal or ceramic optional) Focus Size: 1 x 10 mm 2 or 0.4x14m m2 Rated power 2.4kW or 2.7kW (ceramic tube or metal cermic tube technology)	Target Optional targets such as Cu, Fe, Co, Cr, Mo, W (metal or ceramic optional) FOCUS Sim 1 x 10 mm 2 or 0.4 x 14m m2 Rated power 2.4kW or 2.7kW (ceramic tube or metal ceramic tube technology)
X-ray Generator (PLC control)	Maximum output power :3kW high frequency high voltage generator (domestic/import)X-ray tube voltage: 10~60kV, 0.1kV/Step X-ray tube current 5~50mA, 0.1mA/step Output stability: ≤ 0.01% (power supply fluctuation ±10%)	Maximum output power :3kW high frequency high voltage generator (domestic / import) X-ray tube voltage: 10~60kV. 0.1 kV/step X-ray tube current 5~50mA, 0.1mA/step Output stability: ≤0.01% (power supply fluctuation ±10%)	Maximum output power :3kW high frequency high voltage generator (domestic / import) X-ray tube voitage;10~60kV, 0.1kV/step X-ray tube current 5~50mA, 0.1mA/step Output stability. ≤0.01% (power supply fluctuation ± 10%)
Goniometer	Goniometer structure Hollow shaft vertical goniometer Θs-Θd structure (sample level is fixed) Goniometer scanning radius: Standard 225mm (150~285min continuously adjustable) Scanning range: -110°~16'0° Scan speed: 0.006°~120°/min Positioning speed: 1200°/min Drive mode: Θs-Θd linkage, Θs or Θd single Scan mode: Stepping, continuous, segmentation, transmission scanning Minimum step angle: 0.0001° Measurement accuracy: ≤0.001° 2Θ angle repeatability: 0.0002°	Goniometer structure Hollow shaft vertical goniometer Θs-Θd structure (sample level is fixed) Gonioineter scanning radius: Standard 225mm (150~285mm continuously adjustable) Scanning range: -110°~150° Scan speed: 0.006°~120°/min Positioning speed: 1200°/min Drive mode: Θs-Θd linkage, Θs-Θd single Scan mode: Stepping, continuous, segmentation, transmission scanning Minimum step angle: 0.0001° Measurement accuracy:≤0.001° 2Θ angle repeatability: 0.0002°	Goniometer structure Hollow shaft vertical goniometer Θs-Θd structure (sample level is fixed) Goniometer scanning radius: Standard 225mm (150- 235mm continuously adjustable) Scanning range: -110°~160° Scan speed:0.006°~120°/min Positioning speed: 1200°/min Drive mode: Θs-Θd linkage, Θs or Θd single Scan mode: Stepping, continuous, segmentation, transmission scanning Minimum step angle: 0.0001° Measurement accuracy: ≤0.001° 2Θ angle repeatability: 0.0002°
Recording control unit (Detector)	Detector Type: Amy Detector Maximum linear count rate: up to 1X109cps, no noise, diffraction intensity is more than 100 times that of SC DCS controller readout time is only 89μs Dynamic range: [bit] 24 Energy range [keV] 4-40 Read time: [μs] 89 Energy resolution (rms): [eV] 687±5	Detector Type: Array Detector Maximum linear count rate: up to 1x109cps, no noise, diffraction intensity is more than 100 times that of SC DCS controller readout lime is only 89μs Dynamic range: [bit] 24 Energy range [keV] 4-40* Read time: [μs] 89 Energy resolution (rms): [eV] 687±5	Detector Type: Array Detector Maximum linear count rate. up to 1X19cps, no noise, diffraction intensity is more than 100 times that of SC DCS controller readout time is only 89μs Dynamic range: [bit] 24 Energy range [keV] 4-40* Read time: [μs] 89 Energy resolution (rms): [eV] 687±5
Safety Protection Alarm	KV and mA are too high or too low, overload protection, no water alarm, X-ray tube over-temperature and other multiple protection, to prevent radiation leakage, protective door interlock protection and platform lead shielding protection.	KV and mA are too high or too low, overload protection, no water alarm, X-ray tube over-temperature and other multiple protection, to prevent radiation leakage, protective door interlock protection and platform lead shielding protection.	KV and mA are too high or too low, overload protection, no water alarm, X-ray tube over-temperature and other multiple protection, to prevent radiation leakage, protective door interlock protection and platform lead shielding protection.
X-ray leakage	≤0.1μSv/h (maximum power of X-ray tube, without subtracting the background)	≤0.1μSv/h (maximum power of X-ray tube, without subtracting the background)	≤0.1μSv/h (maximum power of X-ray tube, without subtracting the background)
Stability Dimensions(r-nain body)	≤0.5%(40kV, 40mA, continuous operation for 8 hours) 1170mmx87Ommx1800mm (lengltixwidthxheight)	≤0.5%(40kV, 40mA, continuous operation for 8 hours) 1170mmx87Ommx1800mm (lengltixwidthxheight)	≤0.5%(40kV, 40mA, continuous operation for 8 hours) 1170mmx87Ommx1800mm (lengltixwidthxheight)
Transmission	Insutrial Ethernet	Insutrial Ethernet	Insutrial Ethernet

ATL series XRD accessaries

Multi function integrated accessory

α axis(tilt)	Range:-45°~90°, min step:0.001°/step
ßaxis(Inside rotating)	Range:0°-360°, min step 0.005°
z axis(front and back)	Range:10mm, min step 0,001mm/step
y axis	Range:±10mm, Swing horizontally at 45°
Sample size:	MaxΦ040m, thickness 10mm

High temperature accessory

Temperature set:	Inert gas environment, room temperature to 1200°C
Vacuum environment	Max temperature 1600°C
Control precision	±0.5°C
Window material	Polyester film
Cooling method	Deionized water circulation cooling

Medium and low temperature accessory

Temperature set:	Inert gas environment, room temperature to 1200°C
Vacuum environment	-195~450°C
Control precision	±0.5°C
Window material	Polyester film
Cooling method	Liquid nitrogen Deionized water circulation cooling

Temperature accessories controller

High frequency high voltage generator Domestic (left) import (right)

Input voltage: AC220V ± 10% 50Hz/60Hz
Output voltage: 0~60kV
Output current: 0~50mA
Max output power: 3kW
Output voltage Long-term stability: 0.01%/8 Hr
Output current Long-term stabilfty:0.01%/8 Hr

ATL-3010 cryogenic liquid nitrogen cooling system

* Almost all X-ray laboratories require cryogenic equipment and Dandong ATL Technology provides one of the most widely used liquid nitrogen cooling systems in the world today.

* Optimized usability system
Fast cooling (cooling to 120K takes only 50 minutes)
High performance fluid system (no ice, no noise during operation)
35 liters of liquid nitrogen can be used for 36~48 hours
High precision crystal temperature monitoring
High stability (±0.2K) and data recording system
Programmable monitoring software
Quick start (no need to set up)

Liquid Nitrogen Vessel | **Gas Pump** | **Temperature Control**

Nitrogen Cooling system Specification

Temperature Range	120-350K
Flow Rate	5-10Limin
Nitrogen comsumption	0.6L/h under the rate of 5L(min
Time to 120k	50min
Temperature stability	0.1K
Transfer line longth	3000mm

ATL || controller

Size and weight	315mm x 320mm x 220mm, 10kg
Power supply	220V 50Hz
Power comsumption	550VA

ATL || Dry Air unit

Size and weight	660mm x 300mm x 415mm, 42kg
Power supply	220V 50Hz
Power comsumption	1500VA

Coldhead support

Max height	660mm
Max horizontal distance	430mm
Weight	7kg

Liquid nitrogen vessel

Capacity	35.5L
Structure	Stainless steel welding
Dimensions	680mm x 473 x 650mm
Weight	13.8kg (empty), 49kg(full)
Bottleneck size	NW50Kf fitting 50mmΦ

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Technologies Limited

Servicing, Validation, Trainings and Preventive Maintenance :

Servicing	: We have team of service engineers who can attend to any make of instrument promptly @the most affordable cost.
Trainings	:We also take up preventive maintenance to reduce downtime of instrument's Trainings.
AMC's/CMC	: We offer user training both in-House and at customer sites on instrument principles, operations, troubleshooting.
Validations	: We have protocols for carrying out periodic Validations as per GLP/ GMP/USFDA norms.
Instruments	: We offer instruments/Renting Services Modules like pumps, detector etc. on Rent.

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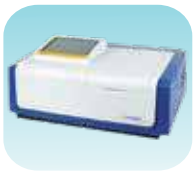
Analytical Technologies is synonymous for offering technologies for doing analysis and is the Fastest Growing Global Brand having presence in at least 96 countries across the globe. Analytical Technologies Limited is an ISO :9001 Certified Company engaged in Designing, Manufaturing, Marketing & providing Services for the Analytical, Chromatography, Spectroscopy, Bio Technology, Bio Medical, Clinical Diagnostics, Material Science & General Laboratory Instrumentation. Analytical Technologies, India has across the Country operations with at least 4 Regional Offices, 6 Branch Offices & Service Centers. Distributors & Channel partners worldwide.

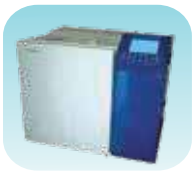
Our Products & Technologies



UV/VIS Spectro 2080+ Double Beam

Infra FTIR

Optima Gas Chromatograph 3007



Optima Gas Chromatograph 2979 Plus

Flash Chromatograph

Atomic Absorption Spectrophotometer

Liquid Partical Counter

Optical Emission Spectrophotometer

DSC/TGA

Semi Auto Bio Chemistry Analyzer

HEMA 2062 Hematology Analyzer

Micro Plate Reader/Washer

URINOVA 2800 Urine Analyzer

Total Organic Carbon 3800

Fully Automated CLIA

NOVA-2100 Chemistry Analyzer

PCR/Gradient PCR/ RTPCR

TOC Analyzer

Laser Particle Size Analyzer

Ion Chromatograph

Water purification system

Regulatory compliances

Corporate Social Responsibility

Analytical Foundation is a Nonprofit Organization (NGO) found for the purpose of:

1.Research & Innovation Scientist's awards / QC Professional Award : Quality life is possible by innovation only and the innovation is possible by research only, hence ANALYTICAL FOUNDATION is committed to identify such personallities for their contributions across various field of Science and Technology and awarding them yearly. To participate for award, send us your details of research / testing / publication at info@analyticalfoundation.org

2. Improving quality of life by offering YOGA Training courses, Work shops / Seminars etc.

3. ANALYTICAL FOUNDATION aims to DETOXIFY human minds, souls and body by means of Yoga, Meditation, Ayurveda, Health Care, Awards, Media, Events, Camps etc.

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