NAME _____ PREF ____ SECTION SC_____ DATE _____

EXPERIMENT 10: ELECTROLYSIS OF BRINE

Equipment: litmus paper, "U" tube, graphite electrodes
Materials: 15% NaCl

This experiment will show what chemical reaction takes place and what products are formed when an electric current (D.C.) is passed through a solution of common salt.

A. Fill a "U" tube with a solution of 15% NaCl to within an inch of the top. Drape a long strip of red litmus paper over the edge of each arm. Lower the Block holding the carbon electrodes into the arms of the "U" tube and connect the electrodes to the source of the current. Let the current pass through the solution for a few minutes, and then observe any changes in the color of the litmus. **(Note which electrode is positive and which is negative.)**

1. What ions must be formed in the solution at the negative electrode as shown by the litmus?

2. Name the gas which is being liberated at the cathode.

B. Cautiously note the odor of the gas given off at the positive electrode. **(Teachers: remind students about how to smell substances safely.)**

3. Name the gas which is being liberated at the anode.

4. How does this explain the change in color of the litmus at the positive electrode?

5. Why is this gas being liberated at the anode and not at the cathode?

6. Use Table L in your Reference Tables to write the half reactions taking place at each electrode.

7. Name the oxidizing and reducing agents in the reaction.

C. **TEACHER DEMONSTRATION.** Repeat Part A using a solution of potassium iodide (KI).

8. Note the color of the substance given off at the positive electrode.

9. Place a piece of bread or other starch in the solution around the positive electrode. What happens? What substance must be present?
10. Use Table L in your Reference Tables to write the half- reaction taking place at each electrode.

CONCLUSIONS

11. In the electrolysis of brine, ... and ..... are produced at the cathode and ..... is produced at the anode.

12. In the electrolysis of KI solution, ... and ..... are produced at the cathode, and ..... is produced at the anode.

13. The process of ..... takes place at the anode. The process of ..... tales place at the cathode.

DIAGRAM