

**METHYLFLUORENES, METHYLDIBENZOFURANS AND
METHYLDIBENZOTHIOPHENES IN OILS AND ORGANIC MATTER OF WEST
SIBERIA SOURCE ROCKS**

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Ternary plot depicting relative distribution of fluorene, dibenzofluorene and dibenzofuran was previously suggested as an indicator of sedimentation environment for non-marine depositions (Lin and Wang, 1991). Our research applied a similar approach in describing organic matter of source rock and related oil in south-western part of West Siberia (Russia), being based on the distribution of methyl-substitution of the above-mentioned compounds. Fig. 1 shows the distribution plot of relative methylfluorenes, methyldibenzofurans and methuldibenzothiophenes content in source rock extracts and related oils in south-western part of the West Siberian basin. There are two unique oils among those that were investigated – one found in the oil source rock of Bazhenov suite, Glukhovskaya well 2; the second – in the Polusukhinskaya coal mine (Kemerov region).

Significant methyldibenzofurans content was found in the coal and rock extracts, containing organic matter type III. Bazhenov suite rock extracts (main oil source rock in West Siberia) predominately contain methuldibenzothiophenes, deposited during marine reducing conditions. Not one of the investigated oil source rock samples indicated the fact of methylfluorenes predominance to methyldibenzofurans and methuldibenzothiophenes.

The relative content redistribution of the above-mentioned components during primary and secondary oil migration can explain the high methylfluorenes content in oils originated from non-marine matter in comparison to potential oil source rocks (shales and coals). Because of the absence of heteroatom in its composition, there is less methylfluorenes retention in rock than methyldibenzofurans and methuldibenzothiophenes. Coals, presumably being the main oil paraffin source in West Siberia with Pr/Ph > 3.0 (Goncharov et al., 2006), have high sorptive properties, accordingly, high polar methyldibenzofurans and methuldibenzothiophenes are retained in oil source rock more than methylfluorenes. Oil from Polusukhinskaya coal mine according to methyldibenzofurans, methuldibenzothiophenes and methylfluorenes distribution, can be classified to that oil group related to non-marine organic matter.

Thus, methyldibenzofurans, methuldibenzothiophenes and methylfluorenes distribution in oil originated from non-marine organic matter can indicate that coal type capable of generating oil, particularly those sedimentation conditions under which such coal deposition occur.

The secondary migration process of Bazhenov-related oil from oil source rocks to reservoir trap affects different component distributions. Besides, the difference in component sorptive properties, oil migration in combined genesis reservoir (often rich in coal organic matter) also has a great influence. So, to a certain extent, oil can be enriched in some dibenzofurans compounds. This can explain the reason why oils location in the diagram is beyond the border correspondingly to rock extracts of Bazhenov suite. Sample of «pure» Bazhenov oil is oil from Glukhovskaya well 2, obtained directly from Bazhenov suite. Thus, the oil composition from Glukhovskaya well 2 should not be distorted due to secondary migration processes. Relative distribution of methyldibenzofurans, methuldibenzothiophenes and methylfluorenes in this oil fully corresponds to the distribution of these components in rock extracts of the Bazhenov suite.

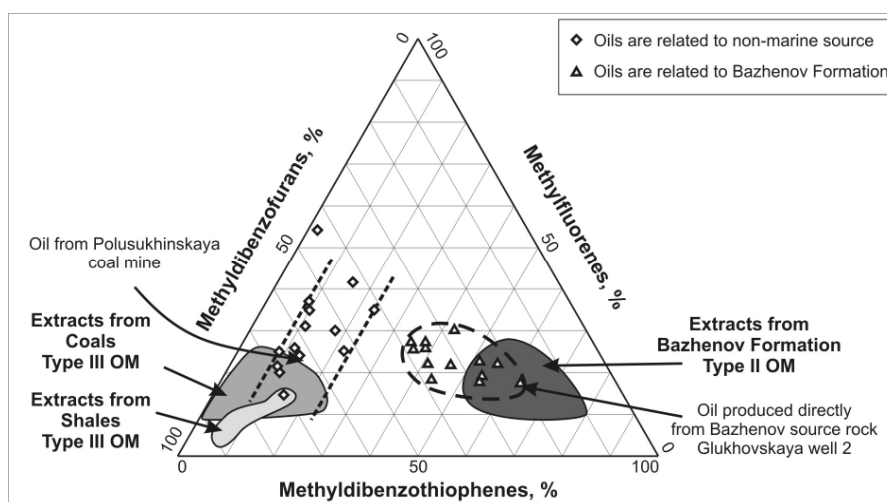


Figure 1. Ternary plot showing the relative distribution of methylfluorenes (m/z 180), methyldibenzofurans (m/z 181) and methuldibenzothiophenes (m/z 198) in the studied source rock extracts and related oils.

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