Innovation and Commercialization

UNIVERSITY OF TEXAS ARLINGTON

Photothermal Absorbance Measurement in a Flow System

Tech ID: UTA 18-54

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TECHNOLOGY NEED

Optical absorbance detection has been a long-term staple in analytical sciences to measure optical absorption and thermal characteristics of a sample. Photothermal deflection spectroscopy (PDS) is likely the most commonly used liquid phase photothermally measured optical absorption (PMOA) technique. While all PMOA techniques rely on a temperature change, this is rarely directly measured. Despite the fact that numerous flow-through applications are known, there is no commercial detector for liquid phase PMOA. Therefore, a simple photo-thermal detection system in a flow stream based on temperature difference upstream and downstream of the point of illumination is required to measure a temperature change precisely.

INVENTION DESCRIPTION/SOLUTION

We have developed a novel photothermal absorbance measurement system based on measuring a differential temperature change precisely. This is done by measuring the temperature difference between two close locations (one location immediately before and one location immediately after the analyte) on a flow conduit subject to light irradiation. The temperature is measured using a thermocouple, made from two fine wires. When there is a temperature gradient between the junctions, a voltage is generated, which is then amplified and converted by the use of simple electronics. Additionally, this same photothermal measurement can measure fluorescence. Think of bio-fluorescent marine organisms. This is more sensitive because it involves the measurement of a small signal over no background at low concentration.

APPLICATIONS

- Measurement of analyte temperature
- Determination of quantum efficiency of an analyte
- Liquid Chromatography detector
- Capillary scale detection system

KEY BENEFITS

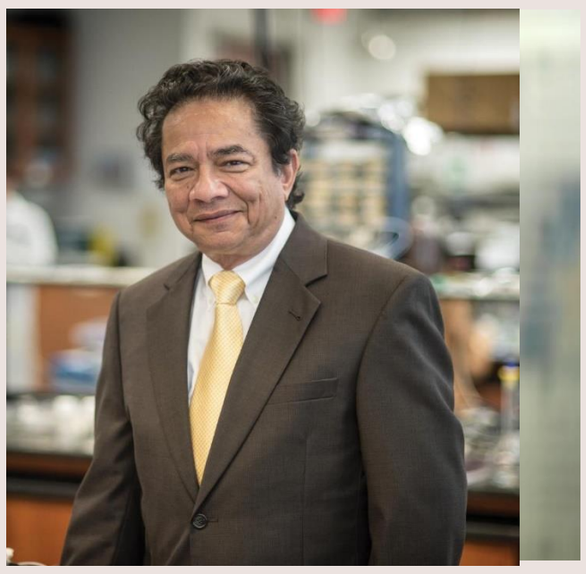
- Cost-efficient A temperature resolution of 1 m°C with less than $100
- Simple and inexpensive to use
- Signal to noise ratio improves significantly
- Use of high power light source in capillary format

STAGE OF DEVELOPMENT

Prototyped & Animal tested

INTELLECTUAL PROPERTY STATUS

Patent Pending



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