AQA - Electrolysis – GCSE Combined Science Chemistry

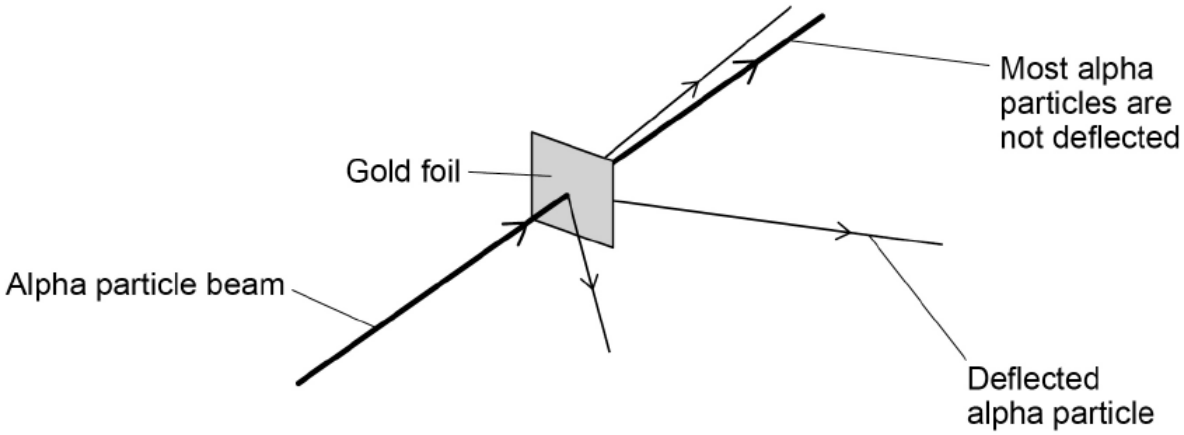
1. May/2020/Paper_8464/1F/No.3.1-3.3

In the alpha particle scattering experiment alpha particles are fired at gold foil.

Alpha particles are positively charged.

Figure 4 shows the results.

Figure 4



Some alpha particles are deflected.

Complete the sentence.

Choose the answer from the box.

[1 mark]

negatively charged	**not charged**	**positively charged**

Some alpha particles are deflected because

the nucleus of the atom is _____.

Why are most alpha particles **not** deflected?

[1 mark]

Tick (✓) **one** box.

The atom is a tiny sphere that cannot be divided. ☐

The atom is mainly empty space. ☐

The electrons orbit the nucleus at specific distances. ☐

What was **one** conclusion from the alpha particle scattering experiment?

[1 mark]

Tick (✓) **one** box.

The mass is concentrated at the centre of the atom. ☐

The mass is concentrated at the edge of the atom. ☐

The mass is spread evenly throughout the atom. ☐

2. May/2020/Paper_8464/1F/No.6.1-6.4

Aluminium is produced by the reduction of aluminium oxide (Al_2O_3).

What is meant by the term reduction?

[1 mark]

Oxygen is formed at the positive carbon electrodes.

Explain why the positive carbon electrodes must be continually replaced.

[3 marks]

A substance conducts electricity because of free moving, charged particles.

What are the free moving, charged particles in a:

- carbon electrode (made from graphite)
- molten mixture of aluminium oxide and cryolite
- metal wire?

[3 marks]

Carbon electrode (made from graphite) _____

Molten mixture of aluminium oxide and cryolite _____

Metal wire _____

3. May/2020/Paper_8464/1H/No.1.2-1.4

Aluminium is produced by the reduction of aluminium oxide (Al_2O_3).

What is meant by the term reduction?

[1 mark]

Oxygen is formed at the positive carbon electrodes.

Explain why the positive carbon electrodes must be continually replaced.

[3 marks]

A substance conducts electricity because of free moving, charged particles.

What are the free moving, charged particles in a:

- carbon electrode (made from graphite)
- molten mixture of aluminium oxide and cryolite
- metal wire?

[3 marks]

Carbon electrode (made from graphite) _____

Molten mixture of aluminium oxide and cryolite _____

Metal wire _____

4. Jun/2019/Paper_8464/1F/No.2.4

Molten copper chloride can be electrolysed.

State the product at each electrode when molten copper chloride is electrolysed.

[2 marks]

Negative electrode _____

Positive electrode _____

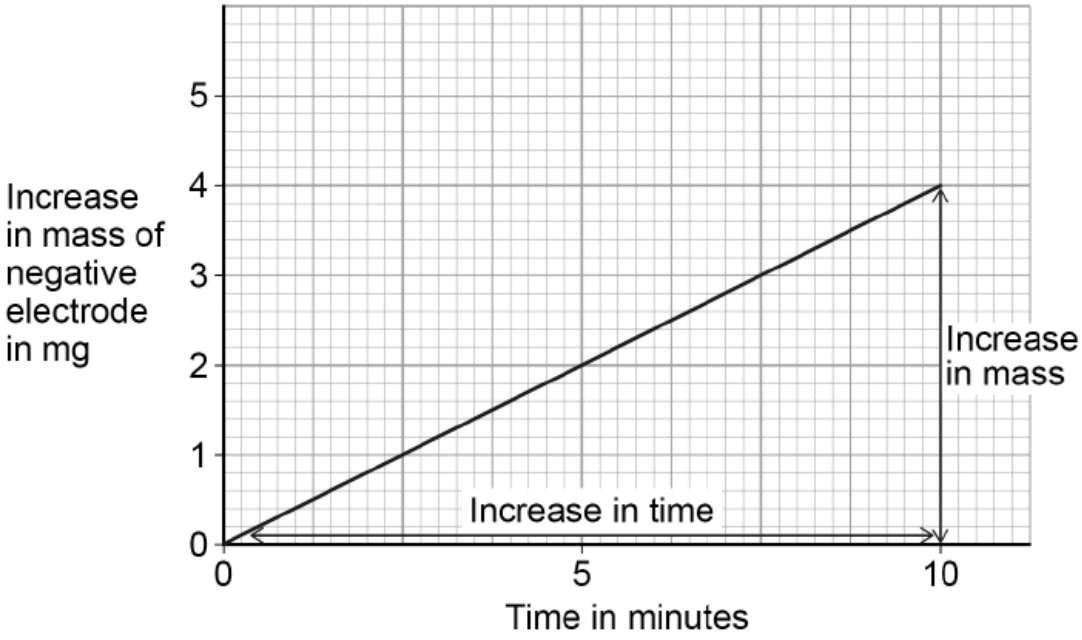
5. Jun/2019/Paper_8464/1F/No.2.5

A solution of copper chloride is electrolysed.

Figure 3 shows a graph of the increase in mass of the negative electrode.

This increase is shown over a time of 10 minutes.

Figure 3



Calculate the gradient of the line in **Figure 3**.

Use the equation:

$$\text{Gradient} = \frac{\text{increase in mass in mg}}{\text{increase in time in minutes}}$$

[3 marks]

Increase in mass _____

_____

Increase in time _____

_____

Gradient _____

_____

_____

_____

Gradient = _____ mg per minute

6. Jun/2019/Paper_8464/1F/No.2.6

Aluminium is produced by electrolysis of a molten mixture.

Complete the sentence.

Choose the answers from the box.

[2 marks]

carbon	**chloride**	**cryolite**	**oxide**	**sulfate**	**water**

The molten mixture contains _____ and

aluminium _____ .

7. Jun/2019/Paper_8464/1H/No.5

This question is about electrolysis.

Some metals are extracted from molten compounds using electrolysis.

Why is electrolysis used to extract some metals?

[1 mark]

_____

_____

Aluminium is produced by electrolysis of a molten mixture.

What **two** substances does the molten mixture contain?

[2 marks]

1 _____

2 _____

Copper and chlorine are produced when molten copper chloride is electrolysed.

Complete the half equation for the reaction at each electrode.

[2 marks]

Half equation at negative electrode

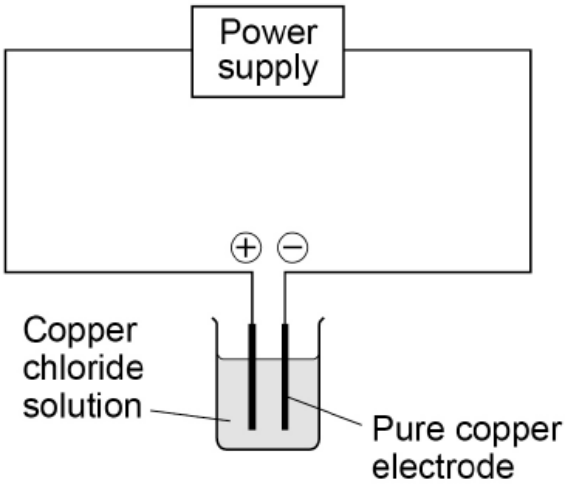
Cu^{2+} _____ $\rightarrow$ _____

Half equation at positive electrode

$2\ Cl^{-} \rightarrow$ _____

Figure 4 shows the apparatus a student used to electrolyse copper chloride solution.

Figure 4



The student:

- measured the mass of copper deposited on the negative electrode after 60 minutes
- compared the mass deposited with the expected value.

Suggest **two** reasons why the mass deposited was different from the expected value.

[2 marks]

1 _____

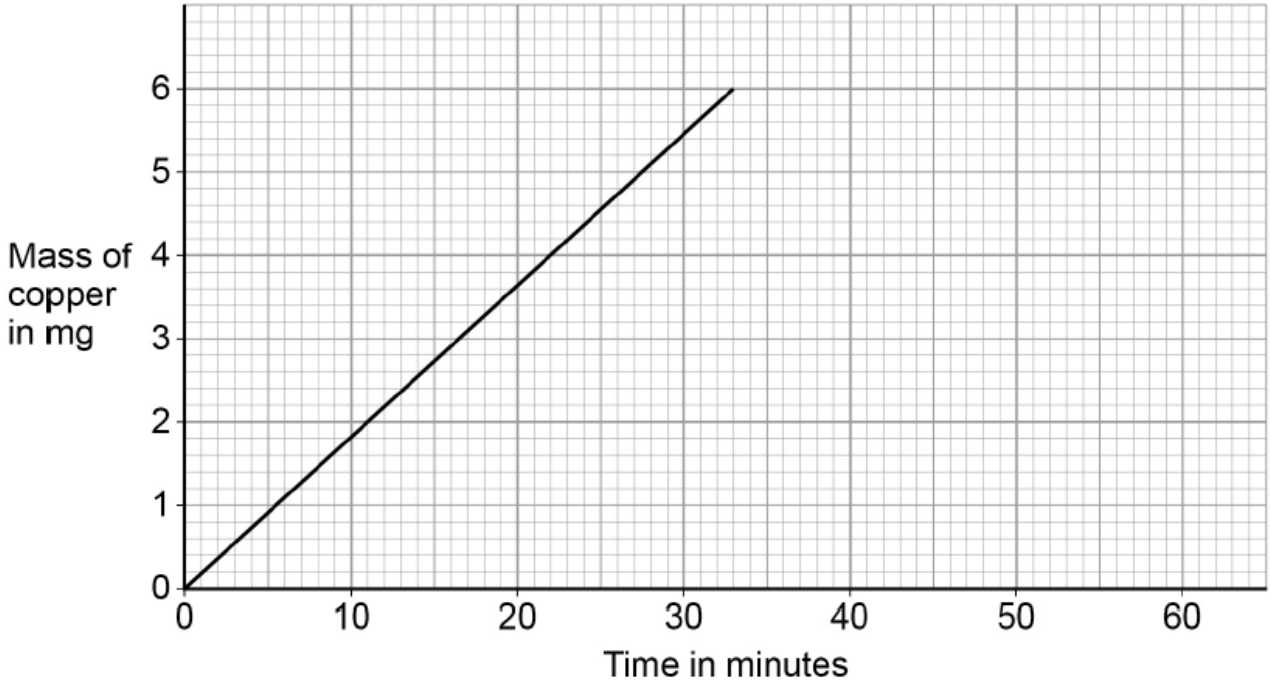
_____

2 _____

_____

Figure 5 shows the expected mass of copper produced each minute.

Figure 5



Determine the expected mass of copper after 24 hours.

Use **Figure 5**.

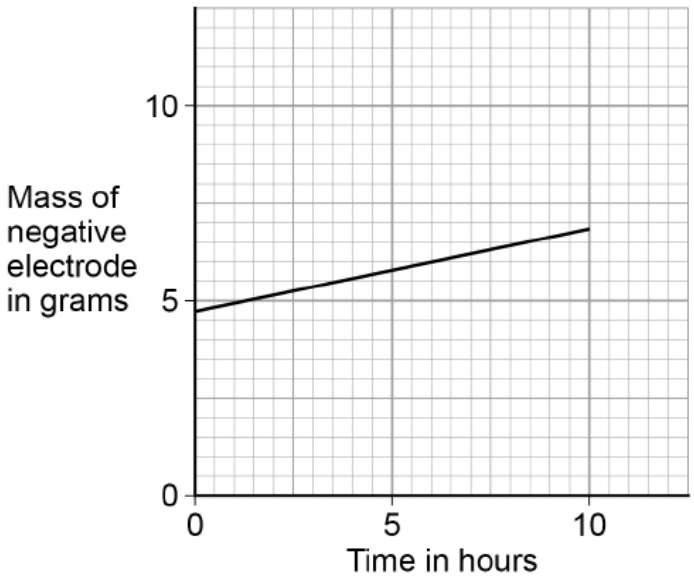
[3 marks]

Mass = _____ mg

Silver nitrate solution is electrolysed.

Figure 6 shows the change in mass of the negative electrode over 10 hours.

Figure 6



Determine the mass of the negative electrode at the start of the experiment.

Use **Figure 6**.

[1 mark]

Calculate the gradient of the line in **Figure 6**.

Give the unit.

[3 marks]

Gradient _____

Unit _____