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The post-war reconstruction of the metallurgical industry must be based on new technical foundations, taking into account contemporary technological, environmental and economic challenges. Consequently, blast furnace production, the production of coke for its needs, and the smelting of steel in converters and, in particular, open-hearth furnaces are now obsolete, necessitating the introduction of more modern technologies. In view of this, considerable attention is being paid to methods of direct iron reduction using generator gas and the production of metal products with specified properties through the processing of directly reduced iron, primarily using electrometallurgical technologies. Coke-chemical production will retain its importance as a source of solid-phase reducing agents for the production of ferroalloys, which are necessary for the production of alloy steels. At the same time, there is the challenge of producing hydrogen on an industrial scale as the most efficient reducing agent for metals from ores; its use would significantly (by a factor of several dozen) reduce the carbon footprint of metallurgical production and the amount of greenhouse gas emissions released into the atmosphere. Currently, the main industrial source of hydrogen is the steam reforming of natural gas methane, which is unacceptable for Ukraine, whose industry meets its needs almost entirely through expensive imported natural gas. Coke oven gas, which contains about 60% hydrogen by volume, cannot be considered a viable source either, due to the decline in coke production and the lack of significant spare coke oven gas resources, which are, moreover, scattered across various enterprises. This necessitates the development of new technologies for hydrogen production. The effectiveness of this approach has been demonstrated by us in previous studies on the production of synthetic liquid motor fuels from coal.

Keywords: coal; gasification; hydrogen; blast furnace production; indirect iron reduction; direct iron reduction; coke-chemical production.

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