

## **GEOCHEMISTRY OF ASPHALTENES FROM ORGANIC MATTER AND OILS OF WEST SIBERIA**

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Investigation of geochemistry of heterocyclic compounds of dispersed organic matter (DOM) and oils of West Siberia is an effective tool for solving a wide range of theoretical and applied problems of geology and geochemistry of oil and gas: diagnosing oil-generating rocks (identification of initial type of organic matter (OM), diagenetic environment of OM burial, the degree of OM catagenesis, as well as revealing the genetic relations in the series asphaltene of recent sediments – asphaltene of DOM – asphaltene of aqueous bitumens – asphaltene of oils, and reconstructing biodegraded oils.

Jurassic and Cretaceous deposits of West Siberia, accumulating in a wide spectrum of paleogeographic environments, and oils from the host deposits with the age ranging from Aptian-Albian-Cenomanian to Paleozoic, have been chosen as geologic subjects of inquiry. Investigation of resins and asphaltene was carried out using integrated physical and physicochemical methods (elemental and isotopic analyses, IR-, NMR-, EPR-spectroscopy, Rock-Eval pyrolysis, x-ray diffraction analysis, hydrous pyrolysis, and electron microscopy).

The main conclusions are reduced to the following:

- Non-hydrocarbon components of DOM of oil-generating rocks and oils derived from it, similar to hydrocarbons, contain “inherited” information on the composition of the initial living matter, burial environments, and regularities of alteration in catagenesis.

- Investigation of asphaltene components of recent sediments has shown that the future type of bitumens and oils forms as early as diagenesis. The precursors of asphaltene, rather than asphaltene proper, form in the sediments, which are referred to as protoasphaltene. The latter are less condensed compounds with looser structure, having no graphite-like framework, as asphaltene of fossil sediments but possessing high generative potential.

- Comparative examination of the composition and structure of resinous-asphaltene components (RAC) from OM of marine (aquagene) and continental (terragene) origin made it possible to identify the impact of the type of DOM, its catagenetic transformations, on the RAC composition. The criteria of diagnosing oil source rocks have been developed based on data of resin and asphaltene investigation.

- The regularities of composition variation of resins and asphaltenes from DOM have been revealed in meso- and apocategenesis. The scale of the degree of catagenesis has been developed based on data of asphaltene investigation.

- Data on geochemistry of asphaltenes and resins from oils and DOM of different genetic types have been generalized. Genetic relations in the OM of recent sediments – DOM – OM of underground waters – oil – bitumen series have been identified. Thus, asphaltenes of the Bazhenovo Formation and Upper Jurassic and Neocomian oils, derived from the Bazhenovo Formation, have similar carbon isotope composition and higher content of sulfur and vanadyl porphyrins.

- Significant concentrations of asphaltenes and resins in underground waters of petroleum basins (V.P. Danilova, A.E. Kontorovich) allow more unequivocal solution of the problems of heterocyclic compounds and composition of oils in primary pools.

- The composition of asphaltenes contains “coded” information on the composition of initial oil, which is not destructed during biodegradation of oils.

## REFERENCES

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