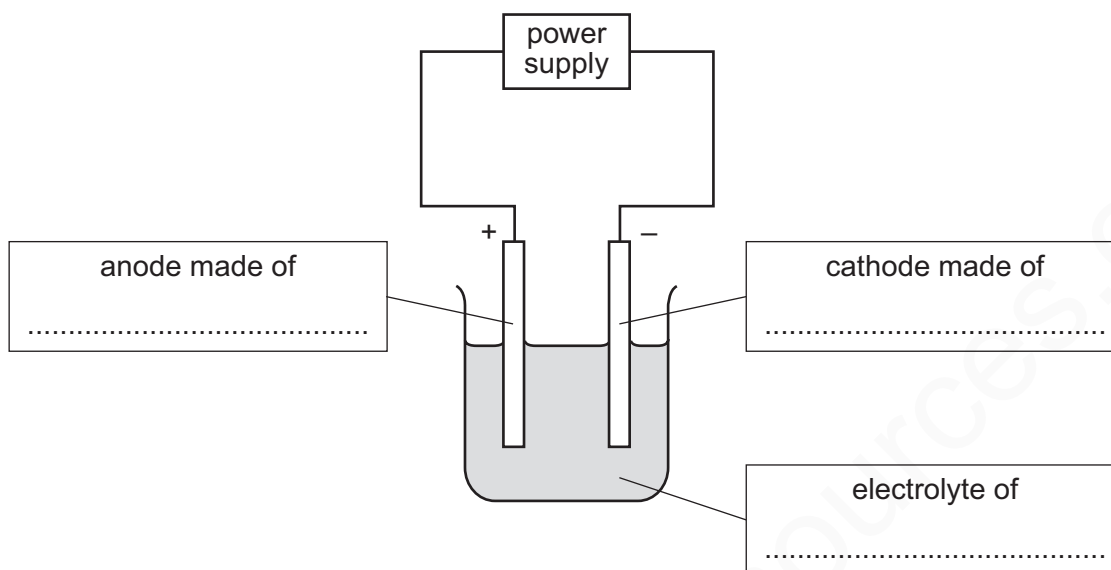


# PURIFICATION OF COPPER

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

## 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)  $\text{Cu}^{2+} + 2\text{e} \rightleftharpoons \text{Cu}$  [1]
- (iv) oxygen [1]  
sulphuric acid accept hydrogen sulphate [1]