

基于紫外差分算法的机动车尾气检测方法研究

作者：韩芳芳, 张晓玲, 孙永跃, 张宝峰

单位：天津理工大学

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摘要：

本文应用紫外差分吸收光谱技术 (DOAS) 实现机动车尾气中SO₂和NO_x的检测。对DOAS的测量原理和差分光路进行分析研究, 采用多元线性回归模型和最小二乘法拟合的方法来实现DOAS技术数据处理, 应用LabVIEW8.2图形化开发环境设计了机动车尾气紫外检测系统软件, 实现了光谱数据的采集、显示、保存, 查询等功能。通过标准气体实验证明了该系统对气体浓度测量的准确性和稳定性, 具备实际应用能力。

关键词：尾气检测; 吸收光谱测量; 紫外差分; 最小二乘法; LabVIEW

UV Differential Algorithm used for Vehicle Tail-gas Determination

Author's Name:

Institution:

Abstract:

A method based on differential optical absorption spectroscopy (DOAS) technique is developed to the concentration determination of SO₂ and NO_x on the vehicle tail-gas measuring. The fundamentals theory and the differential optical path of DOAS are discussed and analyzed. Then the multiple linear regression models and the least-square fit method are used to realize the DOAS data processing algorithm. Moreover, the vehicle tail-gas measuring software with Laboratory Virtual Instrument Engineering Workbench (LabVIEW) is designed to realize the spectroscopic data collection, processing, display, save and poll. Serials of standard gas experiment show that the measurement system can fulfill the requirements of the on-line measuring for vehicle exhaust with a proper measurement accuracy and stability.

Keywords: Tail-gas determination; Absorption spectrometry; DOAS; Least square method; LabVIEW

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