

论文

O<sub>2</sub>/CO<sub>2</sub>条件下煤焦-NO生成特性的实验研究

王贲, 苏胜, 孙路石, 胡松, 周英彪, 向军

华中科技大学 煤燃烧国家重点实验室, 湖北 武汉 430074

摘要:

以山西褐煤为样品在固定床反应器上研究O<sub>2</sub>/CO<sub>2</sub>燃烧方式下NO的生成特性, 分析了CO<sub>2</sub>, CO体积分数变化对于煤焦NO异相还原的影响。研究表明: 与O<sub>2</sub>/N<sub>2</sub>气氛相比, O<sub>2</sub>/CO<sub>2</sub>燃烧条件下, 煤粉NO的排放能够被有效抑制; O<sub>2</sub>/CO<sub>2</sub>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; O<sub>2</sub>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CO<sub>2</sub>的存在对于煤焦-NO异相还原反应有明显促进作用, CO<sub>2</sub>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: O<sub>2</sub>/CO<sub>2</sub>燃烧; 煤焦; NO; 生成特性

Experiment on NO formation characteristics of char in O<sub>2</sub>/CO<sub>2</sub> atmosphere

Abstract:

In order to reveal NO formation characteristics and the effect of CO<sub>2</sub> concentrated and CO on NO heterogeneous reduction with char during the process of O<sub>2</sub>/CO<sub>2</sub> combustion, the combustion experiments for Shanxi lignite were carried out on a horizontal furnace. The results show that, compared with O<sub>2</sub>/N<sub>2</sub> atmosphere, NO emissions from coal nitrogen can be effectively suppressed in O<sub>2</sub>/CO<sub>2</sub> combustion conditions. O<sub>2</sub>/CO<sub>2</sub> 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 O<sub>2</sub> concentration increasing. Char NO heterogeneous reduction reaction is obviously improved by a moderate amount of CO<sub>2</sub> and the promoting effect can be cancelled out to a certain extent by excess of CO<sub>2</sub>. 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: O<sub>2</sub>/CO<sub>2</sub> combustion; char; NO; formation characteristics

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通讯作者: 王贲

作者简介: 王贲(1983—), 男, 湖北武汉人, 博士研究生

作者Email: wangbenhust@yahoo.com.cn

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