Aurora Pro Scientific (Distributor)
103 Godwin Ave, Suite 133
Midland Park, NJ 07432, USA
sales@auroraprosci.com
www.auroraprosci.com

User Manual for Silmeco SERStrates

- measure correctly

Please follow these three simple steps to get optimal results:

1. Do **not** wash/sonicate/treat the SERStrates prior to analyte deposition.
2. Deposit a droplet of the analyte on the SERStrate and let it dry. Use e.g. water, ethanol or isopropanol solvents.
3. Measure.

If you want to measure molecules in **gas phase,** please see next page.

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Gas sensing with SERStrate

You can use the SERStrates for gas sensing in two ways both of which take advantage of the unique nanopillar structure. The key aspect is to have the pillars lean together in the presence of your analyte to achieve the highest enhancement when doing the Raman measurement.

Nanopillar leaning: Nanopillar leaning is achieved by having a solvent evaporate on the SERStrate. We recommend you use purified water. The SERStrate do not need any processing or cleaning before use. Handle them at the edges and avoid touching the surface of the active (*the brownish/bronze/reddish side in the case of gold, and the light/beige tone for silver*) side of the SERStrate.

Will my gas bind to gold? This could play a role in which of the following two methods is best.

METHOD 1 Direct

1. Expose the surface of the SERStrate to your gas. The SERStrate can be placed in a gas flow cell if needed.
2. Place a droplet of water (1µl) and let the droplet evaporate.
   The nanopillars under the droplet will lean together as the droplet evaporates hence forming electromagnetic hot spots. You will be able to see that the substrate changes into a darker color tone.
3. Perform the Raman measurement within this darker area - this is where the nanopillars lean i.e. with the most hot spots. We recommend you start with low laser power and work your way up.

NOTE: There is a risk that you "wash" away your analyte with method 1 - therefore please consider method 2.

METHOD 2 Pre-leaning

1. Pre-lean the nanopillars by depositing a droplet of water (1µl) on the surface and let it evaporate.
   This will cause the pillars to lean and create the hot spots.
2. Expose the SERStrate to your analyte gas.
3. Perform the Raman measurement inside the darker area where the nanopillars are leaning.

Method 2 is slightly less sensitive than method 1 but has the advantage that you can measure immediately after gas exposure. In addition, you do not have to worry about

water solubility of your analyte. Moreover, you can measure in situ with method 2.

There should be enough area on a single SERStrate chip to try both methods providing you make the droplets of water small enough.

SERStrate Specifications

SPECS	VALUE
Dimensions	3x3 mm *(other dimensions are available on custom request)*
SERS active area	9 mm^2
Sensitivity	ppm to ppb
Surface metals	Ag or Au
Substrate material	Nanostructured Si
Sampling methods*	Vapor deposition, drop deposition, substrate incubation (immersion)
Laser excitation wavelengths*	514 (silver), 532 (silver), 633 (silver), 780-785 (silver + gold) nm
Laser power density*	< 10 W/cm^2

**) recommended*

For more information, please contact sales@auroraprosci.com