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EXPERIMENTS ON THE PROPERTIES OF UNSATURATED HYDROCARBONS USING INNOVATIVE TECHNOLOGIES

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ABSTRACT: Nowadays, there is a growing interest in the use of interactive methods, innovative technologies, pedagogical and information technologies in the educational process, one of the reasons for this is the fact that while students are taught to acquire only ready-made knowledge, modern technology teaches them to search for, study and analyze independently, and even draw their own conclusions. In this process, the teacher creates the conditions for the development, formation, acquisition and upbringing of the individual, and at the same time acts as a leader, a guide. The student becomes the main figure in the learning process. It should be noted that at this point we can take into account the specifics of teaching chemistry. It is because now, thanks to innovative technologies, even complex chemical topics are much easier to remember and study. In this article, I want to talk about unsaturated hydrocarbons, which is one of these topics.

KEYWORDS:unsaturated hydrocarbons, innovative technologies,study, analyze, nomenclature, interactive methods.

Therefore, the role and place of modern teaching methods - interactive methods, innovative technologies in the training of qualified professionals in higher education and faculties is enormous. Knowledge, experience and interactive methods related to pedagogical technology and pedagogical skills ensure that students acquire knowledgeable, mature skills.

Innovation is the introduction of something new. Innovative technologies are a pedagogical process, as well as innovations and changes in the activities of teachers and students, the implementation of which is based on the full use of interactive methods. Interactive methods are called collective thinking, i.e. methods of pedagogical influence are an integral part of the educational content. The peculiarity of these methods is that they are carried out only through the interaction of educators and students.

This process of pedagogical cooperation has its own characteristics, which include:

- Force the student to be indifferent during the lesson, to think independently, to be creative and to explore;
- Ensuring that students have a constant interest in knowledge in the learning process;
-Increase the student's interest in knowledge independently, creatively approaching each issue;
-Organization of constant joint activities of the teacher and the student.

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According to teachers, researchers, practitioners studying the problems of pedagogical technology, pedagogical technology is associated not only with information technology, but also with TSO, computer, distance learning, which must be used in the teaching process or the use of different techniques. In our opinion, the main basis of pedagogical technology depends on the technology chosen so that the chemistry teacher and the student can achieve a guaranteed result from the set goal, that is, to achieve a guaranteed result in the learning process. Every educational technology used must be compatible.

As can be seen from the diagram above, the achievement of the goal and the achievement of the guaranteed result depends on the collaborative activity of both the teacher and the student and the goal they set, the chosen content, method, form, tool, i.e. technology.

It is up to the teacher and the student to choose which technology to use to achieve the goal, because the main goal of both parties is clear: to achieve the result, in which the technology used depends on the level of knowledge of students, the nature of the group, the situation to achieve it you will probably need to work with a computer, maybe you will need film, handouts, drawings and posters, various publications, information technology, it all depends on the teacher and the student.

The above-mentioned technological map, drawn up by the teacher for each subject of the subject, for each lesson, gives him a holistic idea of the subject, the subject, the beginning of the whole learning process, the purpose of the whole , will help you to get the result you want. In particular, the design of the technology card based on the capabilities and needs of the student leads him or her to the center of learning as an individual. This will increase the effectiveness of teaching.

In the process of teaching, the student is considered as an individual, the use of various pedagogical technologies and modern methods allows them to think independently, freely.

A creative approach to research, a sense of responsibility, research, and analysis enhances interest in the effective use of scientific literature and, most importantly, in reading, science, pedagogy, and the profession of one's choice.

Achieving this result requires the use of innovative and information technologies in the learning process in practice. They are very diverse. We will talk about some of them and give instructions on how to do them. The modern methods presented in this manual, or technological trainings that help to increase the effectiveness of teaching, are necessary for students to develop logical, intellectual, creative, critical, independent thinking, develop skills, become competitive, mature professionals and professionals helps to nurture the professional qualities you want. It is also very convenient if the teacher and the student work together to teach the topic of unsaturated hydrocarbons in chemistry. Let’s take a brief look at them.

Are unsaturated hydrocarbons different from saturated hydrocarbons in structure and chemical properties?

Alkenes are also called olefins, ethylene series hydrocarbons, and they form a homologous row with the general formula C_nH_{2n}. Alkynes are also called acetylene series hydrocarbons and form a homologous series with the general formula C_nH_{2n-2}.

Electronic structure: [in the example of ethene (ethylene) and ethin- (acetylene)].

Strongly heated alkanes split hydrogen atoms into unsaturated hydrocarbons.

1. Unsaturated hydrocarbons - hydrocarbons in which the carbon atoms in the molecule are connected by a double or triangular bond.
2. The most important representatives of unsaturated hydrocarbons are alkenes (ethylene series), alkadienes (diene series), alkynes (acetylene series).
3. Alkenes are hydrocarbons with one double bond in the molecule.
4. Alkadienes are hydrocarbons with two pairs in the molecule.
5. Alkynes are hydrocarbons with one triangle in the molecule.

The distance between the carbon atoms in ethane decreases from 0.154 nm to dab ethylene to 0.133 nm. The angle between the gardens also varies from 109 ° 28 'to 120 °, respectively. Modern mazars of the structure of matter explain this phenomenon as follows. The two p-electrons of ethylene belonging to the carbon atoms separated by hydrogen atoms form a p-bond. Thus, the carbon atoms in ethylene are joined by a double bond consisting of one s-bond and one p-bond. The change in angle by 120 ° occurs as a result of sp_2-hybridization. Unlike ethane, ethylene hybridizes one s-orbital and two p-orbitals (p_x and p_y) does not participate in the third p_z-orbital hybridization, which forms a p-bond and has a minimum energy density in the s-bond plane. As a result, each carbon atom in ethylene forms three s_p^2-hybridized orbital at an angle of 120 ° to each other in the same plane.

Hybridized orbitals form one s-bond between carbon and two s-bonds with s-orbitals of hydrogen. Therefore, the s-bonds of the six atoms in ethylene are in the same plane, and the p-bond is in the plane perpendicular to that plane. The p-bond stabilizes the ethylene molecule in this case, and the double-bonded molecules do not have free circulation around this bond. Therefore, geometric stereoisomerism is observed in double bonds.

• Geometric stereoisomerism is an isomerism that results from differences in spatial arrangement around substituents.

• Structural isomerism is the isomerism associated with the branching of a carbon chain and the location of a double bond.

The bond between the carbon atoms in ethene is much shorter than in ethane. H - C = C - H (0.120 nm). The angle between the bonds is 180 ° and the molecule has a linear structure. The convergence of the carbon atoms in ethene is explained by the formation of two p-bonds from the two p_y-electrons of these carbon atoms. The triangle in Etiden consists of one s-bond and two perpendicular p-bonds. An angle of 180 ° is the result of sp-hybridization. Unlike ethene,meat has one s-orbital and one p-orbital hybridized. As a result, each carbon atom in the flesh has one sp-hybrid orbital. They are involved in the formation of one s-bond between carbon and another s-bond with the s-orbital of hydrogen. The ethin molecule has five bonds: three s-bonds and two p-bonds.

Isomerism: Structural isomerism and geometric stereoisomerism are observed in alkenes starting from the butene, while only structural isomerism (starting from the butine) is observed in alkenes. When naming alkenes, the suffix -in is added to the base of the corresponding alkane, and in alkynes -in, and when naming isomers, the carbon atoms are numbered on the side where the double or triple. The number of isomers of unsaturated hydrocarbons is much higher than the number of isomers of

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saturated hydrocarbons. It is because unsaturated hydrocarbons contain p-bonds. The p-bond also changes position in the carbohydrate chain.

Pentene isomers and nomenclature:

1) Isomerism due to the displacement of the double bond:

$CH_2 = CH - CH_2 - CH_2 - CH_3$ - pentene-1

$CH_3 - CH = CH - CH_2 - CH_3$ –pentene-2

2) Isomerism due to chain branching:

$CH_2 = C - CH_2 - CH_3$ 2-methylbutene-1

|

CH_3

$CH_3 - C = CH - CH_3$ 2-methylbutene-2

|

CH_3

$CH_2 = CH - CH - CH_3$ 3-methylbutene-1

|

CH_3

Stereoisomers are named after the trans- prefix alken if the same substituents are located in the plane on one side of the pair and on the other side.

For example, there are cis- and trans-isomers of butene-2:

CH_3CH_3 is sis - butene-2 H CH_3

\ / \ /

C = C C = C

/ \ / \

H H trans - butene-2 □ CH_3 H

Physical properties: Lower alkenes - gas, from C_5H_{10} to $C_{14}H_{28}$ - liquid, high alkenes - solids. All alkenes are almost insoluble in water, partially soluble in alcohol. The first three representatives of alkynes are gases, C_4 to C_8 are liquids, and the next are solids.

Chemical properties: Alkenes and alkynes are more active substances than alkanes. Let's look at their chemical properties in the case of ethylene-ethene and acetylene-ethin. It is because p-electrons form an overlap outside the molecular plane, the smaller the p-bond stability, the greater their chemical activity. Chemical reactions involve carbon that is initially double or triple, so it is characterized by a coupling reaction.

Accumulation of halogens (halogenation):

When exposed to brominated water, alkenes and alkynes decolorize it. This reaction is used to determine unsaturated hydrocarbons:

$CH_2 = CH_2 + Br_2 \rightarrow CH_2Br - CH_2Br$ 1,2 - dibromethane

$CH = CH + Br \rightarrow CHBr = CHBr$

1,2 - dibromethane

$CHBr = CHBr + Br_2 \rightarrow CHBr_2 - CHBr_2$ 1,1,2,2 - tetrabromethane

Hydrogen accumulation (hydrogenation):

This reaction takes place under the catalyst of platinum, palladium, nickel and other metals:

$CH_2 = CH_2 + H_2 \rightarrow CH_3 - CH_3$

$CH = CH + H_2 \rightarrow CH_2 = CH_2$

$CH_2 = CH_2 + H_2 \rightarrow CH_3 - CH_3$

Combination of hydrogen halides (according to Markovnikov's rule):

$CH_3 - CH = CH_2 + HBr \rightarrow CH_3 – CH_2Br - CH_3$ 2-bromopropane

The addition of hydrogen halides to alkynes occurs at 120-180 ° C and in the presence of activated carbon or mercury salts:

Hc = CH + HBr → HCBr = CH_2bromethane

Modern theory of the structure of matter explains this phenomenon as follows. Methyl radical CH_3 - pushes an electron pair (positive induction effect), vinyl radical CH_2 = CH - attracts electrons (negative induction effect). As a result, the symmetrical double pole is partially polarized. Therefore, the H + cation bind to a carbon atom with a high electron density, and the anion (Br-) to a carbon atom with a low electron density.

• According to Markovnikov's rule, when substances with a mobile hydrogen atom are attached to unsaturated bonds, the hydrogen atom binds to a more hydrogenated carbon

atom (the rest of the molecule binds to a less hydrogenated carbon atom).

When teachers use interactive methods to master the topic, creating an appropriate atmosphere for each other and students actively participating in the lesson as a group on the basis of various quizzes, the level of comprehensibility of the topic will increase.

CONCLUSION

In short, the effectiveness of teaching is enhanced through the active methods of Inter, the interaction between teacher and student. Students developed and formed free creative thinking skills. In this innovation approach, the student becomes a central figure in personal learning. Non-traditional forms of reading interactive methods can be divided into 3 groups: collaboration in teaching, modeling, research model of learning. I think these methods always work.

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