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AQUATHERMOLYSIS OF HIGH-VISCOSITY OIL IN THE PRESENCE OF AN OIL-SOLUBLE IRON-BASED CATALYST

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A synthetic oil-soluble iron-based catalyst was studied experimentally. A physical model of the catalytic transformation of high-viscosity oil at 200°C was developed. The composition and physicochemical and rheological characteristics of the thermocatalysis products were studied. IR spectroscopy found that the compositions of individual fractions changed. It was shown that the fraction of high-molecular-mass components could be substantially reduced by using the synthetic catalyst in combination with a hydrogen donor. This reduced the viscosity and; therefore, increased the degree of oil extraction.

Keywords: *high-viscosity oil, catalyst precursor, aquathermolysis, enhanced energy efficiency, thermal extraction methods.*

Extraction of heavy crudes is hindered mainly by their anomalously high viscosities due to significant contents of resins and asphaltenes. Various methods that reduce the viscosity in the formation and partially transform heavy constituents by aquathermolysis are used to extract heavy crudes [1-5]. The drawbacks of this method are the high cost and formation of free radicals from ruptured bonds. Free radicals can polymerize to form larger molecules that increase the viscosity. Various catalysts are used to inhibit free-radical formation and reduce the oil viscosity and thermal-treatment temperatures [6-9]. They are added as nano-sized particles or precursors that decompose directly in the formation to form the active catalytic species.

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