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Improving Energy and Environmental Efficiency of Co-processing of Coal and Biomass Processes

The coal industry is one of the basic economic branches of Ukraine. It is known that coal - the integral component of electric power industry and metallurgy. Coal takes of the second position after oil and considerably advances natural gas.

Despite low cost of coal in comparison with natural gas and furnace fuel, the use of coal as fuel for energy development gives many problems. Basically, the main drawback of fossil fuels is pollution, gaseous and firm (ashes).

Limitations and exhaustion of non-renewable energy has led to the search for alternative energy sources. One promising area is the joint thermal processing of coal and biomass to generate heat and electricity.

In Ukraine sufficient reserves of coal, including brown coals are located. Major deposits of brown coal (lignite) are concentrated in Kirovograd, Dnipropetrovsk and Kharkov regions. According to experts, total reserves of brown coal and shale are about 8 billion tons, proven reserves of lignite - 2 billion tons. More than 1 billion tons of which can be mined open-pit, what is safe and cheap.

The main argument in favor of the co-processing of coal and biomass is that the use of such fuels in power plants for production different types of energy (electricity, heat) does not require significant capital expenditures for boilers upgrading.

Joint heat treatment has several advantages:

1. Reducing use of fossil fuels.
2. Reducing the cost of the energy produced.
3. Reduced emissions of nitrogen oxides and sulfur aerosols.
4. Reducing greenhouse gas emissions.
5. More efficient use of disposable fuel heat.
6. Utilization of biomass.

Despite the obvious advantages of process of heat treatment of coal and biomass, they require further study and improvements since they have not been considered from the viewpoint of formation of toxic substances. The most dangerous of which are dioxides and furans. Thus, the task of research is the study of the formation of these compounds and methods for their further neutralization.

For this purpose there will be calculations for different ratios of biomass and coal shares for their effective layout for the reduction of toxic emissions when used in various power plants and their different ways of thermal processing.