

The rate and extent of chemical change

Describe the effect of decreasing the temperature of a system at equilibrium on the relative amount of products for an exothermic reaction.

The effect of temperature changes on equilibrium (HT)

The rate and extent of chemical change

Describe the effect of decreasing the temperature of a system at equilibrium on the relative amount of products for an endothermic reaction.

The effect of temperature changes on equilibrium (HT)

The rate and extent of chemical change

The following reaction is exothermic in the forward direction and endothermic in the opposite direction: $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$. Describe what happens if the temperature is decreased.

The effect of temperature changes on equilibrium (HT)

The rate and extent of chemical change

The following reaction is exothermic in the forward direction and endothermic in the opposite direction: $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$. Describe what happens if the temperature is increased.

The effect of temperature changes on equilibrium (HT)

The rate and extent of chemical change

Describe the effect of decreasing the pressure of a gaseous reaction at equilibrium.

The effect of pressure changes on equilibrium (HT)

The rate and extent of chemical change

Describe the effect of increasing the pressure of a gaseous reaction at equilibrium.

The effect of pressure changes on equilibrium (HT)

The rate and extent of chemical change

Describe what will happen to the equilibrium position if the pressure is increased for the following reaction:
 $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$

The effect of pressure changes on equilibrium (HT)

The rate and extent of chemical change

Describe what will happen to the equilibrium position if the pressure is decreased for the following reaction:
 $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$

The effect of pressure changes on equilibrium (HT)

Organic chemistry

What is crude oil formed from?

Organic chemistry

What is the composition of crude oil?

Crude oil, hydrocarbons and alkanes.

The relative amount of products at equilibrium decrease.

The relative amount of products at equilibrium increase.

The relative amounts of NH_3 will decrease at equilibrium.

The relative amounts of NH_3 will increase at equilibrium.

An increase in pressure will cause the reaction to shift to the side with the smaller number of molecules (from the balanced symbol equation).

A decrease in pressure will cause the reaction to shift to the side with the larger number of molecules (from the balanced symbol equation).

. There are more molecules on the right (4 moles compared to 2 moles) so the reaction will shift to the left (more $\text{N}_2 + \text{H}_2$).

There are less molecules on the left (2 moles compared to 4 moles) so the reaction will shift to the right (more NH_3).

Crude oil is a mixture of a very large number of compounds, mainly hydrocarbons.

Crude oil is the remains of biomass consisting mainly of plankton buried in mud.

Organic chemistry

What are hydrocarbons?

Crude oil, hydrocarbons and alkanes.

Organic chemistry

What type of molecules are most of the hydrocarbons found in crude oil?

Crude oil, hydrocarbons and alkanes.

Organic chemistry

What is the general formula for alkanes?

Crude oil, hydrocarbons and alkanes.

Organic chemistry

Name the first four members of the alkanes.

Crude oil, hydrocarbons and alkanes.

Organic chemistry

What is the formula of methane?

Crude oil, hydrocarbons and alkanes.

Organic chemistry

What is the formula of propane?

Crude oil, hydrocarbons and alkanes.

Organic chemistry

What is a crude oil fraction?

Fractional distillation

Organic chemistry

How can crude oil be separated into fractions?

Fractional distillation

Organic chemistry

How does the petrochemical industry use different fractions?

Fractional distillation

Organic chemistry

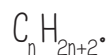
What are the five main crude oil fractions?

Fractional distillation

Alkanes.

Hydrocarbons are molecules made up of carbon and hydrogen only.

Methane, ethane, propane and butane.



Fractional distillation.

Groups of molecules with a similar number of carbon atoms.

Petrol, diesel oil, kerosene, heavy fuel oil and liquified petroleum gas.

The petrochemical industry processes fractions for fuels and feedstock.

Organic chemistry

Name four useful materials produced by the petrochemical industry?

Fractional distillation

Organic chemistry

Why are there are vast array of natural and synthetic carbon compounds?

Fractional distillation

Organic chemistry

Explain how fractional distillation works.

Fractional distillation

Organic chemistry

Name three properties of hydrocarbons which depend on the size of the molecule.

Properties of hydrocarbons.

Organic chemistry

What is viscosity?

Properties of hydrocarbons.

Organic chemistry

Describe how these properties change with increasing molecular size.

Properties of hydrocarbons.

Organic chemistry

What is released by the combustion of fuels?

Properties of hydrocarbons.

Organic chemistry

What two substances are oxidised during combustion?

Properties of hydrocarbons.

Organic chemistry

Write a word equation for the complete combustion of a hydrocarbon.

Properties of hydrocarbons.

Organic chemistry

Write a balanced chemical equation for the complete combustion of methane.

Properties of hydrocarbons.

Carbon atoms have the ability to form families of similar compounds.

Solvents, lubricants, polymers and detergents.

Boiling point, viscosity and flammability.

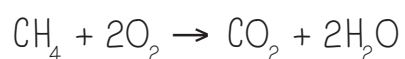
Crude oil is heated until most of it turns to gas. The gases enter the base of the fractionating column. The fractionating column has a temperature gradient. It is hot at the bottom and cool at the top. The longer hydrocarbons have high boiling points so they condense at the bottom of the column. Shorter hydrocarbons have low boiling points so they condense at the top of the column.

As chain length increases, boiling point increases, viscosity increases and flammability decreases.

A measure of how a substance flows (high viscosity = low flow).

Carbon and hydrogen.

Energy.



Hydrocarbon + oxygen \rightarrow carbon dioxide + water.

Organic chemistry

Write a balanced chemical equation for the complete combustion of pentane.

Properties of hydrocarbons.

Organic chemistry

What is cracking?

Cracking and alkenes.

Organic chemistry

Name two methods of cracking.

Cracking and alkenes.

Organic chemistry

Describe the two methods of cracking hydrocarbons.

Cracking and alkenes.

Organic chemistry

What are the products of cracking?

Cracking and alkenes.

Organic chemistry

Compare the reactivity of alkanes and alkenes.

Cracking and alkenes.

Organic chemistry

Describe the test for alkenes.

Cracking and alkenes.

Organic chemistry

Why is cracking required?

Cracking and alkenes.

Organic chemistry

What are alkenes used for?

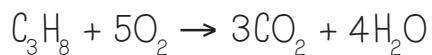
Cracking and alkenes.

Chemical analysis

What is a pure substance?

Pure substances.

The breakdown of hydrocarbons into smaller, more useful molecules.



Catalytic cracking is when long chain hydrocarbons are heated and vapourised. The gas is passed over a catalyst where the long chains are broken down into smaller chains. Steam cracking is when long chain hydrocarbons are heated, vapourised and mixed with steam.

Catalytic cracking and steam cracking.

Alkenes are more reactive than alkanes.

Alkanes and alkenes.

Because there is a high demand for fuels with small molecules.

Orange bromine water is added to the hydrocarbon. The mixture is shaken. It is an alkene if the orange bromine water will become colourless. It is an alkane if the bromine water stays orange.

A single element or compound that is not mixed with any other substance.

They are used to produce polymers and are the starting materials for many chemicals.