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RESEARCH

CHANGE IN THE HYDROCARBON AND COMPONENT COMPOSITIONS OF HEAVY CRUDE ASHALCHINSK OIL UPON CATALYTIC AQUATHERMOLYSIS

L. E. Foss,[1,2*] G. P. Kayukova,[1,2] B. P. Tumanyan,[3] N. N. Petrukhina,[4] V. F. Nikolaev,[1] and G. V. Romanov[1]

A physical model has been developed for the aquathermolysis of heavy crude oil from the Ashalchinsk oil field at 250°, 300°, and 350°C. Nickel and cobalt carboxylates were used as oil-soluble catalyst precursors. In the presence of a hydrogen proton donor at 300°C, the oil content was found to rise considerably and the resin content was found to decrease by a factor of 1.8, which leads to a decrease in crude oil viscosity by 91% and a decrease in density from 960 to 933 kg/m^3. The hydrocarbon composition of the liquid aquathermolysis products was studied by chromate-mass spectrometry. The average molecular weight of the asphaltenes was determined by matrix-assisted laser desorption/ionization (MALDI) spectrometry. The maximum disproportionation of the hydrocarbons into n-alkanes, alkylcyclohexanes, and alkylbenzenes occurs at 300° and 350°C. The composition of the hydrogen proton donor (tetralin) conversion products at these aquathermolysis temperatures was determined.

Key words: *aquathermolysis, heavy crude oil, asphaltenes, catalyst precursor, hydrogen proton donor.*

Catalytic systems play an extremely important role in chemical reactions and the synthesis of new compounds, various transformations of hydrocarbons and their derivatives, and in the preparation of

[1]A. E. Arbuzov Institute of Organic and Physical Chemistry, Kazan' Science Center, Russian Academy of Sciences, Kazan', Russia. [2]Kazan Federal University, Kazan', Russia. [3]I. M. Gubkin Russian State University of Petroleum and Natural Gas, Moscow, Russia. [4]A. V. Topchiev Institute of Petrochemical Synthesis, Russian Academy of Sciences, Moscow, Russia. *E-mail: iacw212@gmail.com.* . Translated from *Khimiya i Tekhnologiya Topliv i Masel*, No. 2, pp. 19 – 23, March – April, 2017.