**UV-Vis Spectroscopy Instrumentation**

Instruments for measuring the absorption of U.V. or visible radiation are made up of the following components;

1. Sources (UV and visible)
2. Wavelength selector (monochromator)
3. Sample containers
4. Detector
5. Signal processor and readout

**Sources of UV radiation**

The electrical excitation of deuterium or hydrogen at low pressure produces a continuous UV spectrum. Both deuterium and hydrogen lamps emit radiation in the range 160 - 375 nm.

Quartz windows must be used in these lamps, and quartz cuvettes must be used, because glass absorbs radiation of wavelengths less than 350 nm.

#### Sources of visible radiation

#### The tungsten filament lamp is commonly employed as a source of visible light. This type of lamp is used in the wavelength range of 350 - 2500 nm.

The lifetime of a tungsten/halogen lamp is approximately double that of an ordinary tungsten filament lamp. Tungsten/halogen lamps are very efficient, and their output extends well into the ultra-violet. They are used in many modern spectrophotometers.

#### Wavelength selector (Monochromator)

All monochromators contain the following component parts;

* An entrance slit
* A collimating lens
* A dispersing device (usually a prism or a grating)
* A focusing lens
* An exit slit

Polychromatic radiation (radiation of more than one wavelength) enters the monochromator through the entrance slit. The beam is collimated, and then strikes the dispersing element at an angle. The beam is split into its component wavelengths by the grating or prism. By moving the dispersing element or the exit slit, radiation of only a particular wavelength leaves the monochromator through the exit slit.

#### Cuvettes

The containers for the sample and reference solution must be transparent to the radiation which will pass through them. Quartz or fused silica cuvettes are required for spectroscopy in the UV region. These cells are also transparent in the visible region. Silicate glasses can be used for the manufacture of cuvettes for use between 350 and 2000 nm.

**Detectors**

Detectors are used to measure the transmitted or reflected light from a sample and convert it into a signal. The type and material of the detector will determine the sensitivity and wavelength range of the data that can be acquired. However, all the detectors exploit the photoelectric effect where light or photons that are incident on a material result in the emission of electrons.