

M.Sc. Semester I

Organic chemistry

Paper - CC-III

Unit - II

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Chirality

A carbon atom having four different monovalent atoms or groups is known as chiral carbon or a chiral center. The word chiral (Greek "handed") was first introduced by Kelvin in 1884 to describe the phenomenon of handedness of molecules, i.e. object and mirror-image relationship of a left and right hand. The term chiral is used to discuss molecules enantiomers because these are related to the same way as a right hand is related to a left hand. The molecules or objects which are not superimposable on their mirror images are chiral, and are said to possess chirality. Thus we can say that the terms chiral and chirality are used in reference to

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compound whose mirror image is non-superimposable over itself.

Chirality is necessary and sufficient condition for the existence of enantiomers. All the optically active compounds have chiral molecules. Chirality is the essential criterion for optical activity as well as for enantiomerism. If a molecule or object is superimposable on its mirror image is said to be achiral (non-chiral), which are optically inactive and can't exhibit enantiomerism. If a molecule is nonsuperimposable on its mirror image, the mirror image must be a different molecule because superimposability is the same as identity. The terms chiral and chirality have been widely accepted, and they have replaced ~~to~~ the earlier dissymmetric, dissymmetry, asymmetric and asymmetry terms although one may encounter these earlier terms in the older chemical literature.