

Organic chemistry 3

Isomers: Structural isomers are different compounds with the same molecular formula, but different structural formula.

Drawing structural isomers:

- Take the terminal end (CH₃) methyl group off and place it on a non terminal(carbon)
- Change the position of the functional group *from a carbon to another carbon* (C=C), (OH) to give the molecule a different name.

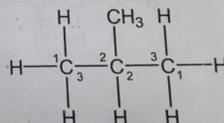
name	formulae	structural formulae	condensed structural formulae	M _r
butane	C ₄ H ₁₀	$ \begin{array}{cccc} \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \\ \text{H}-\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\ & & & \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array} $	CH ₃ CH ₂ CH ₂ CH ₃	58
methylpropane or 2-methylpropane	C ₄ H ₁₀	$ \begin{array}{ccc} & \text{H} & \text{CH}_3 \\ & & \\ \text{H}-\text{C} & -\text{C} & -\text{C}-\text{H} \\ & & \\ \text{H} & \text{H} & \text{H} \end{array} $	CH ₃ CH(CH ₃)CH ₃	58

Naming the isomer of butane

- Identify the longest carbon chain

There are three carbons in a row

- Number the carbons from left to right and from right to left



- Which substituent groups are bonded to the longest chain?

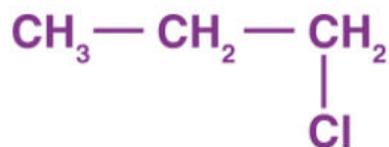
There is a -CH₃ group attached which is called a **methyl group**.

- In naming this molecule, give the position and name of the substituent group first, followed by the longest carbon chain

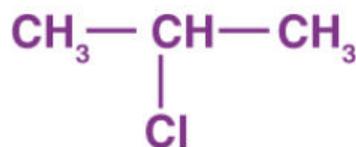
2-methylpropane tells us there are 3 carbons in the longest chain
 methyl group on carbon number 2 of the longest chain

Position Isomerism

- The positions of the functional groups or substituent atoms are different in position isomers.
- Typically, this isomerism involves the attachment of the functional groups to different carbon atoms in the carbon chain.



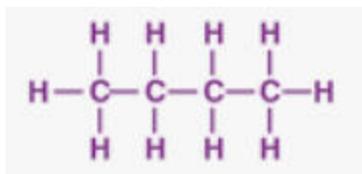
1-Chloropropane



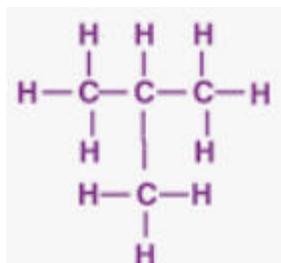
2-Chloropropane

NO structural isomers possible for CH_4 , C_2H_6 , C_3H_8 .

C_4H_{10} has two possible structural isomers.



Butane

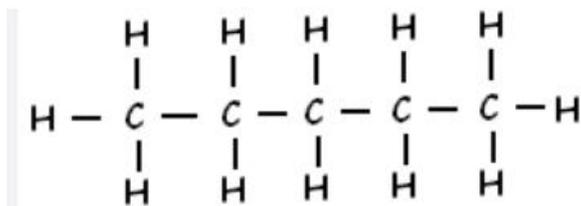


2-methyl propane

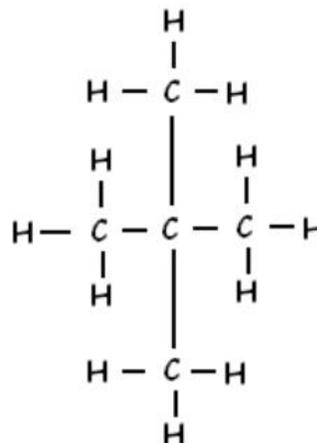


Same molecular formula but different structural formula

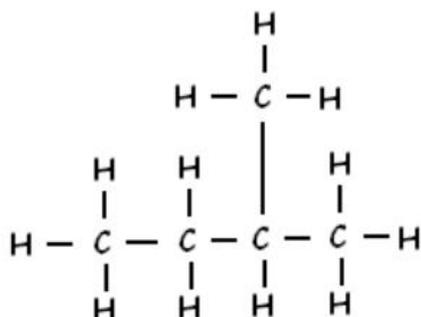
C_5H_{12} has three possible structural isomers



Pentane



2,2-dimethyl propane



2-methyl butane

Pentane is a straight chain and the rest of the structures are branched chains. Straight chain has higher boiling point than branch chains.

Alkanes and alkenes are hydrocarbons

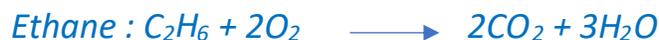
Alkanes are saturated hydrocarbons because they have c-c single bond.

Alkenes are unsaturated hydrocarbons because they have C =C double bond.

Chemical properties of Alkanes

They are generally unreactive due to presence of relatively strong bonds between the atoms but they take part in **combustion and substitution reactions**.

Combustion in excess oxygen



Incomplete combustion produce carbon monoxide.



Substitution with halogens

Substitution reaction is when an atom or group of atoms in a molecule is replaced by another atom or group of atoms forming 2 products.



reagents	methane	chlorine
conditions	ultra violet light	

