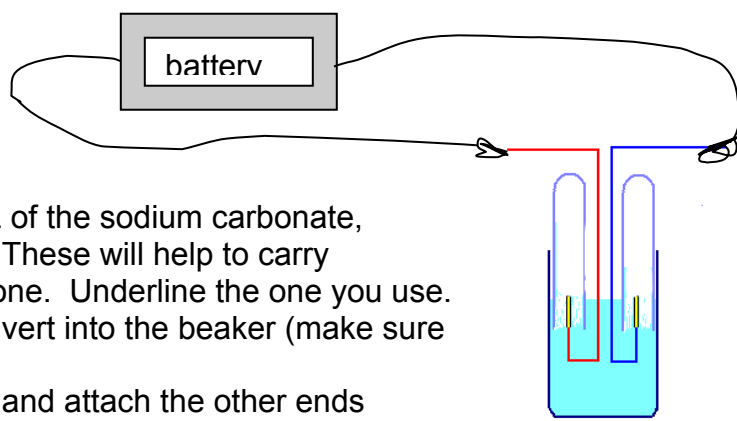


**Title: Electrolysis of Water**

**Introduction:** H<sub>2</sub>O is probably the most well known chemical formula in the world. Most of us become familiar with it at an early age. What most of us do not know is what it really stands for and how those elements are very different from the water that they form. In this lab activity you will break the water molecules into their parts and then test the flammability of each gas.

**Materials:** water, two test tubes, 400 mL beaker, wooden splint, electrodes (purchased or use two pencils sharpened at both ends) sodium hydroxide, sodium carbonate, dilute sulfuric acid. Phenolphthalein (optional)

**Prediction:** What gasses will form when water molecules are split and in what amounts?

**Procedure:**

1. Clip a wire to one tip of each electrodes.
2. Fill the beaker with water and add 20 mL of the sodium carbonate, sodium hydroxide or sulfuric acid solution. These will help to carry the electric current. Do not add more than one. Underline the one you use.
3. Fill the test tubes with the solution and invert into the beaker (make sure no air is inside the test tubes).
4. Place an electrode inside each test tube and attach the other ends of the wires to the battery.
5. Observe the gas collecting at the top of the jars.
6. After 30 min. disconnect the electrodes and test for the presence of H<sub>2</sub> and O<sub>2</sub>
7. The addition of some phenolphthalein indicator to the solution will determine which electrode is the cathode. A pink color around the cathode will be seen due to the production of hydroxide and hydrogen.

**Test for H<sub>2</sub>**

1. Remove the jar from the water and keep it inverted.
2. While holding a match or burning splint in the tongs light it and place it in the mouth of the jar containing the hydrogen.
3. A popping sound indicates hydrogen is present.

**Test for O<sub>2</sub>**

1. Remove the jar and cover with the lid (cardboard) quickly.
2. Turn the jar right side up (a small amount of water in the jar is O.K.).
3. While holding a match or splint in tongs, light it and then blow it out.
4. Remove the lid from the jar and place the smoldering match in the jar.
5. If the match glows then oxygen is present.

**Data:**

Draw the resulting test tubes:

Label the hydrogen and oxygen:

Results of flame tests:

**Analysis:**

1. What does the chemical formula of water represent?
2. How are the chemical properties of water different from the hydrogen that it is made of?
3. How are the physical properties of water different from the oxygen that it is made of?
4. How are the chemical properties of water different from the hydrogen that it is made of?
5. How are the physical properties of water different from the oxygen that it is made of?
6. The formula for hydrogen peroxide is  $\text{H}_2\text{O}_2$ . What results would you expect from electrolysis of this substance?

**Conclusion:**