Fly Ash Carbons Separated by Various Cleaning Processes

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ABSTRACT

The utilization of coal combustion by-products, such as fly ash, has an important impact on the coal industry. The rising cost of disposal and the environmental concerns associated with fly ash has caused the coal industry to search for alternative uses for these combustion by-products. Fly ash can generally be used as an additive for Portland cement if its carbon content is lower than 6%. However, the overall quality of fly ashes is changing due to the implementation of low- NO_x burners, where fly ashes produced under these conditions have a higher carbon content and will not meet the required specifications for preparation of Portland cement. Accordingly, there is a current demand for methods to separate the unburned carbon and inorganic components of fly ash and for the development of new applications and markets for these components.

An industrial fly ash sample was cleaned by three different processes which were triboelectrostatic separation, ultrasonic column agglomeration, and column flotation. The unburned carbon concentrates were collected at purities ranaging up to 62 % at recoveries of 62 %. In addition, optical microscopy studies were conducted on the final carbon concentrates to determine the types of carbon (inertinite, isotropic coke and anisotropic coke) collected from these various cleaning processes. The effects of the various cleaning processes on the production of different carbon types from fly ash will be discussed.