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Analyzing Composition of PTE Accumulation and Processed Products by Organic Matter

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Abstract: The objective of study aims to figure out Analysis of composition of PTE accumulation, oil and processed products by organic matter.
Therefore with qualitative model and analytical methods, then also used historical materialism method, This study finds out that: When dying, the living matter accumulates in the depths and, passing through certain stages of metamorphism, basically retains in itself those initially accumulated PTEs that were present in it, creating part of the balance of PTEs in hydrocarbons due to their primary genetic enrichment with these components.
Keywords: Oil And Gas, PTE, Analysis, Organic Matter.

INTRODUCTION

The information presented in this section should be taken into account when constructing various models for the formation of organic residues anomalously enriched in PTE, since primary sources can play a significant role in their overall balance in hydrocarbons generated from this OM.

Element	heavy oils	Malta, asphaltites	Vein asphaltites
V	200-1400	230-2000	2350-4800
Ni	100-195	100-190	520-708
Mo	2.2-15	-	22
As	-	60	-
U	-	5.9	-

Figure 1: Changes in the content of individual PTEs (g/t) in the composition of heavy oil and natural bitumen

Above figure shows change in the content of individual PTEs (g/t) in the composition of heavy oil and natural bitumen Volga-Ural NGP. Formation of domanik deposits - the main oil generator, occurred in the Late Devonian, in deep water conditions, over a vast area of the platform, those. The sedimentation process was slowed down, and the removal of sedimentary material was accompanied by physical and chemical concentration of many elements brought from weathering zones.

Research Questions
Question 1: What are previous studies and **Analysis of composition of PTE accumulation, oil and processed products by organic matter**?

METHODOLOGY

Authors have used qualitative and analytical methods, then also used synthesis and discussion methods in this paper.

We also used historical materialism method.

MAIN FINDINGS

The Key Problem

The enrichment of microcomponents of organic matter continues at the earliest stages of its metamorphism - in diagenesis. In this regard, the data on the extremely diverse microelement composition of mumiyo and guano - an organic substance that is formed in an oxidizing environment, mainly in mountainous conditions, are peculiar in this respect. The mineral composition of the inorganic part of the mummy is poorly studied, but even the data that are available indicate a fairly wide representation of microelements in

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it, including such as V, Ni , Ti , M n , Ag , C r , Zn and others. The content of trace elements in the inorganic part of various varieties of mummy is shown in table below.

As can be seen from this table, the mummy obtained in certain areas serves as a rather significant concentrator of various elements, which indicates effective mechanisms for the accumulation and preservation of PTE in diagenesis.

Table 1. The content of trace elements in the inorganic part of various varieties of mumiyo

Distribution area and name	Color	Solubility in water, %	Microscopic Compound insoluble draft	The mineral composition of the inorganic part, %
Wed Asia : Tajik	black	48-52	No data	Si, Al, Na, K , Fe, Mg, P , Ba , Sr , Mn , Ti, Cu, Pb , Zn, Bi, Ni, Co, Sn, Be
Salajidi	black	45-45	Elements of cereals, fruits, pollen, plant trichomes	Si-1, Al-10, Fe-5, Mg-10, Ca-3, P-0.3, Mn-0.01,Zn-0.02, Ni-0.005, Co-0.002, V-0.007, Cr-0.07, Mo-0.001, Pb-0.08, Ba-0.03
Dorobi	red-brown	40-50	Elements of cereals, fruits, pollen, plant trichomes, glands labiales	Si-1, Al-3, Mg-10, Ca-3, Mn-0.001, V-0.001, Cu-0.001
Zogh	black	70-98	No data	V-0.001, Ni-0.001, With u -0.0005 and others
Asil	black	100	No data	Si -1, V -0.001, Ti -0.1, Ag -0.001, Zn -0.1, etc.
Altai Altai	black	40-48	No data	No data
Pamir Pamir	black	50-56	Elements of cereals, fruits, trichomes plants	Ni-0.0005, Ti-0.01, V-0.002, Zn-0.02, etc.
Siberia white oil	light grey	70-80	No data	Ni -0.03, Ti -0.03, V -0.0015, Zn -0.04, etc.
Transbaikali Bragsun	black	45-52	Elements of cereals, fruits, pollen, plant trichomes, stony cells, debris insects	Si-0.1, Ni cl ., T i -0.005, V cl., Mo cl., Cu-0.0115, Pb - 0.0007, etc.

In addition, one more example of the accumulation of PTE in organic matter during early diagenesis can be cited - the high concentration capacity of guano for uranium. Guano, bird droppings and bat droppings, is the last link in the food chain in the ocean, just as shilajit is probably the last link in the high mountain biota food chain. The content of uranium in guano from the Peruvian coast was 2x10 $^{-4}$ %, from the Galapagos Islands - 5x 10 $^{-4}$ %, from Christmas Island (Indian Ocean) - 4x 10 $^{-4}$ %, while in sea water it contains only 3x10 $^{-6}$ % [37]. At the same time, guano is actively used as a fertilizer, shown.

Figure 1: Indonesian guano. Commodity product.

When characterizing the primary accumulation of PTE in living matter, one should especially note the processes of anomalous enrichment of living matter in zones of a specific biocenosis. The geochemical heterogeneity of the biosphere is obvious. There are also obvious opportunities for the assimilation of bioactive elements by biological objects, including higher ones, leading to the concentration of toxocomponents in their organisms. Despite the great chemical and physiological intra-population variability, it is possible to single out objects of wildlife that are active accumulators of metals. In particular, plankton is a powerful concentrator of PTE from sea water.

Thus, the accumulation of technetium, uranium, radium, lead was revealed in marine phytoplankton, and it was noted that the content of these elements in plankton is 1-2 orders of magnitude higher than the background. At the same time, the content changes in the series: Tc > Pb > Ra =U, and technetium and lead contain both waste products and organisms in the greatest amount, while uranium and radium are more indifferent to biogenic matter. Studies of plankton in the subantarctic part of the Pacific Ocean showed that it accumulates Co , Zn to the maximum, and to a lesser extent C r , M n , Ni , Fe , C u , Al , Ti , V, Si and Ca . The degree of concentration of metals by plankton is inverse to the concentration of the element in water.

The ability of unicellular algae to actively absorb PTE from sea water is also known. They are capable of accumulating uranium salts in an amount one hundred times higher than its concentration in sea water - up to 0.3 g/t.

Table 2. Comparative data of established concentrations of radionuclides in the springs of Hanford town and WHO recommendations on radionuclides in drinking water

Concentrations of radionuclides in the springs of the Hanford town (Bq/l)		**WHO recommendations on radionuclides in drinking water (Bq/l)**	
iodine-129	tritium	iodine-129	tritium
0.007	2100	1,000	10000

To compare the scale and effectiveness of the set of measures taken, newborns in Hanford receive a dose of radiation twice as high as the children of Chernobyl, and Native American children receive many times the dose of radiation than the other population of the Hanford area.

The total one-time mass of living matter on Earth, according to various estimates, ranges from $2x10^{12}$ to 10^{13} tons. And if we take the average content of only vanadium in the composition of living matter equal to $6x10^{-5}$ %, then the one-time mass of this metal, attributed to the first - second hazard class, in living matter can be about 10^{7} - 10^{8} t. The ability to accumulate a significant mass of organic matter of various elements and its ability not only not to lose, but in some cases even to concentrate additional amounts of PTE, during its death, undoubtedly plays a significant role role in the formation of deposits of mineral raw materials with high environmental risks during their development.

As noted above, the widespread processes of primary accumulation of biophilic elements by living biomass served as the basis for the formation of a whole area of work in prospecting geology, especially in hidden mineralization, united under the general name of lithobiogeochemical surveys. Among them - metalmetry of soils and vegetation, hydrogeochemistry, etc. In the course of various biogeochemical surveys, a large and, as a rule, highly productive material has already been accumulated. Moreover, often with metallometry it is possible not only to fix ore bodies under the cover deposits, but even to estimate their expected composition.

For example, we present the research data of A.L. Kovalevsky in the search for silver in Buryatia. The search was carried out in the southern taiga on lands devoid of outcrops, overgrown mainly with conifers. The basis for setting up the work here was the aerogamma-magnetic anomalies identified during early geophysical studies (1970 г.) . The objects of research were pines, especially rotten stumps of the oldest trunks.

Deep geochemical anomalies for silver were revealed. In the ashes of plants from individual plots, they reached 1000-3000 g/t against a background of 0.7 g/t, which is clearly seen in Figure 6.

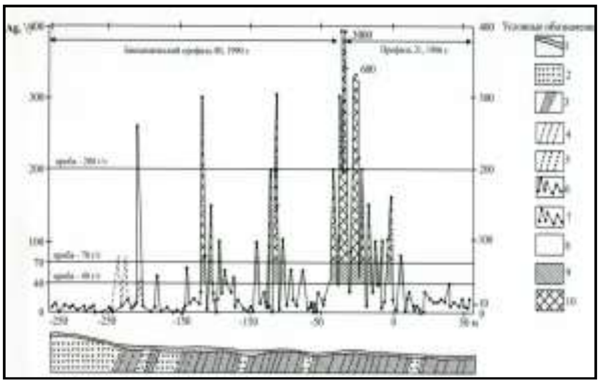

Figure 6. Distribution of silver in the wood of old pine stumps along profiles 21 and 80 of the Severny site

1 - loose cover; 2 - syenites; predicted silver-bearing zones and ore bodies with different Ag grades ; 3 - wide with 0.2 - 2.0 against the background of 0.04 g/t; 4 - local with 2 - 20 g/t; 5 - silver ore bodies with 20-3000 g/t; Ag distribution plots ; 6 - actual; 7 - expected according to lithogeochemical data; biochemical anomalies of Ag of varying intensity; 8 - supposed near-ore biochemical anomalies - 40 µg/g; 9 - supposed ore biochemical anomalies from 40-70 µg/g; 10 - supposed high -grade biochemical anomalies from 70-3000 µg/g.

Subsequent overburden work revealed vein silver ore bodies in bedrock represented by alkaline Lower Paleozoic syenites with diorite dikes. It is peculiar that the soil-geochemical halos were not so pronounced. With a background of 0.01 g/t, they usually did not exceed 0.1–1.0 g/t; The main accumulators of Ag were the oldest tree trunks, especially in their root part. It is they who subsequently will turn out to be the basis of metal-enriched humus organics in the bowels.

Especially widespread in exploration geology are the methods of aerial photography, when ore geochemical anomalies are revealed by examining the ashes of grasses. For the problem we are discussing, these results are important as a clear illustration of the active intravital accumulation of metals by flora, up to the inhibition of their viability in zones of anomalies with high PTE concentrations.

Another example can be given according to the study of the content of mercury, one of the highly toxic elements widely used in modern technologies and representing a significant environmental hazard in areas with high concentrations.

The geochemical peculiarity of elemental mercury consists in its high volatility and, accordingly, high migration ability in the form of vapors, in the chemical tendency to form organometallic compounds and strong bonds with sulfur, as well as in the active sorption of mercury by carbonaceous rocks. In addition, mercury is extremely easily absorbed by living organisms.

In a reducing environment, mercury easily converts to its elemental form and migrates in the form of vapors in the subsoil. The geochemical barrier for it is organic-rich coals and oil shale, which absorb mercury, forming its industrial concentrations and reserves. When the temperature regime of the subsoil changes during ascending tectonic rearrangements, under conditions of cooling of the subsoil, mercury settles on sorbents (coals, slates, etc.), when lowered, it again turns into vapor and migrates upwards.

Let us present some data on the background content of mercury in various natural objects. In igneous rocks, its content is usually small - $n\text{-}10^{-2}$; somewhat more in sedimentary ones; and in clay shales enriched with organic matter and soils, 200–400 mg/kg. It is important to emphasize, even on the basis of this short list, the immediate reactivity of mercury to the content of organic matter in rocks.

The primary source of mercury in the subsoil is considered to be deep exhalations, which come with the activation of deep processes - geothermal, eruptive, etc., and rocks enriched in organic matter - carbon-containing formations and the soil layer become its intensive accumulator in the sedimentary cover. It is from the latter that it again enters the biocycle with a new stage of lifetime accumulation in plant and animal organisms in greater quantities, the higher its content in the environment. In addition, there is a peculiar species selectivity of plants in the accumulation of mercury. Thus, under the same conditions, the content of mercury in the fresh mass of cabbage is 0.012 mg/kg, an order of magnitude higher than in carrots and beets - 0.0018 and 0.003 mg/kg, respectively.

DISCUSSION AND CONCLUSION

The ability of unicellular algae to actively absorb PTE from sea water is also known. They are capable of accumulating uranium salts in an amount one hundred times higher than its concentration in sea water - up to 0.3 g/t.

When dying, the living matter accumulates in the depths and, passing through certain stages of metamorphism, basically retains in itself those initially accumulated PTEs that were present in it, creating part of the balance of PTEs in hydrocarbons due to their primary genetic enrichment with these components.

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There is no conflict of interest

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