



## **The Aromatic Carotenoids in the Organic Matter of the Devonian Domanic Formation (on example of Tatarstan territory)**

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This report contains the results of the studies of shale hydrocarbons (HC) from carbonate-siliceous rocks on the territory of Melekes depression and South-Tatar arch of Volga-Ural oil and gas province of the East European Platform. Studies were performed in the laboratory of Geochemistry of Combustible Minerals at the Institute of Geology and Petroleum Technology of the Kazan Federal University.

The main object of this study is Domanicoid high-TOC rocks of Devonian time. They are mainly represented by dark gray, almost black bituminous limestones that are interbedded with calcareous siliceous shales and cherts.

Complex studies include the following:

- extraction of bitumen from the rock,
  - determination of organic carbon content,
  - determination of the group and elemental composition of the bitumen,
  - gas chromatographic studies of the alkanolic lube fractions of bitumoid and oil,
  - gas chromatography-mass spectrometry of the naphthenic lube fractions of bitumoid and oil,
  - isotopic studies of bitumens and oils,
  - pyrolysis studies of the rock using the Rock –Eval method (before and after extraction),
  - study of trace-element composition of the rocks and petrogenesis,
- comparison in terms of adsorbed gas and studying of the composition of adsorbed gases.

Simultaneously with the study of standard and generally accepted biomarkers, deep and detailed study of alkyl toluene, aromatic hydrocarbons (and aromatic carotenoids in particular) were conducted.

The comparison and comparative correlation aromatic carotenoids with standard biomarkers (for example, with hopanes C<sub>30</sub> and steranes C<sub>27</sub>:C<sub>28</sub>:C<sub>29</sub>). Attitude hopane/aromatic carotenoids is 0.05. This testifies to the dominance of the transformation of carotenoid compounds on bacterial activity in the water column. Bacterial activity in the studied samples is also high. Attitude steranes C<sub>29</sub>/aromatic carotenoids reaches 10<sup>-3</sup>.

The study of aromatic carotenoids has allowed first in the region of Tatarstan to get a new information on the paleo facies conditions of the Domanik formation — black shales rich in organic matter.

The use of aromatic carotenoids can restore paleo facies conditions of sedimentation of the Domanik strata, as well as a comparison of these with paleo tectonics and paleo geodynamics of the passive continental margin.