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INTERDISCIPLINE SEMINAR ON "APPLICATION OF THE LAWS OF ELECTROLYSIS"

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ABSTRACT:

This article discusses the technology of conducting interdisciplinary seminars on "Application of the laws of electrolysis."

Keywords: education, training, skill, qualification, knowledge, process, concept, landscape, electrolysis, dissociation, ion, covalent, polar, electrolyte, reaction, electrode.

INTRODUCTION:

In order to increase the cognitive effectiveness and practical orientation of the educational process, it is advisable to use the form of organization of this process in the form of seminars. In the systematization and generalization of knowledge acquired in related disciplines, the use of interdisciplinary seminars provides a wide range of opportunities for in-depth study of the basic concepts of related courses, expanding students' knowledge of applied phenomena and laws, shaping the scientific worldview, as well as generalization. Related teachers of science will take part in the preparation of such a seminar. Each teacher compiles a list of literature for students to read in advance. He also shows literature for the preparation of abstracts and information for lectures (at least two sources: popular science brochures, encyclopedias, articles in journals, etc.) and agrees them with the teacher who organizes the complex seminar. The workshop can last 2 hours. Students work independently with academic and popular science literature. They make plans and report theses. They write essays or participate in the discussion of lectures. At the same time, the ability to generalize knowledge from one subject to another of interdisciplinary nature, the ability and skills of comparative analysis of similar or similar concepts, questions, events in different disciplines. Take, for example, the application of electrolysis in production and technology. Electrolysis is studied in physics and chemistry. The question of its practical application will be studied in the ninth grade in both subjects. Students were introduced to the ionic conductivity of solutions and Faraday's laws in physics classes. In chemistry, they studied the processes of rotation of substances when a constant current passed through a solution or alloy. Using interdisciplinary connections in physics and chemistry classes, the question of the application of electrolysis can be highlighted. General secondary education for the development of science and technology is necessary and sufficient scientific level can be achieved only in the process of joint training. We describe the technology of the interdisciplinary seminar "Application of electrolysis in engineering and production", conducted jointly by teachers of physics and chemistry of IX grade. Prior to the seminar, students will be given the following seminar assignments in physics and chemistry:

Electrolytic dissociation, dissociation mechanism with ionic and covalent polar bonds. The structure of the water molecule,

1) Its role in electrolytic dissociation.
2) Ionic permeability of aqueous solutions and electrolyte solutions.
3) Oxidation-reduction processes in the passage of current through electrolytes.
4) Secondary processes at electrodes.
5) Faraday's laws for electrolysis, their physical and chemical meaning.

PRACTICAL APPLICATION OF ELECTROLYSIS:

1) Extraction of alkali and alkaline-earth metals;
2) Electrolytic chlorine production;
3) Formation of sharp alkalis;
4) Electrochemical production (extraction) of aluminum;
5) Purification of copper from impurities. ;
6) Electrochemical separation of water.

PHYSICS AND CHEMISTRY TEACHER'S WORK TOGETHER TO PREPARE A WORKSHOP PLAN, OUTLINING ITS MAIN OBJECTIVES. FOR EXAMPLE:

1) Repetition and generalization of the basic concepts and laws studied in physics and chemistry courses on electrolytic dissociation, oxidation-reduction processes, and Faraday's laws for electrolysis.
2) To study the practical application of electrolysis in engineering and production. 3. Formation of the basis of dialectical worldview.
3) To form students' interest in learning, the ability to distinguish the main material, logical thinking.
4) Continue to educate students ideologically, politically and economically, using materials on the need to save the use of metal, to protect metals from corrosion. Demonstrate the importance of electrochemistry for the development of science and technology.
5) To form an explanation of the social significance of human labor on the basis of ideas about modern electrochemical production, the role of science in its development. 7. Help to direct students to professions in the field of electrochemistry, to acquaint them with the example of electrochemical production of the galvanic shop of the plant.
6) 8. Continue to develop the following general learning, skills and competencies: planning the answer, preparing brief information on a given topic, preparing summary tables, being able to explain the results of the observation.

SEMINAR PLAN:

1) Interview on questions asked to students the day before the seminar.
2) Experiment on electrolysis of copper sulfate solution.
3) Theoretical derivation of Faraday's law (student information).
4) Discuss the table of chemical processes in the practical use of electrolysis (as a task to be performed when discussing with the team). 5. Teamwork on quantitative and qualitative issues.
5) Practical application of electrolysis in the main chemical industry, metallurgy, metalworking industry (student presentations on the prepared abstracts; use of the poster "Application of electrolysis in the national economy" and the stand "Electrochemical industry").
6) Conclusion of the seminar facilitator. Information on educational institutions teaching electrochemical professions.

EQUIPMENTING:

Posters on "Electrochemical production of aluminum", "Application of electrolysis in the national economy", film "Electrolysis and its application", film "Aluminum", "Metal

extraction from ore", and stand "Electrochemical industry". Product samples prepared by galvanoplasty method. Electrolyte: 450 ml of water, 25 g of crystalline copper sulfate. Instruments and equipment for solving quality problems: a device for monitoring the movement of ions, a device for electrolysis; potassium nitrate solution with phenolphetalene; water container, two copper electrodes, paraffin.

Conducts a frontal conversation with the students conducting the lesson. The conversation repeats the following: ionic and polar covalently bonded compounds - acids, alkalis, soluble salts, electrolytes. They can dissociate in polar solvents.

ε = 81. Coulomb's law is used to explain this value, and it is shown that the attraction of ions in water is 81 times weaker than in a vacuum. In ionic conductivity, the displacement of a substance as a result of the passage of an electric current is determined. The essence of electrolysis as an oxidation-reduction process that occurs at the electrodes during the passage of an alternating current is repeated. In the example of the electrolysis of a calcium fluoride solution, it is noted that the oxidizing and reducing effects of electric current are several times stronger than the effects of chemicals (therefore, fluorine could not be formed freely until the salt solution used electrolysis for a long time). Then the students conducted an experiment on the electrolysis of a solution of copper (II) sulfate and wrote the corresponding equation of the reaction. Students are reminded that there may be secondary processes at the electrodes due to the possible interaction reactions of the electrolysis products with the materials from which the electrodes are prepared, and relevant examples are given. After talking to the students, they are reminded that Faraday's law is a quantitative law of electrolysis. The students found the electrochemical equivalent in a laboratory work done before physics. Faraday's law can also be derived theoretically on the basis of the molecular-kinetic theory of the structure of matter. This conclusion is recommended when a pre-prepared student speaks.

1. M = moi N1, where: moi is the mass of the first ion; N1 is the number of ions reaching the electrode.
2. Here; M - molar mass; NA - Avogadro.
3. Here; q is the charge passing through the electrolyte, the first ionic charge, qoj is the whole multiple of the elementary charge.

REFRENCES:

1) Воронков Г.Я. Электричество в мире химии. –М.: Знание, 1987.
2) Манолов К. Великие химики. Перевод с болгарского языка. Т.1. –М.: -Мир, 1985. С. 262-279.
3) Kurbonova Gulnoza Abdukhalik qizi. № 17 (255) / 2019 The notions of “knowledge”, “action” and “learning” p217 Молодой ученый Международный научный журнал
4) Qurbonova Gulnoza Abduholiqovna. (2021). EPISTEMOLOGICAL APPROACHES AND THE PSYCHOLOGY OF KNOWLEDGE. Emergent: Journal of Educational Discoveries and Lifelong Learning (EJEDL), 2(04), 50–53. Retrieved from https://ejedl.academiascience.org/index.php/ejedl/article/view/23
5) Qurbonova Gulnoza Abduholiqovna. (2021). DEVELOPMENT OF THE CONCEPT “KNOWLEDGE” IN ENGLISH. Academicia Globe: Inderscience Research, 2(04), 91–94. Retrieved from https://agir.academiascience.org/index.php/agir/article/view/59