Identifying Three Types of Acids (Hydrochloric Acid, Sulfuric Acid, Acetic Acid)

Grade : Class : Name :

<Reaction Between Magnesium and Acid>

Wear safety goggles, and rubber gloves when handling chemicals.

1. Objective

Deepen understanding of the strength of acids and valency through the reaction between magnesium and acid.

2. Reagents

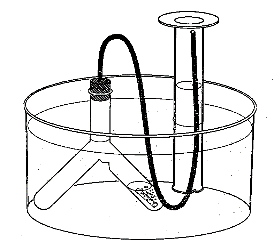
1.0 mol/L Hydrochloric Acid 2.5 mL, 1.0 mol/L Sulfuric Acid 2.5 mL, 1.0 mol/L Acetic Acid 2.5 mL

Magnesium ribbon 0.10 g × 3 pieces, Sandpaper

3. Equipment: Water tank, 100 mL graduated cylinder, bifurcated test tube, rubber stopper with a hole,

rubber tube, glass tube, stopwatch, 50 mL beaker (for waste), distilled water, three Komagome pipettes

4. Procedure

① Place 0.10 g of polished magnesium ribbon into one side of the bifurcated test tube.

② Add 2.5 mL of 1.0 mol/L Acid A to the other side of the bifurcated test tube.

③ Submerge the bifurcated test tube into the water tank, mix Acid A and magnesium, and

collect the gas produced in a 100 mL graduated cylinder by water displacement. Measure

the gas volume every 30 seconds from the start of mixing for about 8-10 minutes. Ensure

some magnesium remains undissolved after completion.

④ Replace Acid A with 2.5 mL of 1.0 mol/L Acid B and repeat steps ①–③.

⑤ Replace Acid B with 2.5 mL of 1.0 mol/L Acid C and repeat steps ①–③.

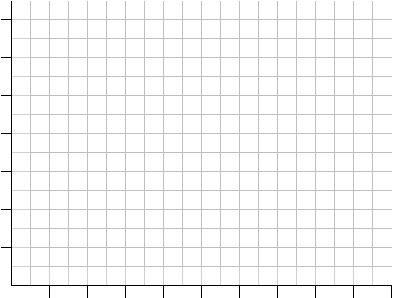
5. Results

① Summarize the relationship between time and gas volume for each experiment in a table.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time | 0 | 0:30 | 1:00 | 1:30 | 2:00 | 2:30 | 3:00 | 3:30 | 4:00 | 4:30 | 5:00 |
| A |  |  |  |  |  |  |  |  |  |  |  |
| B |  |  |  |  |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |  |  |  |  |
| Time | 5:30 | 6:00 | 6:30 | 7:00 | 7:30 | 8:00 | 8:30 | 9:00 | 9:30 | 10:00 | 10:30 |
| A |  |  |  |  |  |  |  |  |  |  |  |
| B |  |  |  |  |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  |  |  |  |  |

〔mL〕

② Graph the data from ①.



6. Discussion

① Using the reaction equations for magnesium and each acid (1)–(3), explain why the maximum amount of gas

produced differs.

② Explain why there are differences in the gas generation rates.

7. Conclusion

What were Acids A, B, and C? Explain the reasons for your conclusions.

|  |  |
| --- | --- |
| Acid A | Reason : |
| Acid B | Reason : |
| Acid C | Reason : |