Chemistry

Electrolysis using PolyPocket sleeves:

(Belgium)

Background

Background: It is not possible to obtain reactive metals from their solutions by electrolysis.

When you electrolyse a solution of a highly reactive metal, hydrogen – not the metal is given off at the cathode.

Safety

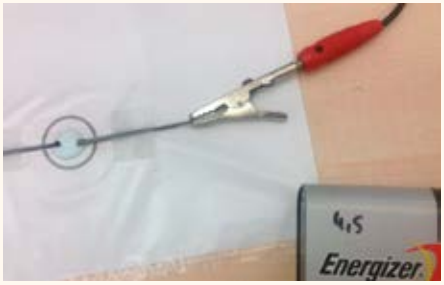
- ✓ Goggles
- ✓ Disposable gloves

You will need...

- ✓ 0.1 M $CuCl_2$ solution
- ✓ 0.2 M KI
- ✓ vegetable oil,
- ✓ a magnifying glass (optional)

Follow these steps

1. Put two pencil leads on the horizontal lines and fix them with sticky paper. Connect these electrodes to a 4.5 V to 9 V battery with crocodile clips.
2. Place a 0.1 M $CuCl_2$ solution in the circle and observe what happens beside the pencil leads.
3. Add a drop of 0.2 M KI solution to the circle and continue the electrolysis.



4. Then add a drop of oil which must touch the drop which has been electrolysed and observe.

So what happened?

Electrolysis of copper (II) chloride solution:

Cathode (negative): $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$

Anode (positive): $2Cl^-(aq) \rightarrow Cl_2(g) + 2e^-$

Redox

Iodide is a good reducing agent. It reduces copper from a +2 oxidation state to a +1 oxidation state.

$2CuCl_2 + 2KI \rightarrow 2CuCl + I_2 + 2KCl$

The presence of C=C double bonds in the oil can be detected by iodine; the more double bonds there are, the more iodine is used up.

What next?

Nature of covalent or ionic compounds, relative molecular mass and stoichiometry