Cis-Trans isomers or geometric isomers are stereoisomers that differ from each other in the configuration either around a double bond or around a ring.

eg. 1:

\[
\begin{align*}
\text{molecular formula} & \quad C_2H_6 \\
\text{structural formula} & \quad \text{CH}_3\text{H} = \text{CHCH}_3
\end{align*}
\]

1 and 2 have the same molecular formula and the same structural formula and, therefore, are stereoisomers. They differ from each other in the configuration around the double bond. In 1, the like ligands are on the same side of the double bond; in 2, they are on the opposite sides. Thus, 1 and 2 are cis-trans isomers.

eg. 2:

\[
\begin{align*}
\text{molecular formula} & \quad C_2H_6Br_2 \\
\text{structural formula} & \quad \text{Br}\text{H}_2\text{Br}
\end{align*}
\]

3 and 4 have the same molecular formula and the same structural formula and, therefore, are stereoisomers. They differ from each other in the configuration around the ring. In 3, the two bromine atoms are on the same side of the ring; in 4, they are on the opposite sides. Thus, 3 and 4 are cis-trans isomers.

• see also diastereomers
Contributors

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