

OPTICAL ACTIVITY



LALY A.S.
ASST. PROFESSOR
DEPT. OF PHYSICS
LITTLE FLOWER COLLEGE
GURUVAYOOR

Optical activity : The property of rotation of the plane of polarisation of a plane polarised light when it passes through certain solutions or crystals is called optical activity.

Substances which rotate the plane of polarisation to the right hand sense(clockwise) when viewed against the direction of light- Dextro rotatory substances.

Substances which rotate the plane of polarisation to the left hand sense(anticlockwise) when viewed against the direction of light- Laevo rotatory substances

□ The angle through which the plane of polarisation is rotated depends on the following factors:


- Concentration of the solution, C
- Length of the solution, l
- Wavelength of light, λ
- Temperature, T


At a given temp., for a given wavelength, the angle of rotation will be $\theta = S l C / 10$ where S is a constant called **specific rotation**.


$$\theta = S l C / 10$$

When $l = 10 \text{ cm}$, $C = 1 \text{ gm/cc}$, then $\theta = S$.

ie, Specific rotation can be defined as the angle of rotation produced by a decimeter (10 meter) length of an optically active solution of 1 gm/cc concentration.

- 
- Calculate the thickness of a half wave plate of quartz for light of wavelength 589.3 nm. For quartz $\mu_o=1.5442, \mu_e=1.5533$.
 - Calculate the minimum thickness of a calcite plate that converts a plane polarised light into an elliptically polarised light. The refractive indices are $\mu_o=1.485, \mu_e=1.656$ at the wavelength 589 nm.



Thank you...