



Lead Inventor

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Biomedical Engineering

Research Interests

- Use of optics for medical diagnostics and biomedical sensing.
- Macro-scale to nano-scale biomedical systems.
- Point-of-care devices using lasers, optics and electronics.

Contact

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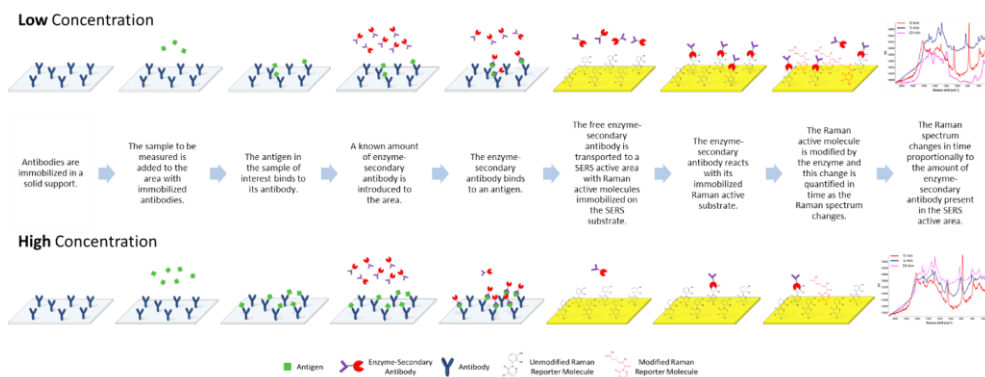
Immobilized substrate enzymatic SERS assay

Overview

Analytical biochemical assays are commonly used by many industries to measure the presence and concentration of a substance (e.g., a chemical compound or biomolecule). This information can then be used, for example, for medical diagnosis, sensing, or monitoring. Other applications are listed below for new technologies such as this that provide more precise and sensitive information, which are needed to improve the performance of current assays.

Technology

The technology is a sensing test in which an enzyme is conjugated with a biomolecule (antibody, protein, or molecule) which reacts in an immunoassay with the analyte that is being measured. There are two reactions. The first reaction determines the amount of enzyme-biomolecule (which is proportional to the measured analyte) that will be present in the enzymatic reaction (second reaction). The enzyme in the enzyme-biomolecule conjugate reacts with its substrate that is linked to the surface of a metal to modify its structure. The change in structure is monitored in time by measuring the changes in the output and one such output would be optical such as the surface enhanced Raman spectroscopy (SERS) spectrum of the substrate. The rate of change of the spectrum is proportional on the amount of enzyme present, which in turn is proportional to the amount of measured substance.



Advantages

- Reproducibility
- Sensitivity
- Flexible platform that can be used to measure different substances
- Technology has a built-in calibration component

Applications

- Medical (diagnose conditions)
- Pharmaceutical (develop and analyze drugs)
- Veterinary (diagnose conditions)
- Environmental (monitor areas of interest)
- Forensic (obtain information from biological samples)
- Military (monitor people and diagnose conditions)
- Life science (study biochemical phenomena)
- Food sciences (monitor substances for quality control)

Stage of Development

A proof of concept has been demonstrated. Currently, the technology is being optimized.

Patent Status

Patent Pending