

12 Aqueous copper(II) sulfate is electrolysed using copper electrodes.

Which statement is correct?

- A Oxygen gas is produced at the positive electrode.
- B The blue colour of the solution gradually fades.
- C The concentration of copper ions in the solution stays the same.
- D The mass of the negative electrode decreases.

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11 Dilute aqueous sodium chloride is electrolysed using platinum electrodes.

What is the half-equation for the reaction at the cathode?

- A $2\text{H}^+ + 2\text{e}^- \rightarrow \text{H}_2$
- B $\text{Na}^+ + \text{e}^- \rightarrow \text{Na}$
- C $2\text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$
- D $4\text{OH}^- \rightarrow 2\text{H}_2\text{O} + \text{O}_2 + 4\text{e}^-$

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10 Which particles are responsible for the transfer of charge in the external circuit during the electrolysis of molten lead(II) bromide?

- A anions
- B atoms
- C cations
- D electrons

12 Concentrated aqueous copper(II) chloride is electrolysed using carbon electrodes.

What is formed at each electrode?

	negative electrode	positive electrode
A	chlorine	copper
B	copper	chlorine
C	copper	oxygen
D	oxygen	copper

3 This question is about electrolysis.

(a) Complete the definition of electrolysis by filling in the missing words.

The decomposition of compounds when
or by the passage of an electric current.

[3]

(b) Electrolysis of aqueous copper(II) sulfate is carried out using the apparatus shown in Fig. 3.1. The electrodes are made of platinum.

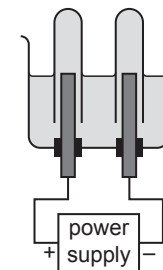


Fig. 3.1

(i) State whether the mass of the cathode increases, decreases or remains the same when platinum electrodes are used.

..... [1]

(ii) Describe the change in appearance, if any, of the electrolyte when platinum electrodes are used.

..... [1]

(iii) Describe what is seen at the anode when platinum electrodes are used.

..... [1]

(iv) Write the ionic half-equation for the reaction at the anode.

..... [3]

(c) The electrolysis is repeated using copper electrodes.

(i) State whether the mass of the cathode increases, decreases or remains the same when copper electrodes are used.

..... [1]

(ii) Describe the change in appearance, if any, of the electrolyte when copper electrodes are used.

.....[1]

(d) Aluminium is extracted from its purified ore by electrolysis.

(i) Name this ore of aluminium.

..... [1]

(ii) Name the substance added to this process to reduce the operating temperature.

..... [1]

(iii) Explain why the anodes need to be continually replaced during this process.

.....

..... [2]

[Total: 15]

13 Three aqueous solutions, L, M and N, are electrolysed using inert electrodes.

L is concentrated hydrochloric acid.

M is concentrated aqueous sodium chloride.

N is dilute aqueous sodium chloride.

Which solutions produce a pale yellow-green gas at the anode?

A L and M **B** L only **C** M and N **D** N only

2 This question is about ionic compounds.

(a) State what is meant by the term ionic bond.

.....

..... [2]

(b) Potassium sulfide, K_2S , is an ionic compound.

Complete the dot-and-cross diagram in Fig. 2.1 of the ions in potassium sulfide.

Show the charges on the ions.

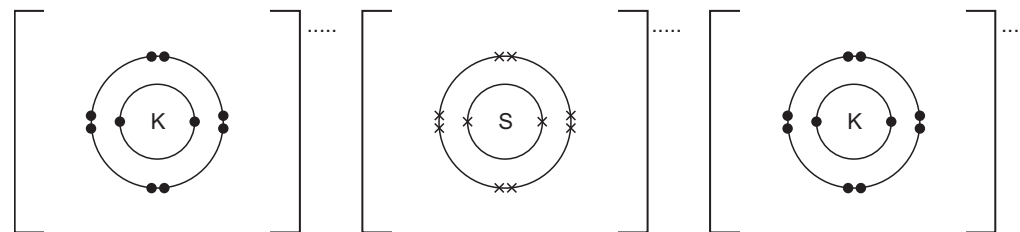


Fig. 2.1

[3]

(c) Ionic compounds form giant ionic lattices.

(i) Fig. 2.2 shows part of the giant ionic lattice structure of sodium chloride.

Complete the diagram in Fig. 2.2 to show the ions present. Use '+' for sodium ions and '-' for chloride ions. One chloride ion has been completed for you.

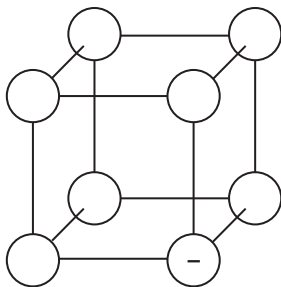


Fig. 2.2

[2]

(ii) State the name given to any positive ion.

..... [1]

(d) Ionic compounds can be decomposed by the passage of an electric current using inert electrodes.

(i) State the name of this process.

..... [1]

(ii) Write the ionic half-equation for the reaction which takes place at the anode when **molten** potassium bromide, KBr, is decomposed by the passage of an electric current.

..... [2]

(iii) Name the products and state the observations at the negative and positive electrodes when **dilute aqueous** potassium bromide, KBr, is decomposed by the passage of an electric current.

product at the negative electrode

.....

observations at the negative electrode

.....

products at the positive electrode

..... and

observations at the positive electrode

.....