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发电

温度对煤粉燃烧生成的一次颗粒物特性的影响

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摘要
实验室条件下，以沉降炉与8级Andersen粒子撞击器级联使用，研究燃烧温度对煤粉燃烧生成的一次颗粒物特性的影响。从一次颗粒物的粒度分布来看，3种燃烧温度下的PM10均在2.8~4.3mm内出现峰值。随燃烧温度升高，PMi的排放量增大。SEM图像显示，较高温度下生成的颗粒物表面粗糙，变形和破碎强烈，熔融表面粘附细微粒子。EDX结果表明超微米颗粒物的主要成分为Fe和Ca以及铝硅酸盐，亚微米颗粒物的成分与超微米颗粒物成分不同。ICP-AES分析结果表明，Cr、Cu、Ni、Pb、Zn 5种痕量元素在细颗粒物中富集。燃烧温度越高，颗粒物中痕量元素的含量越大，颗粒物中元素的含量与燃烧温度呈正相关关系。

关键词 煤粉燃烧 一次颗粒物 排放特性 痕量元素 富集

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Study on Primary PM Features Influenced by Pulverized Coal Combustion at Different Burning Temperature

Abstract
A cascade experimental system of laboratory- scale drop tube furnace and an 8-stage Andersen particle impactor were employed for studying the primary particulate matter (PM) features influenced by pulverized coal combustion at different burning temperature. According to the PM mass-size distribution, the peak value of PM10 appeared between 2.8mm and 4.3mm at three different burning temperatures. PMi emission amount augmented with increasing of burning temperature. It has been shown by scanning electron microscope (SEM) images that on the condition of at higher burning temperature, PM appearance were rough, PM distorted and fragmentated violently, sub-microns were adhered to the melted PM surface. The constituents of ultra-micron PM determined by energy dispersive X-ray(EDX) were mainly ferric, calcic and alumino-silicate particles, the constituents of sub-micron PM were not same as ultra-micron PM. The results of inductively coupled plasma-atomic spectroscopy(ICP-AES) showed that trace elements such as Cr, Cu, Ni, Pb and Zn were enriched in finer PM. The higher the burning temperature was, the greater the concentration of trace elements in PM was. The element concentration was presented the positive correlativity to the burning temperature.

Key words coal combustion primary particulate matter releasing characteristic enrichment trace element

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