Positional isomers are constitutional isomers that have the same carbon skeleton and the same functional groups but differ from each other in the location of the functional groups on or in the carbon chain.

eg. 1: Propyl bromide (1) and isopropyl bromide (2) are constitutional isomers.

\[
\begin{array}{cc}
\text{Br} & \text{Br} \\
1 & 2 \\
\end{array}
\]

They have the same carbon skeleton:

\[
\begin{array}{cc}
\text{C} & \text{C} & \text{C} \\
\text{carbon skeleton} & \text{carbon skeleton} & \text{of 1} & \text{of 2} \\
\end{array}
\]

They have the same functional group, a bromine atom. The difference between 1 and 2 is in the location of the bromine atom on the carbon chain. In 1, the bromine atom is on a terminal carbon atom; in 2, it is on the internal carbon atom. Thus, 1 and 2 are positional isomers.

eg. 2: 1-Butene (3) and 2-butene (4) are constitutional isomers.

\[
\begin{array}{cc}
\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3 & \text{CH}_3-\text{CH}=\text{CH}-\text{CH}_3 \\
3 & 4 \\
\end{array}
\]

They have the same carbon skeleton:

\[
\begin{array}{cc}
\text{C} & \text{C} & \text{C} & \text{C} \\
\text{carbon skeleton} & \text{carbon skeleton} & \text{of 3} & \text{of 4} \\
\end{array}
\]

They have the same functional group, an alkene group. The difference between 3 and 4 is in the location of the alkene group in the carbon chain. In 3, the alkene group is terminal; in 4, it is internal. Thus, 3 and 4 are positional isomers.

see also skeletal isomers, functional isomers

Contributors

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