

Geochemical, Geological and Geophysical Aspects of the Deep Origin of Oil in the Volga-Ural Region, Russia

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Geochemical studies of sedimentary cover oil and organic matter of the prospective oil-source rocks indicate the following: the largest part of oil from the sedimentary cover is not genetically related to the organic matter from the proposed oil-source rocks (Domanic rocks). The organic matter of the Domanic rocks has insufficient maturity for the formation of so much oil and gas (the giant Romashkinskoye oil field). According to pyrolysis data, for Domanic rocks the average value of T_{max} is 429-430.

The results of deep seismic studies have proved the relationship between the oil content of the sedimentary cover and the structure of the earth's crust and upper mantle. The features of the structure of the consolidated crust and upper mantle under the oil deposits of the South Tatar and North Tatar arches strongly differ in the structure of the earth's crust and upper mantle under those regions where there are no oil deposits. Under the oil deposits there are deep listric faults, whose roots are in the earth's crust and upper mantle.

Special geochemical studies (trace element composition and geochemistry characteristic of organic matter and oil) of Domanic black shale indicate a significant effect of endogenous processes on their formation. The area of development of the Domanic shale is the area of active influence of deep reducing hydrocarbons systems at the turn of the Frasnian and Famennian times. According to B. Pisotsky and R. Gottich these reduced gas-fluid systems contained methane, carbon dioxide, hydrogen sulphide, organometallic compounds, light hydrocarbons and others.

The new activation of deep-seated processes in this territory in the Alpine time caused the formation of oil deposits (the migration of hydrocarbons through deep faults into the sedimentary cover).