

Materials Required

- Sodium carbonate decahydrate (washing soda)
- Ammonium chloride
- Sodium chloride
- Red litmus paper strips
- Freshly prepared lime water
- Dilute Hydrochloric acid
- Test tubes (No. 4)
- Test tube stand
- A boiling tube
- A thistle funnel
- A cork
- A delivery tube
- A glass rod
- A measuring cylinder
- A wash bottle
- A spatula

Procedure

Real Lab Procedure

1. Take about 1 g of each of the given samples separately in three test tubes and label them as A, B, and C.
2. Add about 5 mL of distilled water to each test tube. Gently shake the contents of the test tube.
3. Put a drop of every salt solution on separate red litmus paper strips using a glass rod. (Precaution: Wash the glass rod used for one sample before using it for another model). Note the change in colour of the litmus paper, if any, in each case.
4. Add 1 mL of dil. hydrochloric acid to each test tube. If any effervescence from any test tube is observed, then perform the lime water test for those test tubes.

5. For performing the lime water test, take the solution of test tube A in a boiling tube and set up the apparatus (delivery tube, thistle funnel etc).
6. Add dil hydrochloric acid drop by drop into the solution through the thistle funnel.
7. The liberated gas passed through the lime water in a test tube. The lime water turns milky.
8. Continue passing the liberated gas through the lime water.

Simulator Procedure

Litmus test

1. Click on the bottle cap to open the sodium carbonate decahydrate salt bottle.
2. Drag and drop the spatula towards the bottle.
3. Drag and drop the spatula containing sodium carbonate decahydrate towards the boiling tube A.
4. Drag and drop the wash bottle towards the measuring cylinder. Measure 5mL.
5. Drag and drop the measuring cylinder towards the boiling tube A.
6. Click on the boiling tube A to shake it.
7. Click on the bottle cap to open the ammonium chloride salt bottle.
8. Drag and drop the spatula towards the bottle.
9. Drag and drop the spatula containing ammonium chloride towards the boiling tube B.
10. Drag and drop the wash bottle towards the measuring cylinder. Measure 5 mL.
11. Drag and drop the measuring cylinder towards the boiling tube B.
12. Click on the boiling tube B to shake it.
13. Click on the bottle cap to open sodium chloride salt bottle.
14. Drag and drop the spatula towards the bottle.
15. Drag and drop the spatula containing sodium chloride towards the boiling tube C.
16. Drag and drop the wash bottle towards the measuring cylinder. Measure 5mL.
17. Drag and drop the measuring cylinder towards the boiling tube C.
18. Click on the boiling tube C to shake it.

19. Click on the next button to perform the litmus test.
20. Drag and drop the glass rod towards the boiling tube A to drop the solution onto it.
21. Drag and drop the glass rod towards the red litmus paper to drop the solution onto it.
22. Click on the inference button to show the observation.
23. Note: When a drop of sodium carbonate decahydrate solution is added to red litmus, the red litmus turns blue.
24. Note: Wash the glass rod used for one sample before using it for another model.
25. Drag and drop the glass rod towards the boiling tube B to drop the solution onto it.
26. Drag and drop the glass rod towards the red litmus paper.
27. Note: When a drop of ammonium chloride is added to red litmus, there is no change in the litmus paper.
28. Note: Wash the glass rod used for one sample before using it for another model.
29. Drag and drop the glass rod towards the boiling tube C to drop the solution onto it.
30. Drag and drop the glass rod towards the red litmus paper to drop the solution onto it.
31. Note: When a drop of sodium chloride is added to red litmus, there is no effect on the litmus paper.

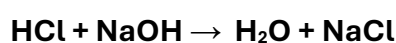
HCl Test

1. Click on the cap to open the HCl bottle.
2. Drag and drop the bottle towards the measuring cylinder. Measure 1mL.
3. Drag and drop the measuring cylinder towards the boiling tube A.
4. Note: When dilute hydrochloric acid reacts with sodium carbonate decahydrate, sodium chloride, carbon dioxide, and water are formed. A brisk effervescence is seen in the release of carbon dioxide.



5. Click on the cap to open the HCl bottle.
6. Drag and drop the bottle towards the measuring cylinder. Measure 1mL.

7. Drag and drop the measuring cylinder towards the boiling tube B.
8. Note: When ammonium chloride reacts with HCl, the resultant will be ammonium chloride. It is an acidic salt.
9. Click on the cap to open the HCl bottle.
10. Drag and drop the bottle towards the measuring cylinder. Measure 1 mL.
11. Drag and drop the measuring cylinder towards the boiling tube C.
12. Note: Hydrochloric acid reacts with sodium hydroxide to form sodium chloride (the salt) and water in the boiling tube. Sodium chloride is composed of Na^+ cations from the base (NaOH) and Cl^- anions from the acid (HCl).



13. Note: The boiling tube A only produces effervescence when dil. HCl are added. Therefore, the next procedure will be done using boiling tube A.
14. Click on the next button.

Lime test

1. Drag and drop the cork towards the boiling tube.
2. Drag and drop the thistle funnel towards the boiling tube.
3. Drag and drop the delivery tube towards the boiling tube.
4. Click on the cap to open the HCl bottle.
5. Drag and drop the dropper towards the boiling tube to drop the HCl through the thistle funnel into the boiling tube.
6. Drag and drop the test tube A containing limewater towards the other end of the delivery tube.
7. Note: Pass the liberated gas evolved through the lime water in a test tube. The lime water turns milky.
8. Click on the inference button to show the observation.
9. Note: The gas evolves when HCl reacts with sodium carbonate decahydrate and is passed through lime water. Lime water turns milky, or a white precipitate of calcium carbonate is formed.
10. Animation: After passing the CO_2 gas, take the boiling tube away from the tube and show the formation of CaCO_3 . Then again pass more CO_2 and observe the change.

11. Continue passing the liberated gas through the lime water.
12. Click on the inference button to show the observation.
13. Observation On passing this gas in excess, it becomes clear again. This confirms the presence of carbon dioxide.
14. On passing excess CO_2 through limewater, calcium hydrogen carbonate is formed. It is soluble in water and forms a colourless solution.

Observation

When a salt solution is added to litmus paper

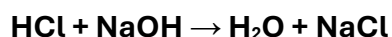
- When a drop of sodium carbonate decahydrate solution is added to red litmus, the red litmus turns blue.
- When a drop of ammonium chloride is added to red litmus, there is no change in the litmus paper.
- When a drop of sodium chloride is added to red litmus, there is no effect on the litmus paper.

When dilute Hydrochloric acid is added

- In the test tube A - When dilute hydrochloric acid reacts with sodium carbonate decahydrate, sodium chloride, carbon dioxide, and water are formed. A brisk effervescence is seen in the release of carbon dioxide.

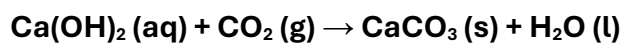


- In test tube B - When ammonium chloride reacts with HCl, the resultant will be ammonium chloride. It is an acidic salt. Ammonium chloride is a weak base, whereas HCl is a strong acid. When a weak base reacts with a strong acid, the base is unable to neutralize the acid completely. Due to this, an acidic salt is formed.
- In test tube C: Hydrochloric acid reacts with sodium hydroxide to form sodium chloride (the salt) and water in the test tube. Sodium chloride is composed of Na^+ cations from the base (NaOH) and Cl^- anions from the acid (HCl).

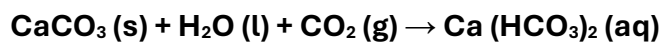


Observed when performing lime water test

- The gas evolves when HCl reacts with sodium carbonate decahydrate is passed through lime water. Lime water turns milky, or a white precipitate of calcium carbonate is formed.



- On passing this gas in excess, it becomes clear again. This confirms the presence of carbon dioxide.



- On passing excess CO_2 through limewater, calcium hydrogen carbonate is formed. It is soluble in water and forms a colourless solution.

Precautions

- Do not touch your skin while handling washing soda or hydrochloric acid.
- Freshly prepared lime water should be used for the lime water test.