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Editorial

Editorial on Ultraviolet-Visible Spectrum

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EDITORIAL

In UV-Vis spectroscopy, light of a given wavelength in the UV or visible spectrum is transmitted through a material. Not all of the light will pass through or be transmitted if the sample absorbs some of it UV-Vis has found itself applied to many uses and situations including but not limited.

The quantitative determination of diverse analytes, such as transition metal ions, highly conjugated organic compounds, and biological macromolecules, is frequently done using UV/Vis spectroscopy in analytical chemistry. Spectroscopic analysis is most typically performed on solutions, but it can also be done on solids and gases.

This law asserts that when a monochromatic light beam passes through a solution containing an absorbing substance, the rate at which the radiation intensity decreases, as well as the thickness of the absorbing solution, is proportional to the solution's concentration and incident radiation.

In comparison to a reference or blank sample, UV-Vis spectroscopy is an analytical technique that analyses the amount of discrete wavelengths of UV or visible light that are absorbed by or transmitted through a sample. The sample composition influences this attribute, which could provide information on what is in the sample and at what concentration. Because this spectroscopy approach relies on the usage of light, we'll start with light's qualities.

The quantity of energy contained in light is inversely proportional to its wavelength. As a result, shorter light wavelengths carry more energy while longer wavelengths carry less. To boost electrons in a substance to a higher energy state, which we can detect as absorption, a precise quantity of energy is required. In a substance, electrons in different bonding environments require a varied amount of energy to promote them to a higher energy state. This is why different wavelengths of light are absorbed by different things.

Humans can see a visible light spectrum ranging from 380 nanometers, which we perceive as violet, to 780 nanometers, which we perceive as red. UV light has wavelengths that are roughly 100 nanometers shorter than visible light. As a result, light may be defined by its wavelength, which can be useful in UV-Vis spectroscopy for analysing or identifying various compounds by locating the exact wavelengths that correlate to maximal absorbance (see the Applications of UV-Vis spectroscopy section).

UV-V is spectroscopy is also beneficial in some more specific studies. Examining specific structural protein changes and estimating battery composition can both benefit from tracking changes in the wavelength corresponding to the peak absorbance. Shifts in peak absorbance wavelengths can also help with more current applications like characterization of very small nanoparticles. This approach has a wide range of applications that appear to be limitless.

Many more sectors could benefit from this strategy. Measuring a colour index, for example, can be used to monitor transformer oil as a preventative measure to guarantee that electric power is provided securely. In cancer research, measuring haemoglobin absorbance to estimate haemoglobin concentrations could be useful. UV-Vis spectroscopy can be utilised in kinetic and monitoring investigations in wastewater treatment to determine that certain dyes or dye byproducts have been appropriately eliminated by comparing their spectra over time.

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