

## **Experimental Organic Matter Maturation and Oil Formation in Unconventional Reservoirs**

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In recent time focus of the oil companies' and geology scientists' investigations is assigned to unconventional reservoirs. These reservoirs have complicated structure, large amounts of organic matter on different maturation stage and are contemporaneously source rock and oil reservoir. There is no permanently high debits of oil from majority unconventional formations nowadays because of organic matter low maturation stage and unpredictable producing zones extent, which is the reason new methods for production are developing. Investigation on kerogen maturation and oil formation would allow predicting areas with economically efficient production from unconventional reservoirs.

Experiments with Bazhenov Formation (Russia) rocks under hydrothermal conditions with different temperatures and exposure time were performed. Oil was produced in the temperature range of 300-400°C, the amount of oil and thermal maturity depends on the conditions and exposure time, allowing to reform up to 95% of kerogen detected by S2 pyrolysis peak. Ratio of liquid hydrocarbons may vary and achieves 35% of all cracking products. Every organic matter maturation stage was recovered confirming theoretical curves.

During kerogen maturing pores both in rocks and kerogen are formed. On the first stage of kerogen cracking and oil synthesys cavities between minerals and kerogen are formed. At high maturity levels pores in kerogen are originated and connect in well-developed pore structure, with interconnection up to 92% of pores. This is one of the factors determining productive zones formation.

Synthesized oil composition was determined by high-resolution 4D chromatography. Oils produced under different temperatures, different exposure times and from kerogen of different maturation stages has different oil composition and properties. The amount of aliphatic and aromatic fractions depends on experimental conditions and could be controlled.

Kerogen cracking investigations allow determining productive oil zones where oil has required properties and composition for oil refining and chemical processes. Also, in situ factory might be the recent trend in unconventional reservoirs development.

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