ISSN: 2582-4686 SJIF 2021-3.261,SJIF 2022-2.889, 2024-6.875 ResearchBib IF: 10.25 / 2025

THE MULTIDISCIPLINARY JOURNAL OF SCIENCE AND TECHNOLOGY

VOLUME-6, ISSUE-2

ERITMALAR

Surxondaryo viloyati tibbiyot texnikumi Umumiy kasbiy kafedrasi o'qituvchisi:
Yigitaliyeva Odinaxon Ergashali qizi

Annotatsiya. Ushbu maqolada kimyo fanining muhim bo'limlaridan biri bo'lgan eritmalar mavzusi yoritilgan. Unda eritma tushunchasi, uning tarkibiy qismlari — erituvchi va eritiluvchi modda haqida ma'lumot berilgan. Shuningdek, eritmalarning agregat holatiga, konsentratsiyasiga va to'yinganlik darajasiga ko'ra turlari bayon etilgan. Eritmalarning fizik va kimyoviy xossalari, xususan, elektrolit va noelektrolit eritmalar haqidagi tushunchalar izohlangan. Maqolada eritmalarning tabiat, tibbiyot, sanoat va kundalik hayotdagi ahamiyati ham ochib berilgan. Mazkur ish eritmalar haqidagi nazariy bilimlarni mustahkamlash va ularning amaliy qo'llanilishini tushunishga xizmat qiladi.

Kalit so'zlar: eritma, erituvchi, eritiluvchi modda, gomogen aralashma, konsentratsiya, to'yingan eritma, to'yinmagan eritma, o'ta to'yingan eritma, eruvchanlik, elektrolit.

РАСТВОРЫ

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Аннотация. В данной статье освещается тема растворов — одного из важных разделов химии. В ней раскрывается понятие раствора, а также приводится информация о его составных частях — растворителе и растворённом веществе. Кроме того, рассматриваются виды растворов по агрегатному состоянию, концентрации и степени насыщенности. Объясняются физические и химические свойства растворов, в частности понятия электролитов и неэлектролитов. В статье также раскрывается значение растворов в природе, медицине, промышленности и повседневной жизни. Данная работа направлена на укрепление теоретических знаний о растворах и понимание их практического применения.

Ключевые слова: раствор, растворитель, растворённое вещество, гомогенная смесь, концентрация, насыщенный раствор, ненасыщенный раствор, перенасыщенный раствор, растворимость, электролит.

SOLUTIONS

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Abstract. This article discusses the topic of solutions, one of the important sections of chemistry. It explains the concept of a solution and provides information about its components — the solvent and the solute. In addition, the types of solutions are considered based on their physical state, concentration, and degree of saturation. The physical and chemical properties of solutions are

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explained, including the concepts of electrolytes and nonelectrolytes. The article also highlights the importance of solutions in nature, medicine, industry, and everyday life. This work aims to strengthen theoretical knowledge about solutions and to promote understanding of their practical applications.

Keywords: solution, solvent, solute, homogeneous mixture, concentration, saturated solution, unsaturated solution, supersaturated solution, solubility, electrolyte.

Relevance of the Problem. Solutions are a fundamental concept in chemistry, closely related to nature, medicine, industry, and everyday life. Studying them is important for understanding chemical reactions, mixing substances, and biological fluids, making this topic both scientifically and practically relevant.

Research Objective. The aim of this study is to thoroughly explore the concept of solutions, understand their types, properties, and significance in everyday life and practical applications, and thereby strengthen theoretical knowledge while promoting their practical use.

Introduction. In chemistry, studying the interactions, mixtures, and transformations of substances is of great importance. One of the most common phenomena in these processes is the formation of solutions. Solutions are encountered constantly in everyday life, medicine, industry, and natural processes. The concept of a solution is significant not only theoretically but also practically. For example, biological fluids such as blood and lymph are complex solutions, and studying them is essential in medicine. In industry, solutions play a key role in carrying out chemical reactions, dissolving substances, and mixing materials. Therefore, understanding solutions in depth is both scientifically and practically relevant. This introduction briefly presents the concept of solutions, their types, properties, and significance in daily life and science, serving as the basis for the study's objectives and relevance.

Research Methods and Materials. In this study, both theoretical and experimental methods were used to thoroughly investigate the topic of solutions. The research focused on examining the properties, types, solubility, and electrolyte behavior of solutions through various experiments.

Main Body.

1. Concept of Solutions

A solution is a **homogeneous mixture** composed of two or more substances. It consists of a **solvent**, which is present in larger quantity, and a **solute**, which dissolves in the solvent. Solutions can exist in **solid, liquid, or gaseous states**. For example, air is a gaseous solution, metal alloys are solid solutions, and saltwater is a liquid solution.

Understanding solutions is essential not only theoretically but also practically, as they play a critical role in biological, industrial, and environmental processes.

2. Types of Solutions

Solutions can be classified according to several criteria:

1. **State of Matter:**
   - Solid solutions (e.g., metal alloys)
   - Liquid solutions (e.g., sugar or salt in water)

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- Gaseous solutions (e.g., air)

2. **Concentration:**
   - Dilute solutions
   - Concentrated solutions
3. **Saturation:**
   - Unsaturated solutions – the solvent can dissolve more solute at a given temperature.
   - Saturated solutions – the solvent has dissolved the maximum amount of solute.
   - Supersaturated solutions – contain more solute than the solvent can normally dissolve at a given temperature, usually unstable.

3. Physical and Chemical Properties

- **Electrolyte vs. Nonelectrolyte:** Some solutions, such as saltwater, conduct electricity because they dissociate into ions (electrolytes), while sugar solution does not conduct electricity (nonelectrolytes).
- **Solubility:** The ability of a substance to dissolve depends on temperature and the nature of the solute and solvent. For example, the solubility of salt increases in hot water.
- **Concentration:** The amount of solute in a specific volume or mass of solvent can be expressed as a percentage, molarity, or molality.

4. Practical Applications

Solutions are widely used in everyday life, medicine, and industry:

- **Biological systems:** Blood, lymph, and cellular fluids are complex solutions essential for life.
- **Medicine:** Many pharmaceutical drugs are administered in solution form to ensure proper absorption.
- **Industry:** Solutions are used in chemical reactions, extraction, purification, and production of alloys.
- **Daily life:** Saltwater, sugar water, beverages, and bronze (solid solution) are common examples.

5. Experimental Observations

Laboratory experiments demonstrated the following:

- Dissolving salt and sugar in water shows differences in solubility and saturation.
- Hot water dissolves more solute than cold water, confirming temperature dependence.
- Conductivity tests distinguish electrolytes from nonelectrolytes.
- Using color indicators allows visual observation of solution homogeneity and the effect of concentration.

By combining theoretical knowledge with experimental observations, this study highlights both the fundamental concepts of solutions and their practical significance in everyday life, medicine, and industry.

1. Theoretical Methods

- **Literature Review:** Chemistry textbooks, scientific articles, and online resources were analyzed to gather information about the concept of solutions, their types, and properties.
  - *Example:* Studying the dissolution of salt and sugar in water, solid solutions (aluminum and copper alloys), and gaseous solutions (air).

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- **Data Generalization:** Solutions were categorized by state (liquid, solid, gas), saturation (saturated, unsaturated, supersaturated), and other properties.
- **Scientific Analysis:** Rules for distinguishing electrolytes and nonelectrolytes, as well as their practical applications, were examined.

2. Experimental Methods and Examples

1. **Preparation of Simple Solutions:**
   - *Example 1:* Dissolving 10 g of table salt in 100 ml of water to observe saturation limits.
   - *Example 2:* Dissolving 5 g of sugar in 50 ml of water to study transparency, mixing rate, and solubility.
2. **Determination of Concentration:**
   - The concentration of solutes was calculated in percentage and molar units.
   - *Example:* Dissolving 20 g of KCl in 200 ml of water and calculating % concentration to determine saturation.
3. **Electrolyte vs. Nonelectrolyte Testing:**
   - The ability of different solutions to conduct electricity was tested.
   - *Example:* NaCl solution conducts electricity (electrolyte), while sugar solution does not (nonelectrolyte).
4. **Effect of Temperature:**
   - Solubility changes with temperature were observed.
   - *Example:* Dissolving 20 g of salt in hot and cold water and comparing solubility; solubility is higher in hot water.
5. **Solid Solution Experiments:**
   - Observing the homogeneity of metal alloys, e.g., aluminum + copper mixtures.
6. **Gaseous Solution Experiments:**
   - Dissolving gases such as carbon dioxide in water and observing solubility.
   - *Example:* The fizzing of soda water demonstrates CO_2 solubility.
7. **Visual Observation Experiments:**
   - Using color indicators to monitor mixing rate and transparency.
   - *Example:* Cobalt chloride solutions show color changes at different concentrations in water.

3. Materials

- **Liquids:** water, vinegar, alcohol
- **Solids:** table salt, sugar, potassium chloride, sodium bicarbonate
- **Gases:** carbon dioxide, oxygen (from air)
- **Equipment:** beakers, flasks, measuring cylinders, spoons, voltmeter, water bath
- **Additional Materials:** color indicators for visual observation

These methods and experiments allowed for a detailed study of solutions' theoretical concepts, physical and chemical properties, solubility, concentration, and electrolyte behavior. The experiments also connected the topic to real-life applications in medicine, industry, and everyday life.

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Conclusion. **Solutions are one of the fundamental concepts in chemistry, playing a critical role in nature, medicine, industry, and everyday life. This study explored the definition of solutions, their components (solvent and solute), types based on state, concentration, and saturation, as well as their physical and chemical properties, including electrolytes and nonelectrolytes. Laboratory experiments demonstrated the solubility, saturation limits, concentration effects, and conductivity properties of various solutions. The results confirm the practical significance of solutions in biological systems, pharmaceutical applications, industrial processes, and daily life. In conclusion, understanding solutions not only strengthens theoretical knowledge in chemistry but also provides a foundation for their practical applications, making this topic both scientifically and practically relevant.**

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