Observed rotation of an optically active compound, measured using the polarimeter, depends on the experimental conditions and, therefore, is not a characteristic property of the compound. Specific rotation (symbol: \([\alpha]_\lambda^T\)) of an optically active compound is defined as follows:

\[
[\alpha]_\lambda^T = \frac{\alpha \text{ degrees}}{l \text{ dm} \times C \text{ g mL}^{-1}}
\]

\(\alpha\) = observed rotation measured using a polarimeter
\(l\) = length of sample tube
\(C\) = concentration, if a solution of the compound is used for the experiment, or density, if a neat sample of the compound is used
\(T\) = Temperature (usually 25 °C)
\(\lambda\) = wave length of the light used (usually 589 nm)

Specific rotation of a compound is a characteristic property of the compound as long as the temperature, the wavelength of the light, and, if a solution is used for the experiment, the solvent are specified. The units of specific rotation are \text{degrees} \text{ m} \text{L}^{-1} \text{ dm}^{-1}. However, since the units of specific rotation are always the above, traditionally, specific rotation is reported without units.

eg:

\([\alpha]_D^{25} = +43.8 \text{ (ethanol)}\)

Camphor

Contributors
- Gamini Gunawardena from the OChemPal site (Utah Valley University)