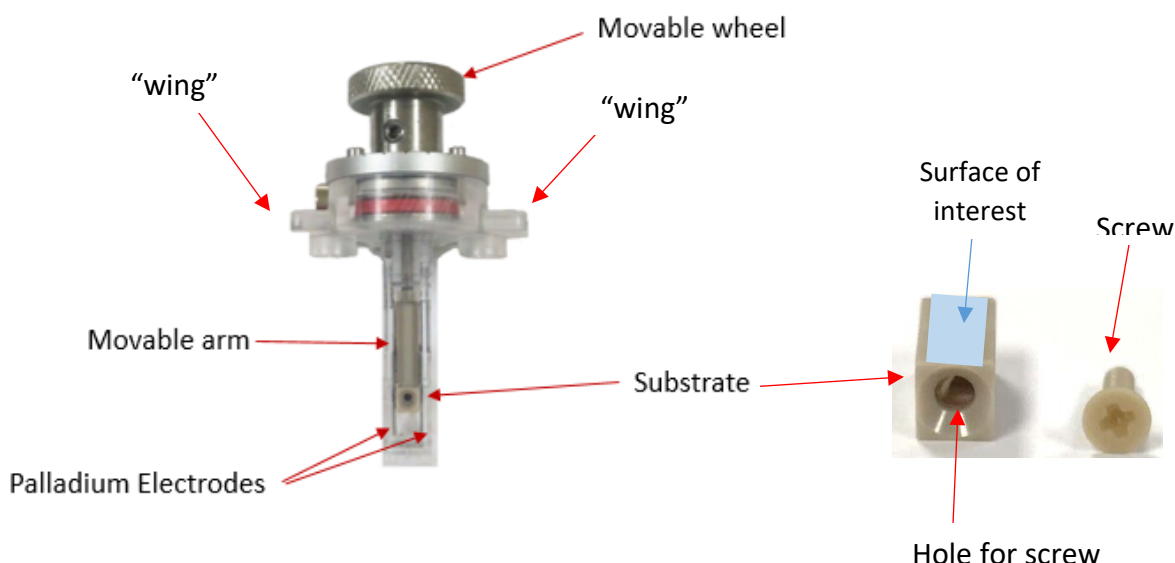


SZP Overview & Instructions

The Surface Zeta Potential (SZP) electrode is used for analyzing the charge on a macroscopic surface. Examples of surfaces include membranes, films, adhesives, and more. Measurements are carried out by attaching the sample to a horizontal place situated perpendicularly between two electrodes. The sample and electrodes are placed into a diluent containing probe particles of which the charge is well-known. Zeta potential measurements are conducted as the sample is moved farther away from the laser beam. As the surface moves an infinite distance away, it no longer imparts its effects on the probe particles and the zeta potential measured plateaus to that of the original solution. Values of zeta potential versus displacement (distance from laser beam) are graphed and extrapolated to obtain the surface zeta potential.

The Electrode

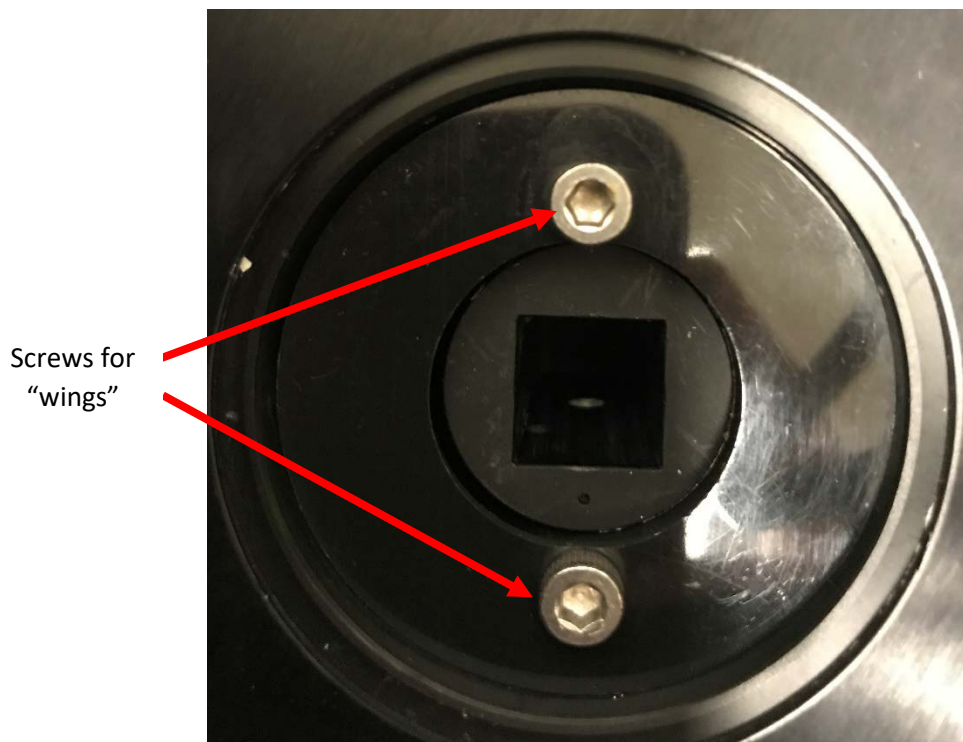


This is a diagram of the SZP. The surface of interest would be attached to the substrate using some sort of adhesive (such as glue or double sided tape) on the right, and then the substrate would be mounted onto the movable arm of the assembly and held in place using the screw. The electrode assembly can then be inserted into a cuvette containing the probe particle solution. The movable wheel at the top moves the arm in 20 micron increments, changing the location of the surface with respect to the laser inside the NanoBrook instrument.

Prepared by Dana Castro 5/9/2017

Preparing for Measurement

- 1) The substrate has dimensions 9.5 mm x 4 mm. Cut your surface to fit the dimensions of the substrate without exceeding any edge.
- 2) If you are using glue as an adhesive, make sure it is inert and doesn't react with your sample or the probe particles you will be exposing it to. Apply a thin coat to the substrate and attach your sample and allow the glue to dry. If you are using a double-sided tape, cut this to the size of the substrate and attach. Then, you can place your sample onto the tape to adhere it.
****Make sure to be using gloves throughout the entire process to avoid contaminating your sample.****
- 3) Take the substrate that now has your sample and insert it onto the movable arm of the assembly using the screw.
- 4) Once the surface is attached to the assembly, fill a 4 mL square, four sides clear cuvette about halfway with your *probe particle solution* (see below).
- 5) Make sure there are no bubbles present between the electrodes or on your surface.
- 6) Insert the assembly into your NanoBrook instrument, making sure to press the "wings" over the screws inside the instrument.



- 7) You are now ready to make a measurement!

How to Choose a Probe Particle Solution

The measurement of charge on your surface is done by monitoring the effect your surface has on a solution that has a known charge. As you move your surface away from the probe particle solution that is being measured, it has less and less of an effect on its behavior. The ideal probe particle solution is one that is very stable (high magnitude of charge) and matches the sign of the charge of your surface. If you pair a positively charged surface with a negatively charged probe particle solution, the particles in solution will eventually stick to your surface, changing its inherent charge. For example, we have a zeta potential reference material called, ZR5, that gives a -44 ± 8 mV charge. This is ideal for surfaces that are negatively charged and have a magnitude that is less than that of the solution. If you do not know what your surface is expected to be at all, try with a simple solution like this ZR5. If your result turns out to be positive, then you should measure a fresh sample, but use a positively charged probe particle solution instead.

Making a Measurement with Particle Solutions

- 1) Once your sample is in the NanoBrook, open up the Particle Solutions Software Suite. Here, you can choose the measurement you'd like to make. In this case, choose "SZP Surface Zeta Potential measurement" and click "New". This will open up the measurement window.
- 2) Once the measurement window is open, use the SOP to enter any parameters relevant to your sample, such as an ID, preparation notes, information about the probe particle solution, and how many PALS measurements you would like to make at each displacement.
- 3) Once you have filled out your SOP, you can click "Start" and the measurement will begin. The software will guide you every step of the way, telling you when to move the sample using the movable wheel on the electrode assembly.
- 4) Once the measurement is complete, you will be able to see your results and analyze using the database.

For examples of sample preparation, software navigation, and data analysis, watch the videos on our website @ www.brookhaveninstruments.com.