

DISTRIBUTION, PRODUCTION AND PROPERTIES OF ALKANES IN NATURE

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Abstract: This article studies the distribution of alkanes in nature, methods of production and their physical and chemical properties. Alkanes are saturated hydrocarbons widely distributed in natural gas and oil, and their production is carried out by methods such as hydrogenation, reaction from halogenated alkanes and cracking. The article analyzes the main chemical reactions of alkanes, including combustion and halogenation, as well as their physical properties. This study aims to highlight the importance of alkanes in chemistry and industry.

Keywords: Alkanes, Natural gas, Oil, Hydrogenation, Cracking, Combustion reaction, Halogenation, Physical properties

Introduction Alkanes are a class of saturated hydrocarbons, the molecules of which contain only one (simple) carbon-carbon bond. They are of great importance in chemistry and industry, and are widely distributed in natural gas and oil. The scientific study of how alkanes are distributed in nature, the methods by which they can be obtained, and their physical and chemical properties is necessary for education and industry. This article discusses the natural sources of alkanes, methods of their production, and properties. Distribution of alkanes in nature Alkanes are found as the main components in natural gas and oil. The main part of natural gas is methane (CH_4), but there are also other small alkanes such as ethane (C_2H_6), propane (C_3H_8), and butane (C_4H_{10}). These gases are formed as a result of the long-term decomposition of organic matter in underground formations. Oil also consists of a mixture of many alkanes, especially long-chain alkanes, and is a raw material for many industries. Alkane production The main sources of alkanes are natural oil and gas. In addition, alkanes can be obtained in the laboratory and industry by the following methods:

- Hydrogenation method: Alkanes are obtained as a result of the reduction of organic substances, especially alcohols, with hydrogen.
- Hydrogenation from halogenated alkanes: Pure alkanes can be obtained by reacting halogenated hydrocarbons with hydrogen.
- Cracking method: Long-chain hydrocarbons are converted into shorter alkanes as a result of thermal or catalytic cracking of oil.

These methods are widely used in industry and laboratories.

Physical properties of alkanes The physical properties of alkanes depend on their molecular mass. Small-molecular alkanes are in a gaseous state, while large-molecular ones are found in a liquid or solid state. They are insoluble in water, but soluble in organic solvents. Their boiling

and melting points increase with increasing molecular weight, as the dispersion forces between molecules increase. Alkanes are usually colorless and odorless substances.

Chemical properties of alkanes

Alkanes are chemically unreactive, and their molecules contain only single bonds. Their main reactions are as follows:

- Combustion: Alkanes burn completely to produce carbon dioxide and water. This process is energetically important and is used as a fuel in industry.
- Halogenation: Alkanes undergo a substitution reaction with halogen atoms under the influence of ultraviolet light. Halogen alkanes are obtained through this reaction.
- They do not react with strong acids or bases, so they are chemically stable.

Summary Alkanes are important organic compounds that are widely distributed in natural gas and petroleum. They are obtained by many methods, including hydrogenation, reaction from halogenated alkanes, and cracking. Their physical and chemical properties allow them to be widely used in industry as fuels and chemical raw materials. The study of alkanes is of great importance for modern chemistry and industry.

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