

## Editorial Note on Stereoisomerism Relationship

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### EDITORIAL

Stereoisomerism, also known as spatial isomerism, is a type of isomerism in which molecules have the same molecular formula and bond atom sequence (constitution), but their atoms are oriented differently in three dimensions in space.

The only stereochemical connections that can exist between two molecules are enantiomers and diastereomers. Any two molecules that meet the following two criteria are stereoisomers: The molecular formulas of both molecules must be the same, and. The atom connectivity in both molecules must be the same.

Stereoisomerism, also known as spatial isomerism, is a type of isomerism in which molecules have the same molecular formula and bond atom sequence (constitution), but their atoms are oriented differently in three dimensions in space. This is in contrast to structural isomers, which have the same chemical formula but differ in their bond connections or order. Molecules that are stereoisomers of one other have the same structural isomer by definition. Constitutional isomers, stereoisomers, enantiomers, and diastereomers are examples of isomers.

How can we detect if two molecules are "connected"? And how can we find out what kind of isomer they are once we know they are? Are they constitutional isomers (same formula, different connectivity), stereoisomers (same connectivity, different arrangement), enantiomers (stereoisomers that are not non-superimposable mirror images), or diastereomers (stereoisomers that are not non-superimposable mirror images) or diastereomers (stereoisomers that are not non-superimposable mirror images) ( $C_2H_2Cl_2$ ) isomers.

### E-Z isomerism and cis-trans isomerism

Because rotation around the double bond is prohibited, stereoisomerism about double bonds emerges, keeping the

substituents stationary relative to one other. There is no stereoisomer and the double bond is not a stereocenter if the two substituents on at least one end of a double bond are the same, as in propene,  $CH_3CH=CH_2$ , where the two substituents on one end are both H.

In the past, double bond stereochemistry was referred to as cis (Latin for "on this side") or trans (Latin for "across"), based on the relative positions of substituents on either side of a double bond. The 1,2-disubstituted ethenes, such as the dichloromethane, are the simplest examples of cis-trans isomerism.

The first molecule is cis-1,2-dichloroethene, whereas the second is trans-1,2-dichloroethene. Due to the possibility of ambiguity, the IUPAC established a more stringent system in which the substituents at each end of the double bond are prioritised according to their atomic number. It is designated Z if the high-priority substituents are on the same side of the bond (Ger. zusammen, together).

It's E if they're on opposite sides (Ger. entgegen, opposite). Because chlorine has a higher atomic number than hydrogen, it is the most important element. Molecule I is (Z)-1,2-dichloroethene, and molecule II is (E)-1,2-dichloroethene, according to this nomenclature Z and cis, as well as E and trans, are not necessarily interchangeable. Consider the fluoromethylpentene below.

Because the alkyl groups that form the backbone chain (i.e., methyl and ethyl) reside across the double bond from each other, this molecule is called trans-2-fluoro-3-methylpent-2-ene, or (Z)-2-fluoro-3-methylpent-2-ene because the highest-priority groups on each side of the double bond are on the same side of the double bond. On the left side of the double bond, fluoro has the most priority, whereas on the right side, ethyl has the highest priority.

The terms cis and trans are also used to denote the relative position of two substituents on a ring; cis when they are on the same side, trans otherwise.

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