环境科学学报
ACTA SCIENTIAE CIRCUMSTANTIAE

研究报告

毛显强,曾桉,刘胜强,胡涛,邢有凯.钢铁行业技术减排措施硫、氮、碳协同控制效应评价研究[J].环境科学学报,2012,32(5):1253-1260

钢铁行业技术减排措施硫、氮、碳协同控制效应评价研究

Assessment of SO_2, NO_x and CO_2 co-control effects by technological reduction measures in iron & steel industry

关键词：多污染物控制 协同控制效应坐标系 污染物减排量交叉弹性 成本-效果评价

基金项目：美国能源基金会中国可持续能源项目(No.G-0911-11642);环境保护行业性公益项目(No.201009051)

作 者 单位

毛显强 北京师范大学环境学院,北京 100875

曾 桉 北京师范大学环境学院,北京 100875

刘胜强 北京师范大学环境学院,北京 100875

胡 涛 环境保护部环境与经济政策研究中心,北京 100029

邢有凯 北京师范大学环境学院,北京 100875

摘要：随着我国污染减排形势的日趋严峻,在高污染行业采用协同控制措施实现多种污染物控制目标不仅十分必要而且非常迫切,而合理评价减排措施的协同控制效应是实施协同控制的基础.基于此,本研究从环境-经济-技术角度系统地提出了钢铁行业技术减排措施对硫、氮、碳的协同控制效应评价方法,包括:协同控制效应坐标系分析、污染物减排量交叉弹性($Els_{a/b}$)分析和单位污染物减排成本评价,3种评价方法相互配合,可以从多角度检验不同减排措施的协同控制效应.协同控制效应坐标系和污染物减排量交叉弹性分析的结果表明,末端治理措施不具有协同控制效应或协同控制效应不佳,而绝大多数过程控制措施都具有较好的协同控制效应.单位污染物减排成本评价的结果表明,末端治理措施优先度排序靠后,而过程控制措施排序靠前,且针对不同污染物的排序结果有所不同.在进行钢铁行业协同减排方案设计和规划时,应根据决策需要选择适宜的评价方法,参考评价结果选择最为成本有效的措施.

Abstract: As the situation of pollution control becoming pressing in China, it is not only necessary but also urgent to take co-control measures to obtain multi-pollutant control target. Development and application of the right assessment methods to evaluate the co-control effects of emission reduction measures is the basis of choosing the best available reduction measures and implementing co-control. Innovative and systematic methods are proposed to assess SO_2, NO_x and CO_2 co-control effects by technological reduction measures in iron & steel industry. Co-control effects coordinate system, pollutant reduction cross elasticity ($Els_{a/b}$) and unit pollutant reduction cost are deliberately designed and applied to examine the co-control effects of SO_2, NO_x and CO_2 for optional technological reduction measures in iron & steel industry. The analytical results of *co-control* effects coordinate system and $Els_{a/b}$ show that end-of-pipe control measures either do not have co-control effects at all or only have poor co-control effects, while most of the in-the-process control measures can reduce SO_2, NO_x and CO_2 emission simultaneously. Moreover, the *unit pollutant reduction cost* calculation also show that end-of-pipe measures are less prior than the in-the-process control measures. We suggest that policy makers should use appropriate assessment methods according to their policy targets, and then choose the most cost-effective technological reduction measures when conducting co-control planning for iron & steel industry.

Key words: multi-pollutant control co-control effects coordinate system pollutant reduction cross elasticity cost-effectiveness analysis