Investigate – The Relationship Between Volume, Temperature, Pressure and Number of Moles of a Gas

Purpose: To determine the relationship between volume, temperature, pressure and number of moles of a gas.

Pre-Lab Questions:

1. Write a proportionality relationship for volume and pressure:

2. Write a proportionality relationship for temperature and volume:

3. Write a proportionality relationship for number of moles and volume of a gas:

4. Write a proportionality relationship that combines all of the terms: volume, temperature, pressure and number of moles.

5. Write a balanced chemical equation for the single replacement reaction of magnesium and HCl.

6. Using the equation above, if 1.32 g of Magnesium was reacted with excess HCl, how many moles of Hydrogen gas would be produced? What would be the volume of this gas at STP?

Materials:

- 50 ml Graduated cylinder
- Rubber stopper
- Magnesium strip
- Temperature Probe
- Hydrochloric acid
- 600 ml beaker
- Distilled water
- Gas Pressure Sensor

Design:

Safety:

Procedures:

Data:

Post Lab:

1. How many moles of Hydrogen gas should have been produced in this reaction with the mass of Magnesium that you used?

2. Using the proportionality relationship that you determined in question #4 of the Pre Lab, and the Pressure, Volume, Temperature (all recorded in the lab) and the number of moles of H_2 (calculated in the question above), determine the value of the unknown constant.

3. What unit would this constant have?

4. If the accepted value of the gas constant, R, is 0.0821, what was your percent error in this lab?

5. Write a formula that relates the pressure, volume, temperature, number of moles and the gas constant.