Webology (ISSN: 1735-188X)
Volume 18, Number 4, 2021

Sources And Mechanisms Of Pte Accumulation By Organic Matter

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Abstract

When considering the sources of PTE entering the composition of hydrocarbons, it is advisable to divide them into primary and secondary. The author considers as primary those of them that accumulated in the organic matter, which was the source of hydrocarbons, and as secondary - sources, the second hydrocarbons received from the host environment for the entire period of their ontogenesis. Consequently, the primary PTEs in hydrocarbons are considered to be genetically inherited hydrocarbons from the OM that generates them, and the secondary ones are those obtained from the time of the formation of oil and gas during their migration, accumulation and destruction.

Keywords: PTE, organic, hydrocarbon, composition

1. Introduction

In the European part of Russia, the residual fund of oil resources is dominated by oil with increased and high density, enriched with potentially toxic elements (PTE). The study and accounting of the levels of natural and technological enrichment of oil and gas feedstock PTE is able to prevent or reduce the negative impact on the natural environment. Availability of information on the composition and content of impurities biotoxicants in oil and gas raw materials
- a necessary and sufficient condition for the development and application of protective measures at the stage of selecting technologies for extraction, processing and disposal oil and gas.

The paper presents related studies and Analysis of **Sources and mechanisms of PTE accumulation by organic matter**

Research questions:

Question 1: What are related researches and Analysis of **Sources and mechanisms of PTE accumulation by organic matter**?

2. **Methodology**

   Authors have used qualitative and analytical methods, descriptive method for primary model, synthesis and discussion methods in this paper.

   We also used historical materialism method.

3. **Main findings**

Analysis of problem :

Separation of the processes of income and accumulation or loss of PTE by hydrocarbons into two different stages is necessary, since these are two completely different temporal and physicochemical processes.

During the primary stage, OM enriched with PTE is formed. It includes lifelong accumulation of potential toxicants by biota together with the early stages of dia- and proto- catagenesis , when HC generation has not yet begun. Figure 1 " Distribution of chemical elements in the lithosphere and living matter" illustrates this process well.

The secondary stage begins with the generation of hydrocarbons from organic matter, includes primary and then secondary migration, covering the entire course of hydrocarbon ontogeny.

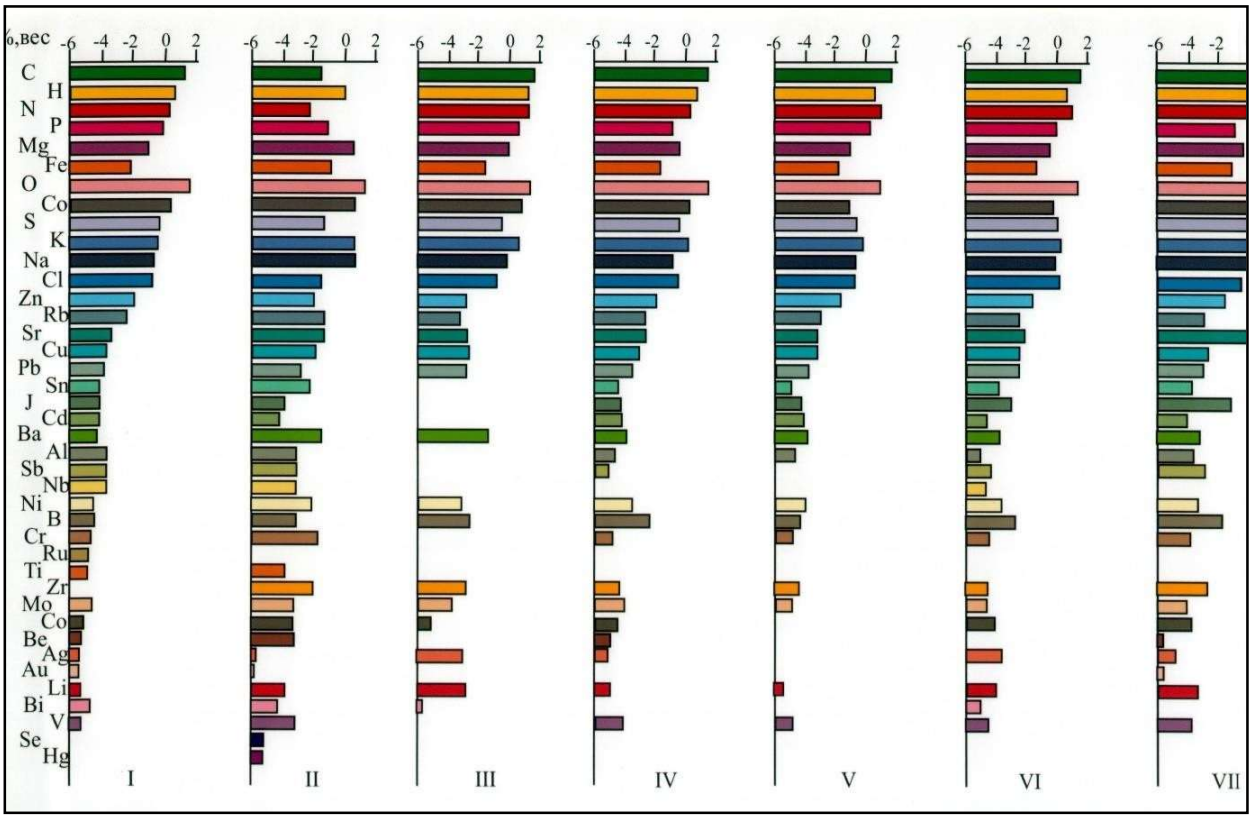

Figure 1 - Distribution of chemical elements in the lithosphere and living matter

I - in the body of a person weighing 70 кг; II - in the composition of the lithosphere; III - bacteria; IV - land plants; V - land animals; VI - marine animals; VII - algae. The concentration of elements on a logarithmic scale.

It should also be noted the differences in the state of knowledge of these processes. The primary processes and scales of accumulation are more substantiated and studied, the secondary ones are

somewhat less. The latter, unfortunately, is objective, since the course of hydrocarbon ontogeny is a predictable rather than a studied process.

Therefore, most often conclusions have to be drawn by solving an inverse rather than a direct problem, i.e. on the basis of objective data on the content and composition of PTE in hydrocarbons, to decide on the possible sources of their entry. The same problem is encountered in mining geology and in all other branches of knowledge that are combined in the natural, and not the exact sciences.

Under lifetime accumulation of PTEs by biological objects, we mean those quantities that enter through the food, air, and other physiological chains both to meet the functional needs of organisms and to harm them in conditions of their abnormal concentrations in the environment.

In Figureabove , for clarity, PTE clarks are combined in a variety of objects and environments. Land plants are enriched in V, Cr , Co , and Ni by an order of magnitude and more compared to terrestrial fauna. But Zn , Cd and Hg are concentrated by terrestrial animals to a greater extent than by land flora. The accumulative capacity of PTEs by the ocean fauna has too large a range of differences, but some similarity with the land fauna is nevertheless observed. V, C r , Co , Ni , Pb and C u are greater in ocean plants than in marine animals. Based on these and other data, S.G. Neruchev calculated the biota concentration coefficients of various elements relative to the hydrosphere, including potential biotoxicants . The latter are characterized by surprisingly high biophilicity . In particular, compared with the hydrosphere in biota , C r and Ge can be concentrated 10^4 times more, V and P b 10^3 -10^4, a Zn , C u , Ni , As , Co , U, Hg and Ra are 10^2 - 10^3 times more than in sea waters. The biophilicity of the majority of toxoelements is exactly the criterion of forced toxicity, the possibility of which is pointed out in study. "Biological activity of natural hydrocarbons and associated potentially toxic components-impurities".

4. Discussion and conclusion

Biological organisms living in the natural environment have not created the time of evolutionary development of defense mechanisms against elevated levels alien to the biosphere concentrations of metal salts and other PTEs massively entering the biosphere in the 20th-21st century.

Toxicants come along with oil and gas extracted from the bowels. Moreover, at high-temperature exposure in the process of processing and disposal of hydrocarbon Raw impurities are converted into a free elemental form. As a result, in the surface environment there are unusual biological contacts.

In this section, we consider only the primary sources of PTE accumulation in organic matter. Secondary, i.e. sources of income and accumulation of PTE by hydrocarbons will be assessed in study. “Processes of secondary concentration of PTE by hydrocarbons during their ontogenesis”, after characterizing the PTE content in oil.

The primary accumulation of biotoxicants by organic matter begins with their lifetime entry into the biota and continues during the processes of dia- and catagenesis up to the stage of hydrocarbon generation. It is difficult to correctly separate the two stages of this primary process, since their intensive lifetime accumulation by biota usually occurs in an anomalous geochemical environment, and this anomaly is expressed not only in living matter, but also in the rocks, soils and waters in which it lived. Dying biota in a reducing environment favorable for its preservation

continues to absorb the same elements from the same environment already in the form of OM. This process of unity of mass destruction of organic matter in a medium enriched with uranium, with the formation of oil and gas source strata, is very well shown by S.G. Neruchev in his work "Uranus and life in the history of the Earth". For the problem we are considering, it is important to assess the lifetime accumulation of biota toxicants , since these processes continue to this day, they are still little studied.

Acknowledgement

Thank you editors, friends to assist this publishing

Conflicts of interest

There is no conflict of interest

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