INV 28: How much gas is produced? – Two-Week lab

Student handout

ALL data below should go in your notebook!

Theory

Idea gas law: $PV = nRT$

P: partial pressure (atm) of **the target** gas

V: volume (L)

n: # of moles of **the target** gas

R: gas constant = 0.08206 L·atm/mol·k

T: temperature (k)

% error= |Experimental-Theoretical|/Theoretical x100

% yield= Experimental/Theoretical x100

WEEK 1

1. Proposal:
   - Write the reaction equations for each solid (Mg, Na_2CO_3, and CaCO3) with HCl .

___Mg(s) + 2 HCl(aq) → $H_2\uparrow + MgCl_2$

___Na_2CO_3(s) + ___HCl(aq) → $HCO_3 + NaCl$

___$CaCO_3$(s) + ___HCl(aq) → $HCO_3 + CaCl$

   - In your notebook, follow the table format below to prepare a table with the following headings for 3 trials.

Trial #	Amount of Mg (g) used	Amount of HCl (mL) used	Initial Pressure (atm)	Final Pressure (atm)	Pressure of Gas (atm)	Volume of Gas (L)	Theoretical mole of gas generated (mol)	Experimental mole of gas generated (mol)	% error	% yield

   - Calculate the total volume: $V_{total} = V_{flask} + V_{tubing}$

     V_{flask} = volume of the reaction flask (Erlenmeyer flask)

     V_{tubing} = volume of the tubing

     V_{flask} can be determined by measuring the volume of water it takes to fill the flask to the point of the stopper. V_{tubing} can be determined by measuring the inner diameter (Use 0.125in of diameter of the inner tube) and length of the tubing and using the equation for calculating the volume of a cylinder: $V = \pi r^2 h$.

     Note that V_{total} used in the calculations in the lab report should subtract the volume of the reactants (mainly HCl solution).