

PRE-LAB DISCUSSION

The electroplating of objects with a metal M is carried out in an electrolytic cell using a M solution and a M anode. The quantity of electric charge transferred through an electrolytic cell is determined by measuring the time and the current. The relation is $Q = I \times t$.

Knowing the mass of the metal and the required number of electrons, it is possible to find the number of electrons needed to deposit a mole of metal. Finally, by relating the number of electrons associated with the deposition of one atom/ we can calculate the number of atoms per mole.

PURPOSE

To plate the surface of the key with copper.

EQUIPMENT

balance
glass rod
copper electrode

beaker
key

MATERIALS

1 M CuSO_4
ethyl alcohol
dilute NaOH
D.C. power
alligator clips

concentrated H_2SO_4
dilute HNO_3
distilled water
copper wire

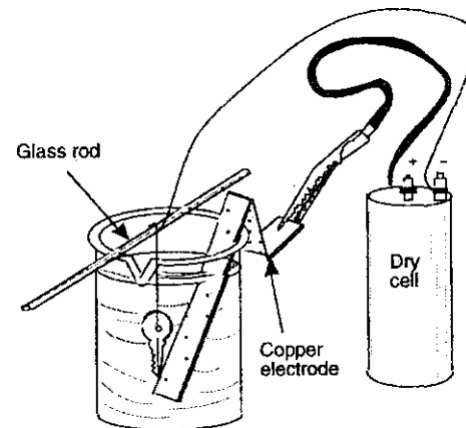


figure 1

PROCEDURE

1. Add 30g CuSO_4 into a beaker add 200 mL of distilled water and dissolve the copper sulfate. Then add 7 mL of H_2SO_4 and 11 mL of ethyl alcohol. Clean the key by washing with dilute NaOH solution, then rinsing with dilute HNO_3 solution. Avoid touching the object with your fingers.
2. Set up the apparatus as shown in the figure 1.
3. Bend the upper part of the copper electrode. Be certain that the key is completely submerged. Do not allow it to contact the copper strip.
4. Remove both electrodes from the solution. Rinse, dry, and polish the object with chalk dust.

CONCLUSIONS AND QUESTIONS

1. Write the anode and cathode reactions.
2. How could you remove the copper plat from your key? **a)** Electrically? **b)** Chemically?
3. Write your observations shortly