Qualitative Analysis of Salts

Subject: Chemistry | Grade: Grade 12

Objective:

To identify the cation and anion present in a given unknown salt sample through systematic qualitative analysis.

Materials:

Test Tubes and Rack
Bunsen Burner
Nichrome Wire
Dilute HCl, HNO_3
NaOH Solution
NH_4OH Solution
$AgNO_3$ Solution
$BaCl_2$ Solution
Limewater
Unknown Salt Samples

Procedure:

1. Preliminary Tests: Note color, solubility, and appearance.
2. Flame Test: Clean nichrome wire in HCl. Dip in salt paste. Hold in flame. Observe color.
   (Yellow=Na, Lilac=K, Brick Red=Ca, Apple Green=Ba, Blue-Green=Cu)
3. Cation Analysis: Add NaOH dropwise then in excess. Repeat with NH_4OH. Observe precipitates.
4. Anion Analysis:
   - Carbonate test: Add dilute acid. Check for effervescence (CO_2) turning limewater milky.
   - Chloride test: Add dilute HNO_3 then $AgNO_3$. White ppt = Chloride.
   - Sulfate test: Add dilute HCl then $BaCl_2$. White ppt = Sulfate.

Discussion Questions:

1. Identify the cation if a white precipitate dissolves in excess NaOH.
2. Identify the anion that forms a yellow precipitate with $AgNO_3$.
3. Why is the nichrome wire cleaned with HCl?
4. Write the ionic equation for the test for Chloride ions.