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NATURAL SOURCES OF AROMATIC HYDROCARBONS

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Abstract: This article discusses the main natural sources of aromatic hydrocarbons (AH) and the mechanisms of their formation. Processes such as oil and natural gas, volcanic activity, biodegradation, and forest fires are considered as natural sources of aromatic hydrocarbons. Information is also provided about the ecological hazard and impact of these compounds on the environment. The article covers aspects related to the scientific study of AH and the current problems of their safe management.

Keywords

• Aromatic hydrocarbons

• Natural sources

• Oil and gas

• Volcanic activity

• Polyaromatic hydrocarbons (PAH)

• Environmental hazards

• Biodegradation

• Forest fires

Introduction

Aromatic hydrocarbons are a class of organic compounds with a unique ring structure. Like benzene and its homologues, they have a ring (aromatic) structure and play an important role in the chemical industry, ecology and biological systems. These compounds are found not only in the laboratory, but also in natural sources. It is important to determine their sources of origin, ensure environmental safety, understand the petrochemical industry and biogeochemical processes.

Natural sources of aromatic hydrocarbons

Aromatic hydrocarbons (HA) are naturally isolated from the following main sources:

1. Oil and natural gas

Oil is the richest source of aromatic hydrocarbons. In particular:

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• The most important aromatic compounds such as benzene, toluene, xylene are released during oil refining.

• They are part of aromatic hydrocarbons formed as a result of the decomposition of organic residues under high temperature and pressure in oil fields.

• Many AUs are also formed as a result of thermal cracking, catalytic cracking and pyrolysis.

2. Volcanic activity

Through volcanoes and geothermal sources:

• Thermal decomposition of organic substances occurs in the Earth's inner layers under the influence of temperature and pressure.

• Benzene and other low molecular weight aromatic hydrocarbons are formed in these processes.

• Volatile aromatic compounds have been observed to be released from hot springs and fumaroles.

3. Biodegradation and plants

Some AUs are formed by plants and microorganisms through natural processes:

• Among the secondary metabolites produced by plants, there are substances with aromatic structures (for example, phenols).

• Aromatic compounds are formed as a result of the decomposition of lignin. Lignin is a structural element of plant cells.

• Some aromatic hydrocarbons are synthesized by microorganisms, especially fungi and bacteria.

4. Forest fires and natural combustion processes

• Aromatic compounds are formed as a result of the combustion of organic matter at high temperatures.

• The natural release of substances such as polycyclic aromatic hydrocarbons (PAHs) - naphthalene, anthracene, phenanthrene, etc., occurs precisely as a result of fires.

• These compounds can spread through the atmosphere to other areas.

Ecological significance and danger

Aromatic hydrocarbons, especially polycyclic aromatic hydrocarbons (PAHs), are considered environmentally and health hazardous. They:

• Can enter the atmosphere, water and soil and cause damage to biological systems.

• May have carcinogenic (cancer-causing), mutagenic and toxic properties.

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• Although the amount of aromatic hydrocarbons emitted from natural sources is small, their cumulative (accumulating) nature makes them dangerous

Conclusion

Natural sources of aromatic hydrocarbons are diverse, and they are formed as a result of geological, biological and thermal processes. These compounds play an important role in natural ecosystems, and are also an urgent issue for environmental safety. Therefore, their study, control and safe use are one of the current scientific directions.

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