

Fiber Optic SPR Hydrogen Sensor



Overview

In this work, a numerical study and experimental validation of an optical fiber sensor based on Surface Plasmon Resonance (SPR) for H_2 detection are presented. This sensor is composed of a multi-mode fiber with a SPR structure of a metal/dielectric/Pd, where the Pd acts as a. Since H_2 has physicochemical properties of being highly permeable and combustible, high-performance H_2 sensors to detect and monitor hydrogen concentration are essential. In this approach, a transducer layer is deposited on the outside of a multimode fiber, after removing the optical cladding. However, due to H_2 's flammability it is crucial to monitor its concentrations in the environment. Optical sensors have been developed to monitor H_2 concentrations. We present a novel fiber optic hydrogen sensor with fast response fabricated from a graphene-Au-Pd sandwich nanofilm and an ultrashort fiber Bragg grating.



Article Content

Highly selective SPR based fiber optic sensor for the detection of ...

Abstract The present study reports the fabrication and characterization of a surface plasmon resonance (SPR) based fiber optic hydrogen peroxide sensor using enzymatic approach.

Innovative FO-SPR Label-free Strategy for Detecting Anti

This fiber optic surface plasmon resonance (FO-SPR)-based label-free method was successfully accomplished in COVID-19 patient serum and, for the first time, directly in undiluted

Surface plasmon resonance based fiber optic hydrogen sensor

In this paper we present an experimental study on the surface plasmon resonance (SPR) based fiber optic sensor for the detection of hydrogen. Wavelength interrogation mode of operation

Highly sensitive optical fiber hydrogen detection in liquid environment

The proposed hydrogen sensor can be used in liquid environments to transmit signals via fiber optics to remote devices for monitoring and control, making them suitable for hazardous or

Fiber optic hydrogen gas sensor utilizing surface plasmon

Since optical fiber sensing technology is employed along with the SPR technique, the present sensor is capable of remote sensing and online monitoring of hydrogen gas.

Review of the Status and Prospects of Fiber Optic Hydrogen Sensing ...

The surface plasmon resonance (SPR) fiber optic hydrogen sensor integrates surface plasmon technology with hydrogen sensing principles, resulting in higher sensitivity than

Fiber optic localized surface plasmon resonance hydrogen sensor

FO LSPR hydrogen can be repeatedly used with low hysteresis characteristic. We propose an optical fiber-based localized surface plasmon resonance sensor to overcome limitations

Pt/MOF-5 film-coated optical micro-nano fibre hydrogen sensor with ...

Based on surface plasmon resonance (SPR), a TCF and Au/PVA film are combined to achieve relative humidity (RH) measurement. Pt/MOF-5 is coated on the surface of the MNF by in

Fiber optic hydrogen sensor based on a Fabry-Perot

We present a novel fiber optic hydrogen sensor with fast response fabricated from a graphene-Au-Pd sandwich nanofilm and an ultrashort fiber

Recent advancements in optical fiber hydrogen sensors

To mitigate the risks of explosion or assess health statuses of transformers, it is needed to realize the high-sensitive, high-precision, rapid, robust, real-time, on-line, and long-distance

Fiber-Optic Pressure Sensors: Recent Advances in

In Section 2, the fundamental physical sensing mechanism of the fiber-optic pressure sensor is thoroughly investigated, focusing on fiber grating and

Fiber optic coupled surface plasmon resonance sensor based Ag-TiO

We propose and demonstrate the fiber optic Surface Plasmon Resonance (SPR) for hydrogen sensing based on Ag/TiO₂ at the telecommunications wavelength of 1550 nm . The

Fiber optic Surface Plasmon Resonance sensor based on wavelength ...

Abstract: A new design of a fiber optic Surface Plasmon Resonance (SPR) sensor using Palladium as a sensitive layer for hydrogen detection is presented. In this approach, a transducer layer is deposited

Modeling of a highly sensitive MoS₂-Graphene hybrid based fiber optic ...

Abstract Optical fiber instead of prism is now widely studied in biosensing research. This paper investigates a highly sensitive optical fiber based Ag-MoS₂-Graphene hybrid surface plasmon

Review of the Status and Prospects of Fiber Optic Hydrogen Sensing ...

Since H₂ has physicochemical properties of being highly permeable and combustible, high-performance H₂ sensors to detect and monitor hydrogen concentration are essential.

A surface plasmon resonance hydrogen sensor using Au/Ta

A novel fiber optic surface plasmon resonance (SPR) hydrogen sensor has been developed based on hetero-core structured fiber optics with multi-layer films of gold (Au), tantalum

Advanced surface-functionalized optical fiber biosensing platform for ...

The cascaded fiber sensor was proposed by fabricating microsphere cavities through the sequential fusion of single-mode fibers and seven-core fiber, followed by flame tapering of the seven

Structure of SPR hydrogen sensor based on hetero

In this paper, we report the surface plasmon resonance (SPR) hydrogen sensor based on hetero-core optical fiber structure. This sensor consists of a multilayer

A two-fold SPR-SERS sensor utilizing gold nanoparticles and

The combination of AuNPs and graphene membrane demonstrated high potential for Surface-enhanced Raman scattering (SERS) and surface plasmonic resonance (SPR) fiber sensors.

Fiber Optics-Mechanics Coupling Sensor for High-Performance

Hence, as an intrinsically safe hydrogen sensor with the high sensitivity and quick response, this optics-mechanics coupling-based fiber hydrogen sensor can be widely used in the

A Thermally and Mechanically Stabilized Plasmonic Optical Fiber Sensor ...

Abstract Optical fiber sensors based on surface plasmon resonance (SPR) are powerful tools for biosensing, yet their performance is often hindered by thermal and mechanical instability.

Operando Battery Monitoring: Lab-on-Fiber

Fiber-optic battery monitoring methods, which are advantageous because of their low cost, compactness, remote sensing capabilities, and simple

SPR-based optical fiber sensor for hydrogen detection using Pd thin films

Optical sensors have been developed to monitor H₂ concentrations in harsh environments with high sensitivity and remote measurement. In this work, a numerical study and experimental validation of

Review of Fiber-Optic Localized Surface Plasmon Resonance Sensors ...

The integration of LSPR with the fiber-optic technology has led to the development of compact and versatile sensors for miniaturization and remote sensing. This comprehensive review explores

Review of the Status and Prospects of Fiber Optic

This review discusses a variety of fiber-optic-based H₂ sensor technologies since the year 1984, including: interferometer technology, fiber

Ultra-Sensitive SPR Optical Fiber Hydrogen Sensor Coated With

A novel optical fiber hydrogen sensor based on Surface Plasmon Resonance (SPR) is proposed and experimentally validated. It is composed of a multimode fiber-single-mode fiber-multimode fiber

Design and optimization of the optical fiber surface plasmon resonance ...

An optimal design of an optical fiber surface plasmon resonance (SPR) sensor based on wavelength modulation for hydrogen (H₂) concentration detection is presented in this paper. The

Plasmonic fiber-optic aptasensor for the detection of bisphenol A

These findings confirm that the proposed TFBG-SPR aptamer sensor provides a robust, label-free, and real-time detection platform with a detection limit several orders of magnitude lower than previously

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