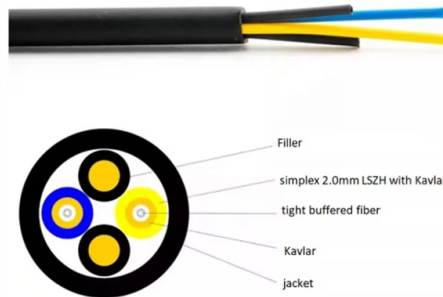


Spectrometer Detection of Precious Metals



Overview

Precious Metals Analysis | SPECTROSPECTRO offers a broad range of XRF and OES spectrometers optimized for precise analysis of precious Advanced Technologie.

Key Takeaways

Precious metals can be accurately detected and quantified using X-ray fluorescence (XRF) and optical emission spectrometry (OES), offering fast, precise, and often non-destructive analysis. X-ray Fluorescence (XRF) Spectrometry

XRF is a non-destructive technique widely used for analyzing precious metals such as gold, silver, platinum, palladium, and rarer metals like osmium, iridium, and ruthenium. The method works by irradiating a sample with primary X-rays, which causes the elements in the sample to emit secondary (fluorescent) X-rays. Each element produces a unique set of characteristic X-rays, allowing both qualitative and quantitative analysis.

- Energy-Dispersive XRF (EDXRF) is ideal for quick, on-site analysis with minimal sample preparation, making it suitable for jewelry, coins, and scrap metal.
- Wavelength-Dispersive XRF (WDXRF) provides higher sensitivity and resolution, often used in laboratory settings for precise measurements.

- Portable XRF analyzers, such as the GEM ORO XRF, can measure elemental composition to a depth of 10–20 microns, sufficient to detect plating and surface alloys . XRF is particularly advantageous because it is fast, non-destructive, and capable of analyzing small or irregular samples without altering the material .
- Optical Emission Spectrometry (OES)

OES, also known as spark OES, is another powerful technique for precious metal detection . In this method, an electrical spark ablates a small portion of the metal surface, exciting the atoms in an argon plasma. The excited atoms emit light at characteristic wavelengths, which is then separated by a diffraction grating and detected using photomultiplier tubes or CCD detectors .

- OES provides high precision and sensitivity, capable of detecting trace elements in the parts-per-billion (ppb) to parts-per-million (ppm) range .
- It is suitable for both major and minor components of alloys and can be automated for high-throughput laboratory analysis .
- Specialized OES instruments, like the ARL iSpark Plus Fire Assay Analyzer, can determine the content of all precious metals in lead buttons in under a minute, streamlining traditional fire assay processes . OES is particularly useful in industrial, research, and recycling applications, where precise elemental composition and detection of non-metallic inclusions are required .

Applications and Advantages

- Jewelry and coin verification: Determines karat, purity, and detects plating or counterfeit metals .
- Industrial quality control: Ensures consistency in precious metal alloys used in electronics, automotive, and aerospace industries .
- Recycling and scrap analysis: Quickly identifies valuable metals in mixed materials .
- Non-destructive testing: XRF allows analysis without damaging the sample, while OES provides high accuracy for detailed compositional studies . Both XRF and OES spectrometers are available in portable and benchtop formats, offering flexibility for fieldwork or laboratory use, and modern instruments provide automated calibration, fast analysis, and high reproducibility . In summary, spectrometric techniques like XRF and OES are essential tools for detecting, quantifying, and verifying precious metals, providing rapid, accurate, and reliable results across a wide range of applications.

Article Content

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Advanced Technologies for Analyzing Precious Metals

Designed specifically for countertop use in retail environments, the Niton DXL Precious Metal Analyzer, with Thermo Scientific AuDIT

Precious Metals Testing with ED-XRF Spectrometry

For routine analysis in a wide variety of pre-cious metal applications, energy-dispersive X-ray fluorescence (ED-XRF) spectrometry

Solutions for Analyzing Precious Metals

Perform precious metal testing with certainty With daily changes in the prices of precious metals, small inaccuracies in testing can

GEMORO XRF GOLD & PRECIOUS METAL

Users can benefit from this fast and efficient technology, quickly

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Precious Metals Analysis with Skyray XRF Spectrometers

Ability to analyze Precious Metals non-destructively and detect counterfeit within a few seconds makes XRF Spectrometers the best

5 Precious Metals Analysis Methods

Why portable XRF technology may be better than scratch, acid, electronic testers, fire

Comparing XRF Analyzers for Precious Metals

Compare XRF analyzers for precious metals to find the right solution for fast, accurate

Advanced Technologies for Analyzing Precious Metals

Advanced technologies for analyzing precious metals and identifying elements and alloys When it comes to assessing the value of

XRF Spectrometers and Metal Analyzers | Worldoftest

This technology is widely used for metal analysis, alloy verification, precious metal testing, and RoHS

Niton™ DXL Precious Metal Analyzer High-performance

Be absolutely sure of the value of the precious metals you buy and sell with a fast, simple nondestructive

GEMORO XRF GOLD & PRECIOUS METAL

Gold & Precious Metal Analyzer The GEM ORO XRF is a handheld, portable Energy Dispersive XRF

XRF Analyzer (Precious Metals)

Our ED-XRF spectrometer is improved for all your precious metal testing requirements. Elemental analysis

Solutions for Analyzing Precious Metals

Gain trust from your customer Thermo Scientific Niton XRF precious metal analyzers provide retailers, pawn shops, cash-for-gold

GEMORO® XRF Gold & Precious Metal Analyzer

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Gold & Precious Metal Analyzer

Its thoughtful design simplifies the detection process. The QualiEDX™ 600 features a highly efficient and reliable proportional

GEMORO XRF ASSAY | Sy Kessler

The GEMORO ASSAY LAB is the perfect solution for analyzing precious metals and it's ideal for jewelers,

Precious Metals Testing | Jewelry Analysis | Hitachi High-Tech

The instrument is compact and weighs only 1.5kg yet will deliver fast and accurate gold and precious metals analysis without having

XRF Analyzer VR-T6, Precious Metal & Element Analyzer

Discover the VR-T6 benchtop XRF spectrometer — a high-precision precious metal and elemental

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