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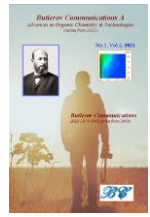

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Influence of the molecular weight distribution of *n*-alkanes in diesel fuel on the efficiency of the depressant additive

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Keywords: diesel fuel, low-temperature properties, molecular weight distribution of *n*-alkanes, depressants, depression of the cold filter plugging point, pour point.

Abstract

The paper considers the effect of the content and the molecular weight distribution of *n*-alkanes in mixtures, which simulate diesel fuel with different content of high-molecular *n*-paraffins, on the low-temperature properties of the fuel and on the efficiency of the depressant additive, as an active component of an ethylene-vinyl acetate copolymer (EVA). Model mixtures were prepared on the basis of a kerosene fraction (low molecular weight hydrocarbons) and a fraction with a boiling point above 280 °C, obtained from diesel fuel (high molecular weight hydrocarbons). The molecular weight distribution of *n*-alkanes was determined by gas-liquid chromatography (GLC) in all model mixtures. For each mixture, the initial low-temperature properties were measured: cloud point, pour point, and the cold filter plugging point (CFPP). A commercially available depressant in 4 concentrations (from 150 to 600 ppm) was tested in 3 model mixtures with the highest content of high-molecular-weight *n*-alkanes. The regularities of the influence of the chemical composition of model mixtures of diesel fuel, the content and molecular weight distribution of *n*-alkanes on the efficiency of the depressant additive was established. It was shown that the CFPP depression decreases with an increase in the proportion of high-molecular-weight *n*-alkanes in the fuel composition and depressant concentration does not effect on it. This result was explained by increase in the crystallization rate due to increase in the concentration of this group of hydrocarbons. In case of deviation from the optimal ratio: depressant concentration/*n*- alkanes C_{15}-C_{26} it leads to the rapid growth of crystals not modified by a depressant. To achieve the maximum depression of the pour point of diesel fuel as the content of high-molecular-weight *n*-alkanes in it increases, an increase in the concentration of the depressant is required. This dependence was most clearly shown for

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the mixture with the highest content of high molecular weight *n*-alkanes. The different influence of paraffin's content on the depression of CFPP and the pour point is explained by different test conditions (CFPP – in dynamics, pour point – static, with a minimal effect on the crystal structure), which is causes the difference in the mechanisms of crystallization of n-alkanes in the volume of fuel.

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