AQA - The Haber process and the use of NPK fertilisers – GCSE Chemistry

1. May/2020/Paper_8462/2F/No.1.2

Which catalyst is used when ammonia is produced from nitrogen and hydrogen?

[1 mark]

Tick (✓) **one** box.

Chlorine ☐

Iron ☐

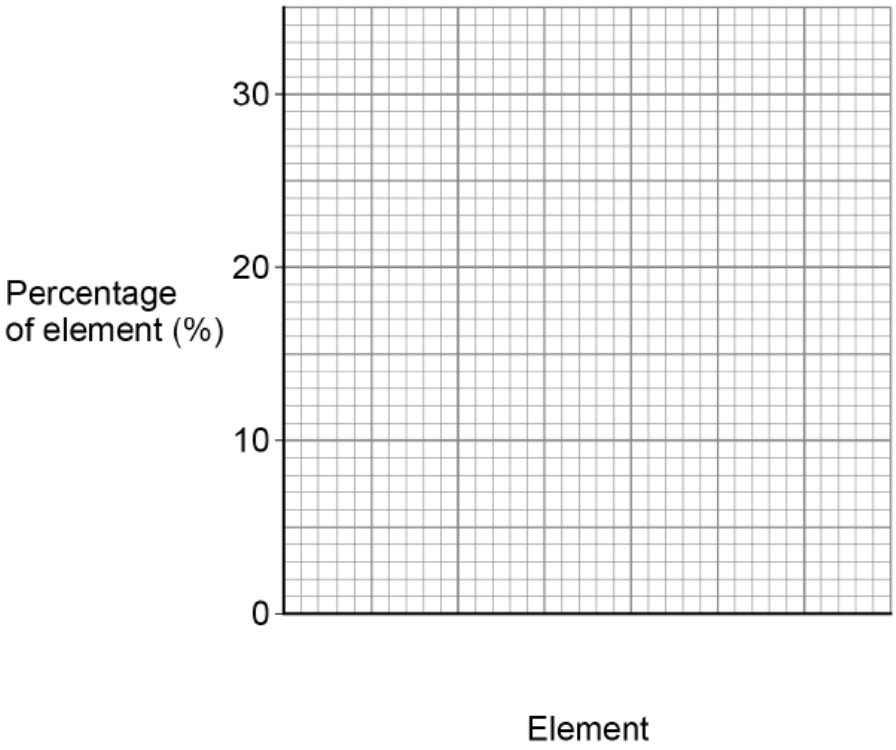
Oxygen ☐

2. May/2020/Paper_8462/2F/No.1.4-1.5

Draw a bar chart on **Figure 2** to show the percentages of phosphorus and of potassium in this fertiliser.

[2 marks]

Figure 2



Why do the percentages of phosphorus and of potassium in this fertiliser **not** add up to 100%?

[1 mark]

3. May/2019/Paper_8462/2F/No.3

Hydrogen is a raw material in the Haber process.

Hydrogen is produced from methane.

The word equation for the reaction is:

$$\text{methane} + \text{steam} \rightleftharpoons \text{carbon monoxide} + \text{hydrogen}$$

How can you tell that the reaction is reversible?

[1 mark]

The forward reaction is endothermic.

Name the type of energy change in the reverse reaction.

[1 mark]

A nickel catalyst is used in this reaction.

Why is a catalyst used in this reaction?

[2 marks]

Tick (✓) **two** boxes.

To increase the temperature ☐

To produce less carbon monoxide ☐

To reduce costs ☐

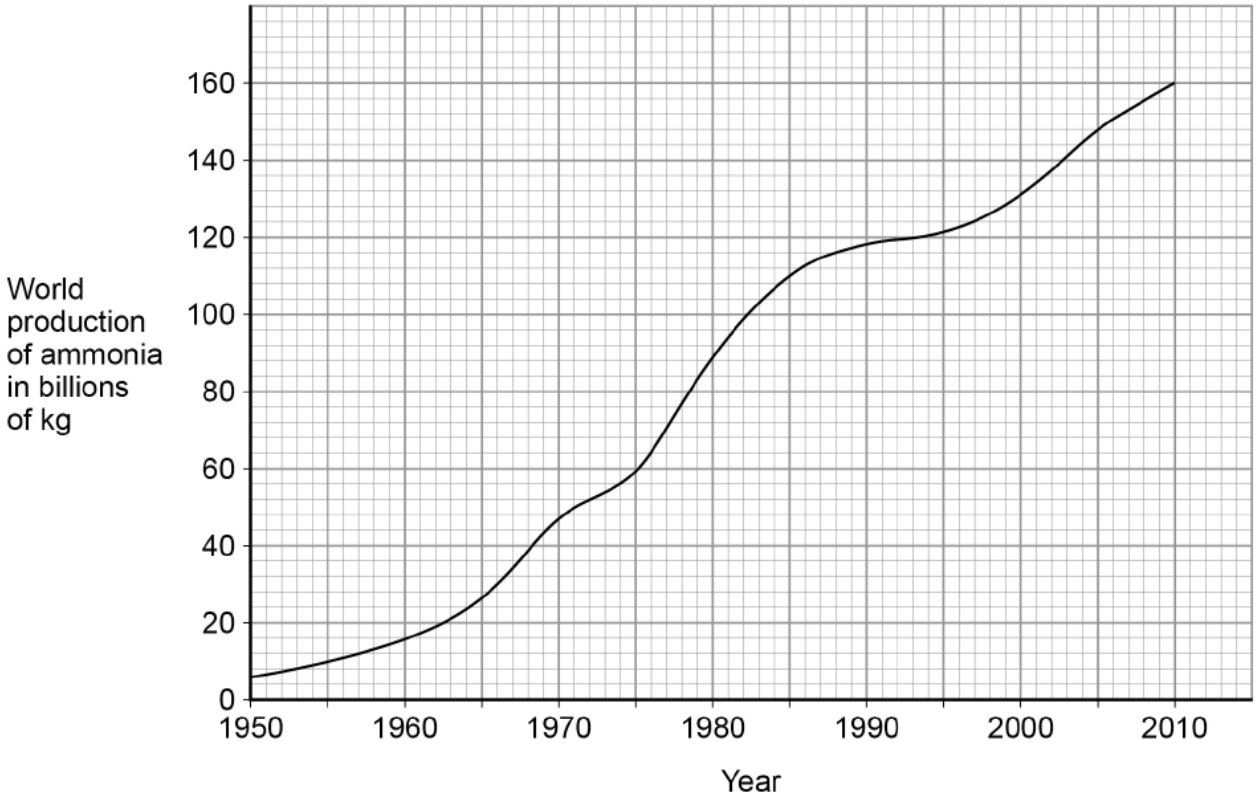
To use less energy ☐

To use less methane ☐

The Haber process also uses nitrogen to produce ammonia.

Figure 1 shows how the world production of ammonia changed between 1950 and 2010.

Figure 1



Describe how the world production of ammonia changed between 1950 and 2010.

[2 marks]

Most of the ammonia produced is used to make fertilisers.

Why did the world production of ammonia change between 1950 and 2010?

[2 marks]

Tick (✓) **two** boxes.

The demand for food changed. ☐

The demand for fuels changed. ☐

The nitrogen percentage in air changed. ☐

The number of cars changed. ☐

The world population changed. ☐

Table 1 shows data about four fertilisers, **A**, **B**, **C** and **D**.

Table 1

Fertiliser	Percentage by mass of nitrogen (%)	Percentage by mass of phosphorus (%)	Percentage by mass of potassium (%)
A	35.0	0.0	0.0
B	21.2	0.0	0.0
C	21.2	23.5	0.0
D	0.0	0.0	52.3

Which combination of fertilisers **A**, **B**, **C** and **D** provides **all** of the elements needed for an NPK fertiliser?

Use **Table 1**.

[1 mark]

Tick (✓) **one** box.

A and **C** ☐

A and **D** ☐

B and **C** ☐

C and **D** ☐

Which fertiliser is **not** made using ammonia?

Use **Table 1**.

[1 mark]

Tick (✓) **one** box.

A ☐

B ☐

C ☐

D ☐