

AIM: To determine whether it is possible to decompose copper chloride using electrical energy.

MATERIALS AND APPARATUS:

- beaker
- cardboard disk large enough to cover the top of the beaker
- two graphite electrodes
- 2 bits of wire
- copper chloride solutions
- 9 volt battery

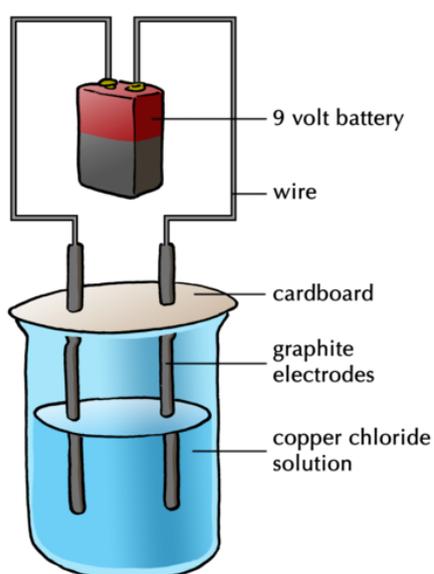
Make the following observations before starting:

What colour is the copper chloride solution?

What colour are the graphite electrodes?

METHOD:

1. Pour the copper chloride solution into the beaker.
2. Make two small holes in the cardboard disk and push the electrodes through the holes as shown on the following diagram.
3. Place the disk over the beaker, so that the greater part of each electrode is under the surface of the solution.
4. Connect the tops of the electrodes to the ends of the battery using the wire lengths. Have a look at the diagram of the experimental set-up.
5. Allow the reaction to proceed for a few minutes and observe what happens.
6. When the reaction has proceeded for approximately 10 minutes, the wires can be disconnected and the set-up disassembled.



The demonstration that your teacher sets up might look something like this.

OBSERVATIONS:

After the reaction had proceeded for a few minutes, what do you observe on the surface of the two electrodes?

One electrode has bubbles

At the end of the experiment, what colour was the copper chloride?

Still blue but less vibrant blue

How did the appearance of the graphite electrodes change?

One remained grey blue and the other went brownish

The electrode attached to the positive side of the battery is the positive electrode and called the anode. The electrode attached to the negative side of the battery is the negative electrode and called the **cathode**.

	The copper chloride solution	Electrode 1 (anode)	Electrode 2 (cathode)
Before the experiment	The solution had an intense blue colour.	Dark grey surface.	Dark grey surface.
After the experiment	The solution was still blue, but the colour was less intense.	Dark grey surface. During the reaction bubbles were observed.	Reddish-brown coating on the surface.

ANALYSIS AND DISCUSSION:

What gave the copper chloride solution its intense blue colour?

Copper chloride

Do you think that some of the copper chloride may have changed into something else during the reaction? Explain why you think so.

Yes

One electrode had bubbles on the electrode

The other electrode had a brownish substance

How would you explain the bubbles on the surface of the first electrode? Do you have any idea what they might have been? Hint: what did the electrode smell like afterwards?

Bubbles mean that a gas formed on the surface of the electrode.

The gas we saw forming at the electrode may have been oxygen gas.

Do you know what the reddish-brown coating on the second electrode is? Hint: Which metal has that same characteristic reddish-brown colour?

Copper (Cu)

How do we know that a chemical reaction has occurred?

You can test by adding a globe to the experiment

Solution changed colour

Gas bubbles formed

CONCLUSION:

Write a conclusion for the investigation. In your conclusion you should rewrite the aim of the investigation into a statement about the findings of your investigation.

It is possible to decompose the compound copper chloride CuCl_2 using electrical energy.

The atoms in copper sulphate were rearranged to make different materials: copper (Cu) and chlorine (Cl_2).