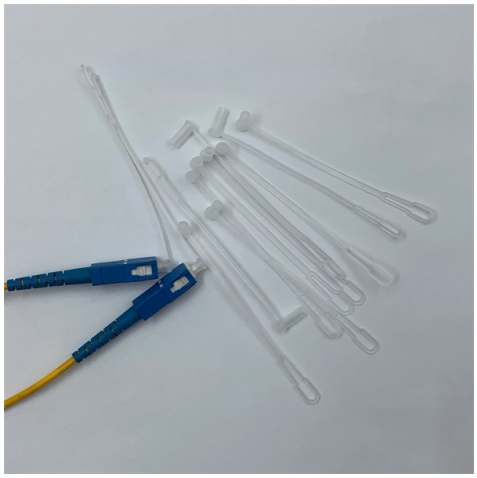
ZITHA TECH SPECIALTY CABLES (Pty) Ltd

Spectrometers are mainly divided into



Overview

Spectrometer Explained: Diagram, Types & ApplicationsIn the testing process with a spectrometer, light enters the instrument from a sample. Inside the syst.

Key Takeaways

Spectrometers are divided into optical, mass, infrared, atomic, and specialized types based on the type of radiation or particles they analyze and their applications.Optical Spectrometers

Optical spectrometers measure the intensity of light as a function of wavelength or frequency. They separate light into its component colors using prisms or diffraction gratings and detect the resulting spectrum. Subtypes include UV/Visible spectrometers, near-infrared (NIR) spectrometers, and fluorescence spectrometers, which are used in chemical analysis, environmental monitoring, and laboratory research . Optical spectrometers often include components such as a light source, monochromator, and detector to measure absorbance or transmittance .

Mass Spectrometers

Mass spectrometers separate and measure ions based on their mass-to-charge ratio. They are widely used in chemistry, biochemistry, and particle physics to determine molecular composition, identify unknown compounds, and analyze isotopic ratios . Mass spectrometry is essential for applications like proteomics, metabolomics, and environmental analysis.

Infrared Spectrometers

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved

Infrared (IR) spectrometers analyze molecular vibrations by measuring absorption of IR radiation. They are particularly useful for identifying functional groups in organic compounds and for pharmaceutical or environmental testing . Modern IR spectrometers often use interferometers to select specific wavelengths and can perform both qualitative and quantitative analysis.

Atomic Spectrometers

Atomic spectrometers, including atomic absorption (AAS) and atomic emission spectrometers (AES), measure the presence and concentration of elements in a sample. They rely on the characteristic absorption or emission of light by atoms and are commonly used in analytical chemistry and materials science .

Specialized and Portable Spectrometers

Some spectrometers are designed for compact or field applications, such as handheld optical spectrometers for food safety, gemology, or environmental monitoring. Others combine multiple detectors to cover a broad wavelength range or optimize performance for low-light or high-speed measurements . In summary, spectrometers are classified primarily by the type of radiation or particles they analyze and their intended application, ranging from optical and infrared to mass and atomic spectrometers, with specialized instruments for portable or high-performance needs .

Article Content

Spectrometers – Visual Encyclopedia of Chemical Engineering

Infrared SpectrometersAtomic AbsorptionAtomic EmissionAtomic FluorescenceAcknowledgementsReferencesDevelopersInfrared spectrometers are used to measure the wavelength and intensity of the absorption of infrared radiation by a sample. The measurements provide valuable chemical composition information.See more on encyclopedia e.engin.umich biologyinsights

How Do Spectrometers Work? Types and Real-World Uses

Most optical spectrometers share four key components arranged in sequence: an entrance slit, a collimator, a dispersive element,

Related Video Reference

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

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved

Contact Us

Continue your research online:

Website: https://zithatech.co.za
Technical inquiry: https://zithatech.co.za/contact.html

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

© 2026 ZITHA TECH SPECIALTY CABLES (Pty) Ltd - All rights reserved