UV- VIS-NIR Spectrophotometer

- Ultraviolet-visible-near-infrared (UV-Vis-NIR) spectrophotometers are powerful tools used in analytics.
- UV-Vis-NIR spectroscopy measures the amount of light transmitted or reflected when a sample is irradiated with light. From these data, we can obtain information such as concentration, colour, and optical characteristics.
- Versatile, non-destructive, and cost-effective technique that delivers high accuracy and precise measurement.
- UV-Vis-NIR spectrophotometers are able to analyze liquids, solids and thin films with minimal sample preparation.

Instrument Capabilities

- The Instrument can measure the absorbance with highest sensitivity in class with three detectors
- High resolution, Ultra-Low stray light, and wide measurement wavelength range

Sample Type

- Solid
- Liquid
- Thin Films

Sample Preparation

- To prepare your samples for solution-state UV-Vis spectroscopy, you should consider the following points:
- Ensure that your cuvettes are as clean as possible. If you can, put them through a standard glass washing procedure. At the very least, they should be rinsed with the last used solvent and a rinsing agent, such as acetone, deionized water or IPA.
- Before loading your sample, you should rinse the cuvette with the solvent that your sample is dissolved in. This should help remove any residual solvents left over from cleaning, which could contaminate your measurement.
- Any reference measurement, such as for absorbance spectroscopy, should be taken of the cuvette filled with the diluting solvent. This will ensure that your measurement will account for any optical effects introduced by the quartz cuvette or the solvent.
- Use an appropriate sample concentration. If your sample is too concentrated, the beam will not be able to penetrate through the sample, and no light can be measured by the spectrometer. If your sample is too dilute, light may pass through your sample without interacting with the sample material at all.
- Optimize the path length for your experiment. A cuvette's path length is the distance that light travels through the sample before it escapes and is measured by the spectrometer. Using a cuvette with a smaller path length can be useful if you cannot reduce your sample concentration without significantly changing your results.
- Additionally, you can use a cuvette with a smaller path length to reduce the volume of sample needed. This can be especially useful if you have a small amount of sample or if your material is expensive.

- Ensure your spectrometer has a sample holder which accommodates your cuvette. The positioning of your cuvette relative to the spectrometer and light source should remain consistent throughout and between experiments. Your sample should also stand "face on" relative to incoming light to reduce any scattering effects. For example, the Ossila Optical Spectroscopy Kit contains a cuvette holder compatible with standard Quartz cuvettes.
- Always ensure that your samples are completely dissolved in your chosen solvent. Wherever possible, filter solutions before using to remove contaminants.

Applications

- High-absorbance measurement of polarizing films
- UV-Vis-NIR spectrophotometers are frequently used across a wide range of industries including pharmaceuticals, environmental science, food safety, and materials research.
- Reflection measurement of multilayer films
- Absolute reflectance measurement of highly reflective mirrors
- Spectral characteristic measurement of beam splitters
- Relative emission measurement of LEDs
- Transmittance measurement of quartz plates
- Absolute reflectance measurement of anti-reflection coatings
- Transmittance measurement of functional films
- Diffuse reflectance measurement and band gap measurement of semiconductor materials
- Transmittance measurement of solar cell cover glass, etc.BB
- Cosmetic color measurement and ultraviolet screening measurement
- Measurement of drugs containing crystallization water
- Measurement of moisture in plants
- Measurement of various amino acids
- Quantitation of proteins and nucleic acids
- Near-infrared measurement of pharmaceutical components
- Transmittance and color measurements of plastic materials
- Reflectance measurement of silica-based white powered materials
- Thickness measurement of thin films
- Near-infrared measurement of organic solvents
- Haze measurement of plastics

References

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