

Name _____

Generating Hydrogen Gas (H₂)

By Chemical Reaction

Objective: To produce hydrogen gas by chemical reaction and observe the properties of this gas.

Procedure:

1. Use the graduated cylinder to measure 50mL of water.
2. Pour the water into an Erlenmeyer flask.
3. Measure the temperature of the water and record. _____
4. Use the digital balance to mass 1.5g of aluminum foil.
5. Roll the aluminum into loose balls about the size of a pea. Drop the Aluminum in the flask with the water.
6. Carefully mass out 5g of sodium hydroxide [Na(OH)] in the tray. **DO NOT TOUCH OR SMELL! NaOH CAN BURN SKIN!**
7. Add the Na(OH) to the flask and gently swirl the mixture.
8. Mass of balloon. _____ Stretch the balloon over the mouth of the flask.
9. Record observations every minute for 10 minutes. (Look for changes in color, temperature, smell, size of balloon, bubbling, etc.)
10. At the end of the 10 minutes, carefully remove the balloon and tie the end trapping the gas inside. Observe the balloons behavior. Mass of balloon and hydrogen _____
11. Carefully measure the temperature of the solution in the flask and record. _____
12. Dump solution into dump bucket when finished and rinse flask.
13. Ignite the balloon PER THE INSTRUCTOR'S DIRECTION!

Minutes	OBSERVATIONS
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Questions for Analysis

1. In what phase is the hydrogen in the balloon? How can you tell?
2. What is Hydrogen's symbol, atomic number, and atomic mass?
3. Hydrogen is a "diatomic" element. What does this mean?
4. What was the evidence from the lab that proved a chemical reaction occurred?
5. The Hindenburg was a German blimp that was filled with hydrogen. This blimp tragically exploded and killed several people. Why was the blimp filled with hydrogen in the first place, and what might be an explanation for the explosion?
6. A balloon filled with hydrogen should float as hydrogen is lighter than air, explain why your hydrogen filled balloon DOES NOT float.
7. Why do you think hydrogen is no longer used for hot air balloons and blimps? Why is helium used instead?
8. How did the temperature of the solution in the flask change? Would this be considered an endothermic or an exothermic reaction? **Why?!?**
9. After the balloon is over the flask, it begins to blow up. Is this an example of an open or closed system? Why? How does this relate to the Law of Conservation of Mass? **Explain!!!**
10. Charles gas law states as the temperature of a gas increases, the volume of that gas increases. This also is true in reverse. Explain how the balloon demonstrated Charles Law.

11. Balance the equation!

Aluminum + Sodium Hydroxide + Water → Anhydrous Sodium Aluminate + Hydrogen gas

