Biosensing Instrument

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EC-DualFlow™ Analysis Module

Dual Channel Electrochemical Flow-Through SPR

Biosensing Instrument Inc. introduces an innovative Dual Channel Electrochemical Flow-through SPR option— **EC-DualFlow™**. This technology provides users with novel capabilities to study molecular binding processes and conformational changes of biomolecules under the influence of applied electrochemical potentials at different flow rates. Its small channel volume facilitates rapid sample exchange and fast kinetic studies, and also drastically reduces consumption of valuable biological samples. The dual-channel design allows users to perform serial downstream analysis, control experiments, and develop new applications.

Key Features

- ☑ Dual-channel electrochemical SPR with flow control
- ☑ BI-DirectFlow™ flow injection technology integrated into the EC-DualFlow™ module for the BI-3000 series
- ☑ Small internal sample volume
- ☑ Modular design provides users with maximum flexibility
- ☑ Wide dynamic range and high sensitivity for both large and small molecules
- ☑ Broad response time for slow (hours) and fast (< ms) kinetic processes

Performance Characteristics

- **Dual-channel, Electrochemical, and Flow Control:** Two independent, electrochemically-controlled channels with a wide range of flow rates makes this system uniquely versatile for cutting-edge EC-SPR applications. A user can apply an external potential to one fluidic channel while leaving the other fluidic channel (upstream, downstream, or in parallel) available for standard SPR analysis. Alternatively, the user can simultaneously apply the same or different potentials to the two channels.
- **Flow Injection Technology:** The EC-DualFlow™ module utilizes different flow injection technologies between the BI-2000 and BI-3000 series. The module compatible with the BI-3000 model is equipped with our unique BI-DirectFlow™ technology, which enables near-zero dispersion for ultra-fast kinetics and distinction/extraction of secondary effects to generate higher quality results.
- **Small internal volume:** A small volume conserves expensive reagents and valuable samples, enabling researchers to carry out rapid sample injection and investigate fast kinetic processes. Moreover, it provides the flexibility of achieving thin-layer cell performance at slow flow rates and steady-state voltammetric behaviors at high flow rates.
- **Biocompatibility:** The cell body and fluidic channels are constructed with biocompatible materials. Such biocompatibility eliminates sample carryovers and memory effects, affording continuous and undisrupted sample injections and analyses.
- **Easy Usage and Simple Maintenance:** The micro-fluidic cell and EC electrodes are uniquely integrated into the cell body with high precision, enabling easy usage, cleaning, and maintenance. This integrated EC-SPR flow system conveniently mounts to all BI-SPR instruments for flexibility in high performance EC-SPR analysis.

Applications

BI's EC-DualFlow™ SPR technology opens the door to many previously impossible experiments. Users can now induce an electrochemical process in one channel so that its reaction products can be captured and/or studied downstream in the second channel. Other applications include:

- Electrochemical SPR studies of redox-labeled biomolecules
- Redox-enhanced and -impeded biomolecular interactions (e.g. protein-protein, protein-DNA, and protein-drug interactions)
- Electric field-controlled binding and dissociation processes
- Electric field assisted DNA hybridization and melting
- Electric field- and redox-induced conformational changes of immobilized proteins and other molecules
- Simultaneous electrochemical and SPR analysis of anodic stripping
- Electrochemical deposition and stripping in flowing solution streams
- Development of high-throughput electrochemical biosensors
- Real-time monitoring of influx/efflux of ions within redox thin films