

Shuttle Shooter

Problem: What hydrogen:oxygen ratio makes the best rocket fuel?

Materials: hydrogen generator
oxygen source
collection bulbs
launch pad
Tesla coil

Warning: Wear goggles throughout this experiment. Do not use flames during this experiment.

Procedure:

1. Record all observations as you go. Also, use a table to measure ratios and distances.
2. Prepare a collection bulb. Increment an inverted pipette bulb to show 0.5 ml increments. Immerse the bulb in a 400 ml beaker of water to fill the bulb. No air bubbles please.
3. Place zinc metal into the hydrogen generator. Add enough HCl to fill the generator with enough HCl to cover the zinc. The generator should be producing hydrogen gas. Write this reaction below.
4. Devise a way to collect and test different possible increment ratios of hydrogen and oxygen. Be sure when collecting the gasses the bulb remains inverted and a water "plug" is left at the base of the bulb. Try one launch with pure hydrogen and another with pure oxygen.
5. To launch the rocket, place the bulb on the nail of the launch pad and shock the tip of the nail with the Tesla coil.

Summing up:

1. Write the balanced equation for the combination of hydrogen and oxygen:
2. How does the combining ratio of your most successful launches compare with the mole ratio in the balanced equation?
3. Identify the limiting reactant in each launch.
4. Explain why the tests with pure gasses were not the best.