**Lab report measuring the volume of gas produced in a chemical reaction**

Ng Cheuk Yin Darren 10 CheA

**Objectives of the experiment**

To compare the reactivity (i.e. the rate of reaction) between magnesium and calcium in acid.

**Variables of the experiment**

Independent variable (IV): Metals used (Magnesium and calcium)

Dependent variable (DV): Volume of gas produced over time

Controlled variables (CV): Type of acid used, Concentration of acid used, Volume of acid used

1. Type of acid used can be controlled by ensuring that the acid used for both the reaction of Mg(s) + acid and Ca(s) + acid come from the same container. Same type of acid should be used for both reactions so that the difference of volume of gas produced over time is caused by the independent variable but not due to the difference of acid used.
2. Concentration of acid used can be controlled by checking if the acid used for both reactions have the same molarity. Acid of same concentration should be used for both reactions so that the difference of volume of gas produced over time is caused by the independent variable but not due to the difference in molarity of acid used.
3. Volume of acid used can be controlled by measuring the acid used in a measuring cylinder before transferring into the boiling tube. Acid of same volume should be used for both reactions so that the difference of volume of gas produced over time is caused by the independent variable but not due to the difference in initial volume of acid.

**Apparatus and chemical**

1.0M Hydrochloric acid HCl(aq), Magnesium ribbon Mg(s), Calcium granule Ca(s), boiling tube, boiling tube rack, 100mL glass syringe, stopper with delivery rubber tubing, stand and clamp, 25mL measuring cylinder, stopwatch

**Procedure**

1. Put the boiling tube on the boiling tube rack, gently clamp the glass syringe to the stand and clamp, connect the glass syringe to the delivery rubber tubing
2. Measure and record accurately the mass of Mg(s) and Ca(s) and cut the metal with more mass slightly until both Mg(s) and Ca(s) have the same mass
3. Measure and transfer 20 mL of HCl(aq) into the boiling tube
4. Add the measured Mg into the boiling tube with HCl(aq) and quickly stopper the boiling tube which is connected to a syringe; start the stopwatch simultaneously
5. Record the volume of gas produced in 1 second intervals until the reaction stops
6. Disconnect the setup; clean the boiling tube with tap water; reset the stopwatch to 0; gently press the plunger top of the glass syringe until it reaches the tip
7. Repeat step 3 – 6 with measured Ca(s)