

张松松,路义萍,杜谦,董鹤鸣,高建民,苏利鹏,苑鹏飞.工业锅炉PM_{2.5}产排特性试验研究[J].环境科学学报,2014,34(4):843-848

工业锅炉PM_{2.5}产排特性试验研究

Experiment study on production and emission characteristics of PM_{2.5} from industrial boilers

关键词: [工业锅炉](#) [PM_{2.5} 浓度](#) [除尘效率](#) [脱硫系统](#)

基金项目: [国家环保公益性行业科研经费专项项目 \(No.201009006\)](#); [中央高校基本科研业务费专项基金资助 \(No.HIT.NSRIF.2013095\)](#)

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摘要: 采用荷电低压颗粒撞击器(ELPI)对哈尔滨市两台燃煤的工业锅炉PM_{2.5}排放特性进行了研究.研究表明: PM_{2.5}的粒数和质量浓度分布曲线均呈现单峰分布,前者峰值出现在0.12~0.2 μm粒径范围内,这部分粒子主要是由无机物气化-凝结形成的亚微米颗粒物和挥发分未完全燃烧形成的炭黑粒子,而后者峰值出现在0.32 μm处,粒子主要是由炭黑粒子形成的亚微米颗粒和残灰粒子形成的超微米颗粒.同时发现,旋风除尘和湿法除尘对PM_{2.5}各级颗粒均有一定的去除效果,采用多管旋风和冲击水浴除尘器联合除尘效率比单种水膜除尘器除尘效率高;湿法脱硫系统对PM_{2.5}的脱除也有明显的作用,由于除雾器不能全部去除小雾滴,这些雾滴中固体颗粒被干燥和水溶性物质结晶析出,PM_{0.32}颗粒物粒数浓度有所增加,而PM_{0.32-2.5}的颗粒物粒数浓度有所减少,但总质量浓度降低.

Abstract: The emissions of PM_{2.5} in two bituminous coal-fired industrial boilers in Harbin were investigated by using Electric Low Pressure Impactor (ELPI). The results showed that the curves of particles number and mass size distributions of PM_{2.5} presented one single peak. The peak of the particles number appeared between 0.12 μm and 0.2 μm, mainly submicron particles formed by vaporization-condensation of mineral matter and soot particles transformed from unburnt volatiles. The peak for mass concentration appeared at 0.32 μm, mainly submicron particles produced by soot and super-micron particles formed by residual ash particles. Meanwhile, it was found that cyclone and wet scrubber had a significant effect on the removal of PM_{2.5}, and the removal efficiency of PM_{2.5} for cyclone and wet scrubber combined dust was higher than that for a single wet scrubber. The wet flue gas desulfurization (WFGD) system also decreased PM_{2.5} obviously. This was because the demister could not remove all the small droplets, a big number of solid particles and water-soluble substances in droplets were dried or crystallized, resulted in the number concentration of PM_{0.32} increased and the PM_{0.32-2.5} reduced, with the total mass concentration also reduced.

Key words: [industrial boiler](#) [PM_{2.5} concentration](#) [removal efficiency](#) [WFGD](#)

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