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INVESTIGATION OF THE EXTRACTION SEPARATION OF GASOLINE FRACTIONS OBTAINED AS A RESULT OF PYROLYSIS OF WASTE TIRES

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In recent years, the high demand for energy resources and environmental degradation have been pressing issues faced by humanity due to the over-exploitation and use of fossil fuels. With the increasing environmental awareness of the population, technologies for the reuse of waste, including waste tires, deserve special attention, which in turn allows to reduce the negative impact on the environment, maximize resource utilization and reduce dependence on fossil fuels. In this work, we analyze the process of extraction separation of the fraction boiling above 200°C to remove aromatic and unsaturated compounds obtained as a result of the pyrolysis process of used tires at a small pilot plant. Two solvents, N-methylpyrrolidone and diethylene glycol (DEG), were used in the extraction separation of the fraction boiling above 200 °C. The volume ratios of raw materials to solvent were chosen as follows: 1:0.5, 1:1, 1:1.5, and 1:2 for N-methylpyrrolidone, and 1:5, 1:10, 1:15, and 1:20 for DEG, respectively. As a result of the studies, the influence of solvents on the physicochemical properties of the obtained products was determined. It has been proved that the best physicochemical properties are characterized by the raffinates and extracts obtained at a volume ratio of raw materials to solvent of 1:2.0 in the presence of N-methylpyrrolidone, and 1:20 in the presence of DEG. It was found that the use of N-methylpyrrolidone in a ratio of 1:2 resulted in a decrease in the density and bromine number of the refined product by 2.64 % and 10.79 % compared to the initial fraction, respectively, and the use of DEG in a ratio of 1:20 resulted in a decrease in the density and bromine number of the refined product by 1.44 % and 12.06 % compared to the initial fraction, respectively. Further ways of using the obtained products of the extraction separation process of the gasoline fraction at a boiling above 200 °C are proposed.

Keywords: used tires, waste tires, tire pyrolysis, gasoline, fraction, extraction separation.

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