

# 1011 THE REACTION OF CALCIUM WITH WATER

## **Lab Notebook Outline** **(Write the following in your lab notebook)**

### **Introduction**

- Title
- Purpose -State the problem/ questions clearly substantiate the question and explain the reason for the investigation?
- Theory (Refer to this handout, and anything you find in your book or online)

### **Materials and Methods**

- Procedure (Refer to this handout). Labs must have noted any procedural changes. Give explicit details of methods and give precise quantitative directions. Make sure modifications stated in lab report

### **Results**

- Written results section

### **Discussion and Conclusion**

- Explain all calculations which produced data in data table
- Answers to questions written in complete sentences with question stated in answer (Refer to Handout stapled in lab notebook)
- Explanation of data and results
- All calculations using data

### **Figures Data Tables**

- Data must have numbers with descriptive units in correct significant figures

Part I: Collecting the Gas

1. Put on Safety Goggles, restrain long hair.
2. Obtain: 3 test tubes, 3 stoppers, a 600 ml beaker, and a 400 mL beaker. Half fill the 600 mL beaker with tap water. Place a piece of tape around each test tube (the tape should go all the way around the tube so that one end sticks to the other end – this will keep the tape in place even when the test tubes get wet). With a ballpoint pen, label the test tubes “1”, “ $\frac{1}{2}$ ”, and “ $\frac{1}{4}$ ”.
3. Fill the “1” tube to the top with tap water. Fill the “ $\frac{1}{2}$ ” tube half way with water and the “ $\frac{1}{4}$ ” tube one quarter full of water. Stopper the tubes. (See illustration to the right).
4. Place the stopper end of each tube under the water in the 600 mL beaker. Remove the stoppers without allowing any water to escape from the tubes (this is most easily done using crucible tongs).
5. Ask your teacher to place some calcium into your beaker. Collect the resulting gas by displacing the water in the tubes. If you have trouble seeing the calcium, lift the beaker up and view it from the bottom. Fill each tube with gas but do not let the tubes bubble over (this could affect your results). (Watch the teacher DEMO)
6. Stopper each tube by placing a stopper in the bottom of the beaker (using tongs) and pushing the open end of the tube over the narrow end of the stopper. Try to get as little liquid in the test tubes as possible.
7. Stand the tubes up in the 400 mL beaker. Dump the water from the 600 mL beaker into the sink.

Part II: Testing the Gas

1. Clear the lab bench around the Bunsen burner (or you can use matches).
2. Remove the stopper from the “1” tube and quickly place the opening of the tube at the edge of the flame (keep a firm grip on the tube).
3. Repeat for the “ $\frac{1}{2}$ ” tube and then for the “ $\frac{1}{4}$ ” tube.
4. When finished, remove the tape from your test tubes and throw it in the garbage. Wash out the glassware, wipe down your lab bench, and return all equipment.

Test tube	pressure	H <sub>2</sub> :Air ratio	H <sub>2</sub> :O <sub>2</sub> (ratio)
<b>1</b>			
$\frac{1}{2}$			
$\frac{1}{4}$			

Questions (answer in your lab journal)

1. List the seven elements that naturally occur as diatomic molecules
2. Write the balanced chemical equation for the reaction of Ca + H<sub>2</sub>O.
3. What gas was given off by Ca and collected in the test tubes?
4. Write the balanced chemical equation showing hydrogen and oxygen combining to form water (keep in mind that hydrogen and oxygen are diatomic molecules).
5. What is the ideal mole ratio of H<sub>2</sub>:O<sub>2</sub> (where all hydrogen and oxygen are used up)?
6. If the outside pressure was 760 mm Hg, and water’s density is 1.00g/ml & Mercury’s density is 13.6g/ml. What is the pressure inside the tube if you collect: 24ml Gas, 12ml gas, 6ml gas