# Guide

## QSense QCM-D experimental design and measurement conditions How to eliminate error sources and optimize reproducibility

QSense® QCM-D is a very sensitive technology, and small variations of the measurement conditions will make a big difference. Here we have compiled a checklist that will help you generate quality data by minimizing unknown variations and optimize the reproducibility of your measurements.

## **Contaminants**

Avoid contaminants that may interfere with your measurement. Make sure you have:

- A clean instrument
- Clean tools (tweezers, beakers, etc)
- Clean sensors
- Clean samples and solvents. Avoid contamination, precipitation, inhomogeneity and unwanted growth (microorganisms)

## Temperature

Ensure a stable temperature throughout the measurement

- □ Set the temperature, Tset, in the instrument and let equilibrate prior to the start of the measurement
- Avoid ambient T-variations, such as direct sunlight or air conditioning
- Equilibrate all liquid liquids included in the experiment to just above the set measurement temperature. If measurement is planned to be above room temperature special measures applies

## Sample variations

Avoid sample variations. These can originate in many areas.

- **D** Be careful with variations in the sample preparation protocols
- Pay attention to potential batch variations (samples and solvents)
- **D** Pay attention to potential aging of e.g. prepared samples
- Avoid variations in sensor handling and preparation

## Air bubbles

Bubbles are trouble.

- Degass solvents
- Let Tsample > Tinstrument

## **Bulk shifts**

Characterization of the bulk shifts will facilitate the analysis and interpretation of the data

- Start and end with the same buffer
- □ As reference, check buffer step(s) prior to measurement

#### Measurement protocol

**D** Ensure reproducibility of exposure times and sample sequences

## Harmonic(s)

- Capture the same harmonic(s) throughout the measurement series
- Capture as many harmonics as possible, including *f*1 and *D*1

## Optimize the data capture for modelling

- Make sure to capture the baseline(s) on bare sensor surface(s)
- **D** Capture a stable baseline for at least 5 minutes
- □ Include as many harmonics as possible
- If possible, let the recorded signal level out e.g. if measuring let us say a protein surface adsorption, record signal until saturation (or near saturation)
- Annotate all surface events

