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# Hydrodynamic and combustion behavior of low grade coals in a circulating fluidized bed combustor

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In order to burn low grade coals for meeting stringent emission requirements in large industrial steam generators, over the years Combustion of Circulating Fluidized Bed (CFBC) technology has been used. For introducing CFBC needed for control of SO2 and NOx emission is one of the important pulling force. However, much is needed to be understood as when heat, mass and momentum heat transfer are interlinked, in order to encounter the complex flow patterns. Understanding of the major fluidization across the CFB loop for low grade coal having various particle size was the main objective of this work. Fluidization behavior of a CFB studied, when various solids e.g. rice husk, Thar coal, sand, etc were fluidized by building a lab-scale CFB test rig. The exit geometry being influenced by riser height along with velocity contours was observed. The experimental work gave useful knowledge on the use of the CFB technology for efficient combustion of low grade coals. For a hot riser of Circulating Fluidized Bed (CFB), combustion behavior for coals of low grade from Baluchistan, was investigated. The influence on emissions has been established by analyzing the effects of changing the primary air and feed rate. In the CFB rig, thermocouples recorded and continuously monitored the temperatures at different locations and the GC analyzer recorded the concentrations of CO, CO2 and O2 in the produced gas. From the sampling port, the flue gas was analyzed by keeping constant the fluidized air for primary air flow rate. The coal feed rate was changed and the temperature variations for various feed rates were recorded. As the feeding started to reach about 900℃, it was noticed that at the top of the CFB, the temperature increased fastly. A practical experience of burning a low grade coal from Pakistan was demonstrated. It is an encouraging study for building power plants on large scale coal fired for ending a drastic shortfall of power in Pakistan.

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