QSense

Superior accuracy in surface interaction analysis

Biolin Scientific

[Progress Together]
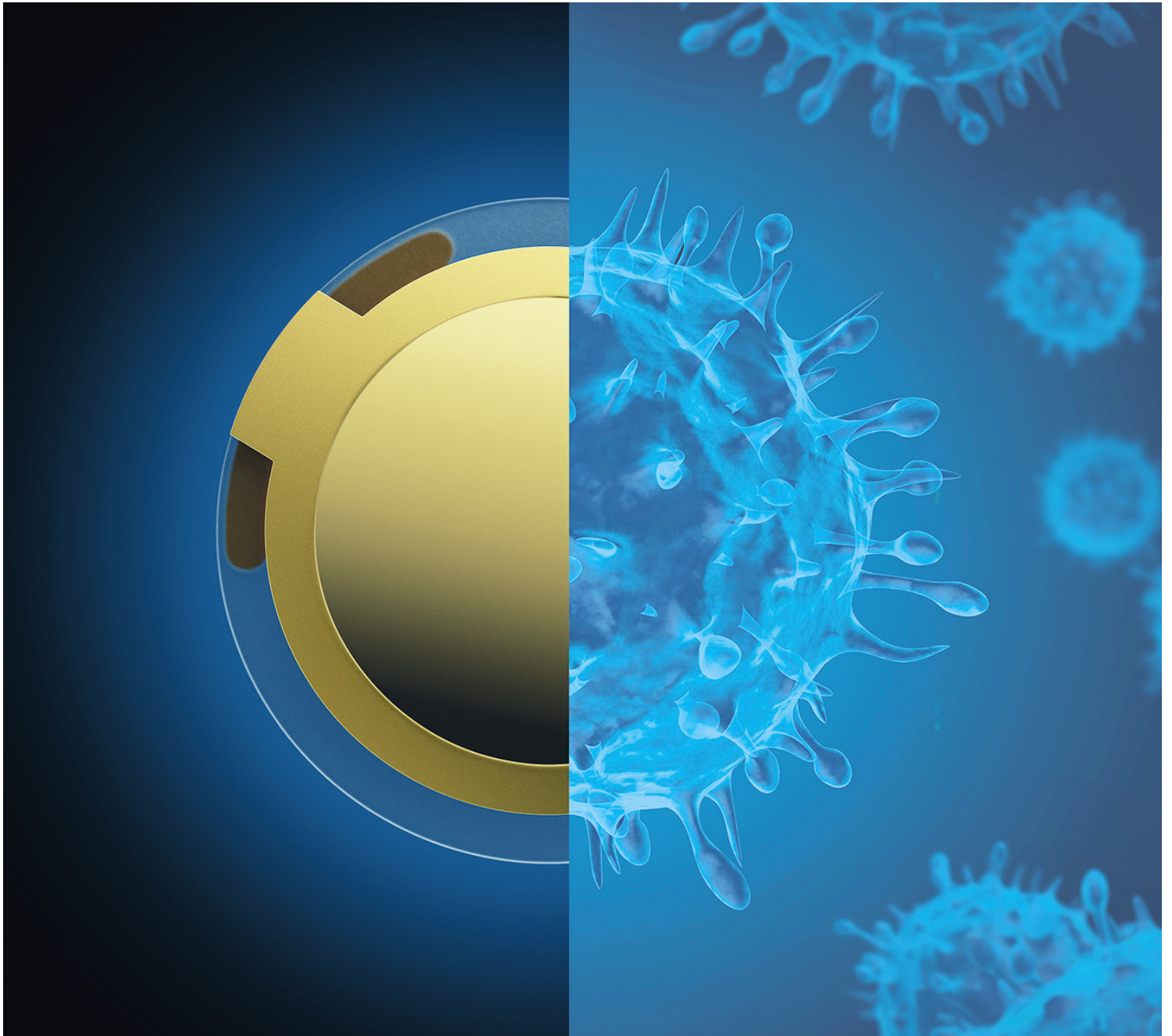
Explore the nanoscale world with QSense

Based on established and powerful quartz crystal microbalance with dissipation (QCM-D) technology, QSense® gives you vast exploration and experimentation capabilities – making it easy for you to find answers to the questions that need asking.

Superior accuracy

The real-time analysis of surface-molecule interactions allows you to measure mass and thickness changes and rapid events with nanogram precision. In addition, structural changes and solvent content are also detected - all with accurate outcomes and high reproducibility.
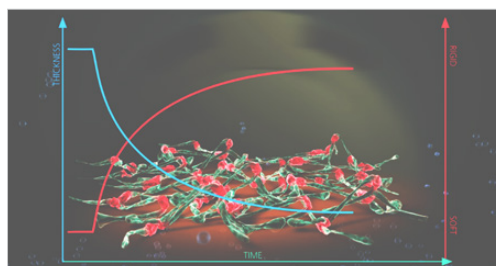
Endless possibilities

Our instruments are designed to enable variable measurement conditions, and a wide variety of samples in liquid or air can be analyzed. We also have the broadest sensor surface offering on the market, enabling you to achieve your real-life conditions.

As easy as it gets

Turn-key instruments, intuitive software and support from our experienced team of experts will ensure you get the most out of your measurements.


QSense - world leader in QCM-D technology

Since 1999, when the first commercial QCM-D instrument was created, QSense has become the world leader in Quartz Crystal Microbalance based instrumentation. Today, QSense systems can be found in over 25 countries worldwide and QCM-D technology is used in thousands of publications.
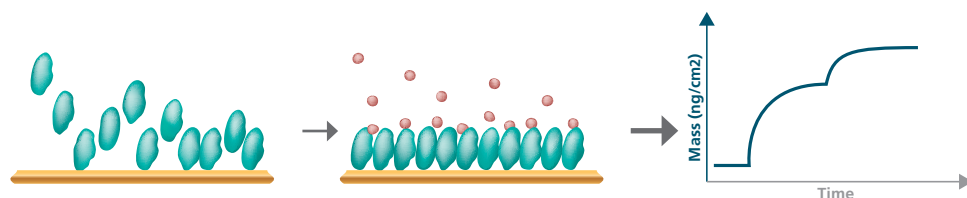
A powerful solution for your lab and application

Get the full picture
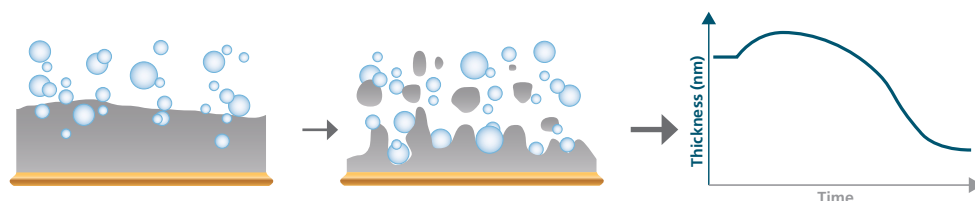of your molecule-surface interactions
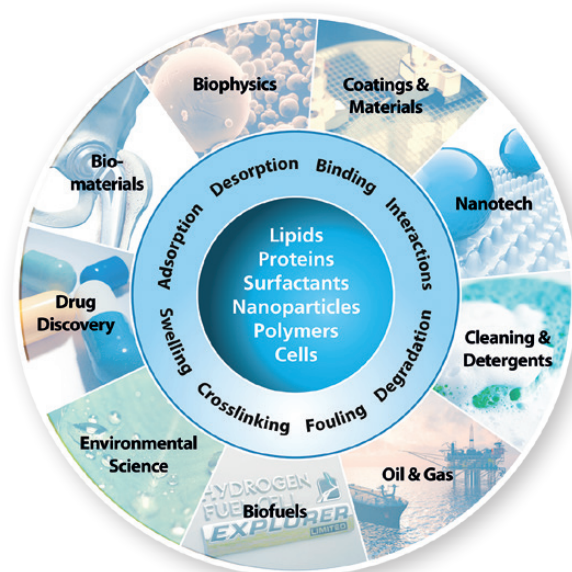
Study surface interactions

- In real-time
- With nanogram precision

Analyze events such as

- Adsorption/Desorption
- Binding
- Degradation
- Cross-linking
- Swelling/Collapse

Find out

- How much?
- How fast?
- What process?
- What structure?
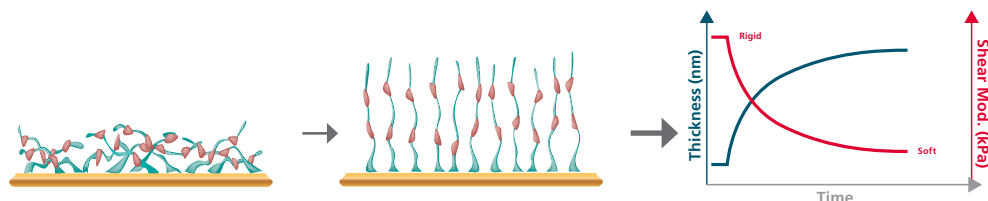
How it works - in brief

QSense instruments track changes in frequency and dissipation when molecules bind and interact on the oscillating QCM-D sensor. From this information it is possible to quantify mass, thickness, viscosity and shear modulus of the adhering layer.

Progress Together

Engineered to enhance your productivity and profitability, QSense is a full solution range that gives you unrivalled off-the-shelf performance. Besides top-of-the-range instruments, QSense provides the most complete line-up of QCM-D sensors, software, service and support on the market.

QSensors

Your world on a sensor

QSense offers the widest range of sensor surface coatings on the market. Whether you are interested in polymers, alloys, basic elements, funtionalized surfaces or a number of other materials, we have a solution for you.

QSense Dfind

Reveal the full potential of your data

QSense Dfind is the reliable and easy-to-use analysis software from QSense. It helps you to quickly and simply extract the information you are looking for, such as mass, thickness, viscoelastic properties and adsorption rates.

Service and support

Your partner throughout the years

We offer service and support solutions to ensure that you and your QSense system perform at your best at all times. At your service, you will have our team of experienced application specialists and certified service engineers.

QSense Initiator

Get up and running with QCM with dissipation monitoring

QSense Initiator focuses on the fundamental functions and qualities of QCM-D analysis. It produces data with superior accuracy, has a robust design and enables a wide range of experimental conditions to suit your basic needs.

High quality data

Rapid data sampling and qualitative components ensure excellent data quality and accurate measurements.

Robust design

Easy to setup and run. Controlled environment conditions thanks to exquisite temperature and liquid flow control.

Wide range of experimental conditions

High chemical compatibility and wide temperature span. Compatible with the entire range of QSense Sensors.

QSense Explorer

Versatile and modular quantification

QSense Explorer is the versatile instrument with endless possibilities. Thanks to a modular design and optional measurement modules, it enables you to extend your measurement conditions and combine measurements with several other technologies.

Endless experiment possibilities

Modular design with several options extends the measurement conditions and gives maximum flexibility.

Combination measurements

The compact chamber together with specialty modules enables simultaneous QCM-D measurements with microscopy, electrochemistry and ellipsometry.

Quantification of film properties

Data collection at high sample rate from 7 harmonics of the fundamental frequency gives maximum input for data analysis and quantification of mass, thickness, viscosity and shear modulus of the adsorbed film.

Explore the versatility with QSense Explorer

QSense Microscopy Explorer

Enables simultaneous QCM-D and microscopy measurements on the same surface. Equipped with a window module to give optical access to the sensor surface which also opens up for light or irradiation sensitive measurements.
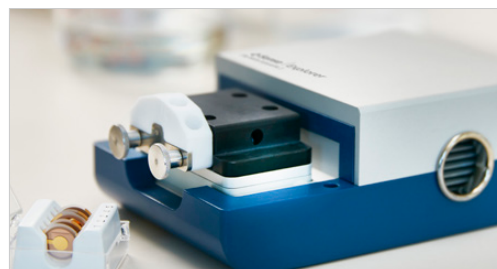
QSense Electrochemistry Explorer

For simultaneous QCM-D and electrochemistry measurements on the same surface. Enables cyclic voltammetry and electrochemical i mpedance measurements to explore polymer behavior, electrostatic nteractions, corrosion etc.

QSense Ellipsometry Explorer

Enables simultaneous QCM-D and ellipsometry measurements on the same surface, which allows for quantification of solvent content in the film. It also gives a refined analysis of the adsorbed film's morphological changes.

QSense Extreme Temperature Explorer

Performs measurements at an extended temperature range of 4-150°C both in flow and stagnant conditions. This package consists of a separate high temperature chamber used together with the QSense Explorer electronics unit.

Additional modules

Humidity Module. Designed to enable measurements of vapor uptake and release from thin films coated on the sensor.

Open Module. Enables pipetting of sample directly onto the sensor surface as well as evaporation studies.

PTFE Flow Module. Flow module with an interior coating of PTFE. Suitable for measurements sensitive to titanium which is the interior material of the standard flow module.

ALD Holder (Atomic Layer Deposition). For measurements in vacuum or gas phase.

QSense Microscopy Explorer

QSense Electrochemistry Explorer

QSense Ellipsometry Explorer

QSense Extreme Temperature Explorer
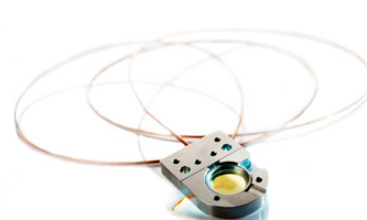

Humidity module

Open module

PTFE flow module

ALD holder

QSense Analyzer

For fast sample processing at high quality

QSense Analyzer produces high quality data from four measurements in parallel. The smart design with four removable flow modules makes it easy to set up new experiments. QSense Analyzer will quickly become a workhorse in your lab.

Speed things up with QSense Analyzer

Efficient evaluation of parameters

Four measurement modules with separate sample flow enables evaluation of different substrates and/or samples in parallel.

Facilitated data comparison

All measurements performed in the same experiment run with equal time sequence which simplifies comparison between measurements in the data analysis.

Increased throughput

Four measurements in parallel increases through-put and minimizes hands-on time.

Quantification of film properties

Data collection at high sample rate from 7 harmonics of the fundamental frequency gives maximum input for data analysis and quantification of mass, thickness, viscosity and shear modulus of the adsorbed film.

Removable flow modules for facilitated handling

Temperature controlled environment for sensor and sample

Four measurements in parallel with separate sample channels

QSense Pro

Fully automated for large-scale analysis

QSense Pro is the most advanced QCM instrument on the market with full automation enabling enhanced efficiency and reproducibility. You can easily program your measurements in the software and high precision flow-control ensures effective sample use.

Sense the difference with QSense Pro

Automated measurements

Integrated sample handling and intuitive software. Preprogramming and full automation allows for unattended measurements.

High throughput

The 8-sensor module enables 8 measurements to be programmed in advance which reduces hand-on time and increases throughput.

Precise sample handling

Sharp sample exchange and a minimum of 50 µl sample per sensor ensures effective sample use.

High reproducibility

High precision flow-control is ensured by syringe pumps. Programming of automated mixing, including concentration gradients of samples, increases reproducibility.

Evaluation of several parameters in parallel

Syringe pumps that run separately enable 4 channels to be used independently with different samples and measurement sequencies.

Quantification of film properties

Data collection at high sample rate from 7 harmonics of the fundamental frequency gives maximum input for data analysis and quantification of mass, thickness, viscosity and shear modulus of the adsorbed film.

Precise sample handling with 1 µl min. volume

Automated mixing of samples

4 sample channels to be used independently

Easy preprogramming and intuitive data analysis in QSense Dfind

Specifications

SENSORS AND SAMPLE HANDLING SYSTEM				
	QSense Initator	**QSense Explorer**	**QSense Analyzer**	**QSense Pro**
Number of sensors	1	1	4	8 (4 parallel in flow)
Volume above each sensor	~ 40 µl	~ 40 µl	~ 40 µl	~ 15 µl
Minimum sample volume	~ 200 µl	~ 200 µl	~ 200 µl	~ 50 µl
Working temperature ± 0.02 °C [A]	20 - 45 °C	15 - 65 °C	15 - 65 °C	4 - 70 °C
Minimum dispense volume	–	–	–	1 µl [B]
Sensors	Gold, SiO2, Ti and other metals, oxides, glass, polymers, etc.			

MEASUREMENT CHARACTERISTICS				
	QSense Initator	**QSense Explorer**	**QSense Analyzer**	**QSense Pro**
Maximum time resolution	~ 4 data points per second [C]	~ 200 data points per second [D]	~ 200 data points per second [D]	~ 200 data points per second [D]
Maximum mass sensitivity in liquid	–	~ 0.5 ng/cm^2 [E]	~ 0.5 ng/cm^2 [E]	~ 0.5 ng/cm^2 [E]
Normal mass sensitivity in liquid	~ 1.8 ng/cm^2	~ 1.8 ng/cm^2 [F]	~ 1.8 ng/cm^2 [G]	~ 1.8 ng/cm^2 [G]
Maximum dissipation sensitivity in liquid	–	~ 0.04 x 10^{-6} [E]	~ 0.04 x 10^{-6} [E]	~ 0.04 x 10^{-6} [E]
Normal dissipation sensitivity in liquid	~ 0.1 x 10^{-6}	~ 0.1 x 10^{-6} [F]	~ 0.1 x 10^{-6} [G]	~ 0.1 x 10^{-6} [G]

SOFTWARE				
	QSense Initator	**QSense Explorer**	**QSense Analyzer**	**QSense Pro**
Analysis software		QSense Dfind	QSense Dfind	QSense Dfind
Output parameters	Frequency, dissipation, Sauerbrey mass	Frequency, dissipation, modeled values of mass, thickness and viscoelasticity.		
Import/export	Excel, BMP, JPG, WMF, GIF, PCX, PNG, TXT			

DIMENSIONS				
	QSense Initator	**QSense Explorer**	**QSense Analyzer**	**QSense Pro**
Electronics unit (HxWxL in cm)	18x36x21	18x36x21	18x36x21	70x67x57
Chamber (HxWxL in cm)	5x10x15	5x10x15	12x23x34	

About Us

Biolin Scientific is a leading Nordic instrumentation company with roots in Sweden and Finland. Our customers include companies working with life science, energy, chemicals, and advanced materials development, as well as academic and governmental research institutes. Our precision instruments help develop better solutions for energy and materials, and perform research at the frontiers of science and technology.

[A] The temperature stability depends on variations in how the ambient temperature affects the warming or cooling of the chamber.

[B] Smallest sample volume to pick up and dispense. Note that the smallest volume needed for measurement is 50 µl.

[C] Two data points per second for each harmonic.

[D] One sensor, one frequency.

[E] Data from one sensor in single frequency mode. One data point collected every 5 seconds. The Sauerbrey relation is assumed to be valid.

[F] Data from multiple frequency modes (all harmonics). Four data points are collected within 1 second. The Sauerbrey relation is assumed to be valid.

[G] Data from all sensors in multiple frequency modes (all harmonics) are collected within 1 second. The Sauerbrey relation is assumed to be valid.

All specifications are subject to change without notice.

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