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论文

O₂/CO₂气氛下煤粉燃烧NO的排放特性

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摘要:

以徐州烟煤和娄底无烟煤为研究对象, 在水平管式炉上对比了O₂/N₂和O₂/CO₂两种气氛下NO的析出释放规律, 获得了O₂/CO₂气氛下, 温度、氧气体积分数、石灰石添加剂与煤种对NO排放量的影响规律。实验结果表明: 高体积分数CO形成的还原性气氛是导致富氧燃烧条件下NO排放总量低于空气气氛的主要原因; 700~900 °C时, 升高温度对两种气氛下NO的释放均有促进作用, O₂/CO₂中两种煤对温度的变化更为敏感; O₂体积分数增加能够促进两种煤NO的释放; CaCO₃的加入在两种气氛下都能对NO起减排作用, 在O₂/CO₂气氛中的减排效果要优于O₂/N₂气氛; 高含氮量煤种的NO排放总量更大, 但转化率低。

关键词: O₂/CO₂; 煤粉燃烧; NO排放特性; 石灰石添加剂

Characteristics of NO emission during pulverized coal combustion under O₂/CO₂ atmosphere

Abstract:

In order to understand the characteristics of NO emission during pulverized coal combustion under O₂/N₂ and O₂/CO₂ atmosphere, a series of experiments were conducted at horizontal tube furnace using both Xuzhou bituminous and Loudi anthracite as samples respectively. The effects of temperature, O₂ concentration, limestone additive and coal rank on the characteristics of NO emission under O₂/CO₂ atmosphere were obtained. The results show that comparing with combustion under O₂/N₂ atmosphere, the presence of carbon oxide with higher concentration is observed during the combustion under O₂/CO₂ atmosphere, which is deduced to be the main factor for the NO reduction. In the temperature ranges from 700 °C to 900 °C, the NO emission increases with the temperature rises, and the NO emission is more sensitive to the temperature under O₂/CO₂. The NO emission is enhanced with the increase of O₂ concentration. The addition of limestone results in the NO emission reduction in both atmospheres and is more effective in O₂/CO₂ atmosphere. The sample whose nitrogen content is higher emits more NO, while its conversion rate is low.

Keywords: O₂/CO₂; pulverized coal combustion; NO emission; limestone additive

收稿日期 2012-05-25 修回日期 2012-09-06 网络版发布日期 2013-07-01

DOI:

基金项目:

国家自然科学基金资助项目(50976049); 江苏省自然科学基金资助项目(BK2011788)

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