LICENSING OPPORTUNITY: PH PHOTOTHERMAL SPECTROMETER AND PERFORMING PH PHOTOTHERMAL SPECTROSCOPY

DESCRIPTION

Problem

Conventional pH sensors require frequent calibrations. In embedded sensor applications such as tissue engineering, the calibration process, which requires removing and re-introducing the probe after calibration, risks introducing microbial contaminants.

Invention

A device that uses multiple wavelengths (colors) of light to probe the pH-dependent changes in absorbance of pH-sensitive dye by determining the difference in temperature rise due to differences in light absorbance at different colors. The absorbed light is thermalized, resulting in an increase in sample temperature, which is detected using an optical thermometer.

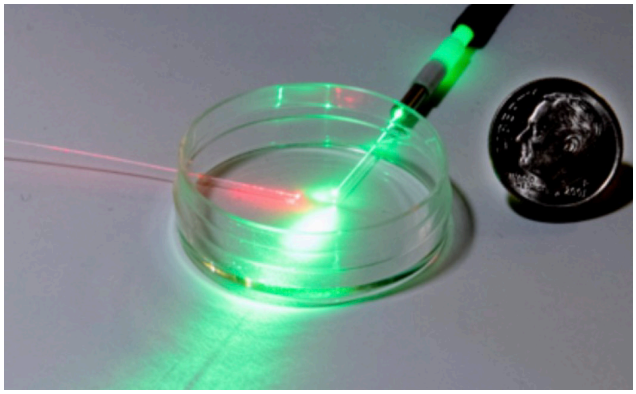
BENEFITS

Potential Commercial Applications

- Bio-industrial processing
- Tissue engineering industry

Competitive Advantage

The use of optical waveguides to deliver light and detect temperature changes allows us to embed the sensor in a biocompatible matrix in regions inaccessible to optical microscopy. The use of soft biocompatible materials allows us to best match the mechanical and chemical environment conducive to cellular/tissue growth while minimizing biofouling of the sensor. The invention is stable for weeks, making it suitable for in situ pH monitoring in cellular environments.



An empty petri dish with two optical fibers, illustrating one version of the researchers' experiment. The left-hand fiber (usually shining infrared light, but depicted here as visible red light) is a temperature sensor. The top fiber shines green, red or blue light into the petri dish to adjust the signal that the temperature sensor measures.

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