

Supplementary Material

Molecular fingerprinting of the Omicron variant genome of SARS-CoV-2 by SERS spectroscopy

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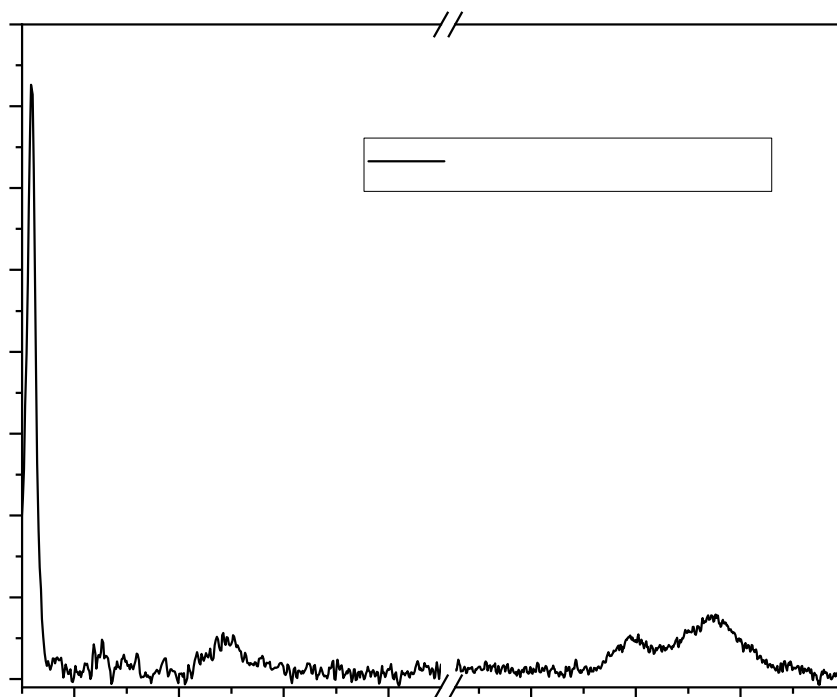
Section S1. Calculation of the SARS-CoV-2 genome concentration in molarity

The final concentration in cps/ μ L was converted in molarity, whose calculation is made based on the assumption that the average molecular weight of a single nucleotide is 325 Daltons.

- Eq.: $N. \text{ copies} = (\text{DNA concentration (ng}/\mu\text{l)}) \times [6.022 \times 10^{23}] / (\text{length of template} \times [1 \times 10^9] \times 325)$.
- $\text{DNA concentration} = N. \text{ copies} \times \text{length of template} \times [1 \times 10^9] \times 325 / (6.022 \times 10^{23}) = 0.002 \text{ ng}/\mu\text{L}$.

This concentration was adopted to calculate the molarity by using the molecular weight of the entire SARS-CoV-2 Omicron genome (9536 g/mol) and obtaining a value of $\sim 0.2 \text{ nM}$.

Section S2. SERS spectrum of water molecules confined in Ag dendrites substrate



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Figure S1. SERS spectrum of water molecules confined in Ag dendrites nanocavities. We distinguish the strong peak of Ag-O species at 235 cm^{-1} and the peak of the S-O vibrational mode at 962 cm^{-1} due to the sulfur contamination of the substrate when exposure to air. The only spectral contributions assigned to the sample added to the plasmonic material are the OH stretching vibrations, in the region between 3000 and 3800 cm^{-1} , due to the water molecules organized in a liquid network. The water molecules, indeed, remain confined in the liquid state inside the nanocavities of dendrites, as commented in the main text. Moreover, the lack of any other spectral signature highlights the absence of contaminations coming from the plasmonic substrate or from the water that we used to prepare the biological solutions.