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MODERN TENDENCES IN ORGANIC SYNTHESIS

Organic chemistry keeps developing very actively, suggesting new methods of synthesis of the molecules. Nowadays chemists are trying to make synthesis faster, cheaper and more environmentally-safe. Organic synthesis plays a key role in modern technological and pharmaceutical progress. As for today, the number of organic compounds is close to 10 million and there is a lot more to discover. Hundreds of new substances are synthesized in chemical laboratories every day. New reactions are discovered, new methods of obtaining organic substances are developed, new methods of stimulating chemical reactions and new methods of studying chemical compounds are introduced.

Results of synthesis

The products of organic synthesis carried out on an industrial scale are plastics, chemical fibers, dyes, medicines, agricultural chemicals, detergents, fragrances and many other substances and materials necessary for human society. In organic chemistry, the term "synthesis" refers to the construction of molecular structures that have a specific chemical and spatial structure. Sometimes this construction may involve one or a small number of operations, but it can also be very complex, involving several dozen stages.

Environmental problem

The most common resources used for organic synthesis are oil, natural gas and petroleum refining gases. This poses a problem for chemists regarding environmental pollution. The impact of petroleum products on living organisms is manifested in disturbances of physiological activity, diseases caused by the introduction of hydrocarbons into the body, changes in the biological characteristics of the habitat, etc. Some fractions contained in oil are toxic. It should be noted that the higher the concentration of these fractions when absorbed or dissolved in water, the higher their toxicity. Oil forms toxic emulsions that cause suffocation in living organisms.

Petroleum products entering the aquatic environment can be destroyed by microorganisms, although this process is quite slow. Petroleum products can accumulate at the bottom of water bodies, which leads to secondary pollution of the environment. The impact of oil pollution on the environment is very large and complex. In connection with the development of the oil industry, it can be assumed that the area of territories polluted by oil and oil products will increase.

Consequently, the environmental situation that exists at the moment will worsen, which will directly affect human health.

Alternate methods

Due to this problem, chemists are trying to use new methods in organic synthesis, such as photo catalysis, organometallic catalysis and "green chemistry". Photo catalysis is the acceleration of a chemical reaction caused by the combined action of a catalyst and light irradiation. Among the indicators determining the quality of water, one of the most important is COD, which generally indicates the presence of organic pollutants. The photocatalytic method pays for itself 8.5 times faster, so photo catalysis can be recommended as a preferable and more environmentally safe alternative to the dichromate method [1]. Chemists are trying to reduce harm to nature by using water solutions, instead of toxic ones, and using biocatalysts (for example, enzymes) [2].

Also, for resource economy scientists are working on different models of applications and artificial intelligence used for predicting the result of synthesis. For today this AI is already more accurate than humans according to studies: (87.5% against 76.5%) [3]

Modern organic chemistry has a huge amount of experimental and theoretical material, and the level of development of organic synthesis can serve as a measure of scientific and technological progress. The goal of organic synthesis is to obtain substances with valuable physical, chemical and biological properties or to test theoretical predictions. Modern organic synthesis is multifaceted and allows obtaining virtually any organic molecules.

LITERATUR

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