

论文

O₂/CO₂条件下煤焦-NO生成特性的实验研究

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摘要:

以山西褐煤为样品在固定床反应器上研究O₂/CO₂燃烧方式下NO的生成特性, 分析了CO₂, CO体积分数变化对于煤焦NO异相还原的影响。研究表明: 与O₂/N₂气氛相比, O₂/CO₂燃烧条件下, 煤粉NO的排放能够被有效抑制; O₂/CO₂气氛下挥发分N向NO的转化明显被抑制, 而焦炭N向NO转化的抑制作用较弱; O₂体积分数的升高对焦炭N向NO转化有明显的促进作用; 适量CO₂的存在对于煤焦-NO异相还原反应有明显促进作用, CO₂体积分数过高则会抑制CO-NO还原反应的进行; CO的加入对NO还原效果明显, 在CO体积分数为0.5%时NO还原效率最高, CO体积分数继续升高, 还原效果有所减弱。

关键词: O₂/CO₂燃烧; 煤焦; NO; 生成特性

Experiment on NO formation characteristics of char in O₂/CO₂ atmosphere

Abstract:

In order to reveal NO formation characteristics and the effect of CO₂ concentrated and CO on NO heterogeneous reduction with char during the process of O₂/CO₂ combustion, the combustion experiments for Shanxi lignite were carried out on a horizontal furnace. The results show that, compared with O₂/N₂ atmosphere, NO emissions from coal nitrogen can be effectively suppressed in O₂/CO₂ combustion conditions. O₂/CO₂ atmosphere can inhibit converting volatile nitrogen to NO remarkably, while the conversion of char nitrogen to NO is relatively less restrained. The conversion of char nitrogen to NO is significantly promoted with O₂ concentration increasing. Char NO heterogeneous reduction reaction is obviously improved by a moderate amount of CO₂ and the promoting effect can be cancelled out to a certain extent by excess of CO₂. The effect of CO addition on NO reduction is remarkable. The highest NO reduction efficient is reached when CO concentration is 0.5%, however, continuing rising of CO concentration can weaken the effect of NO reduction.

Keywords: O₂/CO₂ combustion; char; NO; formation characteristics

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