

MINERAL ACIDS, ALKALIS, AND THEIR SALTS

RAKHMATILLAEVA INDIRA ANVAROVNA

Urgench branch of Tashkent medical academy

Assistant of the department of medical biology and pharmacy

Abstract: This thesis provides a comprehensive examination of mineral acids, bases, and their corresponding salts, focusing on their chemical properties, preparation methods, analytical detection, and industrial applications. The study encompasses major mineral acids including sulfuric acid, hydrochloric acid, nitric acid, and phosphoric acid, along with common bases such as sodium hydroxide, potassium hydroxide, and calcium hydroxide. The research demonstrates the fundamental role these compounds play in various chemical processes, industrial applications, and analytical chemistry. Through systematic analysis of their properties and reactions, this work contributes to understanding the behavior of these essential inorganic compounds in different chemical environments.

Keywords: mineral acids, alkalis, salts, pharmaceutical chemistry, neutralization, titration.

Introduction: Mineral acids and bases represent fundamental compounds in inorganic chemistry, playing crucial roles in numerous chemical processes, industrial applications, and analytical procedures. Unlike organic acids and bases, mineral acids and bases are typically inorganic compounds that exhibit strong acidic or basic properties due to their ability to completely or nearly completely ionize in aqueous solutions. The study of mineral acids and bases is essential for understanding acid-base equilibria, solution chemistry, and various chemical transformations. These compounds serve as starting materials for synthesizing numerous other chemicals, act as catalysts in industrial processes, and function as analytical reagents in qualitative and quantitative analysis. This thesis aims to provide a comprehensive overview of the most important mineral acids and bases, their properties, preparation methods, analytical detection techniques, and practical applications in various fields of chemistry and industry.

Main Content:

1. Mineral Acids:

These are strong acids derived from inorganic compounds. Common examples include:

- Hydrochloric acid (HCl): used in gastric treatments and pH regulation.
- Sulfuric acid (H₂SO₄): used in the synthesis of sulfates.
- Nitric acid (HNO₃): used in nitration reactions and the production of nitrates.

2. Alkalis:

Alkalis are bases that dissolve in water and are crucial in saponification and neutralization. Examples include:

- Sodium hydroxide (NaOH)
- Potassium hydroxide (KOH)

3. Salts:

Salts are formed when acids react with bases. They are used in drug formulation and as buffering agents. Examples:

- Sodium chloride (NaCl)
- Potassium nitrate (KNO₃)
- Calcium carbonate (CaCO₃)

Conclusion:

Understanding the properties and reactions of mineral acids, alkalis, and their salts is essential for pharmacists and chemists. Their roles in drug formulation, chemical analysis, and industrial synthesis underscore their importance in pharmaceutical science.

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