Lattice GO

Portable X-ray Diffractometer

INTRODUCTION

"Diffraction Without Limits"

The **Lattice GO** redefines portable X-ray diffraction, delivering laboratory-grade performance in a compact, lightweight system. Designed for versatility, it integrates a specialized X-ray source, Bragg-Brentano diffraction geometry, and an advanced 2D array detector to generate high-quality XRD spectra in minutes.

Optimized for field research, on-site quality control, and space-constrained laboratories, the **Lattice GO** provides high-intensity data with exceptional angular precision, rivaling traditional benchtop systems. Its rugged construction, rapid scanning capability, and user-friendly operation ensure reliable results in any environment.

With the **Lattice GO**, high-resolution diffraction is no longer confined to the lab—bringing powerful material analysis wherever it's needed.

*Figure 1: Instrument Setup for the **Lattice GO***

KEY FEATURES

- **Compact and Portable Design**
  A lightweight, space-efficient system suitable for benchtop use or field deployment, making it ideal for laboratories with limited space or on-site analysis.

- **Rapid, In-Situ XRD Analysis**
  Enables immediate diffraction measurements following material synthesis, facilitating real-time screening and informed decision-making.

- **Laboratory-Grade Data Quality**
  Delivers high-intensity diffraction patterns with angular precision comparable to full-scale laboratory diffractometers.

- **Bragg-Brentano Diffraction Geometry**
  A proven configuration for accurate and reproducible powder diffraction analysis, ensuring high data reliability.

- **Advanced X-ray Source**
  Optimized for enhanced signal stability and consistent performance across diverse sample types.

- **High-Resolution 2D Array Detector**
  Provides rapid data acquisition with broad angular coverage, capturing high-fidelity diffraction patterns with excellent signal-to-noise ratio.

- **Optimized Analytical Workflow**
  Enables efficient sample pre-screening, reducing the need for external testing and improving overall analytical throughput.

SPECIFICATIONS

X-ray tube	30 W, 30 kV / 1 mA
X-ray tube target material	Cu
Theodolite	Theta / 2theta geometry, the radius of the theodolite is 110 mm
Detector	Photon direct-read two-dimensional array detector
Maximum scanning range	0° - 130°
2Theta Minimum step size	±0.01°
Measure speed	Two speeds available: 6°/min and 13°/min
Battery Runtime	3 hours
Volume and Weight	L 4.8 in (120 mm) × W 11.9 in (300 mm) × H 11.9 in (300 mm), 26.5 lbs (12 kg)

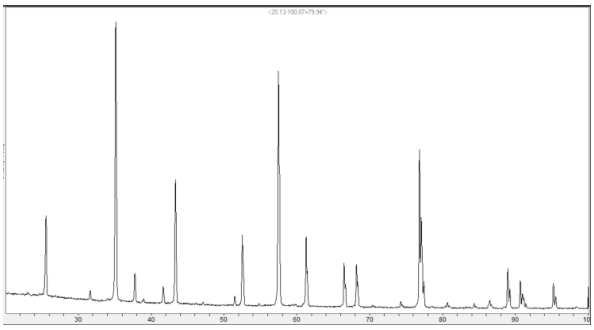

Figure 2: Ruby Standard Sample (NIST1976)

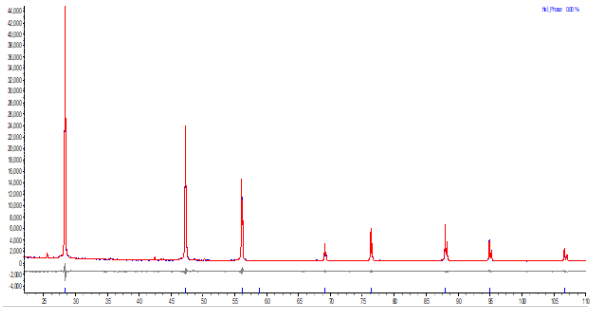

Figure 3: Silicon Powder Measurement Data and Rietveld Structure Refinement

APPLICATIONS

Mineral Industry:

The **Lattice GO** portable X-ray diffractometer is becoming an essential tool for geological exploration teams, providing rapid, reliable analysis directly in the field. Its ability to perform real-time phase identification and quantitative analysis empowers geologists to make faster, more informed decisions.

- **On-Site Mineral Analysis**
  Qualitative and quantitative identification of mineral phases to support mineralogical research and exploration.
- **Geological Feature Evaluation**
  Analyze surrounding rock structures in mineralization zones to understand ore genesis and mineral distribution.
- **Process Optimization**
  Identify ore formation mechanisms and determine appropriate mining, beneficiation, refining, and smelting methods.
- **Core Logging Support**
  Detect fine-grained fragments, complex lithologies, and subtle mineral changes to guide drilling and stratigraphic interpretation.
- **Rapid Ore Quality Assessment**
  Conduct fast, quantitative mineral content analysis on-site to inform mineral trading and field decisions.
- **Urban Resource Recovery**
  Identify and quantify mineral content from recycled materials for effective urban mining and resource reuse.

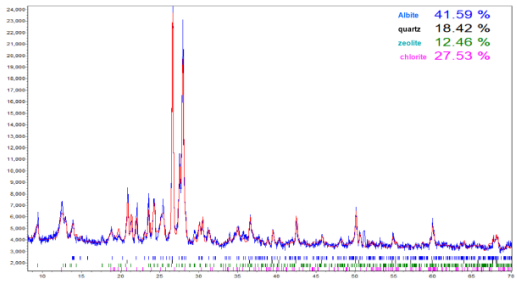

Figure 4: Sandstone Sample Diffraction Pattern and Standard-Free Quantitative Analysis

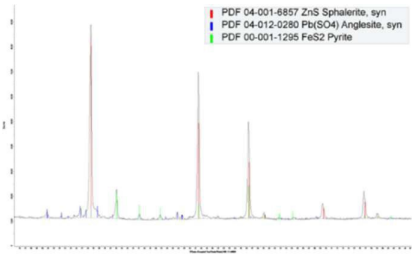

Figure 5: Zinc Concentrate Diffraction Pattern and Qualitative Analysis

Cultural Heritage:

The **Lattice GO** enables non-destructive, on-site analysis of culturally significant materials, making it an invaluable tool for conservation scientists, archaeologists, and museums. Its precision and portability support preservation, research, and authentication of priceless artifacts.

- **Phase Analysis of Artifact Materials**
  Identify crystalline phases in bronzeware, ironware, ceramics, pigments, and mural base layers.
- **Corrosion and Weathering Studies**
  Analyze corrosion products and weathering layers to understand degradation mechanisms and guide conservation strategies.
- **Restoration and Preservation**
  Assist in development of preservation techniques for murals, stone relics, and metal artifacts through material characterization.
- **Provenance Studies**
  Determine the geographic origin and production techniques of cultural relics using mineralogical fingerprinting.
- **Authentication and Anti-Counterfeiting**
  Verify authenticity of artifacts by comparing structural signatures to known references**.**

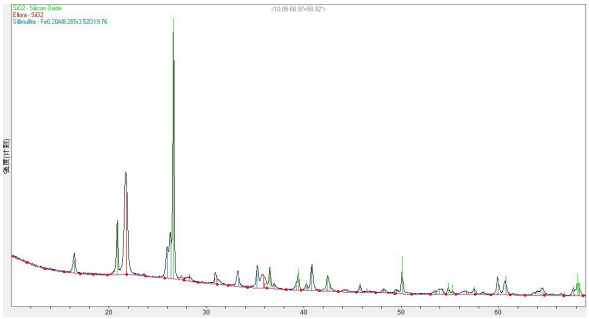

Figure 6: Ancient Ceramic Fragment Diffraction Data and Qualitative Analysis

Security and Drug Safety:

The **Lattice GO** brings advanced, non-destructive XRD capabilities to law enforcement and forensic science, enabling rapid, on-site analysis with minimal sample preparation. Delivering real-time results, it supports fast, accurate decision-making in critical situations.

- **On-Site Drug Identification**
  Perform rapid, non-destructive qualitative and quantitative phase analysis of narcotics, new psychoactive substances (NPS), and precursor materials.
- **Criminal Investigation Support**
  Identify and characterize controlled substances in the field to aid forensic investigations and track drug trafficking routes and sources.
- **Non-Destructive Forensic Testing**
  Preserve sample integrity while obtaining precise, high-resolution diffraction data for reliable forensic analysis.
- **Drug and Substance Characterization**
  Conduct on-site qualitative and quantitative analysis of illicit drugs, counterfeit pharmaceuticals, and precursor materials for trafficking detection and source attribution.
- **Trace Evidence Analysis**
  Detect and classify trace compounds such as cyanide, organic contaminants, paper fillers, toxic additives, and soil or mineral fragments from crime scenes or stolen cultural relics.
- **Security Screening at High-Risk Locations**
  Rapidly identify illicit substances, explosives, and hazardous materials at border checkpoints, airports, train stations, and public venues.
- **Explosives and Contaminant Detection**
  Analyze explosive compounds and their decomposition residues, as well as adulterants such as talcum powder and borax in consumer goods and food products.

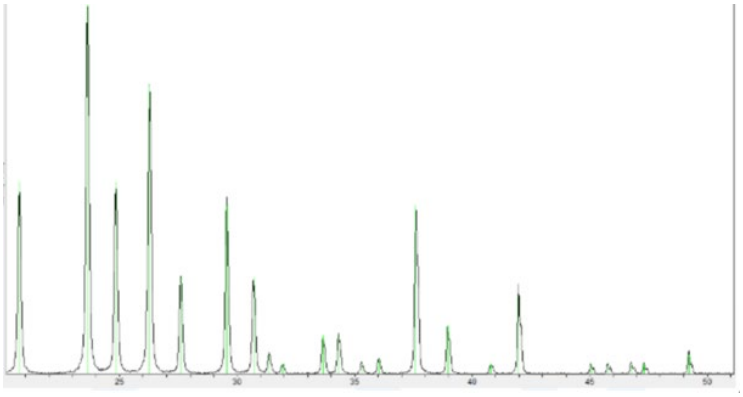

Figure 7: Heroin Hydrochloride XRD Pattern