

Assessing the Potential of Unburned Carbon as a Filler for Carbon Artifacts

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ABSTRACT

The utilization of the unburned carbon present in the fly ash can bring enormous economical and environmental benefits to both the coal and utility industries. Although several technologies have been successfully developed to separate the unburned carbon from the fly ash, only a few power plants have installed a beneficiation process on their sites. This is due to the low value of the resultant separated materials, since a ton of fly ash is generally sold for as little as \$10-20, and the unburned carbon is simply disposed or rerouted to the combustor. However, the economics of this process will be greatly enhanced if the unburned carbon can be used as precursor for high-value premium carbon products. In fact, the nature of the unburned carbon is similar to that of calcined petroleum coke, selling for \$ 220-250/ton, that is currently used for the manufacture of carbon artifacts. Therefore, the added value generated from the unburned carbon utilization would clearly offset the cost of the separation process. In this work, unburned carbon containing fly ash samples have been collected from three different power units operated by GPU Genco. For these samples, the unburned carbon was separated from the fly ash and the resultant carbon concentrates were used for the manufacture of carbon artifacts by mixing the unburned carbon with a suitable binder, that are then pressed into pellets and heat treated. Conventional tests are conducted on these carbon artifacts to assess their performance.