



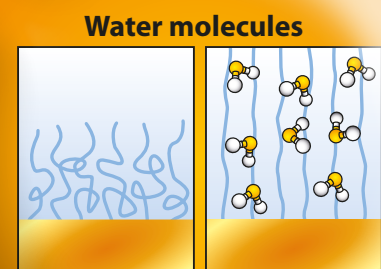
Excellence in Surface Plasmon Resonance

**BioNavis**



**Biomaterials**

# Measurements of hydrogels without water artifacts!



**Water molecules**

**Swelling**

## Key questions MP-SPR can answer in research of biomaterials:

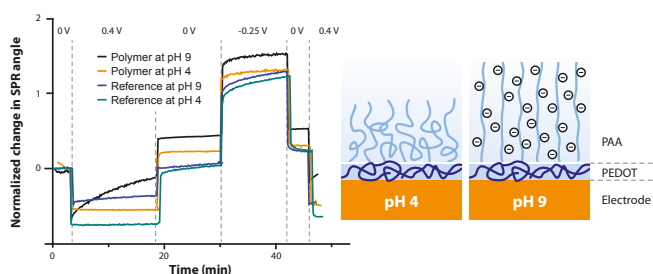
- How does protein X interact with coating Y?
- How thick is the coating?
- When does the responsive coating change its conformation?
- How reproducible is the coating?
- Which coating offers best gas/moisture/antireflective barrier?
- What is the release rate of drug X from material Y at pH 6?

**The most sensitive instrument for real-time label free surface interactions and layer properties!**

## Why choose MP-SPR for characterization of biomaterials?

### The most sensitive instrument for real-time adsorption kinetics on surfaces

Due to its plasmonic principle, MP-SPR is the most sensitive measurement for kinetics on surfaces. This is important in real-time measurements of adsorption kinetics, swelling and release.

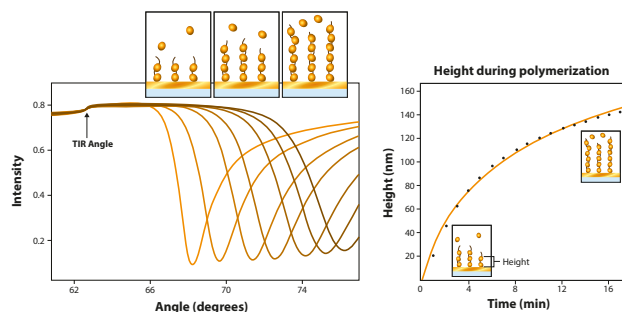


### Measure also thick samples

MP-SPR can measure even 20  $\mu\text{m}$  thick samples. MP-SPR measurements can be performed at different pH, temperature (15 to 45  $^{\circ}\text{C}$ ), electric potential and flow-rate. The measurements do not require vacuum.

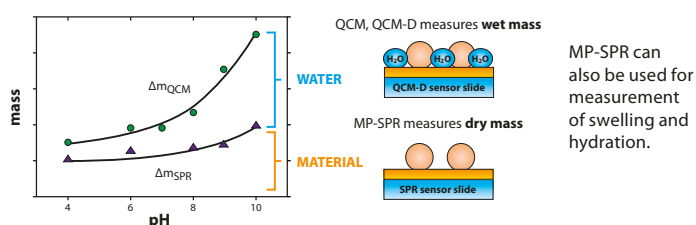
### Thickness and refractive index solved simultaneously

Thanks to our multiwavelength configuration with scanning angular range of almost 40 degrees, MP-SPR is capable of acquiring enough information to solve thickness and refractive index of the layer simultaneously using LayerSolver™. This is possible even up to microns thick films.



### No water artifacts

While QCM (quartz crystal microbalance) instruments suffer from hydration effects as they measure wet mass, MP-SPR is an optical method, and therefore provides desired measurement of adsorbed molecules without solvent in interfacial layers (dry mass).



### Swelling measured *in situ*

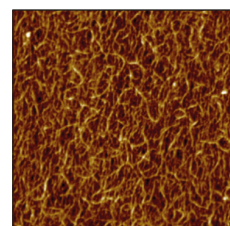
Traditional SPR is developed to work in liquid. On the other hand, traditional ellipsometers work the best in air. Thanks to its goniometric configuration, MP-SPR works in both. This allows measurements from dry to wet state with the same configuration.

### Cross-validation with microscopy and modelling is possible

MP-SPR with electrochemistry, fluorescence or another specialty flow-cell allows for validation of measurements *in-situ*.

Thanks to its oil-free operation, the same sample can be measured *ex-situ* with AFM, SEM or other techniques.

Results from MP-SPR are absolute and therefore can be directly related to physical properties, validated by established theoretical models, and can be confirmed also analytically.



## Recommended MP-SPR Navi™ instrument for measurements of biomaterials:



200 OTSO    400 KONTIO    210A VASA    220A NAALI    420A ILVES

### Further reading:

- AN#161** Polymerization kinetics
- AN#159** Vapour induced changes in polymers
- AN#158** Cellulose nanocrystals dispersibility
- AN#150** Organophosphonates adsorption
- AN#149** Polymer characterization - adsorption studies and layer thickness
- AN#136** Stimuli-responsive polymer monitored with MP-SPR
- AN#128** Thickness and refractive index calculations of transparent films
- AN#111** Polyelectrolyte multilayers formation

### Selected publications:

- Strongly Stretched Protein Resistant PEG brushes (G.Emilsson et al., ACS Appl. Mater. Int, 2015)
- Electrical stimuli responsive coatings (Malmström et al., Macromolecules, 2013)
- Thickness and refractive index characterization by MP-SPR (Granqvist et al., Langmuir, 2013)
- Affibody conjugation to cellulose and bioseparation (H.Orelma, RCS Advances, 2014)
- Nanocellulose characterization and interfacial water expulsion (Vuoriluoto et al., Journal of Physical Chemistry, 2015)
- Monitoring of polymerization kinetics and morphology changes of brushes (Emilsson et al., Applied Surface Science, 2017)