

论文

超临界锅炉劣质无烟煤燃烧NO_x释放特性的数值模拟

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摘要:

针对600 MW超临界W火焰锅炉, 通过数值模拟的方法研究了煤粉浓度和燃烬风对劣质无烟煤燃烧NO_x释放特性的影响。结果表明, NO_x主要在煤粉燃烧前期距一次风喷口2~4 m处大量生成, 选择合适的煤粉浓度, 炉内NO_x最大值可下降16.5%; 与常规浓度相比, 高浓度煤粉燃烧可有效降低炉膛出口NO_x排放; 燃烬风对炉内各物质含量及NO_x的生成影响显著, 燃烬风率由6%增加到15%, 炉膛出口NO_x排放量由756.0 mg/m³下降到502.9 mg/m³。

关键词: 超临界W火焰锅炉; NO_x释放; 煤粉浓度; 燃烬风; 数值模拟

Numerical simulation on the NO_x release characteristics during the combustion of poor-quality anthracite in supercritical boiler

Abstract:

In light of a 600 MW supercritical pressure W-flame boiler, the NO_x release characteristics during the combustion of poor-quality anthracite were numerically simulated at the conditions of different pulverized coal concentrations and different over-fire air rates. The results indicate that a large quantity of NO_x is generated in the initial burning stage of pulverized coal, at the distance of 2~4 m away from the primary air nozzles. The maximum of NO_x in the furnace can be reduced by 16.5% by choosing a reasonable pulverized coal concentration. Compared with the conventional concentration, NO_x emissions at furnace exit can be effectively reduced during the combustion of pulverized coal with higher concentration. Over-fire air has great effects on the substance contents and the generation of NO_x in the furnace, NO_x emissions at furnace exit decrease from 756.0 mg/m³ to 502.9 mg/m³ with the rate of over-fire air increasing from 6% to 15%.

Keywords: supercritical pressure W-flame boiler; NO_x emissions; pulverized coal concentration; over-fire air; numerical simulation

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