
INFLUENCE OF ADDITIVES ON COKE QUALITY PARAMETERS

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The article is devoted to the study of the possibility of identifying the influence of various additives on the quality of laboratory coke, including the electrical resistance of its structure. Inorganic powders of silicon and silicon carbide (carborundum), as well as an organic additive of petroleum coke, were used as charge modifiers.

It is shown that the use of inorganic powder additives will be especially relevant for coal charges with poor coking properties. The obtained results show that the introduction of non-sintering inorganic additives in the amount of 0.125 to 0.5 % by weight allows regulating the processes in the plastic state in order to increase the strength of coke. In particular, the addition of SiC leads to a significant increase in the hot strength index (CSR) and a decrease in the reactivity index (CRI). The improvement of these coke parameters using SiC additives was confirmed by the analysis of other physical and chemical properties of coke. The specific effect of such a modification on coke quality depends on the grade composition of the coal charge.

The data presented in the article indicate an increase in the degree of orderliness of the coke structure and the appearance of a larger number of nanostructures when petroleum coke additive is introduced into coal blends in the amount of 5 % by weight. Such modification of the charge also leads to an increase in the yield of gross coke by 1.2-1.3 %; an increase in the total sulphur content in coke by 0.15-0.23 %; a decrease in the ash content of coke by 0.2-0.3 %; deterioration of mechanical strength (P_{25} – by 0.1-0.6 %; I_{10} – by 0.1-0.2 %) and coke strength after reaction (CSR – by 0.6-1.0 %), coke reactivity (CRI – by 0.2-0.3 %), as well as structural strength (SS – by 0.3-0.4 %), abrasive hardness (AH – by 0.7-1.0 mg) and resistivity (ρ – by 0.002-0.007 Ohm \times cm). Due to the positive impact of Svyato-Varvarinskaya coal on the quality of blast furnace coke, the quality of coke produced with a higher share of this coal in the charge is improving. On the other hand, when using a coal charge characterised by the lowest content of the aforementioned coal, the quality of the coke produced is rapidly decreasing.

Keywords: coal charge, blast furnace coke, quality, modification, additives, petroleum coke, silicon carbide.

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