



STUDYING COMPLEX COMPOUNDS IN CHEMISTRY CLASSES

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Annotatsiya: *Kimyo fanining asosiy yo'nalishlaridan biri kompleks birikmalarni o'rganishdir. Kompleks birikmalar, metall ionlari va ligandlar o'rtasida hosil bo'lgan murakkab strukturalardir. Ularning o'ziga xos xususiyatlari va kimyoviy xossalari, talabalar uchun nafaqat nazariy bilimlarni, balki amaliy ko'nikmalarni ham rivojlantirish imkonini beradi. Ushbu maqolada, kompleks birikmalarni o'rganish jarayoni, uning ahamiyati va ta'lim jarayonidagi o'rni haqida ma'lumotlar berilgan.*

Kalit so'zlar: *kompleks birikmalar, kimyo, metall ionlari, ligandlar, yangi birikmalar, amaliy ko'nikmalar, ta'lim.*

Аннотация: *Одним из основных направлений химии является изучение сложных соединений. Комплексные соединения – это сложные структуры, образующиеся между ионами металлов и лигандами. Их специфические характеристики и химические свойства позволяют студентам развивать не только теоретические знания, но и практические навыки. В этой статье мы дадим подробную информацию о процессе изучения сложных соединений, его значении и месте в учебном процессе.*

Ключевые слова: *комплексные соединения, химия, ионы металлов, лиганды, новые соединения, практические навыки, образование.*

Abstract: *One of the main areas of chemistry is the study of complex compounds. Complex compounds are complex structures formed between metal ions and ligands. Their specific characteristics and chemical properties allow students to develop not only*



theoretical knowledge, but also practical skills. In this article, we will give detailed information about the process of learning complex compounds, its importance and place in the educational process.

Key words: *complex compounds, chemistry, metal ions, ligands, new compounds, practical skills, education.*

INTRODUCTION

Complex compounds are chemical compounds formed between metal ions and ligands. Ligands are molecules or ions that bind to metal ions and surround them. They change the chemical properties of metal ions and form new compounds. For example, a copper-ammonia complex is formed as a result of the combination of copper (Cu) ion with ammonia (NH₃) ligands. This process makes it easier for students to understand chemical reactions. Studying complex compounds in chemistry classes is important for students. During the lessons, students will have the opportunity to learn how to synthesize complex compounds, study their properties and observe their chemical reactions. This process helps to develop chemical thinking among students.

MATERIALS AND METHODS

Practical experiments play an important role in the process of studying complex compounds. Students perform various experiments to observe the bonds between metal ions and ligands. For example, students synthesize color complex compounds and study their colors and properties.[1]

These experiments make it easier for students to understand complex compounds and allow them to see their chemical properties in action. Theoretical knowledge is also important in the process of studying complex compounds. Students learn theoretical knowledge about how to identify complex compounds, their structure and properties. This knowledge provides students with a deep understanding of chemistry and inspires them to pursue scientific research in the future. Complex compounds play an important



role not only in chemistry, but also in biological processes. Some complex compounds, for example, metal complexes, perform important functions in the body. Students will learn the role of these complexes in the body and their use in medicine. It provides students with an in-depth understanding of the practical applications of chemistry. Also, complex compounds help to understand environmental issues. Some complex compounds, such as heavy metal complexes, can have harmful effects on the environment. Students will have the opportunity to learn about these issues and help develop ways to protect and use the environment safely.[2]

RESULTS AND DISCUSSIONS

The process of studying complex compounds creates an opportunity for students to feel themselves as scientific researchers. They will have the opportunity to conduct scientific research by synthesizing new complex compounds, studying their properties and observing their chemical reactions. This process helps students develop scientific thinking and problem solving skills. The process of studying complex compounds is important in chemistry, and various practical experiments are carried out in this process. These experiments help students gain a deeper understanding of complex compounds and allow them to see their chemical properties in action. First of all, experiments on the synthesis of complex compounds are important. Students participate in the process of preparing complex compounds using various metal ions and ligands. For example, the process of preparing a copper-ammonia complex using copper sulfate and ammonia will be interesting and instructive for students. In this process, students observe each step of the synthesis process and study the reaction conditions. Color observation experiments are also important. Complex compounds are often colored, and their colors depend on the bonds between ligands and metal ions.[3]

Students learn about the structure and properties of this complex by forming a complex with iron (III) ions and thiocyanate ions and observing the color of this complex. Color variations create interesting experiences for students in the process of



learning complex compounds. Experiments to observe chemical reactions also take their place. Students conduct various chemical reactions with complex compounds and study their properties in reactions. For example, by testing complex compounds in acidic or basic environments, students have the opportunity to study their stability and reactivity. Through spectroscopic analysis experiments, students learn to analyze complex compounds using UV-Vis spectroscopy. Studying the absorption spectrum of complexes using this method provides important information about their structure and properties. Students gain a deeper understanding of complex compounds by analyzing spectroscopic data. Stability analysis is also an important experience. Students conduct experiments under various conditions to study the stability of complex compounds. In this process, the complex is broken down or transformed into new compounds. Students gain a deeper understanding of complex compounds by studying the effects of changes in pH or temperature. In the process of studying the effect of ligands, students form complex compounds with various ligands and study the effect of ligands on the binding of metal ions.[4]

This process creates fun and educational experiences for students. Comparing the properties of complexes prepared using different ligands provides important knowledge for students. Finally, experiments to study biological effects are also important. Some complex compounds play an important role in biological processes. Students conduct experiments to study the biological activity of metal complexes. For example, studying the relationship of iron complexes with hemoglobin will be interesting and useful experiences for students. In general, hands-on experiences during the study of complex compounds help students gain a deeper understanding of the field. Each experience provides an opportunity for students to develop new knowledge and skills. This process helps to learn interesting and important aspects of chemistry.[5]



CONCLUSION

In general, the study of complex compounds in chemistry classes is an important and interesting process for students. This process helps not only to learn chemical knowledge, but also to develop practical skills. By studying complex compounds, students gain in-depth knowledge in the field of chemistry and have the opportunity to conduct scientific research in the future. Also, this process helps to develop environmental awareness and environmental protection among students. The study of complex compounds in chemistry classes will play an important role in the development of new technologies and drugs in the future.

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