**PRACTICAL 15 – MEASURING THE RATE OF A REACTION USING A CONTINUOUS MONITORING METHOD**

**(CORE PRACTICAL 7b)**

Magnesium reacts with hydrochloric acid as follows:

 Mg(s) + 2HCl(aq) 🡪 MgCl2(aq) + H2(g)

The rate of this reaction can be monitored by measuring the rate of production of hydrogen gas. The amount of gas produced can be measured by its volume.

1. Clamp a gas syringe into a horizontal position so that the bung attached to it can be easily attached to a measuring cylinder.
2. Pour 25 cm3 of 0.2 moldm-3 HCl into a 100 cm3 conical flask.
3. Weigh out 1 g of magnesium on a weighing boat.
4. Add the magnesium to the conical flask, attaching the bung and starting the stopclock immediately.
5. Record the volume of gas produced every 10 seconds until the reaction stops or the volume of gas reaches 100 cm3. Record your data in the table below:

|  |  |  |
| --- | --- | --- |
| Time/s | Volume of H2 produced (Vt) /cm3 | (Vf – Vt)/cm3 |
| 0 |  |  |
| 10 |  |  |
| 20 |  |  |
| 30 |  |  |
| 40 |  |  |
| 50 |  |  |
| 60 |  |  |
| 70 |  |  |
| 80 |  |  |
| 90 |  |  |
| 100 |  |  |
| 110 |  |  |
| 120 |  |  |
| final |  |  |

 (Vf – Vt) gives you a value proportional to [HCl]

1. Plot a graph of (Vf – Vt) (on the y-axis) against time (on the x-axis)
2. Use your graph to determine the initial rate of reaction.
3. Use your graph to determine the rate of reaction when the [HCl] has fallen to half of its initial value.
4. Use your results from Q8 and Q9 to deduce the order of reaction with respect to HCl.
5. Use your result from either Q8 or Q9 to deduce a value for the rate constant of this reaction.