

Knowledge check

Subject area: Organic chemistry

Level: 14–16 years (Foundation)

Topic: Cracking hydrocarbons

 Source: rsc.li/2SCxbLL

1. Complete the sentences using some of the words from the box.

fractional	simple	combustion	smaller	sustainable	finite
thermal	petrol	longer	polymers	cracking	

Crude oil is a *finite* resource.

Petrol and other fuels are produced from it using *fractional* distillation.

However, longer chain hydrocarbons are less useful, so *cracking* is used to change long alkanes into *smaller*, more useful hydrocarbons.

Smaller alkanes are formed in the process and these can be very useful for making more *petrol*.

Alkenes are also made, and these can be used for making many *polymers*.

When heat is used to break down hydrocarbons, it is called *thermal* cracking.

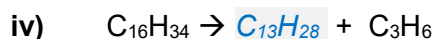
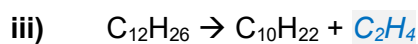
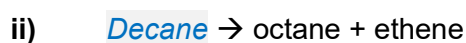
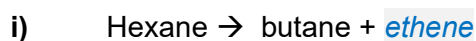
2. When a long chain hydrocarbon is cracked, smaller alkanes and alkenes are produced.

These new molecules are a lot more useful than the original long chain alkane.

a) State a use for these new products.

Smaller alkanes	<i>Answer: Petrol.</i>
Alkenes	<i>Answer: Polymers.</i>

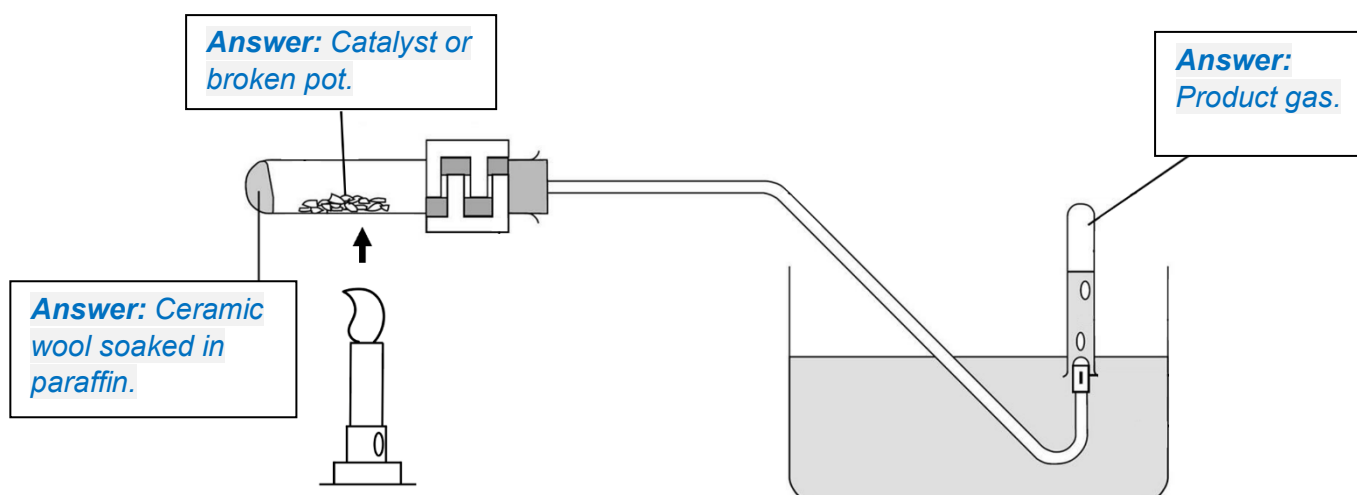
b) Complete the following equations that show hydrocarbons being cracked.



3. Ashley and Diane carry out an experiment to crack some liquid paraffin.

Liquid paraffin is a mixture of straight chain alkane hydrocarbons containing between 5 and 15 carbon atoms in each molecule.

Their equipment is shown below.



a) Label the diagram by filling in the boxes.

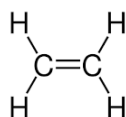
See answers above.

b) Which of the following statements are true or false about this experiment?

Write your answers into the box as 'T' for true, or 'F' for false.

- | | | |
|-------|--|--------------------------------|
| i) | A molecule of formula C_6H_{12} could be present in the liquid paraffin. | <input type="text" value="F"/> |
| ii) | A catalyst is added to increase the rate or speed of reaction | <input type="text" value="T"/> |
| iii) | The paraffin solidifies during the experiment. | <input type="text" value="F"/> |
| iv) | The product gas contains new hydrocarbons. | <input type="text" value="T"/> |
| v) | The product gas contains smaller molecules than those in the paraffin oil. | <input type="text" value="T"/> |
| vi) | A Bunsen burner is used to decompose hydrocarbon molecules. | <input type="text" value="T"/> |
| vii) | A molecule of formula C_2H_4 could be present in the product gas. | <input type="text" value="T"/> |
| viii) | The process taking place is exothermic. | <input type="text" value="F"/> |

c) What is the name of this molecule that is made in this experiment?



Answer: Ethene.