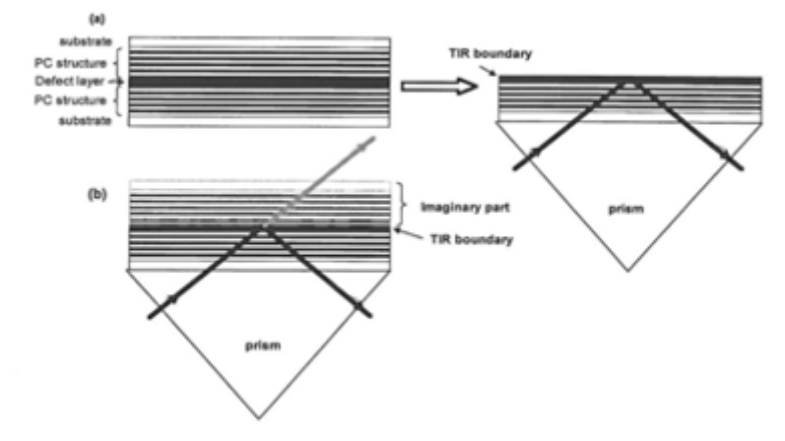
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Novel Photonic Crystal Sensor

Technology number: 3406



OVERVIEW

Highly sensitive detection system using photonic crystal in total internal reflection geometry

- Enhances fluorescent signals and measures multiple dyes without photonic band gap inhibition
- Biomolecular interaction assays, ultrasound detection, kinetic analysis, refractive index measurement

BACKGROUND

Photonic crystals are optical nanostructures with periodic dielectric properties that can control the propagation of light, making them ideal for various photonic devices and sensors. Traditional detection systems, such as surface plasma resonance (SPR), have been widely used for real-time, label-free measurements. However, SPR systems have notable limitations, including poor sensitivity to small analytes (around 1000 Da) and mass transport constraints. These shortcomings necessitate the development of more sensitive and versatile detection technologies. Enhanced signal detection without band gap inhibition is valuable in applications requiring high-throughput and measurement of biomolecular interactions, such as drug discovery, biological research, and diagnostic testing.

INNOVATION

Technology ID

3406

Category

Medical Devices

Life Sciences

Further information

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Researchers at the University of Michigan have developed a novel detection system utilizing a photonic crystal in a total internal reflection geometry (PC-TIR). This innovative design significantly improves the sensitivity and stability of fluorescent signal detection, achieving a 20-fold enhancement compared to non-photonic crystal structures. The PC-TIR sensor allows real-time, label-free quantitative analysis of samples, avoiding the mass transport limitations common in SPR systems. Additionally, this setup facilitates the measurement of multiple fluorescent dyes over a wide wavelength range without photonic band gap inhibition. The versatile and accessible interface of the PC-TIR sensor opens up a wide range of applications, including biomolecular interaction assays, ultrasonic detection, and kinetic analysis, offering a robust platform for advanced scientific and medical research.