Hydrogen Lab Report

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Date of Experiment: 10/18/19
Date Report Submitted: 11/4/19
Class: Chemistry

II. Problem Statement: The purpose of this experiment is to demonstrate how hydrogen can be collected in a home lab, and how hydrogen reacts when mixed with air.

III. Materials and Methods:
A "pneumatic trough", consisting of a water filled tray with a metal bridge
2 Erlenmeyer Flasks
2 Two-hole stoppers
Rubber tubing
4 glass tubes
5 small zinc strips
Test tube
Hydrochloric Acid
Water
Splint
Pipette
Large plastic syringe
First we poured equal parts water and hydrochloric acid into one of the flasks. In the other flask, we placed the zinc strips. Then we fitted both flasks with two-hole stoppers and two pieces of glass tubing each, connected by rubber tubing. Next, we filled the test tube with water, placed it upside down in the pneumatic trough and positioned the rubber tubing connected to the flasks, under the test tube in a way that the hydrogen could fill the test tube. We then used the syringe to push air into the first flask. Once the water drained from the test tube and filled with hydrogen gas, we removed the test tube from the trough and placed a lighted splint inside.

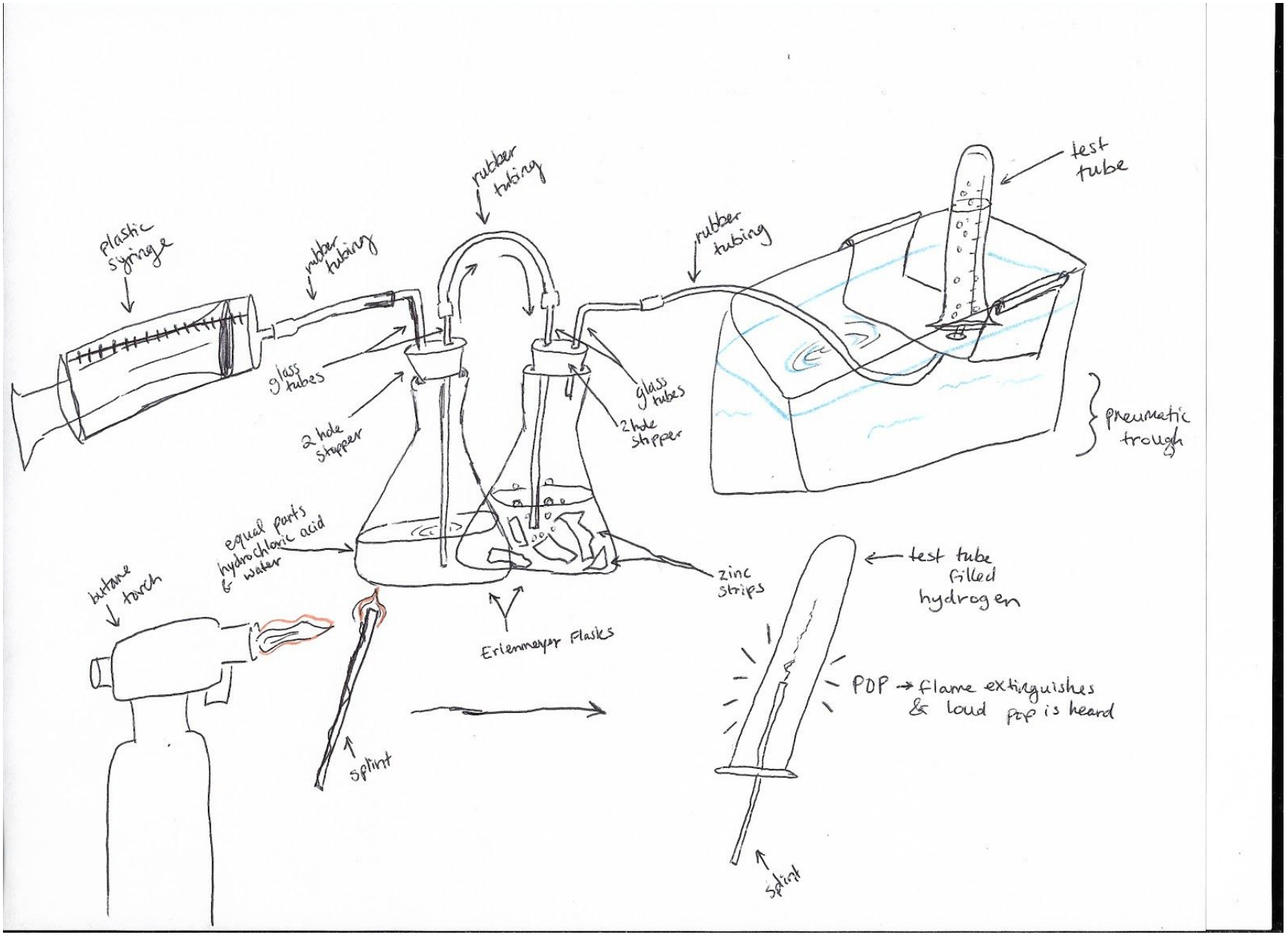
IV. Results:

When we added the hydrochloric acid (2Hcl) to the zinc(Zn), hydrogen gas (H_2) and zinc chloride($ZnCl_2$) was formed. The hydrogen gas bubbled into the water in the pneumatic trough, which we were able to collect in a test tube. When we brought the lighted splint into the test tube, the hydrogen burned at the mouth of the tube, and the flame was extinguished. Because the hydrogen was mixed with air, the result was an explosive "popping" noise.

1) $Zn + 2Hcl \rightarrow H_2\uparrow + Zncl_2$
2) $2H_2 + O_2 \rightarrow \blacktriangle 2H_2O$ + "pop"

V. Conclusion:

In conclusion, this experiment demonstrated that we can make pure hydrogen gas by mixing together hydrochloric acid and zinc. With the aid of the pneumatic trough, we were able to make hydrogen in a home lab. We also learned that although hydrogen is the lightest known gas, it is highly combustible when mixed with air. In addition, we discovered that the explosion of pure hydrogen gas mixed with air, creates a “pop” noise.


plastic syringe
rubber tubing
rubber tubing
rubber tubing
test tube
glass tubes
2 hole stopper
glass tubes
2 hole stopper
pneumatic trough
equal parts hydrochloric acid & water
zinc strips
butane torch
Erlenmeyer Flasks
test tube filled hydrogen
POP → flame extinguishes & loud pop is heard
splint
splint