

ENVIRONMENTAL ASPECTS OF COAL GASIFICATION

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Consumption of solid fuels increases with the development of industry. Working with them is more difficult in terms of hardware and technical supply than with gaseous or liquid hydrocarbons. In addition, coal mining, its transportation, drying, grinding and burning in boilers, accompanied by the formation of solid waste (ash and slag) and significant air emissions of oxides of carbon, nitrogen and sulfur are taken into account. This requires the creation of new technology of solid fuels using to reduce the anthropogenic impact on the environment. This technology is called coal gasification.

Gasification is a thermochemical process that takes place at high temperatures. As a result solid fuel turns into synthesis gas, which consists of hydrogen, carbon monoxide and methane. The process takes place with oxidants.

There are two principles which form the basis of the gasification process. This is the partial oxidation of solid fuel or its incomplete combustion with progress of the reaction between carbon, water vapor and carbon dioxide. Combustible gas is the product of these reactions.

The main advantage of coal gasification is low level of negative impact on the environment. This is due to the fact that the gaseous products of gasification are located in the combustion zone (the temperature of process is 1000-1200°C) at first, then – in the anoxic zone of the formation of synthesis gas. The destruction of harmful substances such as benzpyrene, furans, PCBs, dioxins, and other polyaromatic hydrocarbons takes place under such conditions. In addition, the gasification produces less harmful gases compared to the direct burning of coal.

The gasification can be considered as one of the promising methods of anthropogenic impact decrease on the environment. Therefore, appropriate research is necessary to conduct to determine the efficiency of gasification.

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