

Low NO_x Combustion of Pulverized Petroleum Cokes

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Abstract : This study is aimed to study combustion characteristics of low NO_x burner using petroleum cokes as fuel. The petroleum coke, which is produced through the oil refining process, is an attractive fuel in terms of its high heating value and low price. But petroleum coke is a challenging fuel because of its low volatile content, high sulfur and nitrogen content, which give rise to undesirable emission characteristics and low ignitability. Therefore, the research and development regarding the petroleum coke burner is needed for applying this industrial system. In this study, combustion and emission characteristics of petroleum cokes burner are experimentally investigated in an industrial steam boiler. The low NO_x burner is designed to control fuel and air mixing to achieve staged combustion, which, in turn reduces both flame temperature and oxygen. Air distribution ratio of triple staged air are optimized experimentally. The result showed that NO_x concentration is lowest when overfire air is used, and the burner function at a fuel rich condition. That is, the burner is operated at the equivalence ratio of 1.67 and overall equivalence ratio including overfire air is kept 0.87.

Keywords : petroleum cokes, low NO_x, combustion, equivalence ratio

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