

CHEMICAL AND TECHNOLOGICAL PROCESSING OF LIGNITE FROM THE NOVO-DMITROVSKOYE DEPOSIT IN THE KHARKIV REGION

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The aim of the article is to assess the feasibility of organising the production of synthesis gas from lignite, which has sufficient reserves in Ukraine. As a raw material base, the article considers the coal of the Novo-Dmitrivske deposit located in the Kharkiv region, whose balance sheet reserves in categories A+B+C1 amount to 380 million tonnes in total.

To achieve this goal, the most common coal gasification technologies in the world are analysed: the Lurgi process (countercurrent steam-oxygen gasification of coarse coal (or briquettes) in a stationary bed), the Prenflo process (direct-flow steam-oxygen gasification in a pulverised coal stream), and the Texaco process (direct-flow oxygen gasification in a water-coal pulp stream).

For each of these processes, material balances were developed, the quality of the synthesis gas produced, the possibility of organising the production of the necessary energy resources, the level of emissions of harmful substances into the atmosphere, and the main technical and economic indicators were assessed. The calculations were performed for an enterprise with a coal capacity of 9 million tonnes of working weight per year.

Based on the calculations, the Lurgi process is recommended for industrial implementation. The advantages of this process are the lowest temperature and pressure of the gasification process; close to the optimal composition of synthesis gas in terms of the ratio of H_2 : CO ratio; the lowest emissions of carbon dioxide generated during coal gasification and preparation of synthesis gas for further use; the lowest production cost of prepared synthesis gas; the lowest specific investment (per 1 thousand m³ of prepared synthesis gas).

The inexpediency of using the Texaco process for lignite gasification is substantiated, and the directions of improvement of the Prenflo process for its further application in the conditions of the Novo-Dmitrivske field are determined.

Keywords: lignite, Novo-Dmytrivske field, gasification processes, gasification indicators, synthetic motor fuel.

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