



Insplorion

Insplorion S2

Product Information

Insplorion S2 features a dual-channel flowcell for label-free in situ studies of molecular interactions and surface adsorption events. The system enables true nano-scale measurements within a few tens of nm of the surface/sample interface, with perfect control over the flow of your samples and buffers.



Integrated and automated fluidic handling

Automated flow operation with software command queue, 6-way injection valve and syringe pump with uninterrupted flow. Integrated buffer change and flush operation.

Accurate temperature control

Fast and stable temperature control with a range between 15 and 45°C and fluctuations under 0.1°C.

Dual channel system

Measure simultaneously on up to two samples.

Easy operation

Samples are delivered by means of the integrated fluidic handling system, with complete user accessibility for ease of handling and accurate control. Operation is automated using the Insplorion InControl software. The one-grip removable flowcell with a separate sensor carrier tray makes day-to-day use and maintenance easy.

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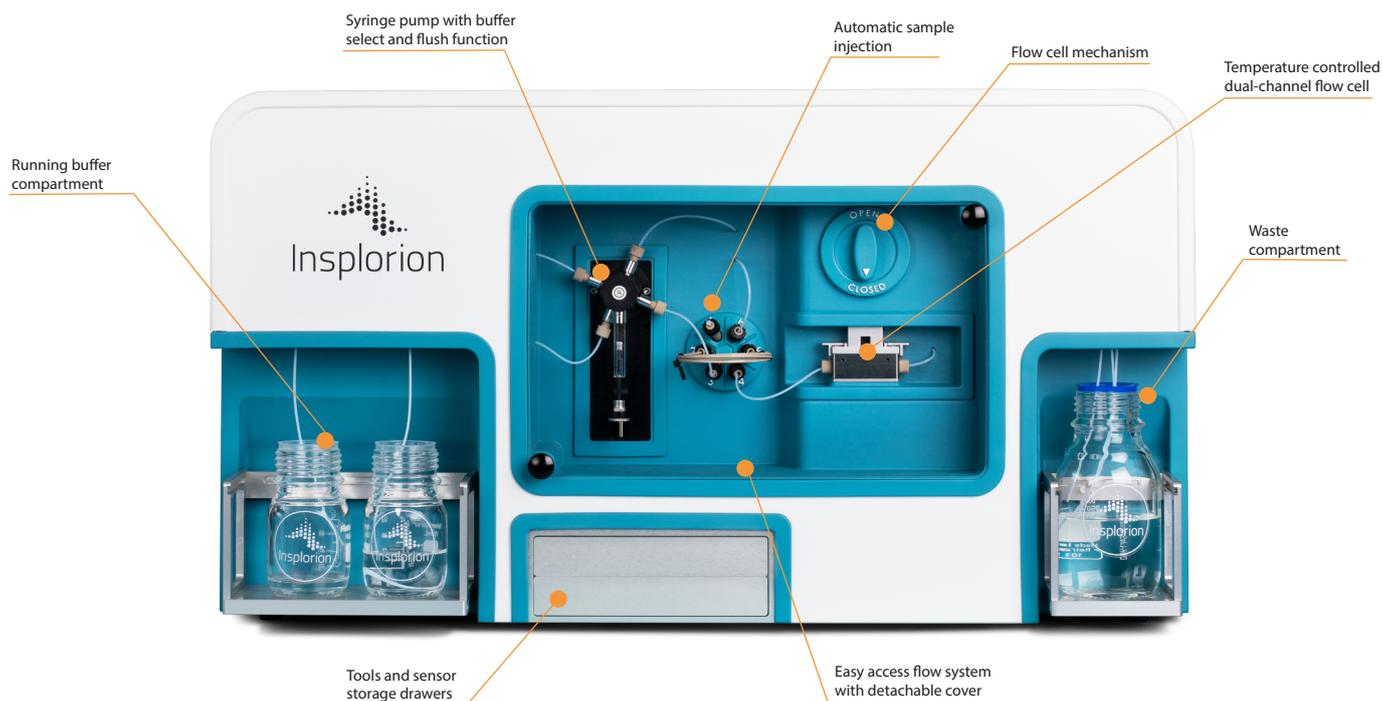
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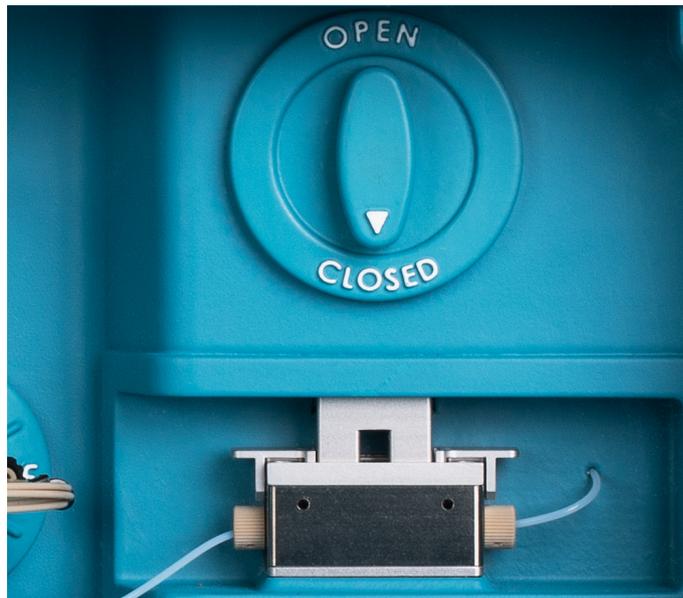
System Features Overview



Easy Operation - Full Control



The Insplorion S2 comes equipped with state of the art syringe pump as well as an automatic injection valve. This allows for precise handling of the sample and buffers and remote control, using the Insplorion InControl software. Syringes and sample loops with different volumes are available.



One key feature of the Insplorion S2 is the new system locking system that makes use of our new sensor holder and flow chambers, delivering an easy to use experience and near-perfect temperature control over both sensors.

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Nanoplasmonic Sensing by Insplorion

Insplorion's proprietary technology, NanoPlasmonic Sensing (NPS) is extremely robust, non-invasive, sensitive, and offers high temporal resolution. The nanostructured NPS sensor is a key component of the Insplorion S2 instrument. The technology is based on the optical phenomenon of Localized Surface Plasmon Resonance (LSPR) observed in metal nanoparticles.

A localized surface plasmon (LSP) is a coherent, collective spatial oscillation of the free electrons in a metallic nanoparticle. LSPs can be excited by the electromagnetic field of visible and near visible light. When white light passes through a plasmonic sensor, the nanoparticles absorb and scatter some of the light, leading to the emergence of a peak in the extinction spectrum. This LSPR peak position is determined by the size, shape and material of the nanoparticle, and more importantly, it also depends on the refractive index of the medium in close proximity to the nanoparticle. Thus, by monitoring changes in the LSPR peak, it is possible to detect and monitor processes influencing the environment in the vicinity of the nanoparticles on the sensor surface. This is the detection principle used in Insplorion's sensors. The resonance peak is extremely sensitive to any changes in concentration, composition or structure in the immediate vicinity (<30 nm) of the plasmonic particle. In practice, the individual plasmonic particles act as nano-sized optical antennas. By monitoring shifts in the resonance wavelength in real time it is possible to follow, for example, the interaction of peptides or proteins with a supported lipid bilayer, as shown in the example below.

The technology constitutes a very versatile sensing platform that enables detection and monitoring of a large variety of material and interface processes under in situ conditions.

Compatibility

The Insplorion S2 is suitable for any biomaterial and can easily handle different types of biosamples:

- Lipids
- Proteins
- Nucleic acids
- Viruses
- Biofilms
- Biomaterials
- Hydrogels

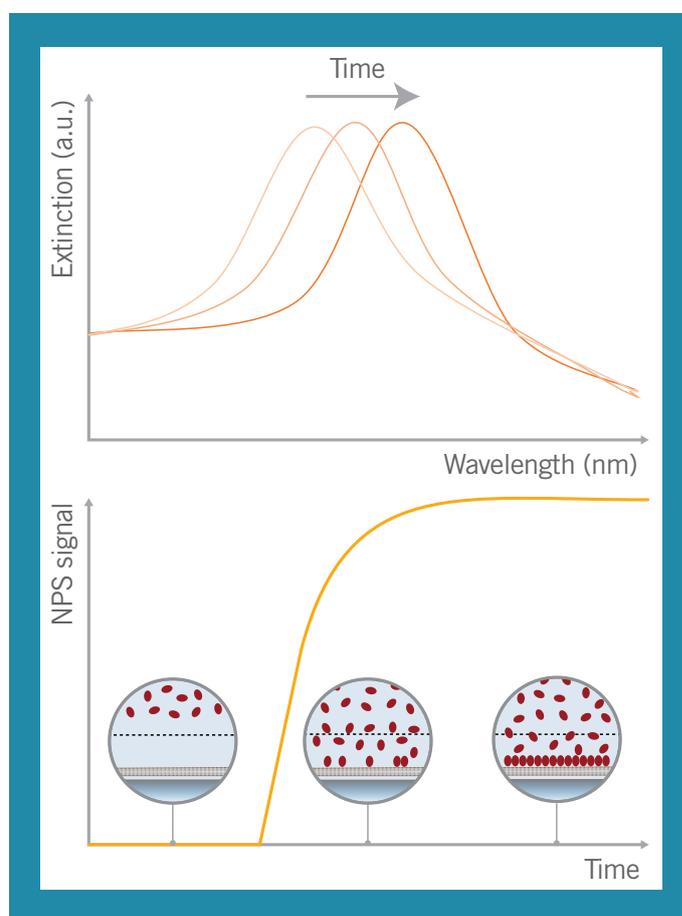
Despite being designed for handling biosamples, the Insplorion S2 is very robust and can handle many other materials and chemical substances. Contact us for more information about the chemical compatibility of your samples.

Versatility

Due to its label-free, real-time and surface-sensitive nature, NPS technology is very versatile.

The Insplorion S2 excels at bringing out the best qualities of NPS technology and directs them towards bio-applications that demand reduced sample handling and require tight temperature control. In theory, any phenomenon that can alter the optical environment of the surface sensor can be measured. This includes a multitude of processes such as:

- Molecular adsorption to different surfaces
- Lipid bilayer formation and interactions
- Temperature dependent interactions
- Conformational changes
- Biomolecular recognition
- Biomaterialization
- Biofilm formation
- Loading and unloading dynamics



The interaction of incident light with the metal nanostructures on the sensor's surface creates LSPR peaks that can be measured using the Insplorion S2. In this example, a small protein interacts with a lipid bilayer on top of a sensor. The interaction of the proteins with the lipid bilayer within the sensing range of the sensor causes the plasmonic peak to change. The more proteins interact with the lipids, the more the peak shifts (top). Insplorion's software allows for easy and precise tracking of this shift (NPS signal) over time, creating curves that show the phenomena you are looking at, be it a conformational change or binding or adsorption kinetics (bottom).



The Sensor Chips

Insplorion provides nanoplasmonic sensors, which enable ultrasensitive measurements of refractive index changes close to (< 30 nm from) the sensor surface. The sensors can be modified or coated with a range of materials, which allows studies on molecular interactions on the surface, from molecular adsorption and biomolecular recognition to diffusion and temperature dependent interactions. Other than our standard sensors, Insplorion also offers the possibility to fine tune the sensors by changing the type and size of nanostructures.

Insplorion NPS Sensors, compatible with the Insplorion S2 as well as the Insplorion X1 and XNano, here presented in the Insplorion's S2 sensor holder.

Specifications

Flowcell

Sensor Chip Position	Dual Channel*
Injection type	Syringe pump with sample loop
Sample dead volume	20 μ L
Standard syringe volume	250 μ L **
Typical flow rate	12.5 - 250 μ L/min ***
Standard sample loop	200 μ L
Materials	Sapphire glass, Titanium
Gaskets and Tubes	PTFE, FPM and Silicone elastomer
Temperature Range	15 - 45 $^{\circ}$ C with 0.1 $^{\circ}$ C stability

* Aligned in series ** Can be configured *** Software controlled

Sensors

Size	9.5 x 9.5 mm, 1 mm thick
Substrate	Fused Silica
Surface*	Nanostructured gold
Standard coatings**	Uncoated, SiO ₂ , Al ₂ O ₃ , TiO ₂

*Custom silver sensor nanostructures are also available ** Sensors can be ordered with custom thin film coatings.

Measurement characteristics

Type of measurement	Label free Nanoplasmonic Sensing
Light source*	Tungsten-Halogen lamp, minimum lifetime 2000 hours
Measured spot diameter	1.5 mm
Time resolution	Up to 10 sample points per second
Typical noise**	< 0.01 nm in wavelength
Probe depth	Up to 30 nm

* Custom choices and replacements are available, ** At a sample rate of 1 Hz.

System

Size	W65xD42xH36 cm
Weight	30 kg

Software

Control software	InControl 1.0
Operating system	Microsoft Windows 10 compatible
Output data format	Proprietary with CSV/TSV export for ease of use with any additional graphing toolkit
Analysed parameters	Multiparameter readout (effective change in surface concentration)

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