

Worksheet 10.5

Burning hydrocarbons

Methane is the major component of natural gas.

- 1** When the fuel methane is burnt in a Bunsen burner, heat energy is released to the surroundings.
The amount of heat given out from the Bunsen burner is controlled by the position of the air hole.

a Is the flame of a Bunsen burner hottest when the air hole is closed or open?

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b Explain your answer to part a.

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- 2** Methane is part of a group of chemicals called hydrocarbons.

a Which **two** elements do hydrocarbons contain?

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b When any hydrocarbon burns, which **two** chemical compounds are formed?

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- 3** The methane does not burn until it is lit by a naked flame. The energy supplied by the flame is called activation energy.

a Explain what is meant by the term '**activation energy**'.

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b The rate of some chemical reactions can be increased by using a catalyst. Use the idea of activation energy to explain how a catalyst works.

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4 A gas barbecue uses butane (C_4H_{10}) as a fuel. The butane is stored as a liquid in a container. When the burner is turned on, the liquid turns to a gas and is lit by pushing a button to create a small spark.

a Suggest **one** advantage and **one** disadvantage of using butane compared to charcoal as a source of heat.

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b Describe the arrangement and movement of molecules in butane when it is:

i a liquid

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ii a gas

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c What term is used to describe the change of state from liquid to gas?

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d Draw a diagram to show the structural arrangement of the atoms in a molecule of butane.

e How does the structure of butane explain why it has a low boiling point?

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f Explain why a spark is needed to start the butane burning.

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