

Triboelectric Processing of Class C Ashes for Carbon-Ash Separation

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ABSTRACT

The installation of low-NO_x burners in coal-fired boilers has generally affected the concentration and form of unburned carbon in combustion fly ashes. For Class F ashes, the increase in LOI typically pushes the carbon contents beyond the ASTM C618-89a standard for cement admixtures; for Class C ashes, the carbon contents may not increase to values beyond the C618 standard. However, even for low LOI (~2%) Class C ashes, the high activity of the carbon for absorbing cement air entrainment reagents can make them objectionable for use in cement. Because their residual BTU contents are too low to sustain combustion, it becomes necessary to beneficiate for carbon removal if potential large-scale cement admixture markets are to be developed.

We report on the application of pneumatic transport, triboelectric separation technology for the beneficiation of Class C combustion ashes. The low carbon contents and different mineralogy of these types of ashes relative to Class F ashes has heretofore been problematic. With careful consideration of Class C mineralogy and with fine-tuning of our separation technology it is possible to increase the extent to which unburned carbon is rejected. These advances may become a part of our first US commercial installation of pneumatic transport, triboelectric separation technology, a description of which is also presented.