

❖ Chirality Due to Helical Shape

This type of chirality arises when the molecule has a helical structure. In other words, an organic molecule can no longer be superimposed on its mirror image if its geometry resembles a helix.

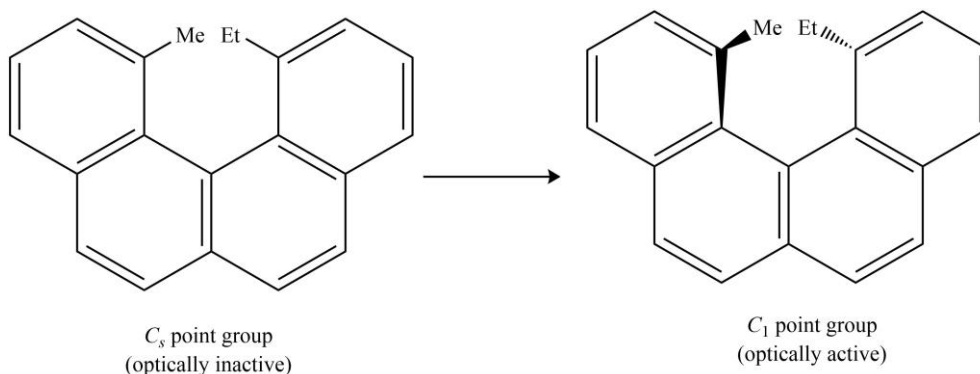
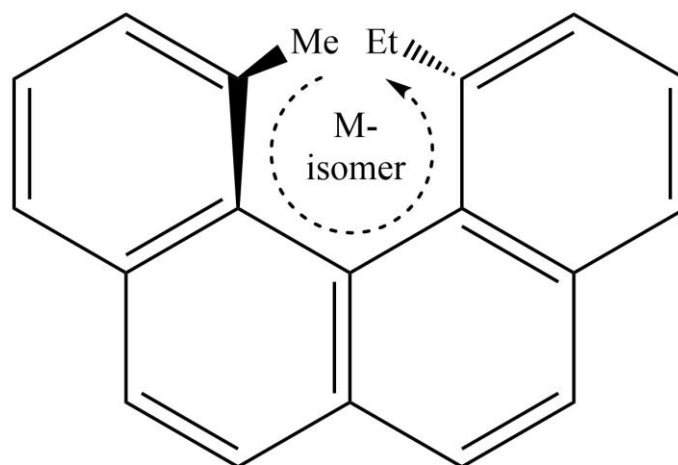


Figure 5. Conversion of an achiral molecule to optically active via the induction of helical shape.

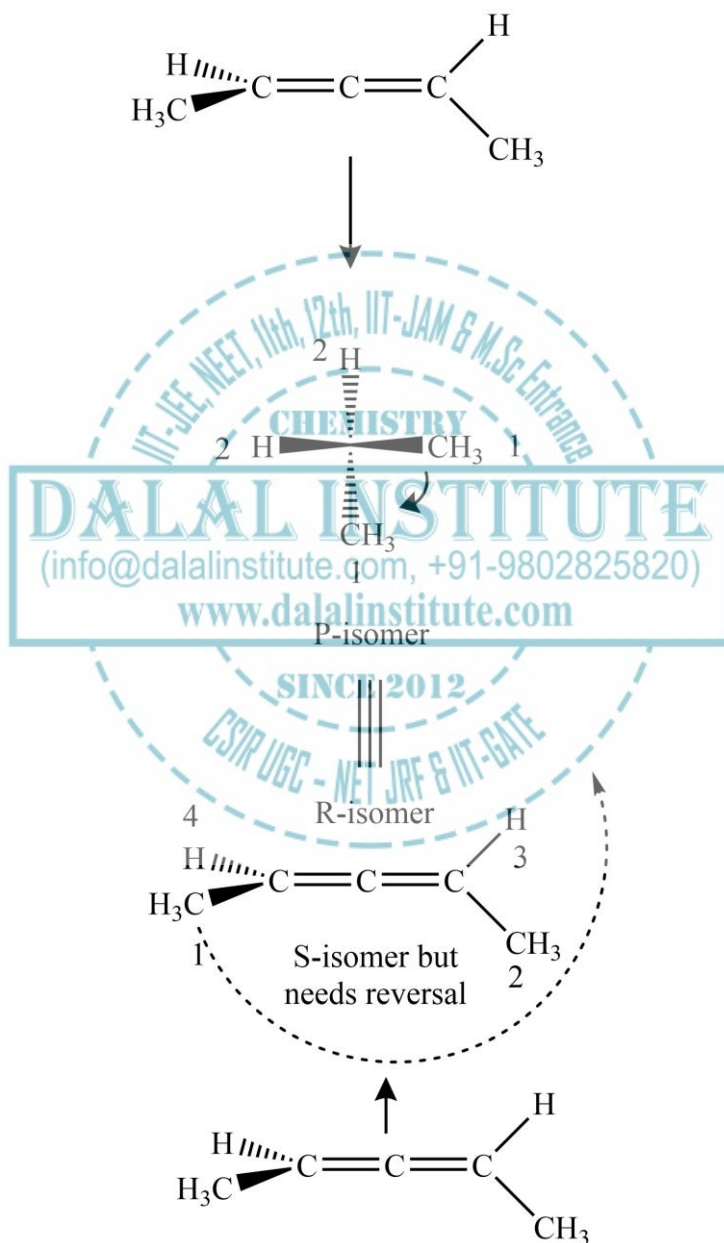
➤ *R-S Nomenclature of Optically Active Compounds with Helical Chirality*

Many molecules (such as a helix) lack a chiral center, chiral axis, or chiral plane but still are optically active. Since we can view a helix along the axis, we need to check the behavior of the near and far end of the same. If the deboarding from the near end of the helix to the far end gives rise to clockwise flight, the molecules should be labeled as P. Conversely, if the deboarding from the near end to the far end gives rise to anticlockwise flight, the molecules should be labeled as M.



Anticlockwise deboarding

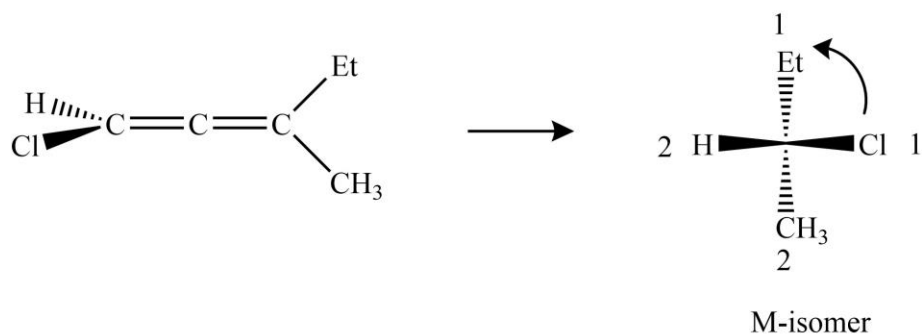
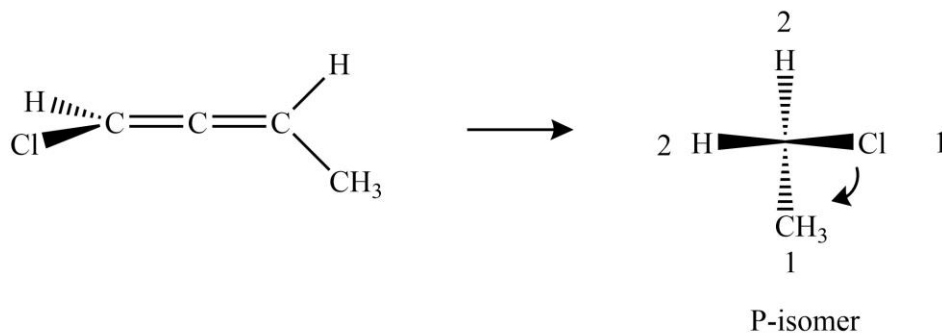
Furthermore, some optically active molecules; like allenes, biphenyls, and spiranes; can have axial as well as helical chirality. The route to do so is the same except for the fact that such molecules must be viewed along the chiral axis first, and priorities are assigned separately at both ends. Now if the deboarding from near highest priority group to the far highest priority group gives rise to clockwise flight, the molecules should be labeled as P. Conversely, if the deboarding from near highest priority group to the far highest priority group gives rise to anticlockwise flight, the molecules should be labeled as M.



It is also very important to note the fact that the R and S labels for molecules with chiral axis translate P and M; respectively.

➤ **Examples of Optically Active Compounds with Helical Chirality**

Some of the most common examples of organic molecules with this type of chirality (due to helical shape) are given below.



The enantiomer of any compound with helical chirality can simply be obtained by twisting the helix in the opposite direction.

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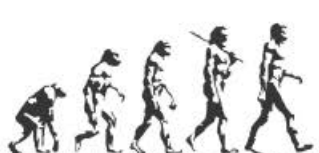
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A TEXTBOOK OF ORGANIC CHEMISTRY

Volume I

MANDEEP DALAL



First Edition

DALAL INSTITUTE

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