

## PRE-LAB DISCUSSION

Electrical energy is easy to produce, and easy to transport from one place to another. It does not cause any environmental pollution either. Therefore it is frequently used in science in the extraction of many metals from their ores, and in the decomposition of many compounds into their constituent substances.

In electrolysis, the electricity is applied to the liquid by means of the metals immersed in to the water. These metals are called electrodes. The substance that will be decomposed is called electrolyte.

Water can be decomposed by passing electricity through it. In this experiment, you decomposed water into two different gases the oxygen gas that supports burning, and the hydrogen gas that is flammable.

## PURPOSE

To decompose water into simpler substances making use of electricity.

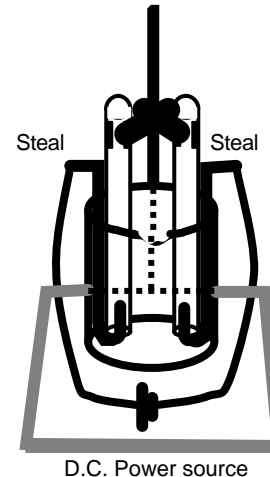
## EQUIPMENT

a beaker (250 ml)  
two steel electrodes  
four crocodiles  
a stirring rod  
a box of matches  
two claps

two identical test tubes  
two pieces of wires (30-40 cm)  
a battery (4.5 V)  
a piece of wood splint  
a ring stand  
a graduated cylinder (10-20 ml).

## MATERIALS

sodium carbonate



## PROCEDURE

1. Fill the beaker about  $\frac{2}{3}$  full of water.
2. Completely fill the test tubes with water. Close the mouth of the first test tube with your finger, and invert it into the water in the beaker. Leave it inverted in the water. Repeat the same procedure for the second test tube.
3. Set up the figure above.
4. After completing the circuit by connecting the electrodes to the battery, observe if any changes are taking place on the surface of the electrodes.
5. Add a few crystals of sodium carbonate to the beaker, dissolve it by stirring. Observe the rate of formation of gas bubbles on the electrodes. Now add a tea spoon full of sodium carbonate to the water and dissolve it. Observe changes taking place at each electrode.
6. Continue your experiment until one of the test tubes is completely full of the gas. As soon as it is filled with the gas completely, open the circuit by disconnecting one of the crocodiles from the battery.
7. Notice the volumes of the gases in each of the test tubes. Release the clamp holding test tube that has less gas. Move it or down into the water so that the levels of water inside and outside of the test tube are equal. Make a mark showing the volume of the gas on the test tube by using grease pencil. Guess the ratio of the volumes of gases collected.
8. Identify the collected gases in each test tubes with suitable methods.
9. Now fill the test tube containing the hydrogen gas with water. Transfer the water into a graduated cylinder, and measure its volume. Fill the test tube containing the oxygen gas with water up to the mark. Measure the volume of the water in the test tube.

## CONCLUSION AND QUESTIONS

1. What is the chemical reaction of this experiment?
2. Divide the volume of the hydrogen gas to that of the oxygen. What is the ratio?
3. What did you do to increase the conductivity of water? What substances can be used instead of sodium carbonate?
4. How is the ratio affected by
  - a) the quantity of water electrolyzed?
  - b) the quantity of sodium carbonate dissolved in water?
  - c) the duration of electrolysis?