

Experimental study of kerogen transformation at hydrothermal conditions (on the example of Bazhenov formation, west Siberia)

A. G. KALMYKOV¹, A. Y. BYCHKOV¹, G. A. KALMYKOV¹,
I. A. BUGAEV¹ AND E. V. KOZLOVA¹

¹Lomonosov Moscow State University, Leninskie Gory, 1,
Moscow, Russia, a.g.kalmykov@gmail.com

Experiments on shale oil recovery from bazhenov formation rocks (West Siberia) under hydrothermal conditions were carried out in closed system. The parameters varied from 250°C to 350°C and saturated water pressure to 470°C and 1000 bar. Duration of the experiments varied, with the most results obtained after the 7 days of hydrothermal studies. It was found that the oil product release oil potential of bazhenov formation rocks under such conditions is 55 to 75 mg/g in equivalent to total organic carbon of the rocks. These values are comparable with the results obtained by other reports for shale oil [1]. It was estimated that under low temperatures (250°C) oil fractions release is very low, the maximum release is observed at 300°C, and it decreases with temperature rises to 350°C.

The oil fraction composition is preferable at the temperature of 300°C. Chromatography investigations shown that at 350°C complex processes occur, kerogen may graphitize, and the higher value of sulfur is present in the oil fractions. The release can be increased with the increase of the experiments duration.

It was also found that gas is produced in the experiment. The produced gas composition corresponds to the composition of the natural gases receded in West Siberia. The amount of the gas increases with the temperature increase. Only gas fracture was found in hydrocarbon products at 470°C and 1000 bar.

Further investigations of the process kinetics in open and closed systems and products composition are necessary for the prediction of the system behavior at the time and in the natural conditions.

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[1] F. Behar, S. Roy, D. Jarvie, *Organic Geochemistry*. 2010, **41**, 1235-1247