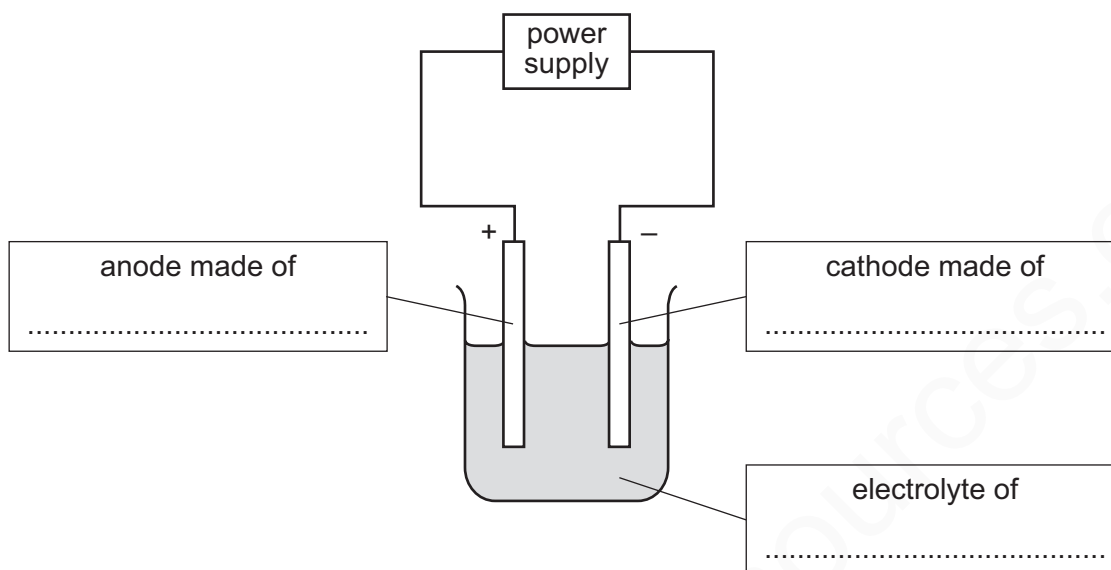


PURIFICATION OF COPPER

1 Copper is refined (purified) by electrolysis. Nickel can be refined using a similar method.

(i) The diagram shows the refining of nickel by electrolysis.

Complete the labels in the boxes.



[3]

(ii) Indicate, by writing **N** on the diagram, where nickel is produced.

[1]

MARKING SCHEME:

(i)	M1 electrolyte aqueous or solution of named nickel salt (1) M2 anode impure nickel (1) M3 cathode pure nickel (1)	3
(ii)	nickel produced at cathode under the liquid surface (1)	1

2

Copper is refined by the electrolysis of aqueous copper(II) sulphate using copper electrodes. Describe the change that occurs at the electrodes.

(i) cathode (pure copper)
.....[1]

(ii) anode (impure copper)
.....[1]

(iii) Write an ionic equation for the reaction at the cathode.
.....[1]

(iv) If carbon electrodes are used, a colourless gas is given off at the anode and the electrolyte changes from a blue to a colourless solution.

The colourless gas is

The solution changes into [2]

MARKING SCHEME:

- (i) copper deposited **or** mass increases [1]
- (ii) copper goes into solution **or** mass decreases [1]
- (iii) $\text{Cu}^{2+} + 2\text{e}^- \Rightarrow \text{Cu}$ [1]
- (iv) oxygen [1]
sulphuric acid accept hydrogen sulphate [1]