

Worksheet 8.4

Energy from metals

When zinc is added to copper sulfate solution, three things are observed:

- ◆ the zinc turns from grey to brown
- ◆ the blue copper sulfate solution becomes colourless
- ◆ the temperature of the solution increases.

1 Explain each observation:

a the change on the zinc surface

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b the change to the copper sulfate solution

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c the temperature rise

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2 Write an ionic equation to show what happens to the zinc atoms during this reaction.

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3 Write an ionic equation to show what happens to the copper ions during this reaction.

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4 Electrons move from the atoms to the ions.

5 If zinc is added to dilute sulfuric acid, what is observed?

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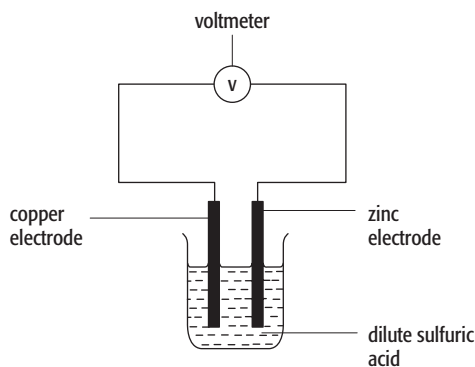
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6 If copper is added to dilute sulfuric acid, what is observed?

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7 If this electrochemical experiment is set up, a reading of 1.1 V is observed on the voltmeter.



a Draw an arrow on the diagram to show in which direction electrons are moving through the circuit.

b What happens to the zinc electrode as the experiment proceeds?

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c Which electrode becomes the negatively charged electrode in this cell?

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d How could the experiment be changed to produce a higher voltage?

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e There is a simple mnemonic to help you apply the names 'anode' and 'cathode' to all types of cell. The mnemonic means that you simply have to remember a 'red cat and an ox'.

Red cat: reduction always takes place at the cathode

An ox: the anode is where oxidation takes place

i Using this, name which electrode is the anode and which the cathode in this cell.

Anode: the electrode

Cathode: the electrode

ii What do you notice about the charges on the anode and cathode in this cell compared to an electrolysis cell?

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