

论文

水蒸气对O<sub>2</sub>/CO<sub>2</sub>气氛下煤焦燃烧特性的影响

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摘要:

在热重分析仪上进行O<sub>2</sub>/CO<sub>2</sub>/H<sub>2</sub>O气氛下淮北烟煤煤焦与内蒙古褐煤煤焦的燃烧实验, 分析水蒸气浓度、氧气浓度等参数对煤焦燃烧特性的影响, 并对其进行燃烧动力学分析。结果表明, 在相同氧浓度下, 水蒸气的存在使煤焦的DTG曲线峰值向低温区偏移, 着火温度、燃烬温度降低。褐煤煤焦综合燃烧特性指数升高, 但烟煤焦综合燃烧特性指数先降低后升高, 这主要是由水蒸气的低摩尔比热容及水蒸气与煤焦的气化反应共同决定的。在相同水蒸气浓度下, 烟煤焦与褐煤焦综合燃烧指数随氧浓度的升高而增大, 着火温度、燃烬温度均降低, 表明提高氧浓度可改善O<sub>2</sub>/CO<sub>2</sub>/H<sub>2</sub>O气氛下煤焦的燃烧特性。

关键词: O<sub>2</sub>/CO<sub>2</sub>气氛; 水蒸气; 热重分析; 燃烧特性

Effect of steam on char combustion characteristics under a O<sub>2</sub>/CO<sub>2</sub> atmosphere

Abstract:

A thermogravimetric analyzer (TGA) was employed to evaluate the combustion behaviors of Huaibei bituminous coal char and Inner Mongolia lignite char in different O<sub>2</sub>/CO<sub>2</sub>/H<sub>2</sub>O atmospheres. The effects of steam and O<sub>2</sub> concentration on combustion characteristics was analyzed and the combustion kinetics were calculated. The results show that as the steam content increases while the oxygen concentration is maintained at the same level, the peak of the DTG curve moves to low temperature zone as well as the ignition and burnout temperature decrease. The presence of steam can raise the lignite char combustion characteristic index, but the combustion characteristic index of bituminous coal char decreases at first, and then increases. This is mainly determined by smaller heat capacity of steam and the gasification effect between steam and char. As the oxygen content increases while steam concentration stays stable, the ignition temperature and burnout temperature decrease, and the combustion characteristic index of both chars increase.

Keywords: O<sub>2</sub>/CO<sub>2</sub> atmosphere; steam; thermogravimetric analysis; combustion characteristics

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