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OBTAINING COMPONENTS OF AUTOMOTIVE GASOLINES BASED ON PRODUCTS OF OIL SHALE PROCESSING

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The article considers the fundamental possibility of using Ukraine's combustible shale as an additional source of raw materials for the production of automotive gasoline components. It is shown that a number of significant factors contribute to the use of oil shale in the technological process of producing automotive gasoline components. First, Ukraine has significant deposits of oil shale, represented by the Kremenets, Oleksandriya, and Lviv-Volyn fields. Secondly, the need to significantly reduce Ukraine's dependence on energy imports necessitates the diversification of existing (traditional) sources of hydrocarbon raw materials through the use of available alternative sources. These sources can include secondary resources, by-products and combustible minerals (e.g. oil shale) that were not previously used as sources of hydrocarbon raw materials. Based on this, the article proposes the use of catalytic pyrolysis technology (temperature 380–500 °C, pressure 0.1–1.0 MPa and zeolite catalyst) for the processing of oil shale into automotive gasoline components. Based on theoretical studies, an energy-efficient scheme for processing combustible shale into components of automotive gasoline has been developed, consisting of separate, interconnected technological units. This scheme allows by-products in the form of hydrocarbon gases – alkanes (C_1–C_4) – to be converted into thermal energy; gases – olefins (C_2–C_4) – into high-octane oxygenated additives for motor gasoline. At the same time, the liquid heavy fraction (C_{15+}) should be used as raw material for hydrocracking aimed at obtaining a base petrol fraction. Implementing the principles of heat recovery, production waste – flue gases – should be used to generate electricity, produce steam and hot water, and coke should be used to produce adsorbents, which can then be used to purify liquid pyrolysis products – shale oil or gasoline fractions extracted from it.

Keywords: combustible shale, technological processing, motor gasoline, catalytic pyrolysis, hydrocarbon gases, synthesis, oxygenates, gasoline fraction, compounding.

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