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[Progress Together]

Quantifying Nano-scale Changes at Material Interfaces Using Quartz Crystal Microbalance with Dissipation Monitoring (QCM-D)

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Q-Sense (Together with Biolin Scientific)

A Technology and Application Review Seminar

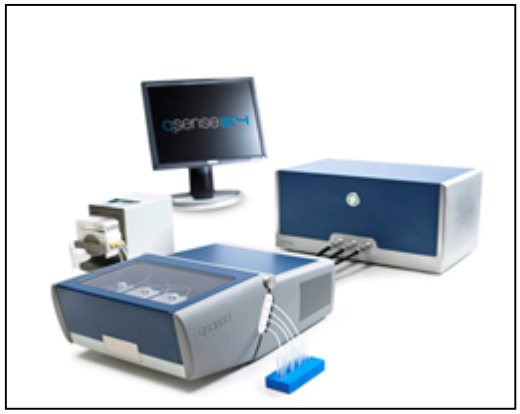
Study Design and QCM-D Optimization

Location: Engineering Building 3546 (CEE conference room)

When: Tuesday, December 6 2016, 10:30 -11:30 AM

Are you interested in quantifying nano-scale changes at interfaces? If so, then come join us for a seminar and demonstration centered on the Quartz Crystal Microbalance with Dissipation Monitoring Technology (QCM-D). We will discuss how QCM-D can be used in applications, such as:

- Protein or polymer adsorption
- Thin Films
- Electrochemistry
- Polymer swelling/degradation
- Nanoparticles
- Surface functionalization
- Enhanced oil recovery
- Biomolecular (Proteins, DNA, Enzymes, Etc.) interactions



Summary: The Quartz Crystal Microbalance with Dissipation Monitoring (QCM-D) is a research tool that can be used to monitor, in real-time, nanoscale mass and viscoelasticity changes that occur at interfaces as a result of the adsorption, deposition, binding, and/or removal of different molecules and materials, such as polymers, nanoparticles, polyelectrolytes, asphaltenes, and biomolecules (proteins, DNA/RNA, enzymes, etc.). Mass and viscoelastic parameters are quantified by monitoring the time-resolved changes in frequency and dissipation (or dampening) of a piezoelectric quartz sensor disk. Because the sensor can be coated with different types of materials and thin films (such as polymers, lipids, nanoparticles, proteins, etc.) and many different types of samples can be introduced in the instrument, the QCM-D technique has been used extensively to mimic real-life molecule/molecule and molecule/surface interactions in gas, liquid, and vacuum environments. QCM-D is a particularly useful technique because it allows one to watch molecular interactions and bulk conformational changes such as adsorption and/or swelling occurs in real-time. QCM-D can also be combined with other analytical techniques such as electrochemistry, ellipsometry, and imaging, allowing for more comprehensive experimental analysis and troubleshooting.

Archana Jaiswal is the Principal Application Scientist at Biolin Scientific. She obtained her doctorate in Chemistry from BHU, India. Archana has published over 15 research articles and contributed to a few book chapters in the fields of material science, thin films and pharmaceutical related research. She has been with Biolin for over 10 years.