

Temperature Invariant Biosensor

BACKGROUND

Researchers at The University of Manchester have developed a novel Tuneable Temperature Invariant Biosensor (TIBS) with a Photonic Microwave BioData Transmitting Capability. The sensor solves the problem of false readings due to environmental, mechanical and temperature change. The Sensor is capable of encoding the biodata directly from photonic to microwave wavelengths without using complex methodologies (i.e no electro-optic or non-linear methods are used). Another novel attribute the sensor has is that the refractive index change can be interrogated in the time domain.

THE TECHNOLOGY

The invention is fabricated using the well-established silicon on insulator (SOI) CMOS fabrication process. The key idea behind the invention is to use pure photonics to realise an extremely sensitive (spectral sensitivity~ 422nm RIU⁻¹, temporal sensitivity ~ 1.94µsRIU⁻¹) temperature invariant biosensor with a novel capability to transmit the sensed data by wireless microwave propagation or radio over fiber (ROF). The limits of detection are ~ 2x10⁻⁴ RIU(spectral), 8x10⁻⁶RIU(temporal). The detection of a bio-analyte changes the spectral position of the output of a microcavity resonator. The novel part of the invention uses the information gained by the change in refractive index of the bio-analyte to formulate a microwave data output. The generation of the microwave data signal does not involve the use of free carrier absorption (electro-optics) or non-linear techniques. The invention is also much simpler to implement as it only uses one, non-laser, excitation source and therefore does not require any form of phase locking techniques.

KEY BENEFITS

- The capability to tune the resonant wavelength to compensate for fabrication tolerance errors. This attribute can also be used to simulate analyte refractive index changes.
- The mass manufacturing market of silicon on insulator devices means that this invention can be mass reproduced in an extremely cost-effective operation.
- No fabrication plant re-tooling required.
- BioData Transmission (Radio Over Fibre (ROF) or Wireless Network)

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APPLICATIONS

- Environmental monitoring
- Health monitoring
- Gas monitoring
- Volatile Organic Compound (VOC) Detection

INTELLECTUAL PROPERTY

Prototype Available for Demonstration

OPPORTUNITY

Collaboration for co-development, Non-exclusive licensing

CONTACT

Dr Rick Watson, Team Leader - New Projects, UMIP, Core Technology Facility, 46 Grafton Street,
Manchester M13 9NT

✉:rick.watson@umip.com

☎: +44 (0) 161 603 7717

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