Andres Martinez

6th Period Chemistry Honors

4/2/12

6th Period

Ideal Gas Law Lab

Title:

Ideal Gas Law Lab

Objectives:

The objectives of this lab were to analyze the ideal gas law, its components, and connect them to the experimentation of the finding of percent H2O with Yeast.

Prelab questions

1. What is in the yeast that aids in the decomposition of hydrogen peroxide?
   * In yeast there are enzymes which aid in the decomposition of H2O2, being a catalyst.
2. List the ideal gas law and define each term with units.
   * Ideal Gas Law: PV=nRT

P= Pressure (atm) V=Volume (L) R= constant (depends on pressure units) n=Number o moles (moles) T= Temperature (K)

1. How many moles of O2 were produced in a decomposition reaction of H2O2 If the barometric pressure was .980 atm, the temperature was 298 K and the volume of the O­­2 gas collected was 0.0500L?
   * T= 298, V= .05L P= .980, (.980atm)(.05L)=(n)(298m)( 0.0821 L-atm/mol-K)=

**.002 mol**

1. If you decomposed 10.00 mL of 100% H2O. How many moles of O2 would you theoretically obtain?

Materials

|  |  |
| --- | --- |
| Safety Equipment: Safety Goggles and Gloves | Thermometer |
| Yeast | Warm Water |
| 10mL Hydrogen Peroxide | Large Ring |
| 10 and 100mL graduated cylinders | Flexible Tubing |
| Erlenmeyer Flask | 250mL Beaker |
| Stopper with Hole | 600mL Beaker |
| Rigid Plastic Tubing | Stopwatch |
| Rubber Band | Ring Stand |
| 2 Droppers | Distilled Water |
| Stir Rod |  |

Procedure: make sure to include a sketch or a diagram of the experimental setup)

Data table

|  |  |
| --- | --- |
| Water Temperature | 293 K |
| Barometric Pressure | 1 atm |

|  |  |
| --- | --- |
| Initial Volume Of Air (mL) | 30mL |
| Final Volume of Air After Reaction (mL) | 5mL |
| Volume of O2 Collected (final-initial) | 25mL |
| Time Reaction Start | 3:25:00 |
| Time Reaction Ended | 3:26:34 |
| Reaction Time (s) | 1min 34 Secs |

Calculations:

1. Convert the temperature of the water from \*C to Kelvin (K). Use the equation K= \*C + 273. This will be your value for absolute T or the temperature in Kelvin.
   * K= 20\*C+273= **293 K**
2. Divide the measured pressure from the Data section by 760 mm Hg. This will give you pressure (P) in atmospheres.
   * 760mm hg/760mm hg= **1 atm**
3. Convert Volume of oxygen from mL to Liters (L)
   * 25mL/1000= **.025L**
4. Rearrange the ideal gas law to solve for n.
   * PV=nRT = **n= PV**

RT RT **RT**

1. You are now ready to solve for the number of moles of O2. Be sure the units cancel so that you end up with only the moles of 02 left. Use the value for the constant R given:
   * n= (1 atm) (.025L) = .025 =  **0.001115409154386 mol**

(.0821 Lxatm/molxK) ( 273 K) 22.4133

1. Calculate the theoretical number of moles of O2, there would be if the hydrogen peroxide were 100%, and not an aqueous solution
2. Find the percent Hydrogen Peroxide.
3. You can easily determine the reaction rate. Divide the total volume of oxygen collected by the total time of the reaction.

0.001115409154386/154=  **7.242916586922155e-6**

Post lab questions:

1. What was the calculated percentage of Hydrogen peroxide close to the same as the percentage on the label?
   * No
2. Considering that catalysts are not consumed in the reaction, how do you think increasing the amount of catalyst would affect the reaction rate for the decomposition of hydrogen peroxide?
   * The increasing of the amount of catalyst would increase the reaction even if it was toward the decomposition of hydrogen. It would lower the activation energy level none the less.

Conclusion:

Overall, I believe that the experiment was not conducted well by me. I think that I may have accidently mixed up information on the worksheet which may have caused a mixing of results. Next time I need to make sure that all data is being inputted correctly, and with proper tools.