Understanding Salts

Salts are ionic compounds formed by the reaction between acids and bases. They play crucial roles in chemistry and everyday life. This overview explores salt types, preparation methods, and analysis techniques.

by Smart Edupexa

Types of Salts

Soluble Salts

Dissolve in water at room temperature. Examples include sodium and potassium salts.

Insoluble Salts

Do not dissolve in water at room temperature. Examples include lead and silver salts.

Salt Preparation Methods

1

Acid-Base Reaction

Neutralization of an acid with a base produces a salt and water.

2

Acid-Metal Reaction

Reaction between an acid and a reactive metal forms a salt and hydrogen gas.

3

Precipitation Reaction

Mixing two soluble salts produces an insoluble salt precipitate.

Solubility of Salts

Salt Type	Solubility in Water
Sodium, Potassium, Ammonium	All soluble
Nitrates	All soluble
Chlorides	Most soluble, except $PbCl_2$, AgCl, HgCl
Carbonates	Most insoluble, except Na_2CO_3, K_2CO_3, $(NH_4)_2CO_3$

Physical Characteristics of Crystals

1 Regular Geometry

Crystals have definite shapes like cubic or hexagonal structures.

2 Flat Faces

Crystal surfaces are smooth and flat with straight edges.

3 Consistent Angles

Angles between adjacent faces are the same for all crystals of a salt.

Qualitative Analysis of Salts

1

Observe Physical Properties

Note color and solubility of the salt.

2

Test for Gases

Identify gases produced from chemical reactions.

3

Heat Treatment

Observe changes when salt is heated.

4

Chemical Tests

Perform specific tests for cations and anions.

Tests for Anions and Cations

Anion Tests

CO_3^{2-}: Effervescence with acid, gas turns lime water milky.

Cl^-: White precipitate with silver nitrate.

SO_4^{2-}: White precipitate with barium chloride.

Cation Tests

Fe^{2+}: Dark blue precipitate with potassium hexacyanoferrate(III).

Pb^{2+}: Yellow precipitate with potassium iodide.

NH_4^+: Brown precipitate with Nessler's reagent.

Stoichiometric Calculations

Mole Calculations

Determine moles of reactants and products using balanced equations.

Mass Calculations

Calculate masses of reactants or products in salt reactions.

Volume Calculations

Compute volumes of gases produced or solutions used in reactions.