

Article Overview

Slovakia produces advanced fluorescent fiber optic sensors, with companies like Sylex offering FBG-based and fluorescence-based solutions for precise monitoring in harsh environments.

Overview of Slovakian Fiber Optic Sensors

Slovakia hosts specialized manufacturers such as Sylex s.r.o., a mid-sized company founded in 1995, which develops high-quality fiber optic sensors and interconnect solutions . Their products include fiber array sensors (FFA-01) with configurable Fiber Bragg Grating (FBG) elements, suitable for direct attachment to structures to monitor strain, displacement, pressure, and temperature . These sensors are widely used in civil engineering, aerospace, energy, transportation, and industrial process monitoring.

Fluorescent Fiber Optic Technology

Fluorescent fiber optic sensors operate by measuring the decay time of fluorescent material applied at the tip of the fiber. The FluoroSenz system is an example of this technology, designed for point temperature measurement in harsh environments such as transformers, switchgears, and generators . The sensor works by exciting the fluorescent material with a light source; the time it takes for the material to return to its ground state correlates with the ambient temperature, allowing calibration-free, real-time monitoring . These sensors are highly stable, maintenance-free, and suitable where traditional thermocouples or RTDs cannot be used.

Applications

- o Structural Health Monitoring: FBG sensors detect strain and displacement in bridges, buildings, and industrial structures .
- o Temperature Monitoring: Fluorescent fiber optic sensors provide accurate readings in high-voltage or high-magnetic-field environments .
- o Pressure and Humidity Sensing: Optical FBG-based sensors can measure pressure in gases or liquids and relative humidity in air or gas mixtures .
- o Harsh Environments: Both FBG and fluorescence-based sensors are designed for extreme conditions, including aerospace, oil & gas, and energy sectors .

Slovakian Manufacturers and Solutions

- o Sylex s.r.o.: Offers custom FBG sensors, fiber array assemblies, and automated monitoring systems. Their solutions include optical interrogators for reading FBG sensors and network accessories for turnkey monitoring .
- o FluoroSenz: Provides fluorescence-based fiber optic temperature monitoring systems with multi-channel

capability (up to 16 points) and industry-compliant communication protocols like MODBUS and IEC-61850 .
o Mouser Slovakia: Supplies a range of fiber optic sensors, including fluorescence-based and FBG types, for research and industrial applications .

Key Advantages

- o High precision and reliability in harsh or electrically noisy environments.
- o Calibration-free operation for fluorescence-based sensors.
- o Customizable configurations for FBG arrays, including fiber count and spacing.
- o Real-time monitoring with automated data acquisition systems. Slovakian fluorescent fiber optic sensors represent a robust and versatile solution for industries requiring accurate, maintenance-free, and high-performance sensing in challenging conditions.

Optical fiber sensors are one preferred solution for temperature sensing, especially for their capability of real-time

Oxygen and carbon dioxide sensors are involved in many chemical and biochemical reactions. Consequently,

Plastic optical fiber is extremely robust and durable, and is already widely used in the automotive, industrial and telecommunication

Flexible optical fiber sensors are being developed using four main sensing methodologies: optical loss-based sensors, fluorescence

OSENSA developed a series of highly cost-effective fiber optic temperature sensors that exploit these

We have discussed some of the special problems and opportunities that result from employing fiber optics in fluorescence sensors

PyroScience - Model OXR50 - Retractable Fiber Oxygen Microsensor The fiber - optic oxygen sensors from PyroScience feature no

Fluorescence based fiber optic sensor for fluoride in acetonitrile is implemented using Curcumin dye as the sensing reagent.

In this article, a flexible single-point sensor integrated into a fiber-optic path, capable of simultaneously detecting temperature and

In this review, we discussed the optical fiber oxygen and carbon dioxide sensors, the highly sensitive sensors

based on dye

This is a series of fiber optic sensor heads designed to be connected to a fiber optic sensor amplifier. The

Optical fibre sensors are an essential subset of optical fibre technology, designed specifically for sensing and measuring several

Fluorescent fiber-optic temperature sensors have found widespread applications owing to their high sensitivity and

Immobilized on the optical fiber sensor, fluorescent probes reveal the advantages while facing outdoor detection

Abstract Fluorescent fiber optic sensors hold promise for monitoring the pH of concrete due to their high accuracy and

FFA-01 is a fiber array sensor with configurable number of FBG elements and their spacing over the fiber

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