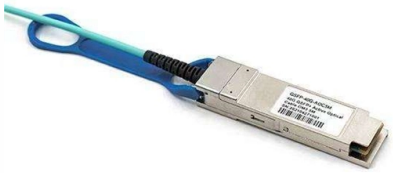
Wavelength Modulation Fiber Optic Sensor for pH Detection



Overview

This review offers a comprehensive analysis of recent advances in optical fiber-based pH sensors, covering key techniques such as fluorescence-based, absorbance-based, evanescent wave, and interferometric methods. The apparatus is a straightforward modification of an existing phase fluorometer and exhibits accuracy and precision of approximately 0. While pH determination is a commonplace laboratory practice, conventional commercial pH probes exhibit drawbacks of bulkiness, slow response times, and signal drift. These become particularly limiting in specialized fields like tissue engineering and bio-industrial processing, where unique pH probe. Advancements in Optical Fiber Sensors for pH Measurement: Technologies and Applications Academic Editors: Flavio Esposito, Stefania Campopiano and Agostino Iadicicco Received: 29 May 2025 Revised: 4 July 2025 Accepted: 7 July 2025 Published: 9 July 2025 Citation:Alhussein, A. ;. In this study, we propose a highly sensitive multichannel pH sensor that is based on an optical-fiber pulse width modulation (PWM) technique.

Article Content

Hot

(PDF) Fiber-optic probes for real-time pH monitoring

Here, we present the development of compact pH fiber probes by integrating silica optical fiber with a colorimetric pH indicator. Our approach

Mar 08, 2026 Hot

Optical Measurements of pH Using Fluorescence Lifetimes and Phase ...

The phase and modulation values were found to be strongly pH-dependent in the physiological pH range, over the easily accessible range of light modulation frequencies from 10 to

Mar 23, 2026 Hot

pH Measurements Using Simple Fiber-Optic

IMTC 2005 – Instrumentation and Measurement Technology Conference Ottawa, Canada, 17-19 May 2005 pH Measurements Using S imple

Jan 29, 2026 Hot

Recent development and applications of optical and fiber-optic pH sensors

Over the past two decades, the development and applications of chemical sensors and biosensors have grown rapidly . Among all sensors, pH sensors have received the most attention

Oct 25, 2025 Hot

Advancements in Optical Fiber Sensors for pH

Measuring pH is a critical parameter in environmental monitoring, biomedical diagnostics, food safety, and industrial processes. Optical fiber

Jan 01, 2026 Hot

Advancements in Optical Fiber Sensors for pH Measurement:

Optical fiber sensors have proven highly effective for pH detection due to their exceptional sensitivity, rapid response, and resistance to electromagnetic interference, making them well suited for real-time

Jul 02, 2025 Hot

(PDF) Fiber-Optic pH Sensor

The same approach was used in the development of optical fiber sensors for biochemical analysis [86,87], determination of solution pH [88,89],

Aug 17, 2025 Hot

Highly Sensitive and Wide-Dynamic-Range Multichannel Optical-Fiber pH ...

In this study, we propose a highly sensitive multichannel pH sensor that is based on an optical-fiber pulse width modulation (PWM) technique. According to the optical-fiber PWM method, the received

Jan 20, 2026 Hot

Highly Sensitive and Wide-Dynamic-Range Multichannel Optical-Fiber

We compared the performance of the proposed optical-fiber PWM pH-sensing systems with different pH sensors: potentiometric, optical-fiber modal interferometer, and optical-fiber Fabry–Perot

Aug 12, 2025 Hot

Fiber optic Surface Plasmon Resonance sensor based

Abstract A new design of a fiber optic Surface Plasmon Resonance (SPR) sensor using Palladium as a sensitive layer for hydrogen detection is

Sep 04, 2025 Hot

A wide range and highly sensitive optical fiber pH sensor using ...

Moreover these sensors can be used in hazardous media without compromising its accuracy. Several types of fiber based pH sensors are fabricated to detect the pH of aqueous

Aug 07, 2025 Hot

High-precision ultra-long distance distributed optical fiber vibration ...

Distributed optical fiber vibration sensing (DOFVS) has emerged as a vital technology for the safety monitoring of long-distance critical infrastructure, owing to its distinct advantages, including

Mar 02, 2026 Hot

Multi-point optical fiber hydrogen detection system based on light ...

A hydrogen sensing system including 8 sensors based on light polarization modulation is developed and demonstrated for simultaneous multi-point hydrogen sensing with high sensitivity.

Feb 01, 2026 Hot

Advanced hydrogel optical fiber sensors with triple-readout for real ...

These hydrogel-based sensors offer a reliable, versatile solution for pH monitoring and hold significant promise for applications in the beverage, food, pharmaceutical, and point-of-care...

Jan 25, 2026 Hot

Fiber Optic pH Sensor Based on Phase Fluorescence

A fiber optic pH sensor based on single fiber phase fluorescence lifetime measurements of commercially available fluorescence indicators is described.

Feb 05, 2026 Hot

Optical Sensing and Imaging of pH Values: Spectroscopies, Materials ...

Wavelength-modulated pH sensors (that are superior to intensity based interferometric sensors) were described that use a pH-sensitive hydrogel with an optical fiber Bragg grating.

Jul 22, 2025 Hot

Fiber optic pH sensor based on mode-filtered light detection

Abstract A novel mode-filtered light fiber optic pH sensor was developed by inserting an optical fiber immobilized with a pH-sensitive indicator into a fused-silica capillary. In the experiment,

Mar 27, 2026 Hot

Optical Fiber Sensors: Working Principle, Applications,

Abstract Fiber-optic technology emerged originally for applications in data transmission and telecommunications. However, sensors based on fiber

Mar 07, 2026 Hot

(PDF) Wavelength-modulated fiber optic sensor for high

A reflective intensity-modulated fiber-optic sensor based on microelectromechanical systems (MEMS) for pressure measurements is

Jan 30, 2026 Hot

A fluorescent fiber pH sensor for sensitive, wide-range detection using ...

Herein, a fluorescent fiber pH sensor, based on orange-emitting SiQDs, was developed for sensitive pH detection in biological and environmental samples (Fig. 1).

Jan 05, 2026 Hot

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May 26, 2026 Hot

Fiber optic pH sensor based on mode-filtered light

Abstract Fiber optic sensor pH Mode-filtered light detection Bromocresol green Cresol red a b s t r a c t A novel mode-filtered light fiber optic pH sensor was

Apr 28, 2026 Hot

Fiber-optic Sensors – distributed sensing, temperature,

This article provides a comprehensive introduction to fiber-optic sensors, also called optical fiber sensors. It explains how these devices use optical fibers to measure

Jul 15, 2025 Hot

Highly Sensitive and Wide-Dynamic-Range Multichannel

In this study, we propose a highly sensitive multichannel pH sensor that is based on an optical-fiber pulse width modulation (PWM) technique. According to the optical

Feb 23, 2026 Hot

Optical pH Detection with U-Shaped Fiber-Optic Probes

Fiber-optic pH sensors are usually based on the evanescent-wave and reflection principles [4, 8 – 11]. Mainly reflection-based sensors have been

Oct 01, 2025 Hot

A wide range and highly sensitive optical fiber pH sensor using ...

A no-core fiber pH sensor based on wavelength interrogation technique is fabricated and demonstrated in this paper. The sensing head is prepared by coating of smart hydrogel on NCF.

Oct 24, 2025 Hot

Fiber optic sensor designs and luminescence-based methods for the ...

In addition, the measurement of an evanescence field interaction between the optical fiber core and a luminescence material attached to it was also successfully used in a fiber-optic flow cell

Sep 04, 2025

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