

U-Bent Optical Fibre Sensors



Problem Statement: Traditionally detection of bacteria and viruses has been done by culturing (and of late by PCR and associated techniques). ICP MS or ICP AES has been used to detect heavy metals. Mass Spectroscopy methods are used to detect organic molecules. However, these methods are time-consuming, require heavy capital investment, and require extensive expertise and interpretation of instrument outputs. These factors make deploying such techniques and instruments difficult at a vast scale.

Uniqueness of the Solution: The sensor developed by the team is easy to use, affordable, robust and reliable. The solution uses nanostructure-decorated U-bent optical fibres, which can be functionalised with suitable receptors which target specific analytes. The instrument consists of a light source (LED), a photodetector, electronics to process the light output, and a digital display. The system shows high

sensitivity. Capital investment and running costs for this sensor are low.

Current Status of Technology: The functionalisation of the sensor head for each of the analytes is at different levels. In some cases, it has been used with field samples, and in other cases, it has been used with simulated samples in the lab only. The prototype of the instrument, along with a cartridge design, has been tested in the lab.

Societal Impact: This solution can be used in water monitoring for drinking water, in monitoring intake and effluents of Effluent Treatment Plants (ETPs), Common and Combined Effluent Treatment Plants (CETP) and Sewage Treatment Plants (STP), food industry, and point of care devices in healthcare. This is one instrument that can be deployed at a large scale for a wide range of applications. The low capital and running costs make this a viable solution for many sensing applications.

Patent(s): Filed

Relevant Industries: Environment, Healthcare, Nanotechnology, IT.

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