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DEVELOPMENT OF RESOURCE-SAVING TECHNOLOGIES OF METALLURGICAL PRODUCTION ON THE BASIS OF UKRAINIAN COAL

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The article shows that the post-war restoration of Ukraine's ferrous metallurgy should be based on a new technical and environmental basis - the so-called 'green metallurgy' aimed at reducing the harmful environmental impact of iron and iron-based alloys. One of the main elements of the development of 'green metallurgy' is the replacement of traditional blast furnace production with the reduction of iron ore with coke with the technology of direct reduction of iron without the use of coke. It is noted that the most promising for the conditions of Ukraine is the process of direct reduction of iron with synthesis gas, which is obtained during the gasification of low-metamorphosed coal. Ukraine has all the necessary prerequisites for the development of low-carbon metallurgy, namely: large deposits of iron ore and its enrichment facilities, which ensure the production of semi-finished products (pellets) of proper quality; the presence of about two-thirds of fossil coal reserves in Ukraine in the balance sheet of low-metamorphosed coal grades B, D, DG and G. It is emphasised that the destruction of most coal-fired power generation facilities has led to a surplus of coal mined in Ukraine, which is quite suitable for gasification and synthesis gas production. Therefore, the development of metallurgy based on the use of synthesis gas from low-metamorphosed coal makes it possible not only to provide the country's economy with high-quality steel, but also to preserve the coal industry and, moreover, to provide it with new opportunities by ensuring sustainable sales at affordable prices. It has been shown that in practic carbon neutrality of the technology of iron recovery from ores can be achieved by using pure hydrogen as a reducing agent with the possible use of carbon fuels only to provide heat for the reduction reactions. Therefore, in order to reduce the environmental impact of the proposed iron production technology, it is necessary to find new ways to produce hydrogen.

Keywords: 'green' metallurgy, coke-free metallurgy, direct reduction of iron, low-metamorphosed coal, coal gasification, hydrogen production.

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