

工程热物理

O₂/CO₂气氛下燃煤NO排放特性的实验研究

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摘要: 在沉降炉上通过在线烟气分析仪研究了燃烧气氛、CO₂浓度、温度及燃料/氧气化学当量比对O₂/CO₂气氛下燃煤NO排放的影响规律。结果表明, O₂/CO₂气氛下NO的排放浓度总小于O₂/N₂气氛下的情况, 在无烟气再循环的情况下降幅约为20%~40%。2种气氛下NO的沿程析出均表现出类似的规律, 但因煤质而有所不同。随着进气中CO₂浓度的增加, NO的排放浓度呈现降低的趋势。与21%O₂/79%Ar气氛下相比, 21%O₂/79%CO₂气氛下NO排放浓度的降幅在30%~50%。随着温度的增加, 2种气氛下NO的排放浓度均增加。随着燃料/氧气化学当量比(f)的增加, NO排放浓度呈现出先增加后降低的趋势, 其最大排放浓度均出现在f=0.8左右; 在f远大于1的富燃料区, 2种气氛下NO的排放浓度基本可以降到一致的水平。

关键词: O₂/CO₂气氛 煤粉燃烧 化学当量比 NO排放

Experimental Investigation on NO Emission Characteristic During Pulverized Coal Combustion in O₂/CO₂ Environment

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Abstract: The NO emission characteristic in O₂/CO₂ mixture was investigated in a drop tube furnace using flue gas on-line analyzer and the effects of combustion environments, CO₂ concentration, fuel equivalence ratio and temperature on NO emission were discussed. Results show that the NO emission concentrations from O₂/CO₂ combustion process without recycled flue gas are always lower about 20%~40% than those from simulated air combustion processes. Under two environments, NO emission along the furnace shows similar trend but different accounted for coal's rank. With the increasing of CO₂ concentration in the feeding gas, NO emission concentration decrease. Compared with 21%O₂/79%Ar environment, NO mission concentrations decrease about 30%~50% in 21%O₂/79%CO₂ environment. With the increasing of combustion temperature, NO mission concentrations always increase. With the equivalence ratio (f) increase, NO emission concentrations increase in fuel lean region, and then appear to slightly decrease after f=0.8. Moreover, in the more fuel rich region, the NO emission concentrations decrease to the same level.

Keywords: O₂/CO₂ environment pulverized coal combustion fuel equivalence ratio NO emissions

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