InAsSb Diode Optical Pairs for Real-Time Carbon Dioxide Sensors

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Received January 11, 2018

ISSN 1063-7842, Technical Physics, 2018, Vol. 63, No. 9, pp. 1390–1395. © Pleiades Publishing, Ltd., 2018.

Abstract

Efficiencies of optical pairs consisting of fast low-noise uncooled immersion LEDs and photodiodes based on InAsSb solid solution are studied. The proposed optical pairs are promising for applications in compact low-voltage sensors of carbon dioxide. The threshold sensitivity of such a sensor is several hundreds of ppm, and the measurement error is no worse than 5% in a wide range of concentrations (up to 10 v/v%) at a relatively high time resolution (50 ms) and a sample volume of no greater than 50 mL. Relatively high working rate and low volume of the sample improve diagnostics in capnography and allow applications in pediatrics and side-stream capnography including measurements of instantaneous CO_2 concentrations in the course of breathing.

DOI: 10.1134/S1063784218090025

DOI: 10.21883/JTF.2018.09.46433.35-18 (Paper in Russian)