Excellence in Surface Plasmon Resonance

BioNavis

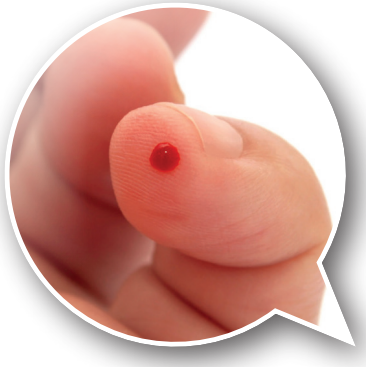
Biosensor development

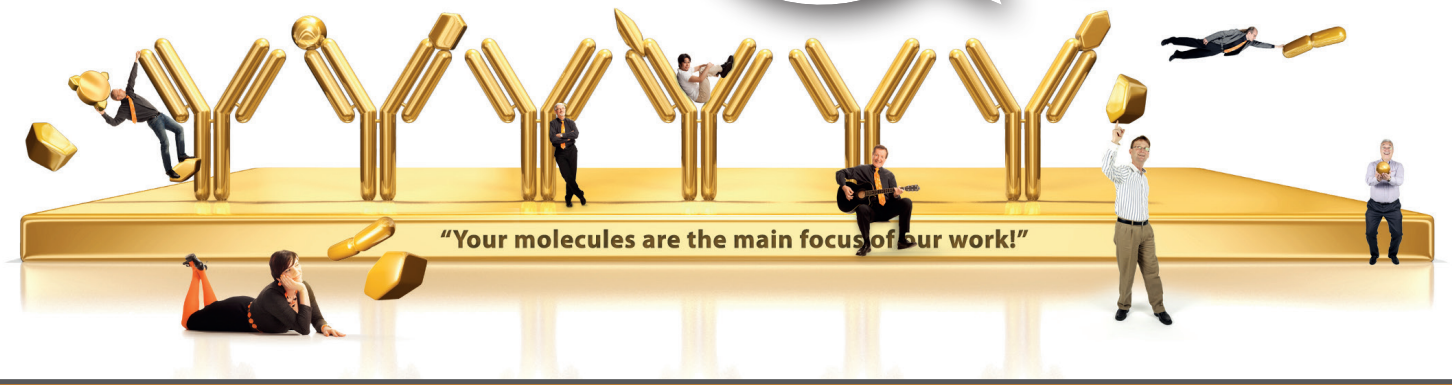
Gas sensor development

Electrochemistry

All the steps of your assay

- in real-time
- label-free
- on surface of your choice!





MP-SPR is an essential tool for assay development in fields such as food and feed safety, environmental safety, clinical diagnostics, border control and process control. While part of the research worldwide is dedicated to high-throughput instruments, more and more attention is gained by portable or point-of-care instruments. MP-SPR is an excellent tool for development of portable biosensors. Point-of-care biosensors typically include electrochemical sensors, surface enhance Raman sensors (SERS), ELISA, fluorescence or newly also printed diagnostics.

Key questions that MP-SPR can answer:

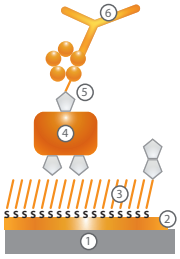
- How fast do the molecules X bind with surface A as compared to surface B?
- What is the optimum surface for my biosensor application?
- How does my assay work with crude sample such as serum, saliva, sea water or urine?
- Is the biosensor that I have designed working better than the previous one?
- Which coating prevents sample adsorption onto my microfluidic channels?

www.bionavis.com/biosensors

Why choose MP-SPR for biosensor development?

Any assay type

MP-SPR monitors every step of your assay, whether it is direct binding, competitive assays, it uses antibodies, fragments, DNA, molecularly imprinted polymers (MIPs), aptamers, nanoparticles, cells or microvesicles. Measure affinity and kinetics of molecular interactions without labels and determine bound mass. MP-SPR as the only one in the market is able to quantify also conformational changes using LayerSolver and measurements at multiple wavelengths.



1. Substrate
2. Electrode
3. Thiol SAM
4. Streptavidin
5. Biotinylated antigen CRP
6. Analyte (antibody to CRP)

Any sample

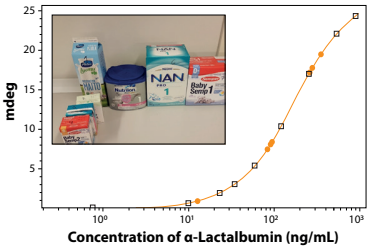
MP-SPR works with gas, vapor or liquid samples. The samples can be purified or crude, including saliva and whole serum. The sample can contain even metallic nanoparticles and still be measured by MP-SPR. MP-SPR is also compatible with certain organic solvents.

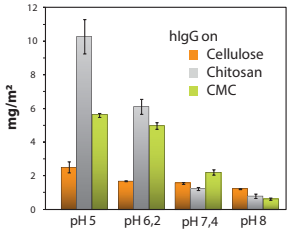
Ex-situ modification of SPR sensor surfaces

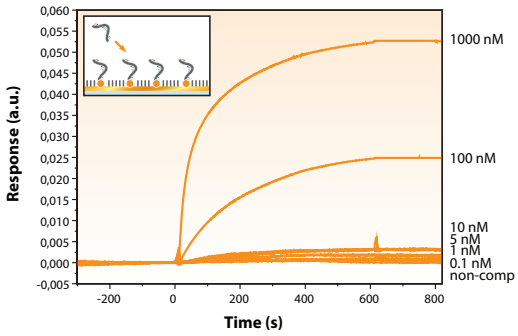
Avoid costly assay transfer - develop your sensor directly on your sensing material: metals for electrochemical (EC) and SPR detection, plastics for ELISA, cellulose for printed biosensors, metal nanoparticles for SERS, glass for classical chemistry, magnetic nanoparticles, bacteria, living cells and more.

MP-SPR instruments do not require refractive index oil and thanks to a fast locking holder for sensors, there is no need for two-sided tape either. **Sensors can be functionalized *in-situ* or *ex-situ*** with a number of methods including spin-coating, dip coating, Langmuir Blodgett, ALD, sputtering, CVD, etc.

Our sensors can be re-used. Our gold sensors use a superior adhesion layer that allows for repeated cleaning with strong acids. We provide many other sensor surfaces including SiO_2, TiO_2, Pt, but also functionalized surfaces such as carboxymethyl dextran, protein A, HisTag and more.







Easy validation

In-situ validation is possible with electrochemistry, fluorescence and other optical detection methods. *Ex-situ* validation is possible with microscopy including AFM and SEM. If you are specifically interested in combination of electrochemical and MP-SPR measurements, please see Application Note 120, 142 and 143.

Microfluidics

Often new biosensors utilize microfluidics to minimize sample consumption and to reduce the analysis time. Microfluidic chips can be made in polymers, silica, metals, glass or even paper. It is essential to coat the microchannels in order to prevent sample adsorption onto the channel surface instead, and thus to avoid the reduction of analyte concentration in the sample. MP-SPR can be used to optimize microfluidic surfaces to provide wetting, yet antifouling surface.

Recommended MP-SPR Navi™ instruments for biosensor development:

200 OTSO **400 KONTIO** **210A VASA** **220A NAALI** **420A ILVES**

Further reading:

AN#162	Concentration analysis from milk
AN#160	Bacteria detection from powdered milk using enzymatic precipitation
AN#154	Cancer cell detection
AN#151	Measurement in 100% serum
AN#140	Gold nanoparticles for biosensing
AN#132	Immunosensor development - Binding capacity quantification
AN#126	Selection of cellulose modification for printed biosensor applications
AN#117	Quantitative detection of DNA

Selected publications:

An impedimetric study of DNA hybridization on paper-supported inkjet-printed gold electrodes, (Ihalainen et al., Nanotechnology, 2014)

Investigation of pH-Induced Protein Conformation Changes by Nanomechanical Deflection, (Thakur et al., Langmuir, 2014)

Dynamic and equilibrium performance of sensors based on short peptide ligands for affinity adsorption of human IgG using surface plasmon resonance (Islam et al., Biosensors and Bioelectronics, 2014)

Rapid and sensitive detection of maize chlorotic mottle virus using surface plasmon resonance-based biosensor (Zeng et al., Anal. Biochem., 2013)

Development of diagnostic SPR based biosensor for the detection of pharmaceutical compounds in saliva (Sonny et al., Proc. SPIE 7376, Laser Applications in Life Sciences, 737605)

Salmonella detection from powdered milk (Farka et al., Analytical Chemistry 2016)

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