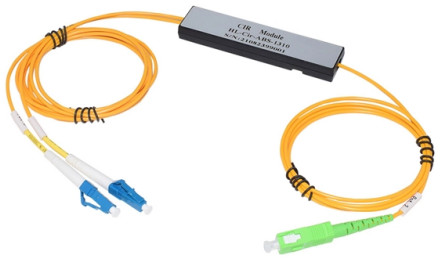
Monochromator of a Purple Spectrophotometer



Overview

In this volume, we will describe the monochromator, an important part of the spectrophotometer that was explained in UV TALK LETTER Vol.

Key Takeaways

A monochromator in a Purple Spectrophotometer isolates a single wavelength of light from a broad spectrum, enabling precise absorbance measurements.

Function and Purpose

The monochromator is a critical component of a spectrophotometer, responsible for selecting a narrow band of wavelengths from a broader light source. This allows the instrument to measure the absorbance or transmission of a sample at a specific wavelength, which is essential for accurate quantitative and qualitative analysis of chemical or biological substances.

Components

A typical monochromator includes: Entrance slit: Controls the amount of light entering the device and ensures collimation. Dispersive element: Either a prism or a diffraction grating that separates light into its constituent wavelengths. Mirrors: Collimate and direct the light through the dispersive element.

Exit slit: Allows only the selected wavelength to pass to the sample or detector.

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Working Principle

Collimation: Light entering the monochromator is first collimated by mirrors to ensure parallel rays. Dispersion: The collimated light hits the dispersive element. A prism disperses light due to wavelength-dependent refractive indices, while a diffraction grating separates light based on interference patterns.

Selection: By rotating the prism or grating, a specific wavelength is directed through the exit slit. Output: The monochromatic light exits the slit and passes through the sample for measurement.

Types of Dispersive Elements

Prism: Simple, covers a wide wavelength range, but efficiency varies with wavelength. Diffraction grating: Offers higher efficiency and better wavelength resolution, commonly used in modern spectrophotometers. Blazed gratings optimize efficiency for specific wavelength ranges.

Design Considerations

The Czerny-

Turner design is widely used in spectrophotometers, including Purple models. It uses two concave mirrors and a diffraction grating to achieve high spectral resolution and efficient light throughput. The slit width affects resolution and signal intensity: narrower slits improve resolution but reduce light intensity, affecting the signal-to-noise ratio.

In summary, the monochromator in a Purple Spectrophotometer ensures that only a single, well-defined wavelength reaches the sample, which is crucial for accurate spectrophotometric analysis. Its design, whether prism- or grating-based, directly influences the instrument's precision, efficiency, and spectral range.

Article Content

Monochromators : Shimadzu (Europe)

In this volume, we will describe the monochromator, an important part of the spectrophotometer that was explained in UV TALK LETTER Vol. 2 "The

Monochromator

A monochromator can use either the phenomenon of optical dispersion in a prism, or that of diffraction using a diffraction grating, to spatially separate the colors of light. It usually has a mechanism for directing the selected color to an exit slit. Usually the grating or the prism is used in a reflective mode. A reflective prism is made by making a right triangle prism (typically, half of an equilateral prism) with one side mirrored. T

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Monochromators

Optical instruments that are designed to make absorbance measurements in colorimetric analyses commonly have a single monochromator. However, having multiple monochromators in

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1.3B: Monochromators

Without incorporating other specific design features into the monochromator, all wavelengths that constructively interfere will be incident on the sample. For

7.3: Wavelength Selectors

The resolving power or resolution for a monochromator is the ability to separate images that have a slight difference in wavelength and the resolving power

Monochromators : SHIMADZU (Shimadzu Corporation)

In this volume, we will describe the monochromator, an important part of the spectrophotometer that was explained in UV TALK LETTER Vol. 2 "The Structure of a Spectrophotometer".

Understanding slit width, grating, and optical principles in ...

You use a monochromator in spectroscopy to separate and measure different wavelengths of light. This helps you analyze the composition of samples in fields like chemistry,

Monochromators and Spectrophotometer.ppt

It then focuses on the details of different types of monochromators, specifically diffraction grating monochromators and prism monochromators.

Monochromators : Shimadzu (Europe)

The monochromator slit width used in a spectrophotometer is expressed not as the slit width dimension but as the value of the resolution achieved. Setting the slit width to 1 nm, sets the monochromator

Characteristics of Single and Double Monochromator UV-VIS ...

This article discussed the characteristics of single monochromator and double monochromator spectrophotometers. To achieve highly accurate spectral measurements, it is best to fully understand

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1.3B: Monochromators

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Characteristics of Single and Double Monochromator UV-VIS

The double monochromator spectrophotometer achieves high linearity by ensuring extremely low stray light in comparison to a single monochromator system. This type of instrument is suitable for

Monochromators : Shimadzu (Nederland)

The monochromator slit width used in a spectrophotometer is expressed not as the slit width dimension but as the value of the resolution achieved. Setting the slit width to 1 nm, sets the monochromator

7.3: Wavelength Selectors

A scanning monochromator is used to acquire a spectrum, and, when operated in a fixed-wavelength mode, for a quantitative analysis. The construction of a typical monochromator is shown

Monochromator M

Monochromators are important for color mea-surement because many color-related optical characteristics are dependent on wavelength. In color science, reflected or transmitted light from a

Monochromators | PPTX

The document presents a detailed overview of monochromators, including their definition, principles, types (prism and diffraction grating), and optical filters. It explains how monochromators function by

Monochromator: Fundamental Principle and Methods

A monochromator is an optical device that converts polychromatic light (such as sunshine or light from a lamp) into a range of individual wavelengths (monochromatic light) and allows a a limited band of

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