



Optica Applicata 2008(Vol.38), No.2, pp. 341-352

Carbon dioxide detection using NIR diode laser based wavelength modulation photoacoustic spectroscopy

Jingsong Li, Kun Liu, WeiJun Zhang, Weidong Chen, Xiaoming Gao

SEARCH

[Advanced search](#)

[About Optica Applicata](#)

[Current issue](#)

[Browse archives](#)

[Search](#)

[Editorial Board](#)

[Instructions for Authors](#)

[Ordering](#)

[Contact us](#)



Keywords

photoacoustic spectroscopy, NIR diode laser, wavelength modulation, CO₂ detection

Abstract

A photoacoustic sensor using a laser diode emitting near 1573 nm in combination with a dual-microphone resonant photoacoustic cell has been developed for carbon dioxide trace gas analysis at atmospheric pressure. Wavelength-modulation scheme and $1f$ detection for CO₂ concentration measurements in Ar are demonstrated. The noise equivalent absorption sensitivity of NEAS(1σ) = 1.01×10^{-8} Wcm⁻¹/Hz^{1/2}, corresponding to a detection limit of 30 parts in 10⁶ by volume (ppmv) for a 100 s integration time and 4.5 mW average laser power. The photoacoustic response of CO₂ dependence on the buffer gases with different mixture ratio of Ar and N₂ was investigated. Finally, the possibility to make use of the sensor for measurements of ambient CO₂ is also presented.



130.0 kB

[Back to list](#)

© Copyright 2007 T.Przerwa-Tetmajer All Rights Reserved 2007