Principle of uv spectroscopy

uv Spectroscopy obeys the Beer-Lambert law, which states that when a beam of monochromatic light is passed through a solution of an absorbing substance the rate of decrease of intensity of radiation with thickness of the absorbing solution is proportional to the incident radiation as well as the concentration of the solution.

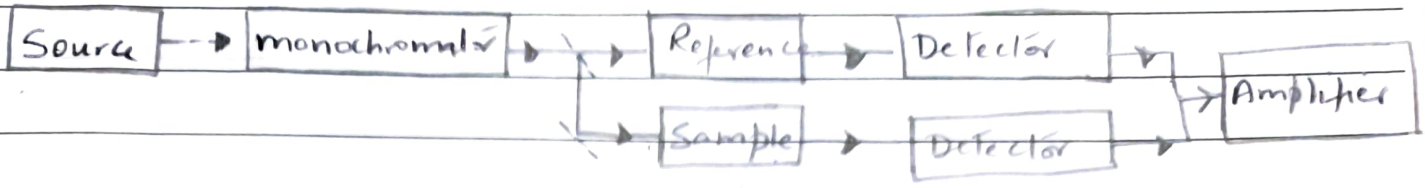
The Expression of Beer Lambert law is

$$A = \log(I_0/I) = Ecl$$

where A = absorbance
I_0 = intensity of light incident upon sample cell
I = intensity of light leaving sample cell.
C = molar concentration of solute
L = length of the sample
E = molar absorptivity

From the law it is clear that greater the number of molecules capable of absorbing light of a given wavelength, the greater the extent of light absorption.

Instrumentation and Working



Light Source: Tungsten filament lamps and Hydrogen-Deuterium lamps are most widely used

Monochromator: The light beam is further divided into two beams.

Sample and Reference cells: One beam passes through the Sample Solution and the other through the reference.

Detector: One photocell receives the beam from Sample cell and second detector receives the beam from reference

Amplifier: is to amplify the signals many times so we can get clear and recordable signals.

The amplifier is connected to the computer which stores all the data generated and produces the spectrum of the desired Compound.

Applications:

- Detection of functional groups
- Detection of extent of Conjugation
- Identification of an unknown Compound
- Determination of configurations of geometrical Isomers

Determination of purity of a Substance