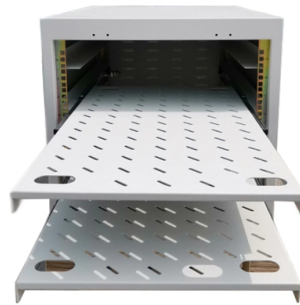


Photonic Crystal Fiber Optic Sensor



Summary of Content

Photonic crystal fiber (PCF) sensors are advanced optical sensors that leverage microstructured fiber designs to detect a wide range of physical, chemical, and biological parameters with high sensitivity and versatility.

Overview and Working Principle

Photonic crystal fiber sensors utilize microstructured fibers with periodic air holes or other geometries that control light propagation. These structures allow precise measurement of amplitude, phase, polarization, and wavelength shifts. PCFs can be integrated with interferometry, gratings, plasmonic coatings, or evanescent field interactions to enhance sensitivity and selectivity. The unique design enables detection of parameters such as temperature, pressure, strain, twist, curvature, electromagnetic fields, and refractive index with high accuracy .

Types of PCF Sensors

PCF sensors are classified based on their structural and functional designs:

- Solid-core and hollow-core fibers: Hollow-core fibers improve light-matter interaction for gas or liquid sensing .
- Dual-core fibers: Enable interferometric sensing for strain or temperature measurements .
- Liquid-infiltrated fibers: Enhance sensitivity for chemical and biochemical detection .
- Metal-coated fibers: Exploit surface plasmon resonance for high-precision chemical and biological sensing .

Article Content

Recent advances in photonic crystal-based sensors

It has exhibited excellent application prospects for the detection of heat, force, magnetism, chemical substances, and

Recent advances in photonic crystal fiber based chemical and

Photonic crystal fiber (PCF) sensors exhibit significant potential for applications in diverse fields, including

Rapid and sensitive magnetic field sensor based on photonic crystal ...

A fast response time (0.1 s) magnetic field sensor has been demonstrated utilizing a photonic crystal fiber with nano

A review on photonic crystal fiber based fluorescence sensing for ...

Photonic crystal fibers (PCFs) have received tremendous interest in recent years for many biomedical applications due

Advances in Plasmonic Photonic Crystal Fiber

This paper explores advancements in plasmonic photonic crystal fiber biosensors,

Designing a terahertz optical sensor based on helically twisted ...

Article Open access Published: 17 January 2025 Designing a terahertz optical sensor based on helically twisted

Advances in Photonic Crystal Fiber-Based Sensor for Detection of ...

Photonic crystal fibers (PCFs) exhibit a wide variety of unique features in the realm of sensing applications including physical,

Photonic crystal fiber based plasmonic sensors

This review discusses fundamentals and fabrication of fiber optic technologies incorporating plasmonic coatings to

Advances on Photonic Crystal Fiber Sensors and

Examples of recent optical fiber sensors for the measurement of strain, temperature,

Prospects of Photonic Crystal Fiber as Physical Sensor: An Overview

Photonic crystal fiber sensors have potential application in environmental monitoring, industry, biomedicine, food

Photonic Crystal Fibers for Sensing Applications

Photonic crystal fibers are a kind of fiber optics that present a diversity of new and improved features beyond what

Multiparameter Sensing Using Photonic Crystal Sensors on a

Abstract: We demonstrate an approach to integrate multiple transducers on the tip of an optical fiber, leading to multiplexed and

Engineering plasmonic photonic crystal fiber sensors: design ...

This review offers a comprehensive examination of PCF-SPR sensors, from their fundamental principles and innovative

(PDF) Photonic Crystal Fiber Sensors, Literature Review, Challenges ...

PDF | On Jul 1, 2023, naira salah and others published Photonic Crystal Fiber Sensors, Literature Review, Challenges, and Some

Compact Three-Channel Photonic Crystal Fiber Sensor Based on

In order to improve the integration of fiber optic sensors, this paper designs a dual-core three-channel photonic crystal

Recent Advances in Photonic Crystal Fiber-Based SPR Biosensors

Thus, an exhaustive analysis of various sensing parameters, plasmonic materials, and sensor models used in PCF

Photonic crystal fibre optic sensor based on a U-shaped detection ...

Photonic crystal fibre-optic sensors with large-aperture cladding and U-shaped detection channels are simple in

Advances in Photonic Crystal Fiber-Based Sensor for Detection of ...

Advances in Photonic Crystal Fiber-Based Sensor for Detection of Physical and Biochemical Parameters—A Review Abstract: The

Photonic Crystal Fiber Sensor Based on Surface Plasmon Resonance

An ultra-sensitive photonic crystal optical fiber sensor based on surface plasmon resonance (SPR) is designed and analyzed. The D

Photonics sensors: A perspective on current advancements, emerging ...

Highlights • A detailed analysis of different types of photonic sensors such as integrated photonic sensors, optical

Advances on Photonic Crystal Fiber Sensors and Applications

In this review paper some recent advances on optical sensors based on photonic crystal fibres are reported. The different strategies

A review for optical sensors based on photonic crystal cavities

Abstract This review covers photonic crystal cavities (PCCs) and their applications in optical sensors, with a particular

Recent Advances in Photonic Crystal Fiber-Based SPR Biosensors

This article presents a comprehensive overview of recent advancements in photonic crystal fiber (PCF)-based

Photonic Crystal Fiber and Crystal-Based Sensing Technologies

Photonic crystal fibres (PCFs) and crystal-based sensing platforms harness periodic dielectric structures to confine and manipulate

Prospects of Photonic Crystal Fiber as Physical Sensor: An Overview

It successfully integrates fiber optics, structural engineering, electromagnetism, laser optics, the infiltration technique,

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