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OES Spectrometer



Overview

Optical emission spectrometry (OES) is an industry-standard technique for the elemental analysis of a range of metals and alloys.

Key Takeaways

An OES spectrometer is a device that analyzes the elemental composition of metals by measuring the light emitted from excited atoms in a sample.What is an OES Spectrometer?

An Optical Emission Spectrometer (OES) is an analytical instrument used to determine the elemental composition of metallic samples. It works by exciting atoms in a sample using an energy source such as a spark, arc, or plasma. When these atoms return to their ground state, they emit light at characteristic wavelengths unique to each element. By measuring the intensity of this emitted light, the OES can provide both qualitative and quantitative information about the elements present in the sample .

How OES Works
• Excitation: Electrical energy is applied to the sample, typically via a spark or arc, creating a high-energy plasma that vaporizes and excites the atoms .

• Emission: Excited atoms release photons as they return to lower energy states. Each element emits light at specific wavelengths, producing a unique emission spectrum .

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• Detection: The emitted light is separated using a diffraction grating, and detectors such as photomultiplier tubes measure the intensity of each spectral line. The intensity correlates with the concentration of the element in the sample .

• Analysis: Software interprets the spectral data to provide precise elemental composition, often from trace levels to percent concentrations .

Applications

OES is widely used in the metals and alloys industry for:

• Incoming material inspection and quality control

• Process monitoring in foundries, steel, aluminum, and copper plants

• Scrap sorting and recycling

• Research and development in metallurgy

• Ensuring compliance with industry standards for alloy composition

Advantages

• Rapid analysis: Provides fast results, often within seconds to minutes

• High accuracy: Capable of detecting trace elements and major constituents

• Versatility: Suitable for a wide range of metals and alloys

• Automation-friendly: Can be integrated into production lines for continuous monitoring

Types of OES Instruments

Modern OES spectrometers vary from portable, ultra-compact models for on-site analysis to advanced benchtop and floor-standing systems for high-throughput laboratory use. Examples include the Q2 ION, Q4 POLO, Q6 NEWTON, and Q8 MAGELLAN, each offering different levels of precision, speed, and element coverage .

In summary, an OES spectrometer is a critical tool for accurate, rapid, and reliable elemental analysis of metals, making it indispensable in industrial, research, and quality control applications.

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The Working Principle of Arc/Spark OES Elemental Analysis

The principle of the analysis method of SPECTRO´s portable, mobile and stationary metal analyzers is optical emission spectroscopy

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Optical Emission Spectroscopy (OES) is a widely used analytical technique used to determine the elemental

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ICP-OES Spectrometers

ICP-OES spectrometers measure the concentration of elements from ppb to % using de-excitation of atoms and ions in a plasma.

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We have a range of optical emission spectrometers (OES) which are either mobile or stationary. All of our OES models offer a high

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Element offers OES analysis for metals and alloys, using sparking or arc excitation methods. OES analysis

Optical Emission Spectroscopy

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