

EXPERIMENT-2

EXPERIMENT-2 (a)

AIM: To study the properties of acids (dilute hydrochloric acid) by their reaction with the following:

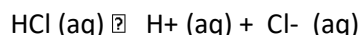
- a) Litmus solution (red/blue)
- b) Zinc metal
- c) Solid sodium carbonate

APPARATUS:

Test tubes, test tube stand, spatula, dropper, test tube holder, litmus solution (red/blue), zinc metal, solid sodium carbonate, dilute HCl.

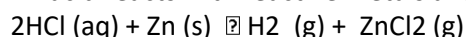
BASIC PRINCIPLES INVOLVED:

An acid is a substance that ionizes in water and releases hydrogen ions $[H^+]$ in the solution.

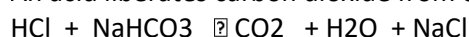


An acid is a substance that changes blue litmus solution red.

An acid reacts with reactive metals and liberates hydrogen gas.



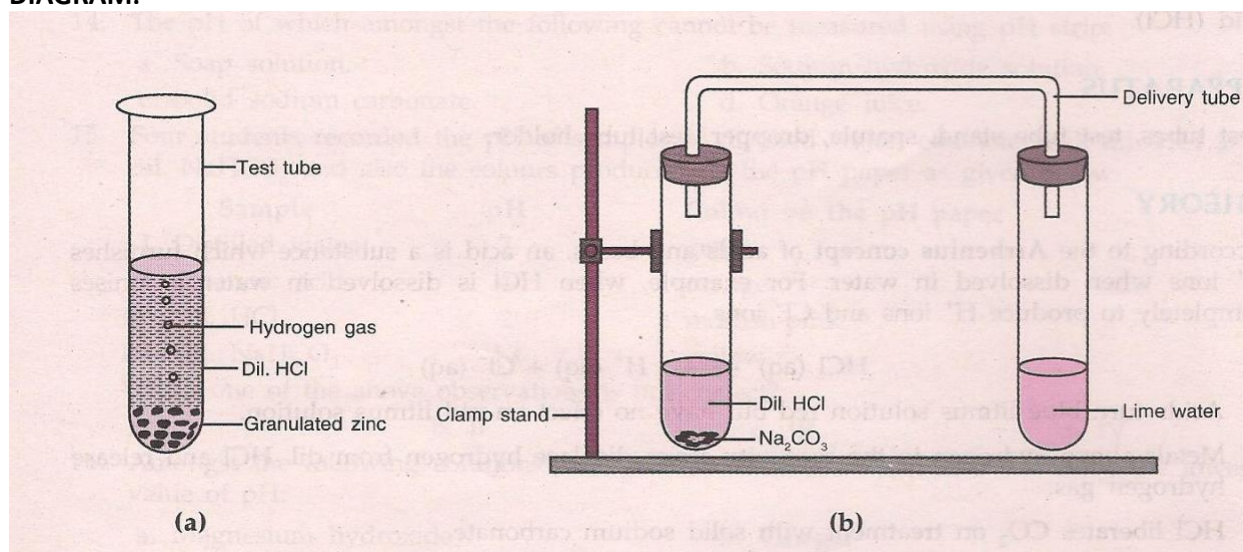
An acid liberates carbon dioxide from carbonate and bicarbonates.



EXPERIMENTAL PROCEDURE TO STUDY THE PROPERTIES OF HCl:

- 1) 1ml of dilute hydrochloric acid is taken in 2 test tubes and 2-3 drops of red and blue litmus solution are added to each of the test tubes. The colour of the 2 solutions is noted.
- 2) About 2 ml of dilute hydrochloric acid is taken in a clean test tube. A small piece of granulated zinc is added to it. The colour and odour of the gas evolved are noted.
- 3) Solid sodium carbonate is taken in a dry test tube and hydrochloric acid is added dropwise. The colour and odour of the gas evolved is noted. The gas is passed through the lime water and the changes produced observed.

DIAGRAM:



OBSERVATION TABLE:

| Experiments | Observations | Inference |
|---|--------------|-----------|
| REACTION WITH LITMUS SOLUTION | | |
| i) 1ml of dilute hydrochloric acid is taken in a test tube and 2-3 drops of red litmus solution is added to it. | | |
| ii) 1ml of dilute hydrochloric acid is taken in a test tube and 2-3 drops | | |

of blue litmus, the solution is added to it.

REACTION WITH ZINC METAL

i) About 2 ml of dilute hydrochloric acid is taken in a clean test tube & a small piece of granulated zinc is added to it.

ii) A burning splinter is brought near the mouth of the test tube.

REACTION WITH SOLID SODIUM CARBONATE

i) Solid sodium carbonate is taken in a dry test tube and hydrochloric acid is added dropwise.

ii) The gas evolved is passed through lime water.

RESULT:

- 1) HCl is----- in nature as it turns ----- litmus solution red.
- 2) It liberates ----- gas on reaction with zinc metal.
- 3) It liberates ----- gas from solid sodium carbonate.

EXPERIMENT 2(b)

AIM: To study the properties of bases (dilute sodium hydroxide) by their reaction with the following:

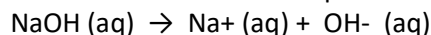
- a) Litmus solution (red/blue)
- b) Zinc metal
- c) Solid sodium carbonate

APPARATUS:

Test tubes, test tube stand, spatula, dropper, test tube holder, litmus solution (red/blue), zinc metal, solid sodium carbonate, dilute NaOH.

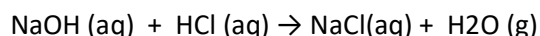
BASIC PRINCIPLES INVOLVED:

A base is a substance that produces hydroxyl ions $[OH^-]$ when it is dissolved in water.



A base is a substance that changes red litmus solution blue.

A base reacts with an acid to form salt and water.



A base combines with CO_2 to form a carbonate.



EXPERIMENTAL PROCEDURE TO STUDY THE PROPERTIES OF NaOH:

- 1) 1ml of dilute sodium hydroxide solution is taken in 2 test tubes and 2-3 drops of red and blue litmus solution are added to each of the test tubes. The colour of the 2 solutions is noted.
- 2) About 2 ml of dilute sodium hydroxide solution is taken in a clean test tube. A small piece of granulated zinc is added to it. The test tube is heated gently. The colour and odour of the gas evolved are noted.
- 3) Solid sodium carbonate is taken in a dry test tube and sodium hydroxide solution is added dropwise.

OBSERVATION TABLE:

| Experiments | Observations | Inference |
|--|--------------|-----------|
| 1. REACTION WITH LITMUS SOLUTION | | |
| i) 1ml of dilute sodium hydroxide the solution is taken in a test tube and 2-3 drops of red litmus solution are added to it. | | |
| ii) 1ml of dilute sodium hydroxide the solution is taken in a test tube and 2-3 drops of blue litmus solution are | | |

added to it.

2. REACTION WITH ZINC METAL

i) About 4-5 ml of dilute sodium hydroxide solution is taken in a clean test tube & a small piece of granulated zinc is added to it.

The test tube is gently heated.

ii) A burning splinter is brought near the mouth of the test tube.

3. REACTION WITH SOLID SODIUM CARBONATE

i)) About 4-5 ml of dilute sodium hydroxide solution is taken in a clean test tube & a pinch of solid sodium carbonate is added to it.

RESULT:

- 1) It liberates – gas from solid sodium carbonate, as it _____ react with it.
- 2) It liberates ----- gas on reaction with zinc metal.
- 3) It liberates---- gas from solid sodium carbonate, as it _____ react with it.

PRACTICAL BASED QUESTIONS

1. Four students, I, II, III, and IV were asked to examine the changes for blue and red litmus paper strips with dilute HCL(solution A) and dilute NaOH (solution B). The following observations were reported by the four students. The sign (-) indicating no colour change.

| Litmus | A | B |
|--------|---|------|
| Blue | – | Red |
| Red | – | Blue |

I

| Litmus | A | B |
|--------|-----|------|
| Blue | Red | – |
| Red | – | Blue |

II

| Litmus | A | B |
|--------|------|------|
| Blue | Red | Red |
| Red | Blue | Blue |

III

| Litmus | A | B |
|--------|------|------|
| Blue | Blue | Blue |
| Red | Red | Red |

IV

Which student gave the correct observation?

2. When a student added zinc granules to dilute HCL, a colourless and odourless gas was evolved, which was then tested with a burning match stick; what would be observed?
3. When a few drops of phenolphthalein are added to a dilute solution of sodium hydroxide, pink colour is produced. What will be the colour of the final mixture when an excess of HCL is added to it?
4. What are the products obtained when zinc metal is allowed to react with a dilute solution of sodium hydroxide?