Mechanisms of fine particulates formation with alkali metal compounds during coal combustion

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Abstract

Two types of coals with different sodium (Na) and potassium (K) concentrations were burned in an electrically heated drop tube furnace, to study the formation of particulates in association to alkali metal compounds from the coals. The particulates formed from these coals during combustion were separated by a low pressure impactor (LPI). The particulates collected in each stage of the LPI were analyzed, using an atomic adsorption spectrometer (AAS). The results obtained show that ash particles have bimodal particle size distribution for both coal types. This tendency could be due to the difference of the inherent minerals in raw coals. It was further observed that Na and K were enriched in the fine particulates for both types of coal. There was a dependence of the Na enrichment on the fine particles on concentration of excluded mineral in the raw coals. This work, therefore, showed that the appearance of alkali metal in the ash particles related to the nature of Na and K concentrations in raw coals.

Keywords

Fine particulates;
Mineral particles;
Alkali metal compounds;
Coal combustion