

热能工程

基于数值计算的煤粉锅炉NOx释放规律研究

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摘要: 运用基于TASCFLOW软件平台的四角切圆燃烧煤粉锅炉专用数值模拟计算软件COALFIRE, 对某电厂300 MW四角切圆煤粉锅炉NOx排放特性进行数值模拟。讨论煤质、煤粉粒度、锅炉负荷、二次风配风方式的影响, 指出炉膛沿程NOx的排放规律, 为锅炉的安全经济运行提供参考。模拟结果表明: 燃煤挥发分和含氮量高的煤, NOx析出浓度也比较高; 较细的煤粉有利于降低NOx的生成; 机组负荷下降20%, NOx下降6.74%。机组负荷下降40%, NOx下降到383 mg/m³, 下降了约28%; 倒宝塔配风有利于降低NOx生成, 三次风投运时NOx排放浓度比停运时低11%。

关键词: 四角切圆煤粉锅炉 炉内过程 数值模拟 COALFIRE软件 NOx排放

Study on NOx Emission Characteristics of Pulverized Coal Fired Boiler

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Abstract: Numerical simulation of the NOx emission in the 300 MW tangentially pulverized coal fired boiler was performed using the software of COALFIRE based on TASCFLOW software platform. The influences of coal rank, coal particle size, boiler load and distribution of secondary air were discussed. The NOx distribution along the height was put forward, which can be referenced for the optimal and safety operation of boiler. The results show that increased volatile and nitrogen content lead to increased NOx density; decreased coal particle size leads to decreased NOx formation; when boiler load reduces 20% and 40%, NOx density drops 6.7% and 28% individually; the reverse tower type of distribution of secondary air is helpful for reducing the NOx emission and the NOx density is 11% lower when tertiary air running.

Keywords: tangentially pulverized coal fired boiler furnace process numerical simulation COALFIRE NOx emission

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