

UV-VIS-NIR SPECTROPHOTOMETER

The Central Research Facility (CRF) has installed UV-VIS-NIR Spectrophotometer with attachments of Integrating Sphere and Peltier Accessory. The Integrating Sphere is for diffuse reflectance measurements of powder samples and the Peltier Accessory is for kinetics studies of liquid samples from room temperature to 80°C. The Colour Calculator Software is also installed with this equipment to calculate the Colour coordinates of the material.



Instrument details

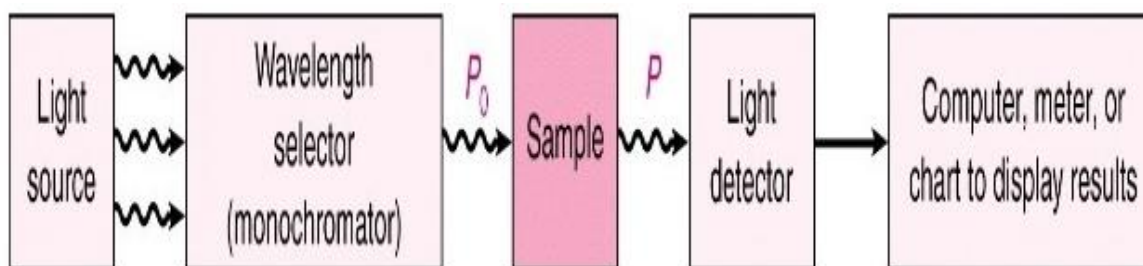
- **Make & model:** Agilent Cary 5000
- **Wavelength range:** 175 nm – 3300 nm
- **Monochromator:** Double out-of-plane Littrow Monochromator
- **Light source :** Tungsten-halogen and deuterium
- **Detector :** For UV-VIS : R 928 Photomultiplier; For NIR : Peltier cooled PbS photocell
- **Integrating Sphere:** 110 mm module for Specular and Diffuse Reflectance measurements
- **Slit width:** Variable slit width down to 0.01 nm for optimum control over data resolution
- **Sample compartment:** Large size with Lock Down mechanism for quick changes and positioning
- **Peltier Accessory:** For kinetics studies of liquid samples
- **Application software:** Windows based Cary WinUV software
- **Colour Calculator software:** For measurements of colour coordinates

Working Principle of the instrument

The double-beam spectrophotometer uses two rather than one beam of light to measure how light is absorbed during spectrophotometry. Unlike single beam units, the double beam allows for

simultaneous measurement of a sample beam and a reference beam. Many applications that require high speed, stability and flexibility are better suited for this double-beam configuration.

UV-VIS-NIR spectroscopy is one of the simplest and yet most useful technique for studying optical and electronic properties of materials. This technique is based on the measurement of light absorption by a sample. The intensity of light from a light source e.g. lamp is measured by a light detector e.g. photodiode, photomultiplier tube or charge coupled device without (blank) and with a sample between the light source and detector.



Applications

- Studies of various Optical properties such as Absorption, Reflectance and Transmittance for solid & liquids samples including thin films.
- Studies of various fundamental Electronic properties such as density of states, energy levels and electronic dipole moment.
- Measurement of film thickness.
- Measurements of various Optical constants such as refractive index, extinction coefficient and band gap of thin films and bulk materials.
- Measurement of moisture content in mineral ore samples.
- Biochemical and kinetic studies of liquid samples.
- Application in life sciences and pharmacy.

End users

- Physicist
- Chemist
- Material Scientist
- Spectroscopist
- Pharmacist
- Mineralogist