
FEATURES OF CHEMICAL PRODUCT FORMATION DURING THE COKING OF STAMP-CHARGED COAL BLENDS© **D.V. Miroshnychenko**¹*National Technical University “Kharkiv Polytechnic Institute” (NTU KhPI), 61002, Kharkiv, Kyrpychova St., 2, Ukraine***L.P. Bannikov**², **K.O. Doroshenko**³*STATE ENTERPRISE ‘UKRAINIAN STATE RESEARCH INSTITUTE FOR CARBOCHEMISTRY (UKHIN)’, 61023, Kharkiv, 7 Vesnina St., Ukraine***V.V. Savchenko**⁴*NTU “KhPI”*¹ *Miroshnychenko Denis Viktorovich, Doctor of Technical Sciences, Prof., Head of the Department of Oil, Gas and Solid Fuel Processing Technology (DOGSFPT), e-mail: dvmir79@gmail.com*² *Bannikov Leonid Petrovych, Doctor of Technical Sciences, Head of Chemical Department (ChD), e-mail: ukhinbannikov@gmail.com*³ *Doroshenko Khrystyna Oleksandrivna, Junior Researcher of ChD, e-mail: xo@ukhin.org.ua*⁴ *Savchenko Vitaliy Volodymyrovych, Postgraduate Student of the DOGSFPT, e-mail: korbinity@gmail.com*

The article is devoted to the analysis of the peculiarities of the formation and release of chemical products during the coking of stamped coal charges. Based on generalised production data and known calculated dependencies, the influence of the composition of coal charge, its bulk density and compaction parameters, moisture content, coal grain size and temperature of the under-roof space on the yield of the main, i.e. the most popular chemical products of coking: coke oven gas, coal tar and crude benzene. It is shown that stamping allows increasing the density of the charge to 1.05–1.15 t/m³, reducing the vertical shrinkage of the coked coal charge and stabilising its carbonisation process. At the same time, the tar yield during coking of stamped charge is lower compared to the more common process of coking bulk charge in Ukraine. Particular attention is paid to the role of elemental composition, and more specifically, to the values of atomic ratios of oxygen and hydrogen content in the initial coal to carbon content in predicting the rate of primary pyrolysis and the ratio of gas products and those that condense to a liquid state in the technological process. Empirical formulas for estimating the yields of main coking products depending on the yield of volatile substances (V^{daf}) are considered, and practical recommendations for process control are given to optimise the ratio of yield and quality of related main products. In particular, the conclusion is justified that for the further development of methods for predicting the composition of coking products, it is necessary to develop and implement kinetic models in production practice that will take into account the reactivity of the structural elements of coal and coking products.

Keywords: coking, coal charge, stamping, volatile matter, coke oven gas, coal tar, crude benzene, pyrolysis, atomic ratios, charge density.

Corresponding author: L.P. Bannikov, e-mail: korbinity@gmail.com

Manuscript received 2025/08/12
Accepted for publication 2025/11/14
Published 2025/12/23