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INNOVATIVE AND HISTORICAL APPROACH IN THE PROCESS OF TEACHING INORGANIC CHEMISTRY

Numonov Bakhtiyorjon Omonjonovich
Kokand State Pedagogical Institute, Doctor of Philosophy in Technical Sciences (PhD), Associate Professor

Annotation
This article discusses the issues of innovative and historical approaches in the process of teaching the subject of inorganic chemistry. The evolution of the formation of chemistry as a science and the stages of development of its teaching, as well as the cognitive and educational value of chemistry, are taken into account. Recommendations are given on the inclusion of historical chronicle and personal value materials in the educational process for the study of inorganic chemistry. An increase in the scientific nature of teaching inorganic chemistry in particular, and chemistry in general, is predicted as a result of the use of historical materials on the development of chemical sciences.

Keywords: history of chemistry, problems of teaching chemistry, genesis of chemical sciences, evolution of chemistry, innovations in education.

Historical information concerning the path of development of chemistry as a science, the emergence and accumulation of chemical knowledge, the formation and formation of a chemical worldview, the most important chemical discoveries, the role of scientists and researchers in the genesis and evolution of knowledge about the material world and chemical transformations occurring in it, have not only cognitive, but also a deep educational value.

For a chemistry teacher, history is not only a source of new facts and illustrations, but also a powerful tool for pedagogical influence on students. The history of chemistry, as a repository of archaic examples, phenomena, facts, information, discoveries, generalizations, victories and defeats, advantages and disadvantages, serves as an arouser of interest and a lever for the development of critical thinking.

Only historical educational material allows students of chemistry to present science as a living stream of emerging and dying hypotheses and theories belonging to the creators of chemistry.

A.M. Butlerov himself, the founder of the theory of the structure of organic compounds, once stated the significance and moral and instructive meaning of historical and methodological materials and information from the entire arsenal of chemical knowledge: “When looking at the past, young chemists will draw guidance for themselves in order to work more usefully in the future” [1, 2].

The "godfather" of the periodic law and the periodic system of chemical elements - D.I. Mendeleev believed that the study of the history of science is necessary not only to understand the complex path of development of science, but also to awaken an active interest in its modern problems. And this is largely achieved only when a person has a scale for their versatile assessment, which allows him to take a general look at scientific research, look back and only then turn back to the present day, tomorrow [3, 4].

Throughout its long history, chemistry has solved two interrelated cardinal problems: obtaining substances with useful properties, explaining the causes of the origin and conditionality of various

properties of substances. This fact should be the focus of attention of Methodist chemists, since the historical interpretation of the fate of chemical science does not always sound unambiguous.

Chemistry developed on the basis of the inanimate material world, since the “disassembly” of representatives of organic chemistry (and this is bioorganic and biological chemistry, or the chemistry of life) took place too late. Without the influence of the demands of practice, everyday life and the needs of mankind, interaction with related sciences (physics, mineralogy, biology), it is difficult to understand and reveal the causes of the development of chemistry.

One of the major historians of chemistry, the famous popularizer of this science, Yu.I. Soloviev, rightly classified the history of chemistry into the following main periods:

1. The origin and development of chemical art (from ancient times to the 11th century).
2. Formation of chemistry as a science (from the second half of the 11th century to the end of the 1111th century).
3. Substantiation and development of chemical science based on the oxygen theory and atomic and molecular theory (end of the 1111th century - 1860s).
4. The transformation of chemistry from a descriptive science into a science that studies the causal relationship between the composition, structure and properties of substances, as well as the mechanism of their transformations (from the 1860s to the present) [2].

Unfortunately, the adopted and current State educational standards of the continuous education system of the Republic of Uzbekistan unfairly do not reflect the true historical value of the emergence, formation, formation and development of chemical thinking, since neither historians of chemistry nor noble chemists-methodologists participated in their development. Shortcomings in teaching chemistry, first of all, are noticeably manifested in the process of teaching inorganic chemistry.

The latter, above all, is the foundation of the chemical worldview. Although the number of inorganic substances is undoubtedly much smaller than organic substances (500 thousand and 18 million, respectively), the chemistry of inorganic compounds is relatively vast. In addition, the rapid pace of development of the latter is currently leading, according to experts, to a doubling of scientific information every ten years. Therefore, attempts to teach inorganic chemistry without its origins and history are doomed to failure [5].

At present, when deep reforms are taking place in the system of continuous education of the Republic of Uzbekistan, all those provisions of it should be disclosed that will allow you to get answers to the most important questions, in a comprehensive historical context: what are the reasons for the stability (existence) of some inorganic compounds and instability (absence) of others, what are the distinguishing features of a chemical reaction between given inorganic compounds, what are the reasons for the similarity or difference in the properties of chemical elements and their various compounds (in the light of the periodic law), which are of a general nature and have sufficient predictive power, why the history and germs of chemical thinking are so tempting, why mankind needed archaic and simple chemical knowledge. What was the need for knowledge of the "bricks" of the material universe - chemical elements, the discovery of stoichiometric laws and basic theories, etc. manifested itself in?

The volume and content of information on inorganic chemistry changes almost every day. And every passing day becomes her living history. The principle of historicism, along with scientific, systematic, practical and many other principles of didactics, retains its modern significance. Once again,

unfortunately, we will have to admit with bitterness that the current components of the educational and methodological complex, including textbooks and teaching aids in chemistry, strongly ignore historical materials [6].

In this situation, in our opinion, it is urgently necessary to include historical chronicle and personal value materials in the educational arsenal of inorganic chemistry. Work in this field should be carried out primarily in the following areas:

1. History and chronology of the discovery of chemical elements.
2. Chemistry of the ancient world and its contribution to the treasury of modern chemistry.
3. Alchemy - as a phenomenon in inorganic chemistry.
4. Classical chemistry - as a cradle of knowledge in inorganic chemistry.
5. Modern chemistry with its historical origins.
6. "The future does not threaten destruction, but only promises superstructures to the periodic law" (D.I. Mendeleev).
7. Atomic-molecular science - as the core of the course of inorganic chemistry.
8. Laws, theories, concepts, things and substances - in the person of their discoverers.
9. The inseparable triangle of inorganic chemistry - "history, modernity, future".
10. “Not gods burn pots,” but chemists idolize and perform miracles.

And finally, without ignoring the ideological, educational, inquisitive and exciting aspects of historical material, we can assert with deep conviction that the use of such information and facts greatly increases the scientific nature of teaching inorganic chemistry in particular, and chemistry in general. The only problem is that the use of historical material in the course of any branch of chemistry should be set in such a way that it does not violate the logic of the development of science itself.

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