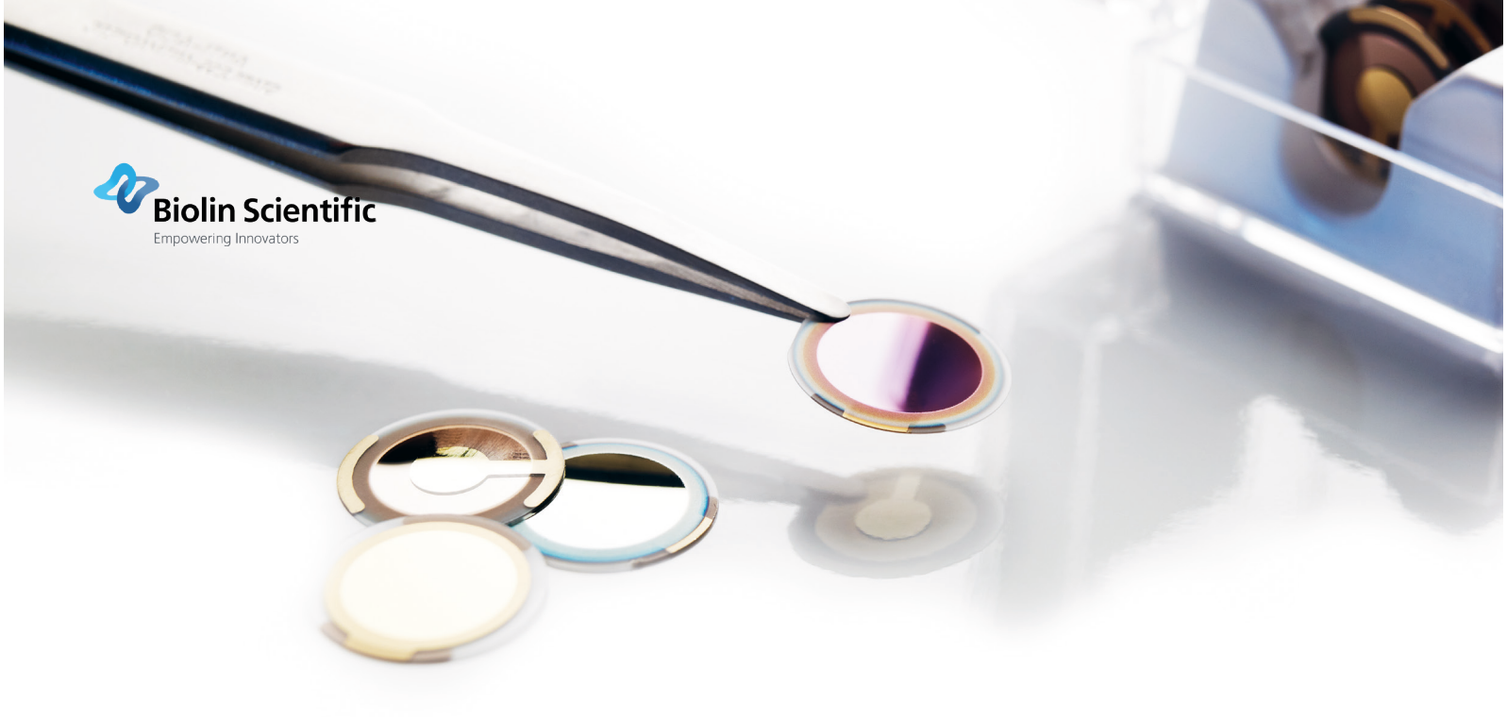

Stainless Steel QSense Sensor

The QSX 304 Stainless Steel SS2343 sensor is an excellent representation of a stainless steel AISI 316 surface, designed for use with Quartz Crystal Microbalance with Dissipation (QCM-D) technology. This sensor benefits from a long-standing production history, supported by a well-defined and optimized production protocol. Comprehensive documentation ensures the quality and applicability of the QSX 304 sensor, making it a reliable choice for applications requiring the properties of stainless steel AISI 316.

Owing to its remarkable properties, including corrosion resistance, mechanical strength, thermal and chemical stability, and excellent weldability, AISI 316 stainless steel finds extensive application across various sectors, such as the marine industry, chemical processing, food and beverage manufacturing, medical devices, and heat exchangers.

	SS2343	AISI 316
C	Max 0,05 %	Max 0,08 %
Si	Max 1,0 %	Max 1,0 %
Mn	Max 2,0 %	Max 2,0 %
P	Max 0,045 %	Max 0,045 %
S	Max 0,03 %	Max 0,03 %
Cr	16,0 – 18,5 %	16,0 – 18,0 %
Ni	10,5 – 14,0 %	10,0 – 14,0 %
Mo	2,5 – 3,0 %	2,0 – 3,0 %

Table 1: *Detailed composition comparison for Stainless Steel SS2343 and AISI 316*

Stainless Steel in QCM-D Measurements

In research, AISI 316 stainless steel has gained significant attention for its integration with advanced techniques like (QCM-D). Stainless steel-coated QCM-D sensors are widely employed to investigate material interactions, including adsorption, deposition, and fouling processes, underscoring the alloy's importance in both industrial and scientific advancements.

SS2343 QSense Sensor

- **Sensor Name:** QSX 304 – SS2343
- **Material:** Stainless Steel SS2343
- **Thickness:** 100nm
- **Roughness:** <1nm
- **Warranty:** 12 months

Validation

Ensuring Sensor Quality and Reliability

Validating sensor performance is crucial not only to confirm their applicability but also to ensure intact surface integrity and reproducibility. Consistent results across all sensors of a given material are essential for reliable data.

QSense SS2343 sensors successfully passed protein binding assay as a proof of concept, demonstrating exceptional surface integrity and batch-to-batch reproducibility. This will provide for high-quality, dependable performance for your research and analytical needs.

Average	-26.13 Hz
Std. dev.	1.5 Hz

Table 2: *Protein binding assay, saturated uptake, f3 (Hz)*

Cases Examples

Biomanufacturing

Mol. Pharmaceutics 2018, 15, 1319–1331

This research explored the adsorption of monoclonal antibodies (mAbs) onto stainless steel surfaces and the formation of subvisible particles (SVPs) during flow conditions. QCM-D was employed to dynamically monitor the adsorption process and layer formation at different mAb concentrations. Using stainless steel-coated sensors, they captured changes in frequency and dissipation to analyze the viscoelastic properties of the adsorbed layers. The study demonstrated that higher mAb concentrations led to increased adsorption, conformational changes, and protein-protein interactions at the stainless-steel interface, which were critical for understanding SVP formation during biopharmaceutical manufacturing.

Energy & Fuels

Energy Fuels 2020, 34, 8, 9283–9295

This study investigated the deposition of asphaltenes from crude oil onto stainless steel surfaces using QCM-D. The researchers focused on understanding the effects of asphaltene concentration and solvent solubility on deposition behavior. Using stainless steel-coated sensors (SS2343), they measured real-time mass changes and viscoelastic properties of the adsorbed layers. This allowed them to study the transition from monolayer to multilayer adsorption and analyze adsorption kinetics under varying conditions. The study validated QCM-D as a sensitive tool for screening asphaltene inhibitors, highlighting its potential for managing deposition challenges in oilfield production.

Food Processing

ACS Appl. Mater. Interfaces 2021, 13, 35506–35517

This study focused on the fouling behavior of milk proteins on stainless steel surfaces during pasteurization processes, using QCM-D to investigate the adsorption kinetics and viscoelastic properties of the resulting protein layers. The stainless steel-coated sensors were exposed to skim milk at different temperatures to replicate industrial conditions. The technique enabled the researchers to monitor the formation of viscoelastic foulant layers in real-time and analyze their structural evolution under varying thermal profiles. It also evaluated cleaning processes by introducing caustic solutions to the QCM-D chamber, revealing the molecular mechanisms of deposit removal and the influence of temperature on fouling and cleaning efficiency.

Visit our webiste to access a variety of sensors for your research needs

About us

At Biolin Scientific we are committed to empower professionals in Surface and Interface science and engineering to reach outstanding results faster and easier. Our instruments and sensors are tailored for advanced analysis of thin film properties and surface and interface phenomena at the nanoscale. Trusted by top universities and industrial labs worldwide, our premium solutions help solve complex challenges and drive progress in scientific research and product development.

Biolin Scientific AB
Hängpilsgatan 7, SE-426 77 Västra Frölunda, Sweden
info@biolinscientific.com | biolinscientific.com

Biolin Scientific
Empowering Innovators