Anton Paar

Solid surface charge

SurPASS 3

Streaming answers: SurPASS 3

Analyzing surface properties can easily become very complex as many influencing factors have to be considered. A direct method is preferred to overcome this complexity; it delivers insights into the surface properties and makes it possible to carry out routine tests and investigations under real-life conditions.

With SurPASS 3 for surface analysis you can generate a stream of answers for routine and individual tasks using real samples, independent of the sample geometry. The determined zeta potential is indicative of any changes occurring to solid surfaces. These changes may be the result of process treatments in production, environmental influences, or due to common wear.

One instrument gives a **stream of answers.**

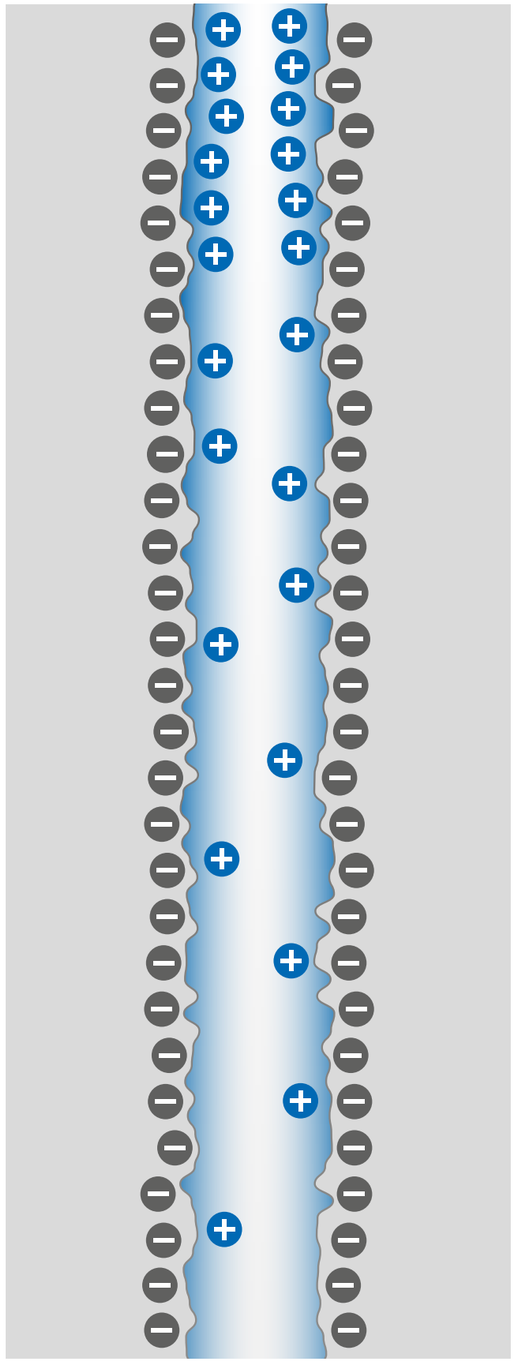
Zeta potential reflects the individual surface properties and informs on:

- The charging behavior of your surface when in contact with a liquid
- The influence of pH and ionic strength
- The isoelectric point which is characteristic for the surface chemistry
- The presence of specific functional groups on the surface
- The success of surface modifications
- Adsorption and desorption behavior of additives on surfaces

Using the SurPASS 3 principle, plane solids, powders, fibers, foils, tubes, porous materials, and materials with different surface roughness can be investigated directly without the need for model surfaces.

- **Direct analysis of real samples**
- **For any sample geometry, size, and origin**
- **Simultaneous measurement of pH, conductivity, and temperature**

A step closer **to the truth.**



Applications

You want to know the effect of external treatments on your material.

With SurPASS 3 you are able to follow the change of surface properties directly step by step.

- For enhanced polymers' wettability, printability, or adhesion
- For reinforced polymers' use as heavy-duty materials

You plan to save resources and reduce environmental impact.

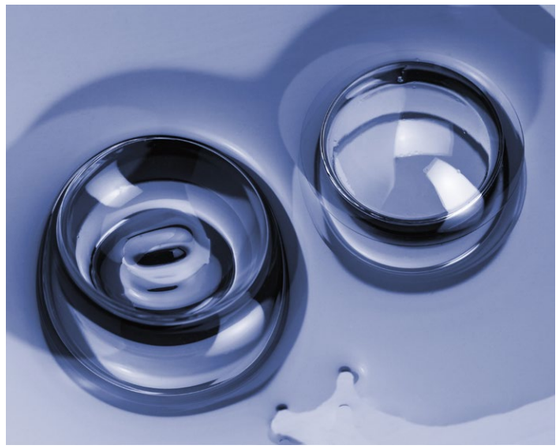
Every material shows signs of wear during use. In order to extend the material's lifetime, surfaces have to be modified to achieve higher stability and better chemical and weather resistance. The success or failure of surface modifications can be evaluated with SurPASS 3.

- For developing special coatings to make metals withstand the environmental influences which lead to corrosion
- For preventing membrane fouling to get an expensive issue under control

You seek to optimize a material's use under real-life conditions.

Changes in the behavior of surface properties during use can be observed under real conditions with SurPASS 3 without being restricted to model surfaces.

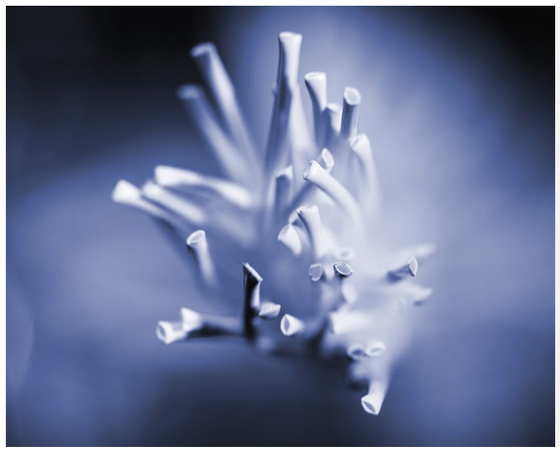
- For development of detergents with special cleaning effects
- For perfect dyeing, washing, and softening of functionalized textiles
- For developing hair care products like shampoos, conditioners, coloring and bleaching agents



You strive to achieve biocompatibility to ensure health.

The human body reacts very sensitively to foreign substances and invaders. The zeta potential is an important parameter for biocompatibility studies as it visualizes the adsorption/desorption behavior of e.g. proteins on implant materials.

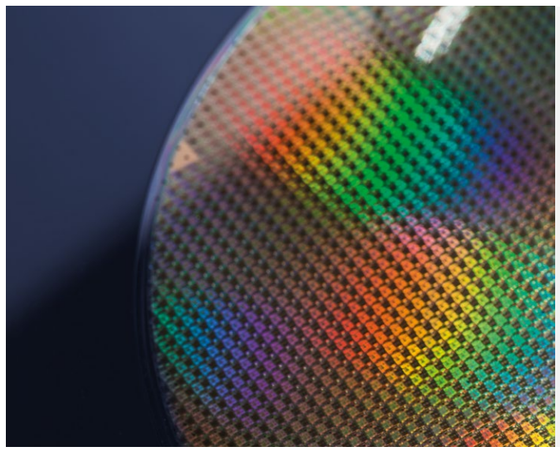
- For developing appropriate biocompatible surfaces as used in biosensors, hemodialysis membranes, or medical implants
- For producing optimal contact lenses and preventing bacteria adhesion



You aim to create surfaces with defined properties for special uses.

Alterations to surface properties due to physical and chemical treatments can be tracked with SurPASS 3. This gives insight into whether the treatment is appropriate for the intended use.

- For high-performance textiles which require the right surface properties for optimum functionality
- For high-end membranes used in filtration and in the purification of water, wastewater, or seawater to adsorb unwanted particles, bacteria, or viruses



You need to detect and remove trace contaminants to ensure purity.

With the SurPASS 3 principle you have a highly sensitive method for detecting trace impurities and monitoring their removal during cleaning processes.

- For ensuring a wafer's purity during chemical mechanical polishing and optimizing the CMP process
- For monitoring the effect and the efficiency of cleaning procedures used on special semiconductor layers to ensure proper functionality

The key features for streaming answers

Direct measurements of real samples

With SurPASS 3 there is no need to use model surfaces to understand surface characteristics.
The measurements are performed on real samples without restrictions to the samples' origin. Porous or rough surfaces and swelling behavior do not affect the quality of the zeta potential measurement. You can investigate materials under environmental or process conditions.

Investigations under real-life conditions

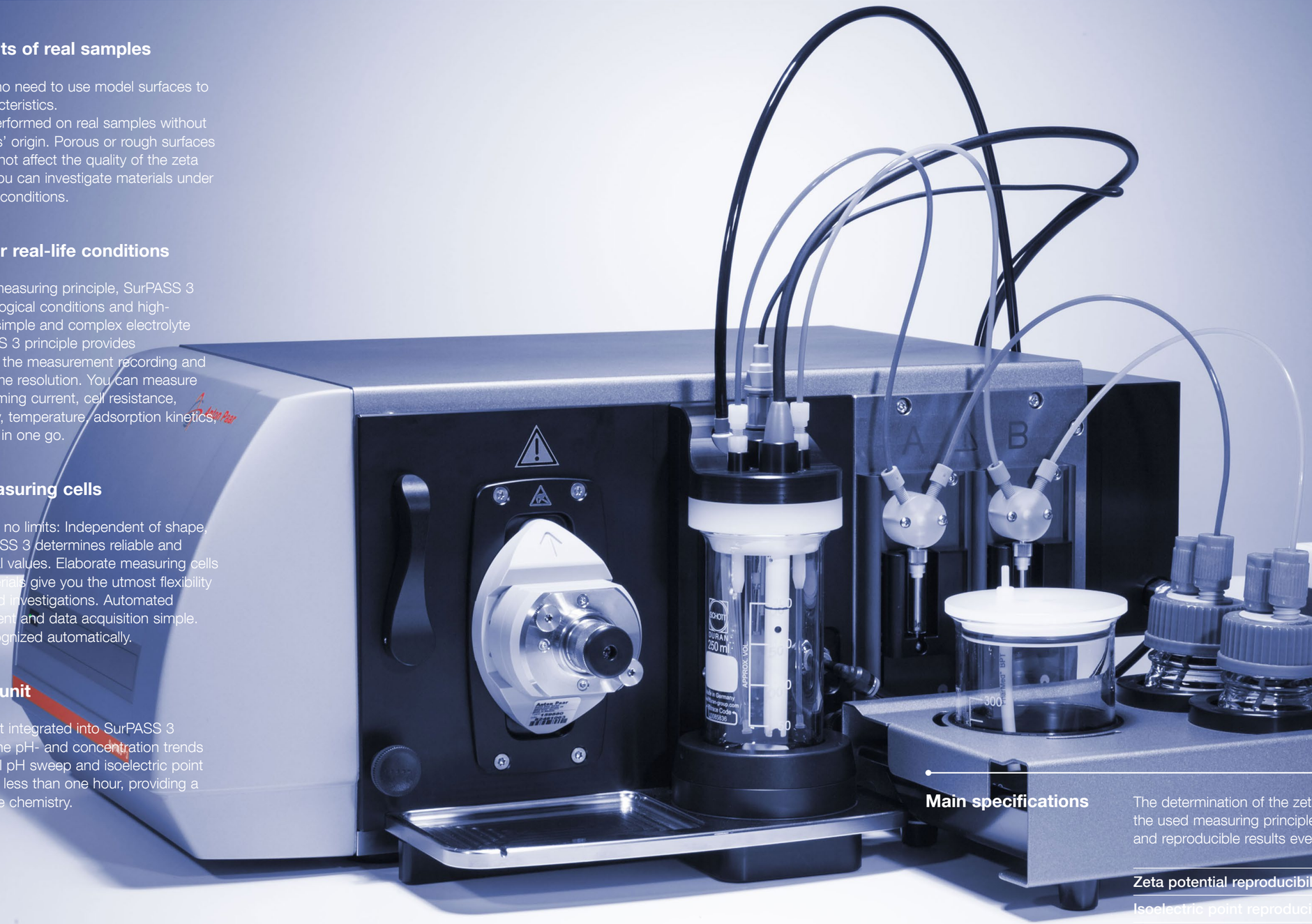
Due to the nature of the measuring principle, SurPASS 3 is compatible with physiological conditions and high- and low-salt solutions of simple and complex electrolyte composition. The SurPASS 3 principle provides unsurpassed sensitivity of the measurement recording and data acquisition in high time resolution. You can measure streaming potential, streaming current, cell resistance, pressure, pH, conductivity, temperature, adsorption kinetics, and display zeta potential in one go.

Huge variety of measuring cells

With SurPASS 3 there are no limits: Independent of shape, size, or roughness, SurPASS 3 determines reliable and reproducible zeta potential values. Elaborate measuring cells for individual sample materials give you the utmost flexibility for your quality control and investigations. Automated features make measurement and data acquisition simple. The measuring cell is recognized automatically.

Integrated titration unit

An automated titration unit integrated into SurPASS 3 allows you to determine the pH- and concentration trends of different additives. A full pH sweep and isoelectric point scan can be performed in less than one hour, providing a clear picture of the surface chemistry.



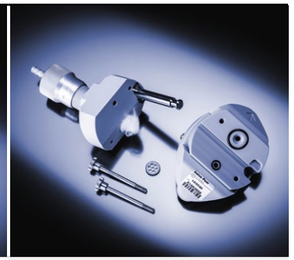
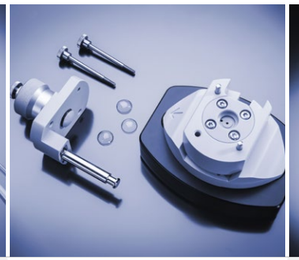
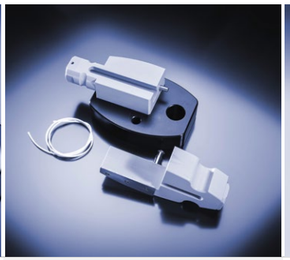
Main specifications

The determination of the zeta potential is unlimited due to the used measuring principle. SurPASS 3 delivers reliable and reproducible results even at small zeta potential.

Zeta potential reproducibility: ±0.5 mV

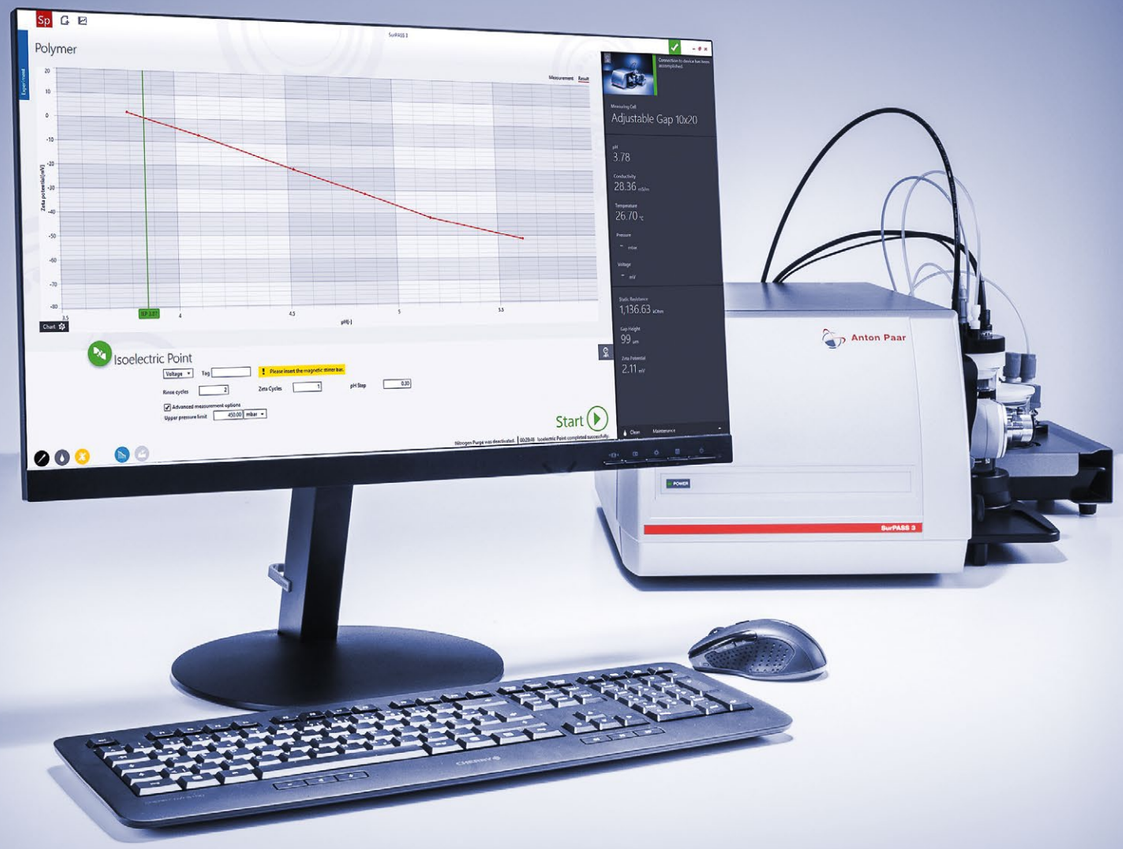
Isoelectric point reproducibility: ±0.1 pH

The right cell for your requirements

							
Measuring Cell	**Adjustable Gap Cell**	**Clamping Cell**	**Cylindrical Cell**	**Measuring Cell for Flexible Tubing**	**Measuring Cell for Contact Lenses**	**Measuring Cell for Hollow Fiber Membranes**	**Measuring Cell for Ceramic Membranes**
	Unsurpassed possibilities	*Outstanding performance*	*Manifold samples*	*Versatile application*	*Uncompromised focus*	*Plug and go*	*Easy handling*
Applications	- For rectangular and disk-shaped solid samples like polymer films, membranes, QCM sensors - Ideal for measurements on porous materials and materials which swell strongly	- For planar surfaces like polymer films and sheets, metals, ceramics, glass, and semiconductor wafers - Enables the non-destructive measurement of samples with different thicknesses	- For natural or technical fibers and fabrics, granular samples - Versatile measuring cell with convenient and easy handling	- For flexible tubing and polymer hollow fiber membranes - Direct analysis at the inner surface of flexible hoses by streaming the electrolyte solution through the sample	- For soft contact lenses - Soft contact lenses are placed on a model eye for straightforward analysis	- For inner surface characterization of hollow fiber membranes - Accommodates sample holder for coarse particles	- For both single and multichannel tubular ceramic membranes for microfiltration - Non-destructive analysis of porous ceramic membranes
Specifications	**Sample size:** 20 mm x 10 mm or 14 mm or 15 mm in diameter **Thickness:** max. 2 mm	**Sample size:** min. 35 mm x 15 mm, or min. 17 mm in diameter **Thickness:** max. 40 mm	**Particle size:** min. 25 µm **Sample weight:** min. 100 mg	**Sample outer diameter:** 0.7 mm to 6 mm **Sample length:** min. 100 mm	**Sample amount:** 1 lens per measurement	**Sample length:** for hollow fibers min. 170 mm **Granule size:** max. 2 mm	**Sample outer diameter:** for single channel: 10 mm or 13 mm, for multichannel: 25 mm or 30 mm

Straightforward analysis with the SurPASS 3 software

The SurPASS 3 software takes over most functions automatically for quick and easy measurements. Push the start button and straightforward analysis starts without the need for sophisticated evaluation or expert knowledge.



Status screen

- Set up the measurement parameters, start, and go.
- Real-time visualization of the key measurement parameters.
- Measurement data saved in MS Excel® format.

Zeta potential measurement

- Start a zeta potential measurement directly at a defined pH value.
- The used measurement cell is recognized automatically.

Automatic detection of the isoelectric point

- SurPASS 3 automatically determines whether acidic or alkaline titration has to be applied.
- Highly efficient measurement mode.

pH scan

- Automated pH titration over the desired pH range.
- pH sweep from pH 2 to pH 10 in less than 60 minutes.

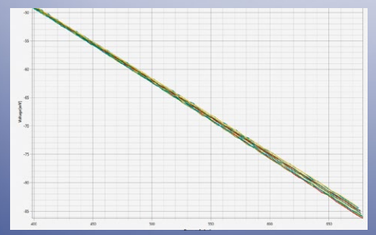
Adsorption and desorption studies

- Adsorption and desorption kinetics with >5 Hz sampling rate.
- Detection of additive concentration in the ppb range.

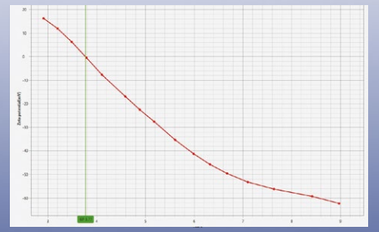
SurPASS 3 viewer

- Load measurement files for quick display and comparison of measuring data.
- Adjust charts, export, and save for future use.

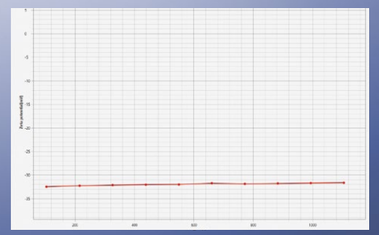
Switch between measurement screen and result screen



Display of measuring data (pressure vs. voltage)



pH scan indicating the isoelectric point (pH vs. zeta potential)



Stability of surface zeta potential (time vs. zeta potential)

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