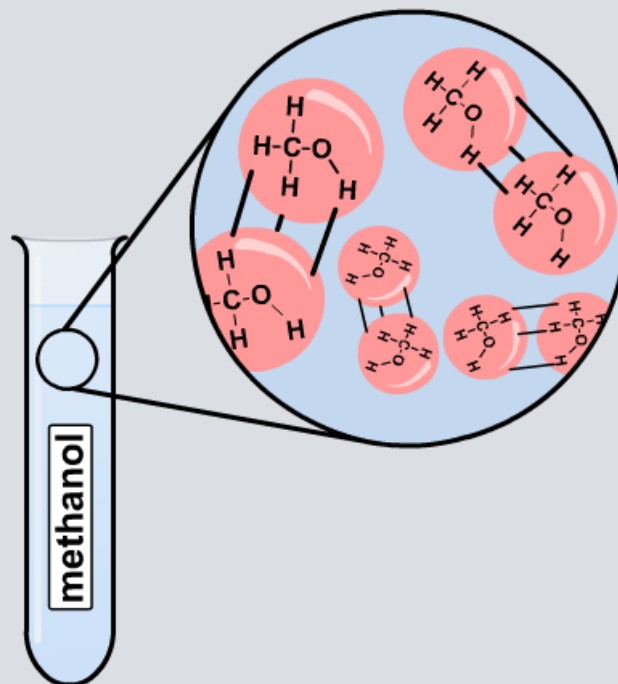


Alcohols

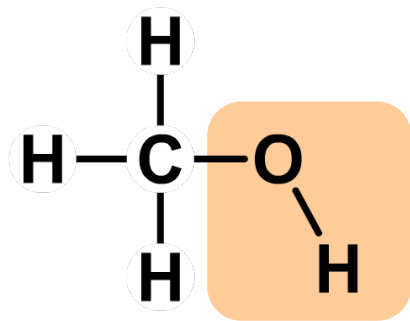


What are alcohols?

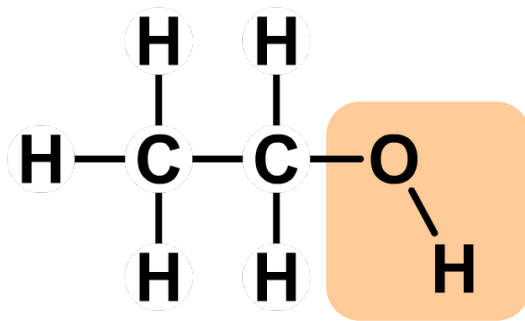
Alcohols are a family of organic compounds that contain carbon, hydrogen and oxygen atoms.

The defining feature of an alcohol is the -OH group.

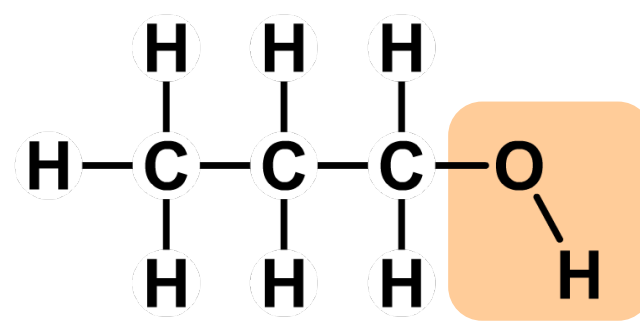
For example:



methanol
CH₃OH



ethanol
C₂H₅OH



propan-1-ol
C₃H₇OH



Boiling point and structure

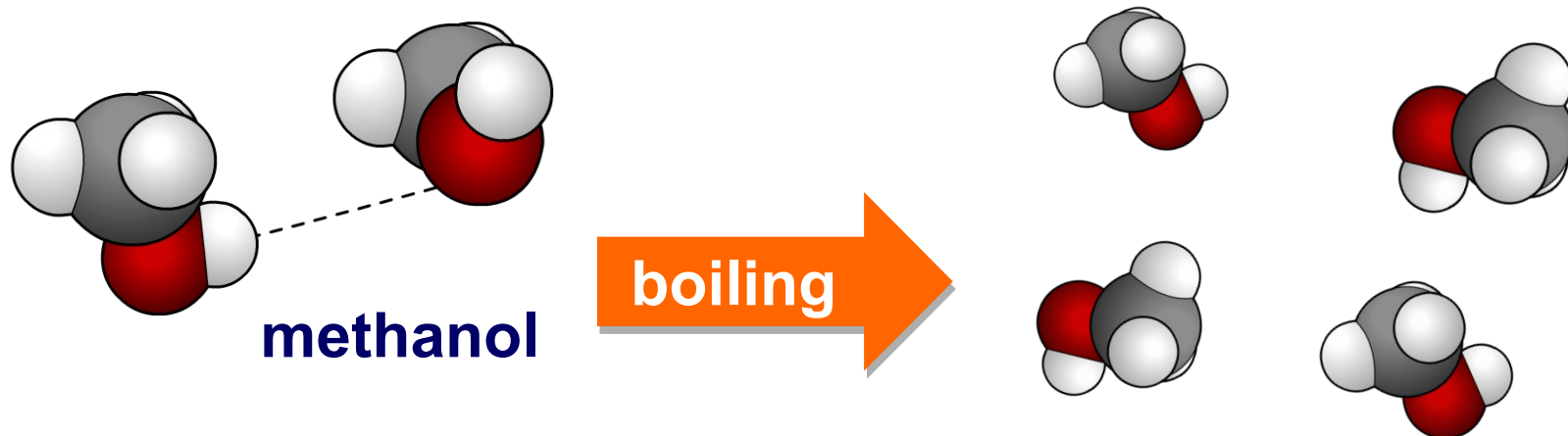
The table below shows the boiling points of the first four alkanes and alcohols. Press "play" to explore this data.

alkane	boiling point
methane	-164 °C
ethane	-88 °C
propane	-42 °C
butane	0 °C

alcohol	boiling point
methanol	65 °C
ethanol	79 °C
propan-1-ol	98 °C
butan-1-ol	117 °C



All molecules are held together by **intermolecular forces**.



These forces must be overcome in order for a substance to turn into a gas (boil).

The intermolecular forces between alcohol molecules are relatively strong because the -OH groups attract each other.

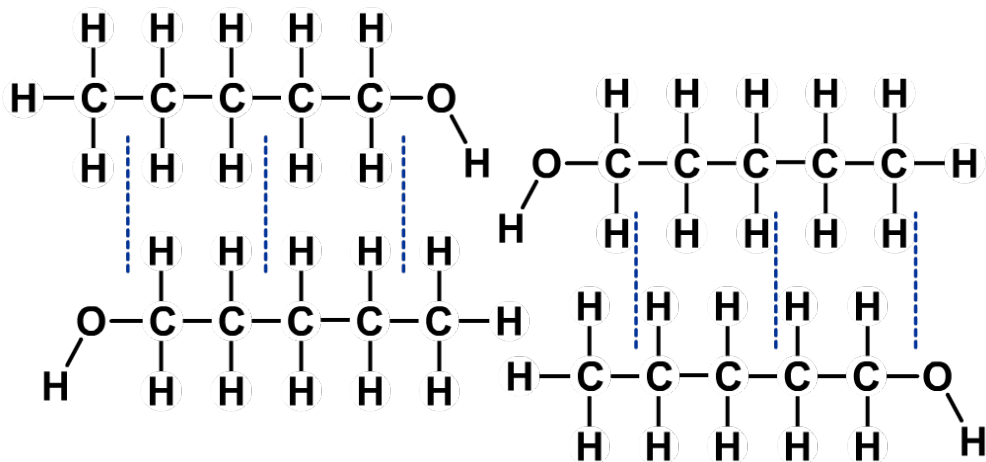
Greater amounts of energy are needed to separate the molecules. This means that alcohols have relatively high boiling points compared to alkanes of the same length.



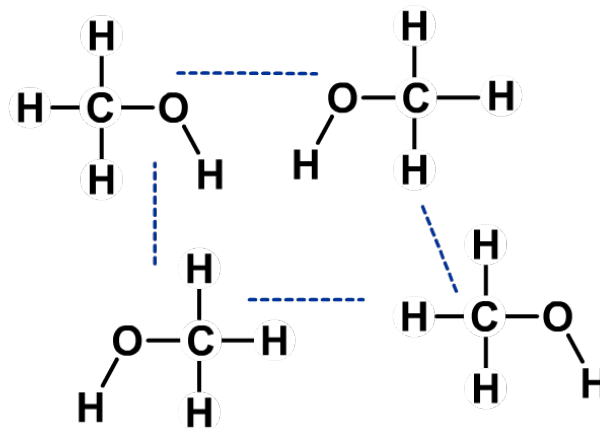
Boiling points: Alcohols vs. alkanes

Boiling points are higher for larger alcohol molecules.

All molecules are weakly attracted to each other. This attraction is stronger between larger molecules than smaller ones, so boiling points are usually higher.



pentan-1-ol: b.p. = 138°C



methanol: b.p. = 65°C

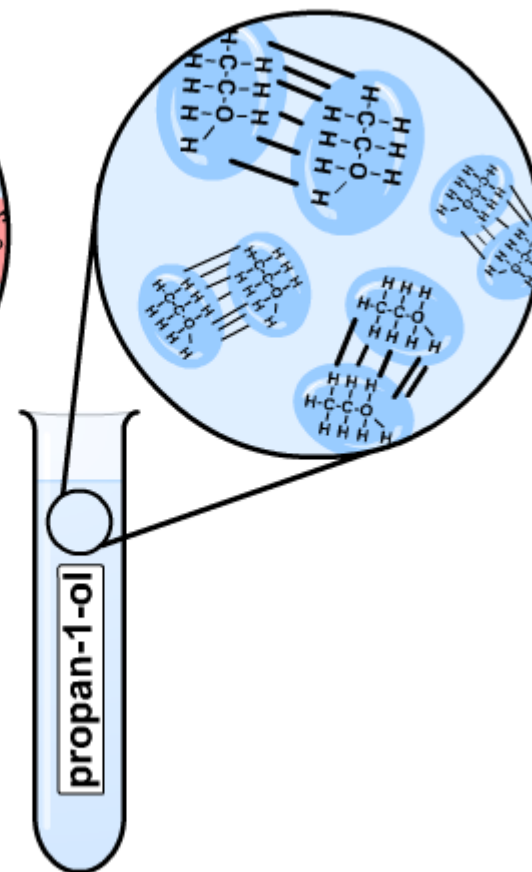
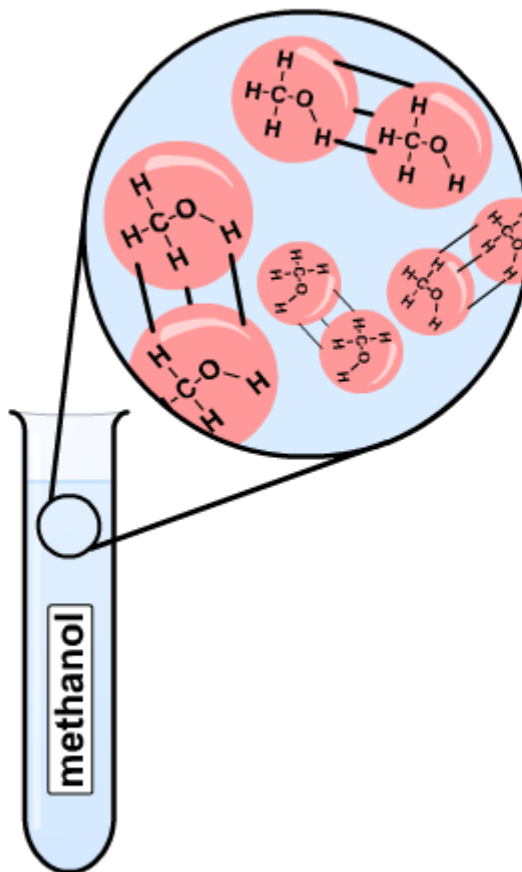
This is true of alkanes as well as alcohols – the longer the carbon chain, the higher the boiling point.



Why do different alcohols have different boiling points?

What happens to molecules of different alcohols when they are heated?

Click "**play**" to find out more.

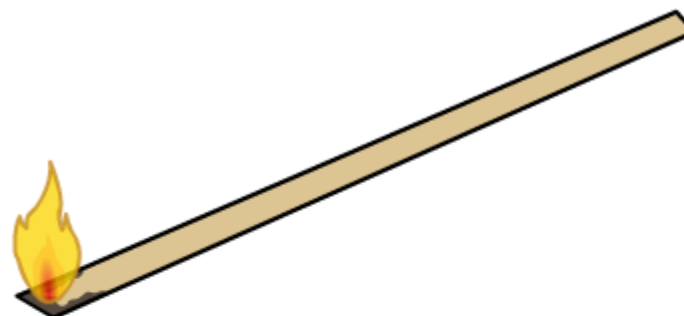


How do alcohols, alkanes and water react?

Reaction with oxygen

Touch the lighted splint onto each dish to see how ethanol, hexane and water react with oxygen.

Press "**start**" to begin.



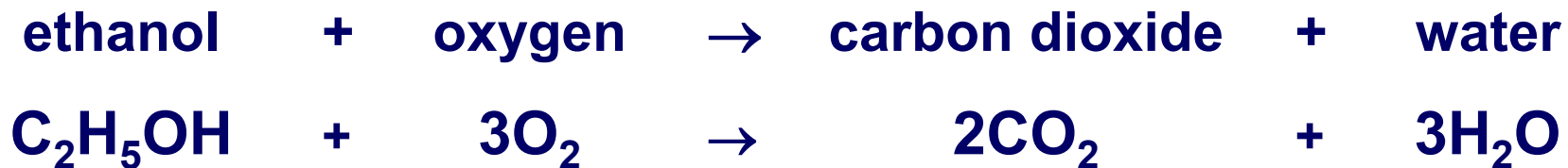
start



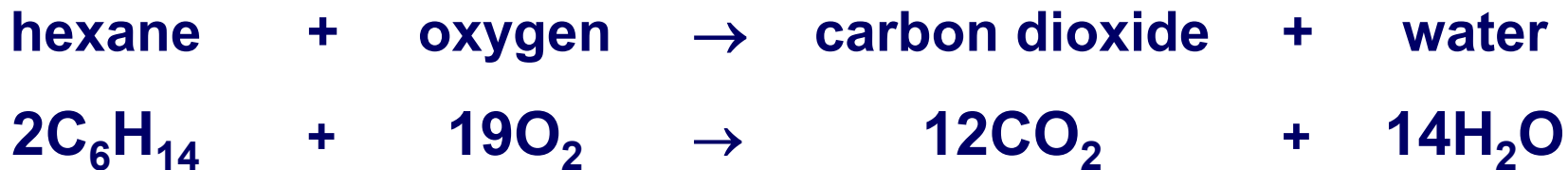
Reaction of alcohols with oxygen

Because alcohols contain hydrocarbon chains, they often react in a similar way to alkanes.

For example, ethanol burns in oxygen to form carbon dioxide and water:



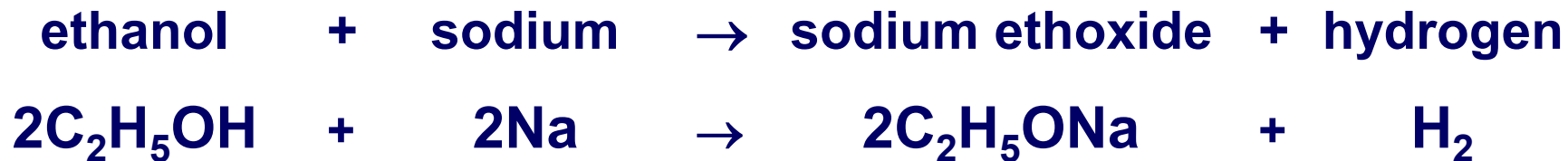
What is the equation for the reaction of hexane with oxygen?



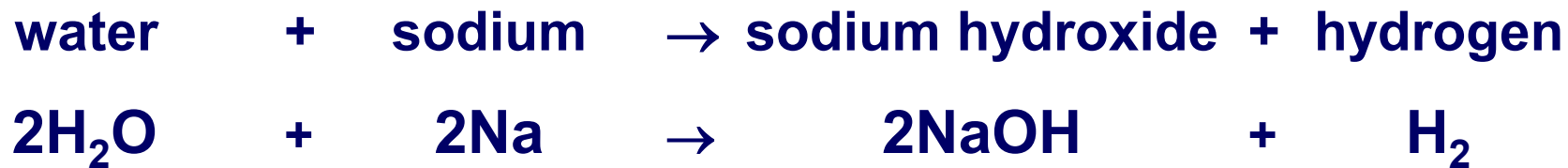
Reactions of alcohols and water

Because alcohols contain an –OH functional group, they often react in a similar way to water.

For example, ethanol reacts with sodium to form sodium ethoxide and hydrogen:



What is the equation for the reaction of water with sodium?



Alcohols: true or false

