

Aim: How do we draw & name isomers?

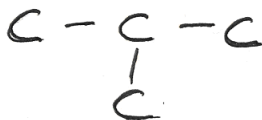
Isomers – are compounds that have the same chemical formula, but a different structure.

What are the isomers of C_4H_{10} ?

Let's not write in the hydrogen atoms so that we can focus on the carbon chain.

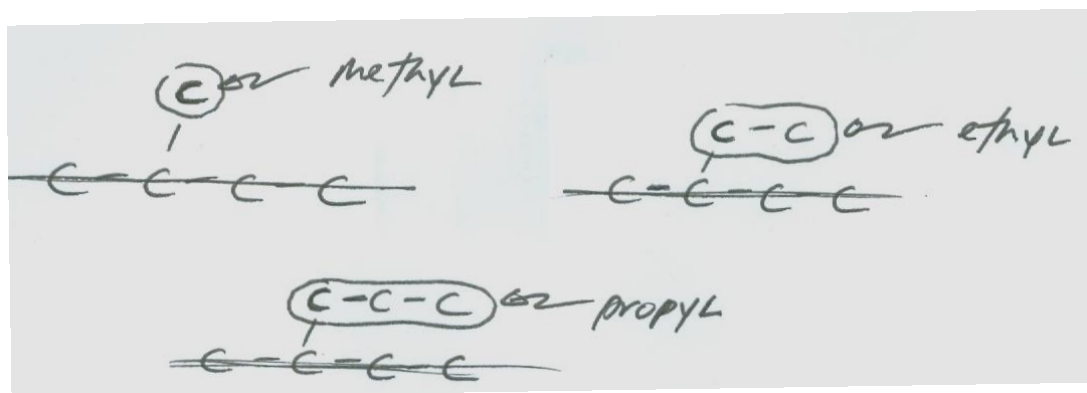


butane

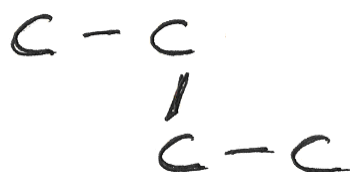


methyl propane

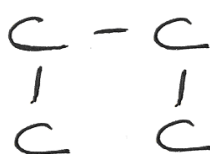
So, to make an isomer, just break off an atom from the chain and stick it somewhere else within the chain.



Note: twisting, bending or flipping molecules doesn't turn them into different isomers. That is,



is the same as



and

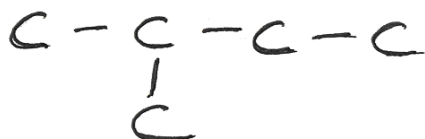


So, there's no point in zigzagging or twisting. Just keep it straight!

What are the isomers of C_5H_{12} ?

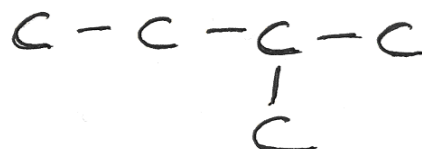


pentane



methyl butane

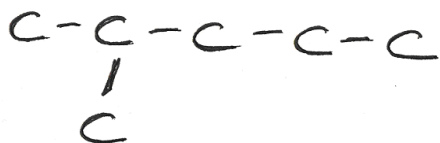
which is identical to



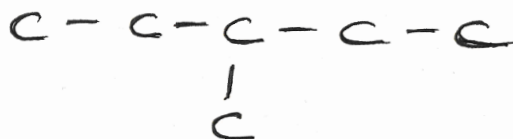
Now, let's do the isomers of C_6H_{14}
Let's start with the straight chain.



hexane

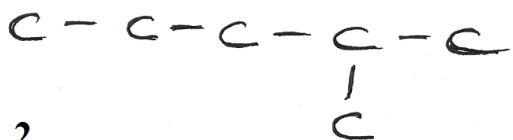


2-methyl pentane



3-methyl pentane

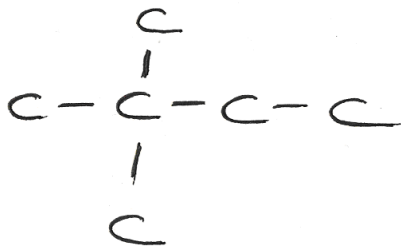
BUT, 4-methyl pentane is not an isomer because you must count from the side that gives you the lowest #'s possible.



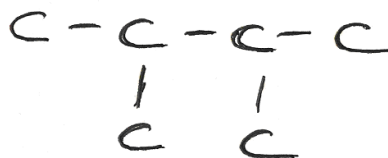
~~4~~
2

~~4~~-methyl pentane

Finally, there are 2 more isomers.



2,2 - dimethyl butane



2,3 - dimethyl butane

Note: Each attachment must get a number even if there's more than one on the same carbon atom.

If you want the steps to doing this, they are:

IUPAC System for Naming Hydrocarbons & their Derivatives:

Steps:

1) Identify the longest continuous chain of carbon atoms and name it indicating the number of carbon atoms and the type of bond between them. This is called the parent chain.

Note: If a double or triple bond is present, it should be included in this chain.

2) Identify the attachments (substituents) attached to the parent chain and name them.

a) For Alkyl groups: CH_3 = methyl, CH_3CH_2 (C_2H_5) = ethyl, C_3H_7 = propyl, etc...

b) For Halogen atoms (Group VIIA) : F = fluoro, Cl = chloro, Br = bromo, I = iodo

3) Indicate how many of each attachment is present using "di " for 2, " tri " for 3 , " tetra " for 4 , etc...

4) Indicate where the attachments are located along the carbon chain by choosing the lowest numbers possible.

Note: a) Each substituent gets numbered.

b) A double or triple bond takes preference in numbering over the positions of any of the attachments.

5) Altogether, list the attachments alphabetically, with the numbers of their positions listed first, followed by the name of the parent chain.

Note: The prefixes " di ", " tri ", " tetra ", do **not** affect the alphabetical order.