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Geochemical Peculiarities of the Distribution of Trace Elements in Caustobioliths

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This research covers the latest data on the quantitative and qualitative contents of trace elements (TE) in naphtides. This work is based on the analysis and generalization of the large volume of scientific literature as well as on the author's analytical research covering oils and organic matter of rocks of different fascial composition and thermal maturity, collected from the wide range of depths in the fields of Volgo-Ural, Western Siberia, Timan-Pechiora, South Caspian, North Caucasian-Mangyshlak, and other oil and gas-bearing basins (OGB).

Analysis of TE contents of oils, coals, oil-and-black shales - caustobioliths of the single genetic series – has been undertaken. The scientific and practical interest in the information on shale formations is connected with the prospects that they offer for extraction and industrial utilization of the trace elements. It is shown that the ontogenesis of naphtides is accompanied by the functional transformation of both the organic components (hydrocarbons) and non-organic components (various metal and non-metal compositions).

Possible origins of accumulation of trace elements in oils were evaluated. Classification of oils of oil-and-gas bearing basins of different tectonic structure based on their physical and chemical properties as well as the contents and ratios of their "biogenesis" elements (V, Ni, Fe) were performed. It was shown that the differentiation of naphtides is due to lithophascial conditions of deposition of the original organic matter and also due to diagenic, cathagenic and hypergenic processes of the evolution of the hydrocarbons. The most significant redistribution in the concentrations of some of the metals occur during the hypergenic transformations of oils.

Existence of oils with different metallogeny is related to the contents of the original organic matter and the processes of the transformation of hydrocarbon fluids during the course of geological development of the OGB.