

INNOVATIVE TECHNOLOGIES

Portable XRD Analyzer - X-ray Diffractometer SHINE Family

PRODUCT RANGE



TORONTECH

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General Overview

The Portable XRD Analyzer (SHINE Family) is **a compact, all-in-one X-ray diffractometer designed for fast, reliable on-site material analysis**. By combining XRD and XRF technologies, it provides simultaneous data collection for accurate identification of material composition, phase, and structure.

With one-button operation and automatic detection, the system is easy to use and delivers precise results with minimal sample preparation—often in under one minute. A CCD detector enhances accuracy by capturing diffraction ring segments for consistent, high-quality data.

Built for both lab and field use, the analyzer weighs 15 kg and features an IP67 waterproof and dustproof design, making it ideal for harsh environments. Users can choose between Cu or Co anode targets to match specific application needs, ensuring flexible and dependable performance wherever analysis is required.

Available Model:

- ▶ SHINE Mineral & Rock Edition
- ▶ SHINE Research Edition
- ▶ SHINE Metal Corrosion Edition
- ▶ SHINE Soil Edition



SHINE MINERAL & ROCK EDITION

DESCRIPTION

The Portable XRD Analyzer – SHINE Mineral & Rock Edition is **purpose-built for on-site mineral phase analysis, combining XRD, XRF, and integrated software into a single field-ready system.** It delivers fast, high-precision qualitative and quantitative analysis, including crystal structure, material structure, and crystallinity of mineral samples. Using transmission geometry and a micro-focus X-ray tube, the system ensures consistent beam penetration and improved resolution, even for low-density materials.

A built-in vibration mechanism exposes more powder particles to the X-ray beam, while a CCD detector accurately captures diffraction patterns. With fixed sample volume and reliable performance in the field, the SHINE Mineral & Rock Edition provides efficient, accurate mineral analysis wherever your work takes you.

APPLICATIONS



➤ Geological Exploration / Ore Tracking



➤ Tailings Recycling and Reuse



➤ Mineral Smelting and Manufacturing



➤ Mineral Research & Grade Identification

SHINE METAL CORROSION EDITION

DESCRIPTION

The Portable XRD Analyzer – SHINE Metal Corrosion Edition **provides fast and accurate on-site corrosion analysis, removing the delays and costs associated with traditional laboratory testing.** It identifies corrosion products, analyzes crystal structure, and quantifies corrosion and scaling, giving engineers clear insight into corrosion mechanisms and severity.

Real-time field results support quicker maintenance decisions, helping to slow corrosion progression, extend equipment lifespan, and reduce the risk of leaks or environmental contamination. Designed for demanding industrial environments, the system enables proactive corrosion monitoring and more efficient asset management.

APPLICATIONS



► **Scaling and Corrosion Analysis of Piping Equipment**



► **Analysis of Silt Sediment in Industrial Areas**



► **Corrosion Failure Analysis of Industrial Equipment**

SHINE RESEARCH EDITION

DESCRIPTION

The Portable XRD Analyzer – SHINE Research Edition is a **versatile analytical tool that combines XRD, XRF, and integrated software to deliver precise insight into material composition, crystal phase, and internal structure.** Designed for research applications, it supports high-accuracy phase identification, trace element analysis, and crystal integrity studies with minimal sample preparation.

Using transmission geometry and a micro-focus X-ray tube, the system provides stable, high-resolution measurements, even for low-density materials such as pharmaceutical samples. A built-in vibration mechanism ensures consistent particle exposure, making the SHINE Research Edition a reliable solution for advanced materials research and crystal structure analysis.

APPLICATIONS



› Bio-pharmaceutical



› Research and Education



› Environmental Monitoring



› Metallic Compound



› Geology and Prospecting



› Chemistry and Catalysts

SHINE SOIL EDITION

DESCRIPTION

The Portable XRD Analyzer – SHINE Soil Edition is **engineered for fast, reliable clay mineral identification and quantitative analysis in soil samples**. It accurately determines clay mineral types and their relative proportions based on crystal structure, including fine-grained materials that are difficult to characterize using conventional methods. With simple sample preparation, rapid analysis, and high measurement accuracy, the system is well suited for soil science, geotechnical, and environmental applications.

Based on proven X-ray diffraction technology, it provides consistent identification of key clay minerals such as kaolinite, illite, montmorillonite, chlorite, and mixed-layer clays, supporting detailed soil characterization across varying regions and depth profiles.

APPLICATIONS



➤ Green Development of Agriculture



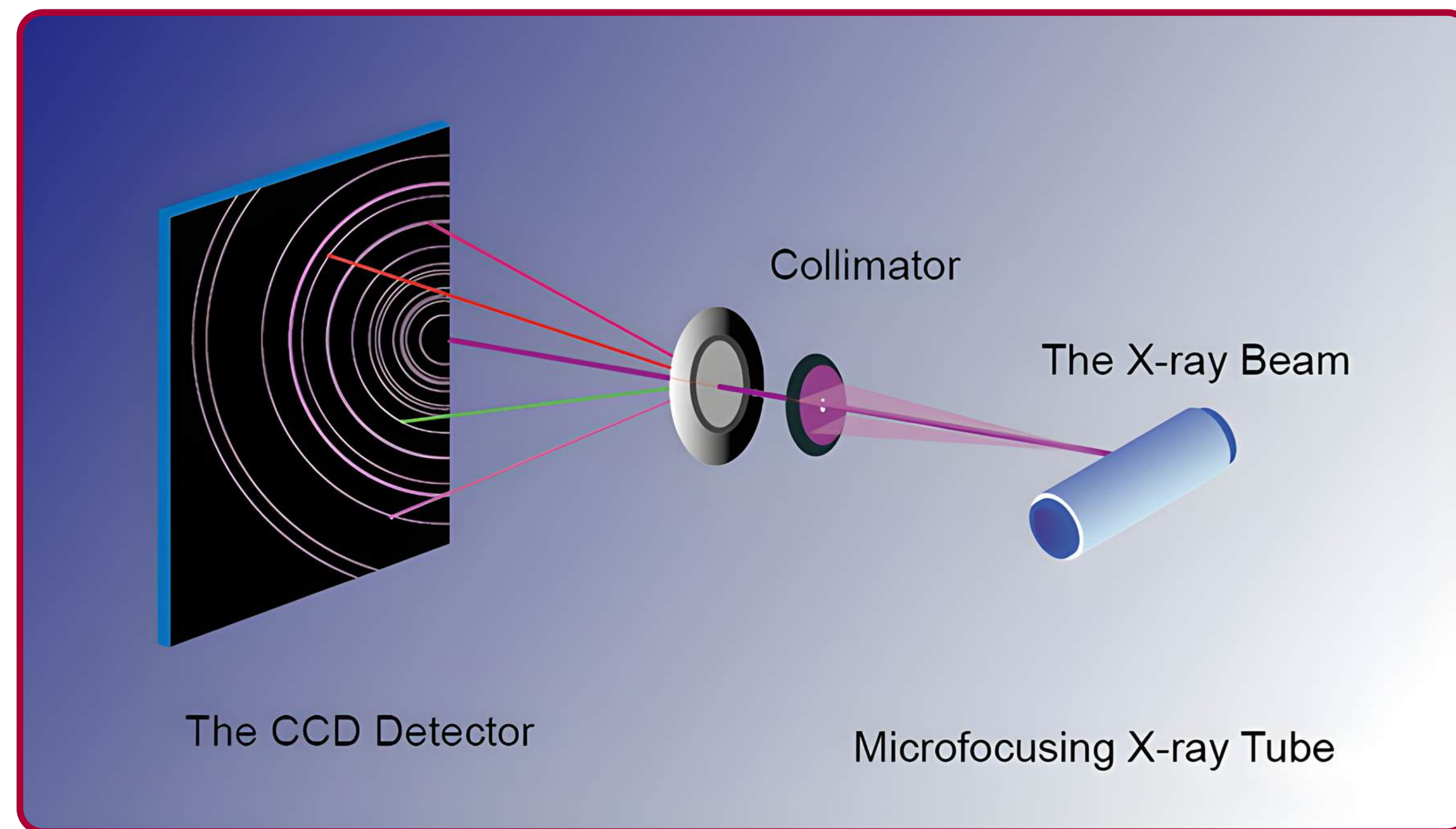
➤ Soil Pollution Control



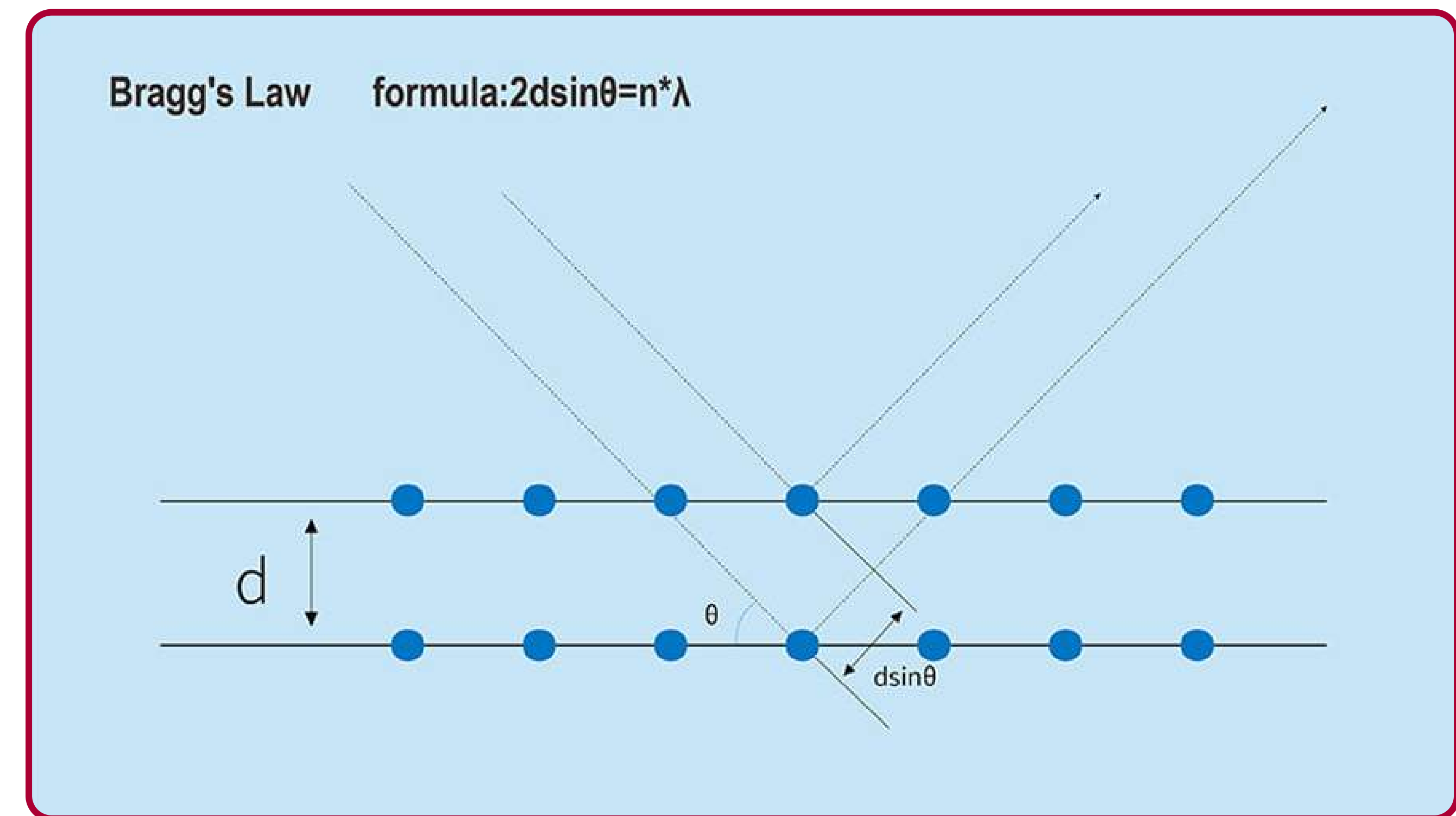
➤ Environmental Indicator Study

THEORY/METHOD

Working Principle



Bragg's Law Theory



FEATURES/ADVANTAGES

▶ **Portable, All-in-One Design**

Compact, lightweight, and fully integrated with a waterproof and dustproof enclosure. No mechanical moving parts, making it ideal for both laboratory and field applications.

▶ **XRD & XRF Integrated Analysis**

Simultaneous XRD and XRF data collection provides comprehensive information on material composition, phase, and crystal structure in a single measurement.

▶ **Simple One-Key Operation**

User-friendly operation with no calibration required. Automatic detection and analysis deliver reliable qualitative and quantitative results with minimal training.

▶ **Minimal Sample Preparation**

High-quality results with as little as 20 mg of sample. Preparation is fast and simple—no molding, pressing, or scraping—typically completed in about 3 minutes.

▶ **Two-Dimensional CCD Detection**

Advanced CCD detector captures diffraction ring slices, helping verify sample preparation quality, particle statistics, and grain orientation for improved data reliability.

▶ **High-Speed Data Transmission**

Supports USB, Bluetooth, and WiFi connectivity for real-time control, data transfer, and phase analysis using a laptop or external software.

▶ **Rugged Environmental Adaptability**

Designed for geological investigations, the instrument features fog-proof, dust-proof, and shock-resistant construction for reliable operation in harsh environments.

▶ **Safe and Flexible Configuration**

Multiple radiation protection measures ensure zero radiation leakage. Optional Cu or Co anode targets allow customization for different application requirements.


TECHNICAL SPECIFICATIONS COMPARISON

SPECIFICATIONS	DETAILS			
	Model	SHINE Mineral & Rock Edition	SHINE Metal Corrosion Edition	SHINE Research Edition
XRD Resolution	0.2° @ 2θ FWHM			
Scope of XRD	5°–55° 2θ			
Detector	2000 × 256 pixels, 2D Level-3 Peltier-cooled CCD			
X-ray Tube Target	Cluster micro-focus spot X-ray tube, Cu or Co, Cr, Fe, Ni, Mo, Ag, W target (optional according to test sample)			
X-ray Tube Voltage	Maximum 50 kV, Adjustable 0–50 kV			
X-ray Tube Power	Maximum 50 W, Adjustable 0–50 W	Maximum 40 W, Adjustable 0–40 W	Maximum 40 W, Adjustable 0–40 W	Maximum 40 W, Adjustable 0–40 W
XRF Energy Resolution	127 eV @ 8 keV			
XRF Detection Range	Mg–U			
Cooling Method	Air cooling	Water cooling	Water cooling	Water cooling
Sample Particle Size	<150 μm (100-mesh sieve)			
Sample Weight	Approximately 20 mg			
Working Temperature	–10 °C to 35 °C			
Weight	15 kg (33 lbs)			
Power Supply	Lithium-ion battery or power adapter			
Dimension	50 × 40 × 18.8 cm (L × W × H)			
Software Language	English and other languages			




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