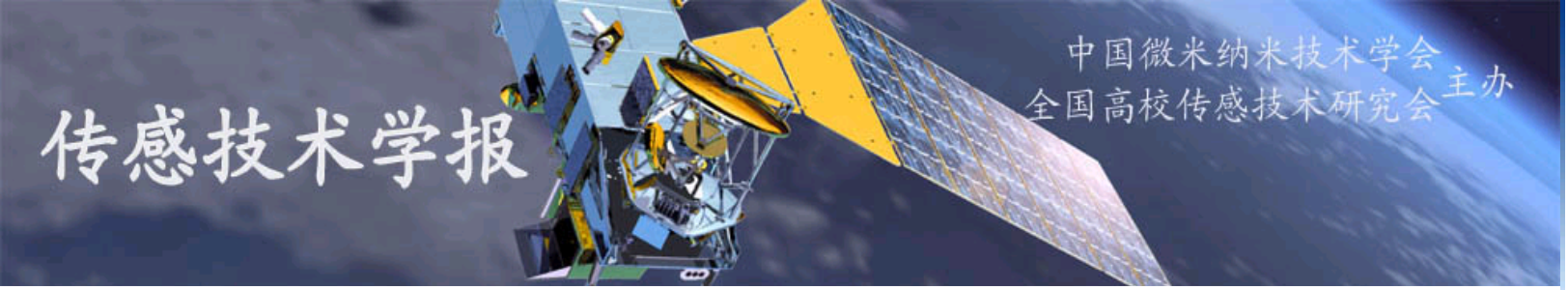

基于TDLAS的汽车尾气测量系统

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摘　要：

设计和构建了一个基于近红外可调谐激光二极管吸收光谱学技术的汽车尾气测量系统。在1583.69nm波段附近测量CO和CO2的吸收光谱，获得CO、CO2的动态浓度用于汽车尾气控制研究。 描述了相关的电子系统和光路系统，特别对开放光路气室和自平衡光电接收器作了详细分析。还设计了基于DSP的数字FIR滤波器和数字锁定放大器去降低系统的白噪音和获得更高的灵敏度。

关键词：可调谐激光二极管吸收光谱学；检测系统；波长调制光谱；开放光路气室；灵敏度

Tunable diode laser absorption spectroscopy for sensing of vehicle emissions

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Abstract:

A near-infrared tunable diode laser-based spectrometer has been designed and built for in situ sensing of vehicle emissions. It detects carbon monoxide and carbon dioxide absorptions around 1583.69 nm and provides the dynamic condensation of CO and CO2 for vehicle exhaust control studies. The optics and electronics of the system especially Open-path cell and Auto-balanced Photo-receiver are described. In addition, digital FIR filter and digital lock-in amplifier are designed based on DSP for system to reduce electronics white noise and get a higher sensitivity.

Keywords: TDLAS; Detect system; WMS; Open-path cell; Sensitivity

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