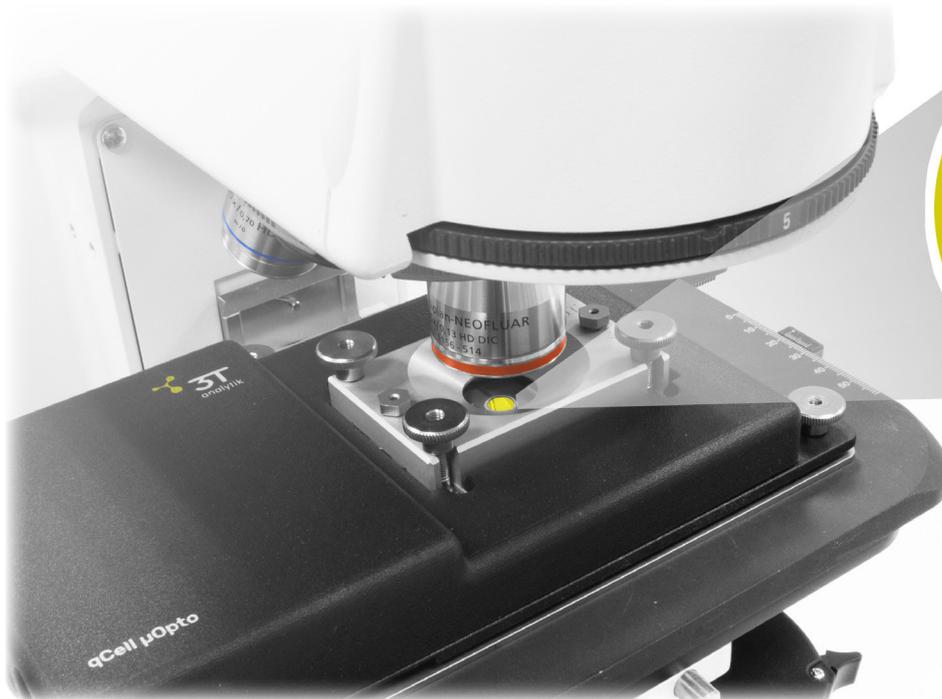


The qCell μ Opto combines 3T's advanced QCM-D technology with up to 600X simultaneous microscopic observation of the sensor surface. Moreover, it features a microfluidic chip design, the fluid pathway towards the sensor surface can be customized according to the likings of the user. Combining QCM-D with real time microscopy allows the user to evaluate frequency and dissipation with respect to sample surface coverage and morphology.



qCell μ Opto
.....
QCM-D goes
Microscopy

Applications



Biofilms



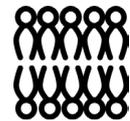
Cells



Microfluidics



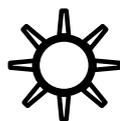
Water



Lipids



Blood



Nanomaterials



Detergents



Proteins

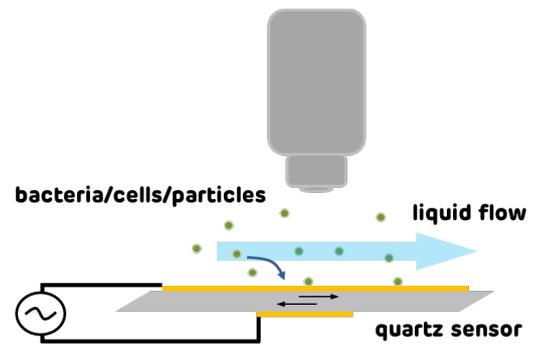


Polymers

[Discover more >](#)

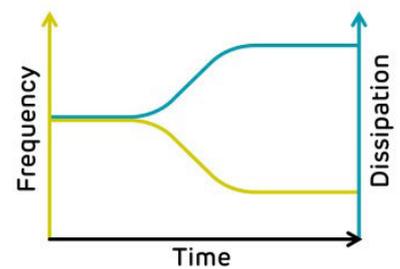
QCM-D Goes Microscopy

The new qCell μ Opto T combines 3T's advanced QCM-D technology with up to 600X simultaneous microscopic observation of the sensor surface. Use this combination to analyze the sample surface coverage and get further insights to the sample's mechanical properties and surface coupling. Applications include, but are not limited to, colloid attachment, bacterial adhesion, biofilm formation and cell adhesion and spreading. Featuring a microfluidic chip design, the fluid pathway towards the sensor surface can be customized according to the likings of the user.



QCM-D Principle

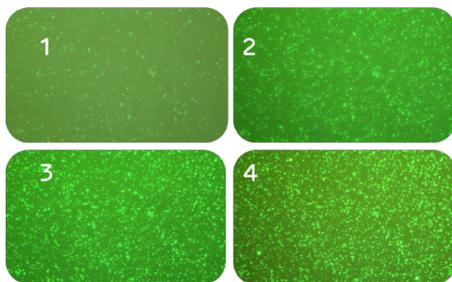
Quartz sensors are highly sensitive to the mass and the material properties of deposited molecular layers as well as of the wetting liquids at their surface. Due to its sensitivity to mass, the technique is often referred to as Quartz Crystal Microbalance (QCM). The measuring principle of quartz sensor technique is based on the precise oscillation of the quartz sensors at their resonant frequency when an alternating voltage is applied. Depositions at the surface or wetting of the surface result in a frequency shift and – depending on the material properties – additionally in a damping of the oscillation. Both, the frequency shift and the damping (dissipation) of the oscillation are captured by qCell μ Opto with high resolution and in real time.



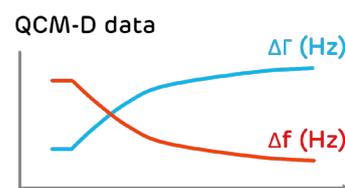
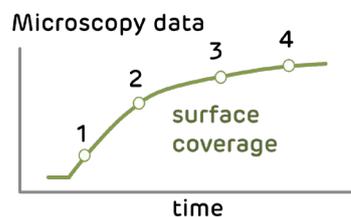
Combined Data Processing

Combining microscopy and QCM-D data is intuitive and easy with the qGraph Viewer software. Capture microscopy images of the quartz sensor surface during a QCM-D experiment. Analyze the microscopy images (e.g., surface coverage) and make direct comparison with the QCM-D data. Use the qGraph Viewer software to combine data to evaluate frequency and damping as a function of e.g. sample sur-

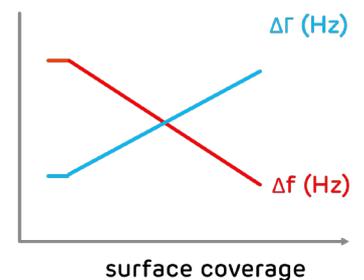
Acquire data



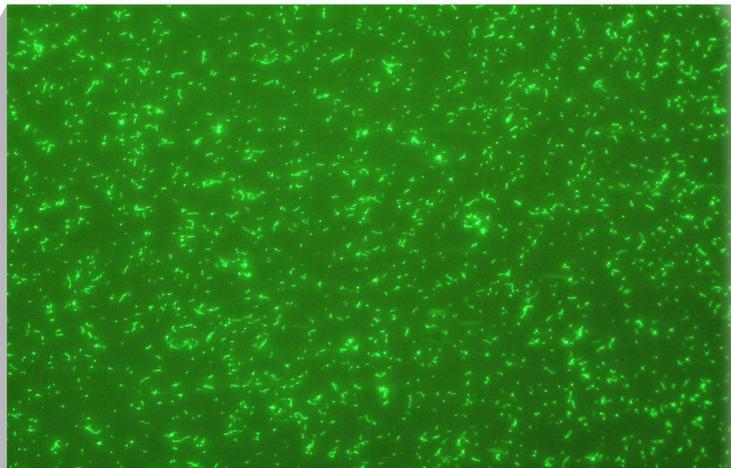
Create twin charts (synchronized time)



Combine data for improved interpretation



Features



COMPACT
DESIGN

AUTOMATED
LIQUID
HANDLING

TEMPERATURE
CONTROLLED

EASY TO
MOUNT

FEATURING
MICRO-FLUIDIC
CHIP DESIGN

UP TO
600x
Magnification

Design Your Own Microfluidic Chip - Powered By ZentriForm™

The qCell μ Opto is the only commercial QCM-D instrument with microfluidic chip integrated. It is the first time that microfluidic functionality and QCM-D detection come together in a compactly designed device. Moreover, with the rapid prototyping tool ZentriForm™ from 3T, users can produce their own PDMS chips with high precision in merely 2 hrs. For more information about ZentriForm™, please visit: <https://www.3t-analytik.de/products/microfabrication>



As Standalone or as Integrated Module

qCell μ Opto is available as integrated or standalone module.

The integrated module is connected to qCell T family devices, ControlBox PT or LiquiBox PT. Temperature control is realized by a powerful Peltier element that ensures accurate and stable temperature of the qCell μ Opto flow cell. qCell T family devices and ControlBox PT provides basic control of the qCell μ Opto. The LiquiBox PT is further equipped with auto sampling features, providing fully automated liquid handling for the identical execution of pre-scripted experimental procedures.

The entry level standalone module is connected directly to PC via USB. Temperature can be regulated by external thermal regulation devices e.g. circulators from JULABO.



Easy to set up

qCell μ Opto can be easily inserted under the microscope. For a more stable operation, adapter plates are provided to fix the device onto the microscope stage. Different spots on the sensor surfaces can be observed by using x, y and z axis stage drive from the microscope. Adapters can be customized to fit microscopes from different producers. qCell μ Opto is compatible with commonly used upright light microscope. However, the microscope must be equipped with long-distance objectives.



Tailored Software

qCell μ Opto comes with a complete software suite for fully automated instrument control, signal acquisition, real time display, processing and data storage. The software of qCell μ Opto is designed in a way that combined data analysis is carried out intuitively. Apart from the features like on-line log files, script control and data base, photos can be associated with QCM-D data. Below is an example of bacteria adhesion analysis with fluorescence light. Images of sensor surface were taken every once a while (marked with grey dots). Information like surface coverage is firstly processed with external image processing software (e.g. ImageJ™) and then associated with frequency and damping. The surface coverage is then compared with frequency/damping signal directly in the dual chart.

