

## **Variability of bitumen composition and its characteristics in different pore space of organic-rich rocks**

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Source rocks are one of the main objects in oil industry, they generate oil for traditional reservoirs and at the same time can be unconventional reservoirs if secondary processes occurred and pore space was formed. New technologies are used to produce oil from source rocks. Lack of knowledge of differences of hydrocarbon composition and properties in source rocks with different thermal maturity and pore space do not allow to develop the most efficient methodology for oil production.

New sequential extraction method was used to investigate hydrocarbons from different pore space. First, plugs were prepared, and bitumen from open pores were extracted step by step with three solvents with increasing polarity: hexane, chloroform and alcohol-benzene. At each step bitumen was collected. Then, samples were pulverized, and bitumen from closed pores were extracted repetitively in the same order.

For the investigation source rocks from different wells with the same organic matter type and different thermal maturity were taken. Bitumen from different pore space extracted with different solvents were analysed by GC-MS to determine hydrocarbon composition and biomarker parameters.

Main characteristics (e.g. maltene and asphaltene ratio, C<sub>29</sub> sterane isomers ratios, n-alkanes distribution) showed that in most cases bitumen from closed pores have lower maturity than in open ones. Though mineralogy and primary migration affect hydrocarbon generation process in the way in some wells bitumen maturation is higher in the closed pores. Hydrocarbon composition in both open and closed pores highly depend on general thermal maturity of the well. It was shown that the most difference in composition and maturity between hydrocarbons from different pore space occurs at the middle of oil window. At the late oil window maturity all hydrocarbons are quite similar and can be involved in oil production by hydrofracturing.

The results imply the importance of the fabric effect which should be considered when the technology for oil production is specified. Otherwise secondary cracking might be necessary for the produced hydrocarbons.

This work was supported by RFBR grant 18-35-20036.