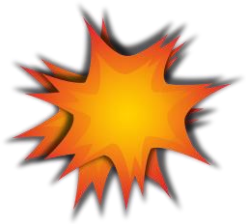
Name: _____ Period: _____ Date: _____

Chemistry of Gases Lab Activity – Student Edition

Making Hydrogen



Background Information:

Hydrogen is a colorless gas which is at least 15 times lighter than any other substance. It is a highly reactive and explosive gas. The sun and stars consist mainly of hydrogen gas and it has been estimated that about 90% of the universe is made up of hydrogen. Hydrogen was also used in airships in the 20th century due to its light nature, however after the Hindenburg disaster in 1937, airships quickly lost their popularity. Today hydrogen has been replaced by helium in modern airships because it is unreactive.

In the presence of a flame hydrogen reacts so rapidly with the oxygen in the air that it explodes to produce water. This forms the basis for the hydrogen pop test and is the same reaction utilized in hydrogen fuel technology. Unlike petrol it produces zero carbon emissions and is deemed much better for the environment.

Learning Objectives

By the end of this lab, you will be able to:

1. Make and test hydrogen gas.
2. Describe the properties of hydrogen gas.

Time allowance:

60 mins

Part 1: Teacher Demonstration

Watch the hydrogen gas demonstration completed by your teacher and record your observations in the space provided on page 2 of this lab activity.

Part 2: Student Activity

Equipment:

• 250ml Conical flask • 2 x 10ml measuring cylinders • Delivery tube with stopper • Water tub/basin • Ring stand with clamp	• Zinc metal pieces • Dilute hydrochloric acid (2M) • Cold water • Tapers/ wooden splints • Matches or lighter

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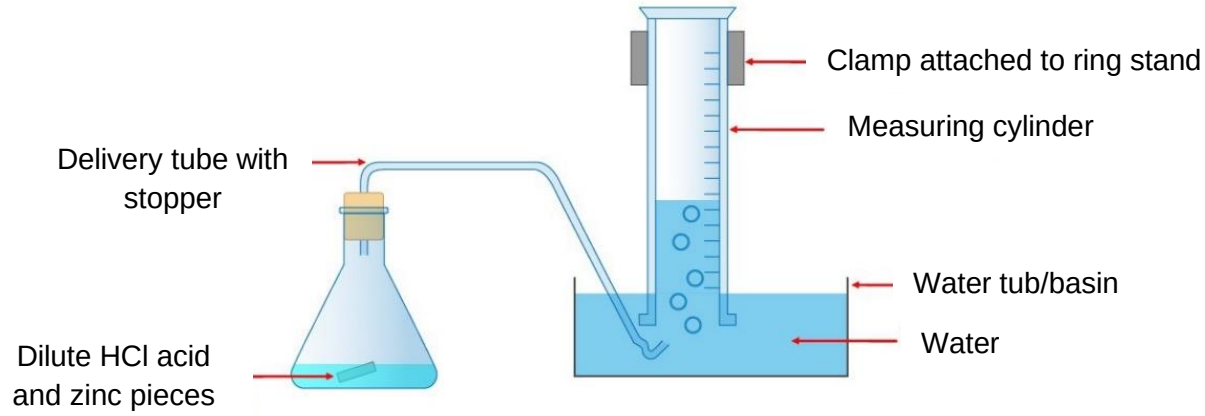
Method:

1. Half fill the water basin with cold water.
2. Place the measuring cylinder in the water basin and allow it to fill with water. Turn the cylinder upside down so that the mouth is resting on the bottom of the basin.
3. Place 2-3 pieces of zinc metal into the conical flask and add 10ml of dilute HCl. Quickly seal the conical flask with the stopper.
4. Place the delivery tube under the inverted measuring cylinder as seen in the diagram below. Secure the measuring cylinder with the clamp stand.
5. Once the measuring cylinder is full of gas (there is no water left in it) loosen the clamp and lift it out of the water, tilting it slightly upwards. Place your finger or thumb over the mouth of the cylinder to keep the gas inside.
6. Take a lit taper, remove your finger, and carefully place it in the mouth of the cylinder.

Diagram of Setup:



Tasks and Questions:

1. Record your observations in the space below for the teacher demo:

_____

_____

_____

_____

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2. Why do the hydrogen bubbles rise in the teacher demo?

_____

_____

3. Record your observations in the space below for your lab activity:

_____

_____

_____

_____

_____

4. Why does the level of the water change in the measuring cylinder?

_____

_____

_____

5. How can you tell when no more gas is being produced?

_____

_____

_____

_____

6. What did you observe on the inside of the test tube after carrying out the gas text for hydrogen? Why was it there?

_____

_____

_____

_____