

## **PETROLEUM SYSTEMS UNDER CONDITIONS OF ABNORMALLY HIGH TEMPERATURES**

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Abnormally high temperatures to 600-700o C which are not typical of “classic” petroleum basins were observed in many ancient platforms of petroleum sedimentary basins. There are no methods for estimating the petroleum potential of these basins. The methods of thermodynamic and chemical-kinetic mathematical modeling were used to assess the effect of such temperatures on hydrocarbon (HC) pools and their country rocks. Three models have been considered. In oil-saturated sulphate-dolomite rocks calcite, periclase and native sulphur are formed in solid phase under the influence of intrusion heat. CO<sub>2</sub> and H<sub>2</sub>S are newly formed in gases and mercaptanes in oil. In oil-saturated aluminosilicate rocks quartz, illite, chlorite, talc, epidote and graphite are newly formed in solid phase. Oil is enriched in low-molecular HC, in the first place aromatics. Concentration of methane and nitrogen-containing compounds formed at the expense of destruction of nitrogen-containing compounds of oil increases in the gaseous phase. As exemplified by the model of sheet oil pool, it has been found that a marked transformation of high-molecular saturated and aromatic HC starts at the temperatures above 220oC. Within the range of temperatures 260-350o C high-molecular HC (C<sub>14</sub>+) are destructed to form low-molecular saturated and aromatic HC and polyaromatic residue. At the temperature 350o C this fraction is transformed into HC gases, stable polyaromatic compounds and graphite. The results of modeling are confirmed by natural observations. Criteria and methods for predicting the petroleum potential of basins with intense trapp magmatism have been proposed.‰