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Absorption Spectroscopy

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Introduction

Absorption spectroscopy may be a spectroscopic technique that measures the frequency of wavelength of absorbed light as a result of the interaction between the sunshine and a sample.

Principle of Absorption spectroscopy

Absorption spectroscopy is predicated on the principle that materials have an spectrum which may be a range of radiation absorbed by the fabric at different frequencies. The spectrum of materials depends on the atomic and molecular composition of that material. The frequency of sunshine radiation absorbed by a cloth depends on the energy difference between the 2 energy states of the molecules. The absorption leads to the formation of an absorption line, which, along side other lines, form an spectrum .Thus, when a photon with sufficient energy reaches an object, the energy is absorbed by the electrons causing them to encounter a better energy level .The amount of photon (radiation) absorbed leads to an spectrum which may then be measured in terms of absorbance. The absorbance of a sample depends on the amount of excited electrons which successively depends on the concentration of molecules within the sample.

Steps of Absorption spectroscopy

Solvent liquid and therefore the sample solution are taken in two transport vessels, also termed as cuvettes. The vessel with solvent liquid is then placed within the spectrometer to work out the sunshine loss thanks to scattering and absorbance by the solvent. Any absorbance observed during this process is to be subtracted from the absorbance of the sample. The cuvette with the sample solution is then placed within the spectrometer. The absorbance of the sample is noted in several frequencies which usually ranges from 200-800 nm. A similar spectrum is made from a special concentration of the samples. A graph of the absorbance measured against the concentration of the sample is plotted, which may then be used for the determination of the unknown concentration of the sample.

Uses of Absorption spectroscopy

Absorption spectroscopy is employed to work out the presence of a specific substance during a sample then to quantify this substance. This technique has been applied in remote sensing, which allows the determination of the concentration of hazardous substances without the direct interaction of the instrument and therefore the sample. Absorption spectroscopy is additionally used for the determination of the atomic and molecular structure of varied substances

Astronomical spectroscopy

Astronomical spectroscopy is that the study of astronomical structures by using the principle of spectroscopy for the measurement of the spectrum , which is radiated from stars or other celestial bodies.

Principle of Astronomical spectroscopy

The spectrum produced by the sunshine coming from celestial objects isn't as smooth because the spectrum of white light. Both the absorption and spectrum of sunshine is produced by passing the sunshine through a grating. The light, when dispersed, forms absorption and emission lines which are hooked in to the energy levels of electrons in atoms and molecules of the thing present within the source. Based on the absorption of radiation at a specific wavelength, a graph is plotted between the wavelength and therefore the flux of the absorption and emission lines. Most of those lines are formed thanks to the presence of metals. Thus, counting on the peak and depth of those lines, the abundance of those metals are often quantified. Steps of Astronomical spectroscopy In astronomical spectroscopy, the incoming light from various stars is skilled a telescope into the spectroscope. As the light reaches the grating of the spectroscope, the sunshine is dispersed into different wavelengths. The dispersed wavelengths land on the photodetectors which analyze the character of the wavelengths. The detectors form the flux scale of the spectrum counting on the wavelength by comparison with observations of ordinary stars.

Uses of Astronomical spectroscopy

The absorption of sunshine from the celebs reveals various properties of stars like chemical composition, temperature, density, mass, and relative motion. The study of the stellar spectrum helps within the study of galaxies and therefore the composition of galaxies and also can be used for the determination of the motion of stars and galaxies through the Doppler effect and redshift