Separation of Stereoisomers

Resolution of Racemic Mixtures

The separation of a racemic mixture into the individual enantiomerically pure enantiomers is called resolution.

Since enantiomers have identical physical properties, such as solubility, boiling point and melting point, they can not be resolved by common physical techniques such as direct crystallization, distillation or basic chromatography.

Since diastereomers have different physical properties, they can be separated by conventional physical techniques. This difference is exploited in resolution by placing a mixture in a chiral environment to initiate diastereomeric interactions. All methods for separating or characterizing enantiomers are based on this principle.

Resolution of Racemic Mixtures

Chiral Stationary Phases

Another common method of resolving a racemic mixture is through the use of chromatography on chiral stationary phases. These are incorporated in gas chromatography and liquid chromatography systems.

In the resolution of racemic 2-aminobutane on a chromatographic system in which an enantiomer of mandelic acid is attached to a stationary phase, new, transient, diastereomeric interactions between 2-aminobutane and the stationary phase lead to different retention times and thus to separation of the enantiomers.

Resolution of Racemic Mixtures

Chromatography on Chiral Stationary Phases