

Electrolysis Apparatus

C6-0440



BACKGROUND:

Electrolysis is the use of an electrical current through a cell to produce a chemical change that would otherwise not occur spontaneously. In the most common example used in the science classroom, electrical current is used to decompose liquid water into hydrogen and oxygen gases. Hydrogen gas is produced at the cathode (positively charged electrode) and Oxygen gas is produced at the anode (negatively charged electrode). Because the formula of water is H_2O , twice as much volume of hydrogen gas is produced. Pure liquid water is an extremely poor conductor of electricity, so an electrolyte must be added to allow ions to flow in the cell. An electrolyte is a substance that will conduct an electrical current when dissolved in water to form a solution. Salts and acids are examples of electrolytes.

KIT CONTENTS:

- 1 plastic water bath with two stainless steel electrodes
- 1 plastic tweezers
- 2 gas trapping tubes with graduations

SAFETY INFORMATION:

Warning: When using the Genecon to separate water into hydrogen and oxygen in the electrolysis of water experiment, be sure that the user turns the handle in only one direction. Turning the handle in both directions will create hydrogen and oxygen in both test tubes. ***This is an explosion hazard and is extremely dangerous.***

Follow the safety guidelines on the container if an acid or base is used as the electrolyte. Dispose of the acid or base solution properly.

ACTIVITIES:

Electrolysis of water:

1. Pour dilute (5%-10%) sodium hydroxide solution into the water bath up to about 1 cm above the tips of the electrodes.
2. Grip a tube with the tweezers and immerse the tube in the solution horizontally and fill it completely with solution.
3. Place the tube over an electrode without lifting the mouth above the level of liquid. The mouth should be down and the tube filled with solution.
4. Repeat for the other tube and the other electrode.
5. After both tubes are placed over the electrodes, connect each of the metal electrodes protruding beneath the bath to a terminal of a DC power supply, battery, or Genecon. Connect one electrode to the positive (+) terminal and the other to the negative (-) terminal.
6. Apply a voltage (4V-10V) to the electrodes. The positive electrode will produce hydrogen gas and the negative electrode will produce half as much oxygen gas.

NOTES:

- If dilute sulfuric acid is used instead of sodium hydroxide, the electrodes will be slightly corroded and oxygen is produced in a slightly different ratio than the normal 1:2.
- Epsom Salts can be used if sodium hydroxide is not available.
- You can use the standard lighted splint test for hydrogen and the glowing splint test for oxygen. Wear appropriate safety equipment and use caution.

RELATED PRODUCTS:

The **Genecon** hand generator (P6-2631) can be used for many electrical experiments, including electrolysis.

The **Lead Acid Storage Battery** (P6-8005) can be charged with the Genecon to show electrochemical reactions and storage.

