Working Principle of Niton Spectrometer



Overview

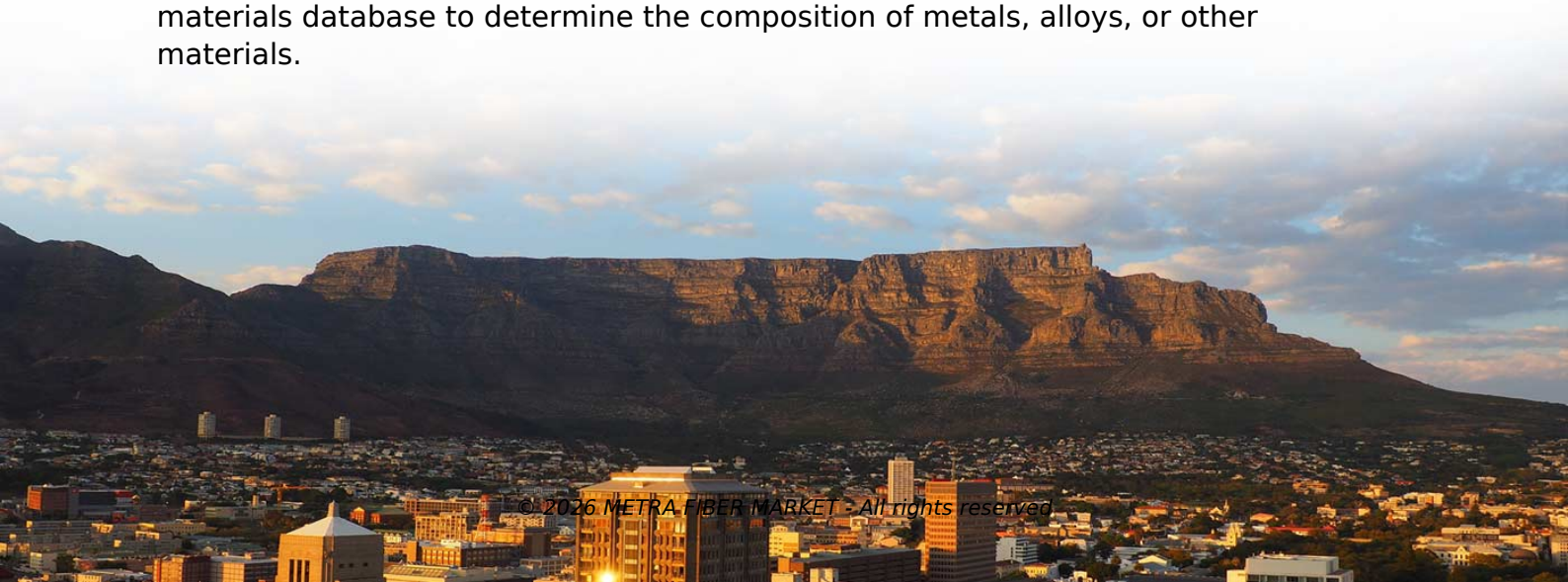
Incoming photons ionize the atoms within the detector, producing electrical pulses which are proportional to the levels of energy being detected.

Key Takeaways

The Niton spectrometer operates on the principle of X-ray fluorescence (XRF), detecting element-specific secondary X-rays emitted from a sample after excitation by primary X-rays. How It WorksX-ray Excitation: The Niton spectrometer emits high-energy primary X-rays onto the sample. These X-rays interact with the atoms in the material, displacing inner-shell electrons and creating vacancies in the atom's electron structure.

Atomic Excitation and Fluorescence: When an inner-shell electron is ejected, electrons from outer shells drop down to fill the vacancy. This transition releases energy in the form of secondary X-rays, which are characteristic of the specific element present in the sample. Detection and Data Analysis: The spectrometer's detector captures these secondary X-rays.

Each element emits X-rays at unique energies, allowing the device to identify and quantify the elements. The onboard software compares the detected signals with a materials database to determine the composition of metals, alloys, or other materials.



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Non-

Destructive and Rapid Measurement: The Niton spectrometer provides fast, non-destructive analysis directly in the field, eliminating the need for extensive sample preparation or laboratory testing. It can analyze a wide range of elements, from light elements like magnesium and aluminum to heavier elements such as uranium. Applications: This technology is widely used in metal inspection, mining, recycling, alloy verification, environmental analysis, and quality control, providing accurate elemental composition data in seconds.

In summary, the Niton spectrometer leverages X-ray fluorescence to excite atoms, detect emitted secondary X-rays, and analyze elemental composition quickly and non-destructively, making it a versatile tool for on-site material analysis.

Article Content

Guide to XRF Technology

Incoming photons ionize the atoms within the detector, producing electrical pulses which are proportional to the levels of energy being detected. These pulses are amplified and interpreted by a

Resources for Niton Portable Analyzers

Learn how Niton XRF handheld analyzers bring the lab outside to the field. See how these versatile instruments are used across the globe for accurate, fast, elemental analysis. Written by an expert in

How does a XRF spectrometer work? We explain step by step

In this article we explain how XRF works step by step, showing the capabilities of portable Niton™ XRF analyzers from Thermo Fisher Scientific, supplied by our company.

Thermo Scientific Niton XL2 XRF Analyzer

The Niton XL2 is the definitive tool for scrap metal recycling. It provides immediate nondestructive chemical analysis of alloy materials from titanium to nickel. With its unparalleled accuracy, you can

Introducing Thermo Scientific Niton Apollo

It may be necessary to use a heavy-duty wheel grinder to get below a de-carb layer, and use Zr-Al oxide media for final prep. Grind sample to clean, bright, representative surface with approximately 1⁄2-1”

XL2 plus Handheld XRF spectrometer

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The mobile XRF spectrometer Niton™ XL2 plus identifies different alloys within a fraction of a second. Its non-destructive measurement method is so

Niton X-Ray Fluorescence Spectrometers

How it works: the Niton X-Ray Fluorescence Spectrometer is a non-destructive analytical tool that uses x-rays to identify the composition of samples. Each

Niton XL2 | Handheld XRF spectrometer for metals & alloys

It identifies and displays in less than 5 seconds the chemical composition of materials in a non-destructive way. It is very easy to use. Just point and shoot to obtain an analysis without having to

Thermo Scientific XL2 User Manual

The Niton Model XL2 analyzer contains an x-ray tube which emits radiation only when the user turns the x-ray tube on. When the x-ray tube is on and the shutter is open, as during a measurement, the

Niton™ XL3t | Portable XRF Spectrometer for Metal

The Niton™ XL3t portable XRF analyzer uses X-ray fluorescence method to analyze the chemical composition of materials. Thanks to its different modes, it can be

Miniature computational spectrometer for mid-infrared

In this work, we propose a novel mid-infrared computational spectroscopy system based on F–P tunable filters, which achieves high

Resources for Niton Portable Analyzers

Access collateral, webinars, brochures, application notes, videos, infographics, ebooks, and more for Thermo Scientific Niton Handheld Analyzers for material identification and metal verification.

Thermo Scientific Niton XL2 GOLDD Tube-Based X

Thermo Scientific Niton XL2 GOLDD Tube-Based X Topics manualzilla, manuals, Collection additional_collections Item Size 120.6M Addeddate 2021-03-11 05:14:25 Identifier

How does a XRF spectrometer work? We explain step by step

How does a XRF spectrometer work? Summary It is worth knowing, how XRF works and why X-ray fluorescence technology is becoming a standard in many industries. Portable Niton™ XRF

Thermo Scientific Niton XL2 XRF Analyzer

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Thermo Scientific Niton XL2 analyzers represent just one of our handheld analyzer solutions, which include XRF tools for metal alloy identification, lead-based paint testing, RCRA metals in soil, toy and

Niton Handheld and Portable Analyzers

Handheld and portable analyzers for advanced elemental analysis and metal identification For more than 30 years, Thermo Scientific Niton analyzers have been the trusted instruments of choice for field

Niton Handheld XRF Analyzers

Niton handheld XRF analyzers help users perform rapid, qualitative screening directly in the field to optimize drill locations by delineating ore from waste boundaries, guide extraction, determine ore

Niton Portable Analyzer Models

Review the many models of Thermo Scientific Niton portable XRF and LIBS analyzers for elemental identification and metal verification.

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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