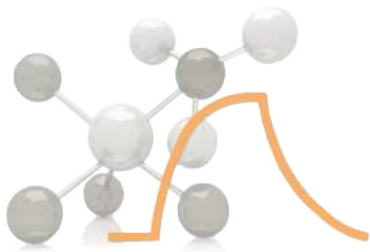


BI-2500 Series

Benchtop SPR with analysis modules

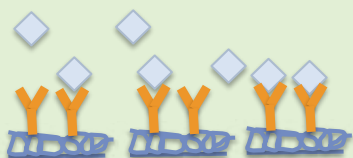


- ✧ **Benchtop SPR with 3-channel SPR detection module**
- ✧ **High sensitivity to measure small molecules**
- ✧ **Innovative multi-module design for optimal flexibility**
- ✧ **Broad response time for slow and fast kinetic processes**
- ✧ **Cost effective solution**

The new BI-2500 benchtop SPR system offers 3-channel flow mode and delivers high quality binding response for low immobilization and small molecule (<100 Da) detection. Its innovative modular design provides users with optimal flexibility to choose amongst various analysis modules for life science, electrochemistry, and biosensing in liquid and gas phase SPR applications. In addition, its fast detection is ideal for the study of fast kinetics of redox-induced conformational changes in proteins and other biomolecules.

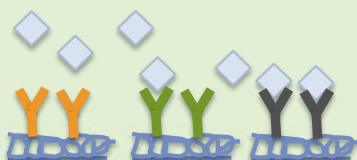
Benefits with 3-channel SPR

The BI-2500 provides greater flexibility and faster assay development, doubling the throughput over 2-channel SPR systems.



Improve data fidelity by obtaining more repeated data sets in one injection

Higher throughput with more channels for binding analysis

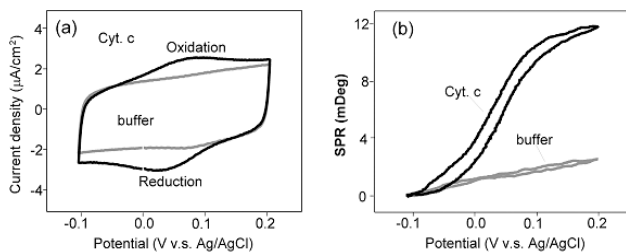
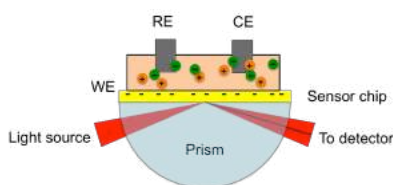


Faster assay development by quickly optimizing immobilization and regeneration conditions

Life Science Application

Redox-Induced Protein Conformational Changes

With the electrochemical enhanced SPR, redox-induced conformational changes in surface bound protein molecules such as Cytochrome c can be studied. By controlling the potential of SPR sensor chip, the simultaneously measured SPR angle shows a sigmoidal change as the protein is switched between the oxidized and the reduced states.

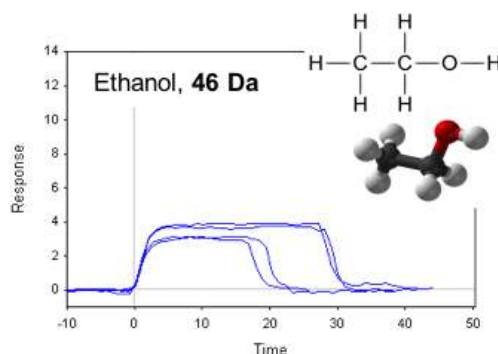


(a) Cyclic voltammogram of cytochrome c, immobilized on a 3-mercaptopropionic acid-functionalized Au SPR sensor chip and (b) the simultaneously recorded SPR angle shift vs. potential. Note that the cyclic voltammogram and SPR response in the absence of cytochrome c are also shown (grey line) for comparison.

Biosensor Application

Chemical Biosensor Testing with Gas SPR

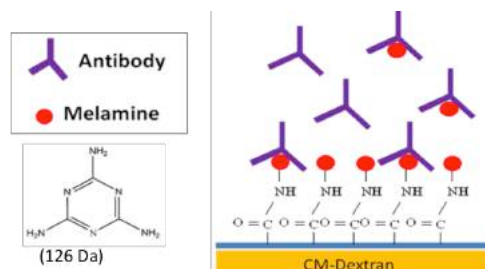
Gas SPR provides superior sensitivity in small molecule detection, which is critical for characterizing polymers and thin films at solid-gas interfaces. Adsorption of the small molecules onto the sensing materials, such as polymers, can be detected by observing SPR angle shift.



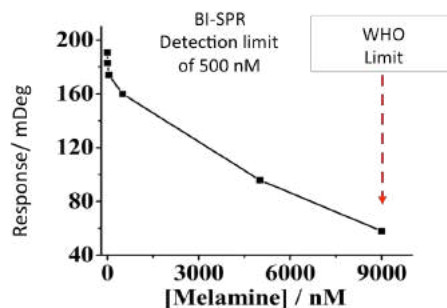
SPR responses of 4 polymerized sensor surfaces exposed to ethanol vapor (46 Da).

Biosensor in Food Safety

Highly sensitive SPR detection has helped to identify illegal alteration of infant milk products with melamine - a small molecule that can boost the detectable protein contents. A competitive binding SPR assay schematic for melamine detection is shown.



The measured SPR response vs. melamine concentration plot for melamine detection in milk has clearly demonstrated the detection limit of the BI instrument (0.5µM) is well below the WHO mandated limit of less than 9µM.



2500 System Specifications

Base Station	Light source	670 nm
	Detection speed	4 ms
	Incident angles	40-47 Deg (gas) 67-81 Deg (liquid)
	Baseline noise	< 0.06 RU RMS (0.01 mDeg RMS)
	Baseline drift	1RU/hr (0.17 mDeg/hr) (when ambient drifts < 1°C/hr)
	Temperature control range	20°C to 30°C (10°C below ambient temperature max)
	PC interface	USB 3.0
	Outer dimension	355(w) x 215 (h) x 365 (d) mm
	Weight	8 kg
	Power supply	110-230 V 50/60 Hz
Fluid Handling	Number of sample flow channels	3 channels
	Flow cell material	PEEK (biologically compatible)
	Flow rate	1.0 to 250 $\mu\text{L}/\text{min}$ (application dependent)
	Sample injection volume	>50 μL (application dependent)
	Sample injection method	Manual
	Channel volume	< 32 nL
	Injection rise time	< 0.2 s
	Kinetic constant	$k_a < 1 \times 10^8 \text{ M}^{-1}\text{s}^{-1}$ $k_d > 1 \times 10^{-6} \text{ s}^{-1}$
	Dissociation constant	$K_D = 10^{-3} \text{ M}$ (1 mM) to 10^{-12} M (1 pM)
	Molecular weight cutoff	100 Da
	Analysis module	3 channel Flow Injection Analysis Module
Control System	Computer	Windows operating system
	Software	BI-SPR software including Data Analysis and Kinetics Analysis packages

2500 Analysis Modules



Flow Injection

Included



EC-DualFlow™

Optional



EC SPR

Optional



Gas SPR

Optional

Analysis Modules

Flow Injection

This 3-channel injection module provides continuous flow stream for uninterrupted binding studies.

EC SPR

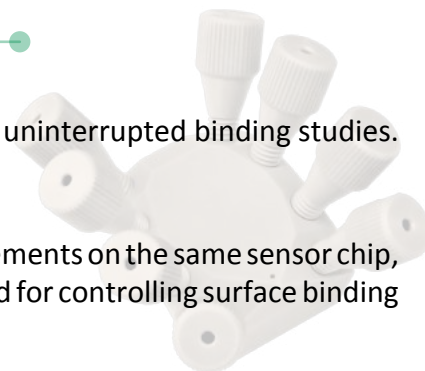
This module facilitates simultaneous electrochemical and SPR measurements on the same sensor chip, and is ideal for studying various electrochemical processes with SPR and for controlling surface binding and molecular conformational changes via electrochemical means.

EC-DualFlow™

This module 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.

Gas SPR

This module enables the high sensitivity of SPR analysis to be performed in the gas phase, permitting new capabilities for sensor development, thin film analysis, environmental and air quality research, and gas molecule binding studies.



Sensor Chips

Bare Gold Sensor Chip

Highly uniform gold film for reproducible SPR research.

Divided Gold Sensor Chip

Pre-patterned gold surface for EC flow SPR applications.

CM Dextran Sensor Chip

Sensor with COOH- linker groups in a dextran hydrogel, ideal for high capacity amine coupling with low non-specific absorption.

Streptavidin (SA) Sensor Chip

Sensor with streptavidin in a dextran hydrogel for immobilization of biotinylated molecules such as proteins, peptides, nucleic acids or carbohydrates.

Ni-NTA Sensor Chip

Sensor with NTA used for immobilizing histidine-tagged molecules. NTA surface can be regenerated by injecting EDTA or imidazole.



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