

USE OF SECONDARY SULPHUR-CONTAINING PRODUCTS IN COAL MIXTURES FOR COKING© O.L. Borysenko¹, I.V. Shulga², Yu.V. Teleshev³STATE ENTERPRISE 'UKRAINIAN STATE RESEARCH INSTITUTE FOR CARBOCHEMISTRY (UKHIN)',
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In accordance with the previously formulated basic principles for the use of secondary raw materials in coke production, experimental and industrial coking of coal charges with the addition of a sulphur-containing secondary product – autoclave mud from the arsenic-soda sulphur purification shop – has been carried out. Elemental sulphur accounts for 39.7% of the total mass of autoclave mud, which turns into a gaseous state at temperatures above 444.6 °C and also reacts with the products of thermal destruction of coal. The permissible amount of autoclave mud added to the charge, provided that the sulphur content of the coke obtained does not exceed 0.1%, is 0.235% of the charge mass. In the steam-gas phase, sulfur will be distributed between hydrogen sulfide in coke oven gas, sulfur compounds in coal tar, and raw benzene. The increase in hydrogen sulfide content in coke oven gas will be 2.65 g/m³, and taking into account the averaging under industrial conditions of the autoclave mud introduced and the products of its thermochemical transformations during the transportation and coking of the charge and the processing of coke oven gas, this same value will be 0.742 g/m³, which, in turn, may also lead to an increase in the amount of autoclave mud formed. However, the accumulation of sulphur compounds in direct coke oven gas will not occur due to the removal of ballast salts from the circulating absorption solution cycle in the desulphurization workshop as a result of neutralization reactions. At least 60 times more elemental sulphur is removed with the ballast solution than is accumulated as a result of adding autoclave mud to the charge. The expected increase in the sulphur content of resin and raw benzene was calculated taking into account the averaging of these products in the storage facilities of the capture workshop, i.e. based on the amount of autoclave mud formed. The increase in the sulphur content of resin is 0.06 %. The content of carbon disulphide in crude benzene increases by 0.03 %, thiophene by 0.02 %, hydrogen sulphide by 0.005 %, elemental sulphur by 0.001 %, and mercaptan by 0.003 %. That is, the change in the properties of tar and crude benzene is insignificant. Similarly, thermochemical transformations of elemental sulphur added to the charge with another associated product, gas sulphur dust formed during the transportation and transshipment of this product, will occur. The maximum amount of sulphur dust added to the charge should be determined based on the condition that the sulphur content of the charge does not increase by more than 0.1 %.

Keywords: environmental protection, coke chemical production, coking, secondary raw materials, by-products, sulphur purification, autoclave dust.

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