J Pet Environ Biotechnol 2018, Volume 9
DOI: 10.4172/2157-7463-C2-044

Kinetics of thermal decomposition of kerogen

Rita Fazlyeva, Alexey Cheremisin and **Elena Kozlova**
Skolkovo Institute of Science and Technology, Russia

Shale oil, as well as oil from tight reservoirs, being a significant area for exploration, drew the attention in last decades. Kerogen is a precursor of hydrocarbons and integral part of the source rocks. Investigation of kerogen from the same formation with two types of maturity (MC-2 and PC-3) was conducted with application of pyrolysis reactor. Despite the similar composition, the mineral structures have a significant difference that is reflected on the results of pyrolysis and its kinetics. This paper considers the following statements: dependence of kinetics spectra on the weight of the samples, influence of mineral matrix in the thermal decomposition of kerogen and studying of its kinetics parameters. For understanding of the influence of various minerals to the process of thermal decomposition, mixtures with kerogen and minerals were prepared. Prior to conducting the experiments, kerogens were cleaned up from the minerals without any chemical changing. Preparation of the mineral components included disaggregation with grain size 60 mesh in an agate mortar. Kerogen samples were then mixed in proportion of 1:10 (kerogen/mineral). The mineral selection was based on their widespread distribution in the source rocks and represented by calcite, pyrite, kaolinite, hydromica, illite and chlorite, diatomite and smectite. Investigation of the pyrolytic parameters was performed using HAWK instrument at the heating rates of 3, 10 and 30°C/min up to 650°C. KINETICS2000 software performs the calculations based on the Arrhenius law and allows processing of the obtained data. Comparative analysis of the pure kerogen and mixture of the same kerogen with a quartz sandstone showed that activation energy has a negligible difference despite the variation in weights. Cumulative curves allowed observing the distribution of activation energy with percentage of hydrocarbons yield. Tendency of the thermal decomposition with lower activation energy occurred when the kerogens were mixed with pyrite, calcite or kaolinite.

ritarita181192@gmail.com