

## ***Additional Information***

# **Dual-mode SERS-based lateral flow assay strips for simultaneous diagnosis of SARS-CoV-2 and influenza A virus**

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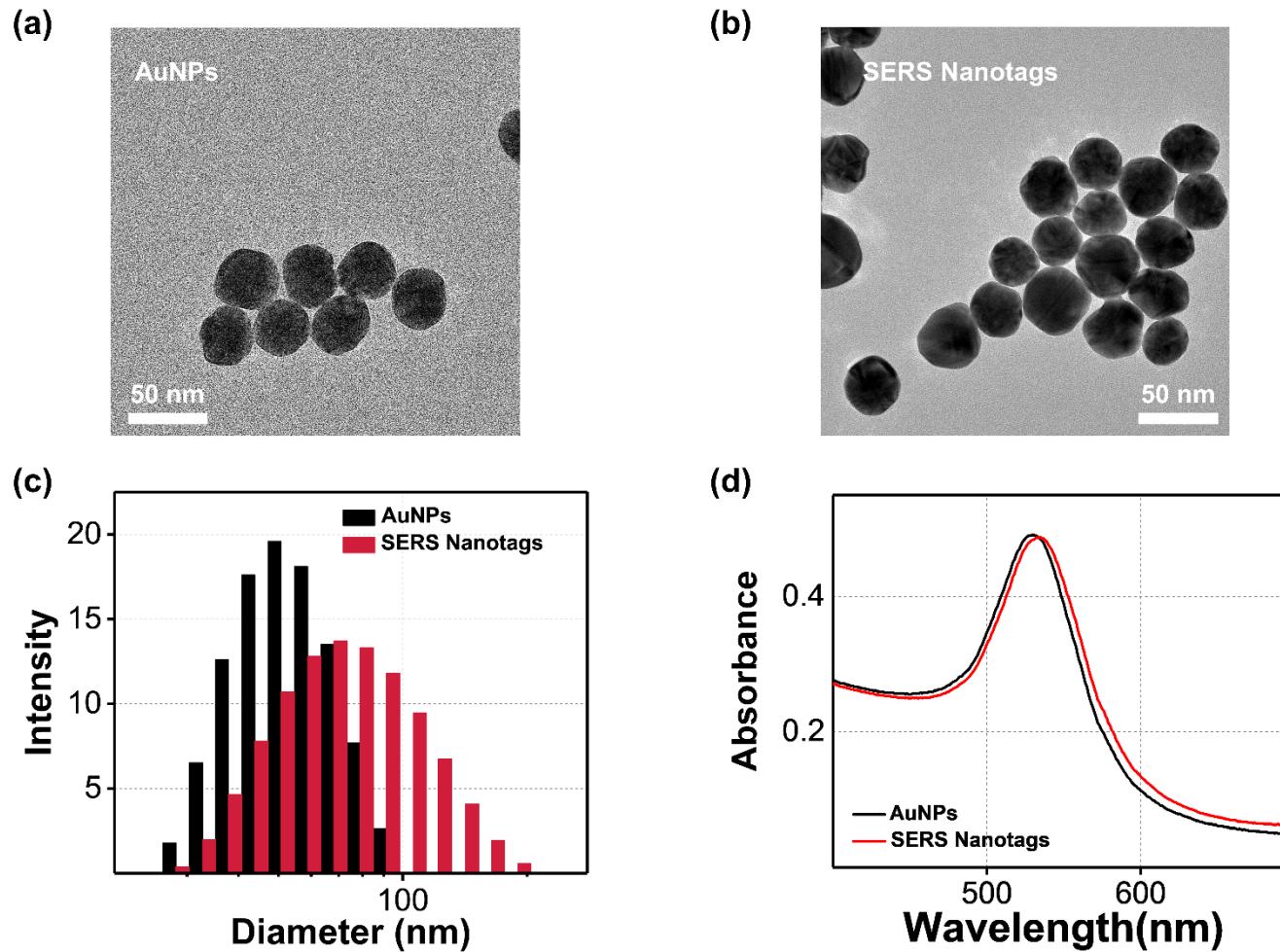
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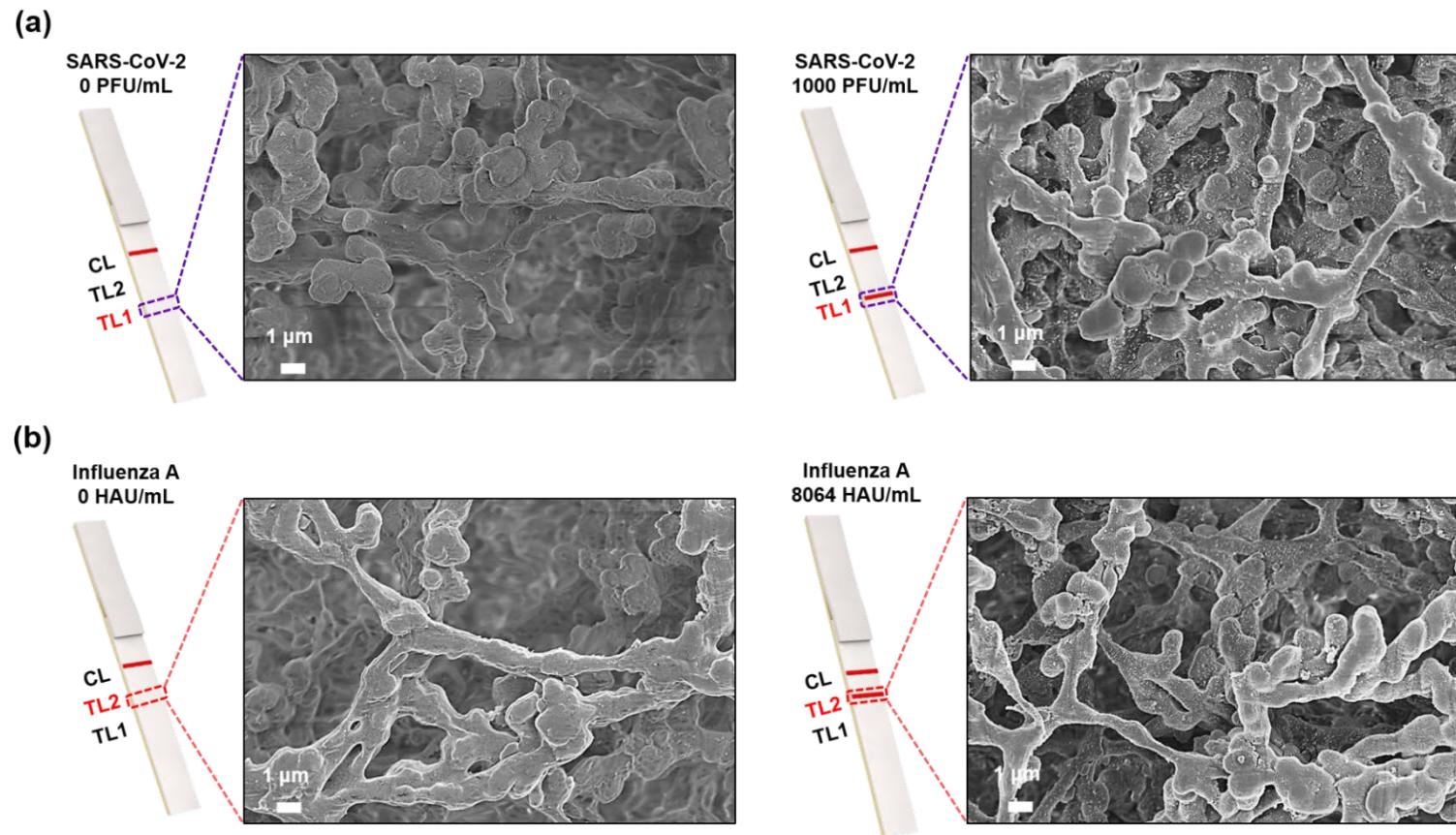
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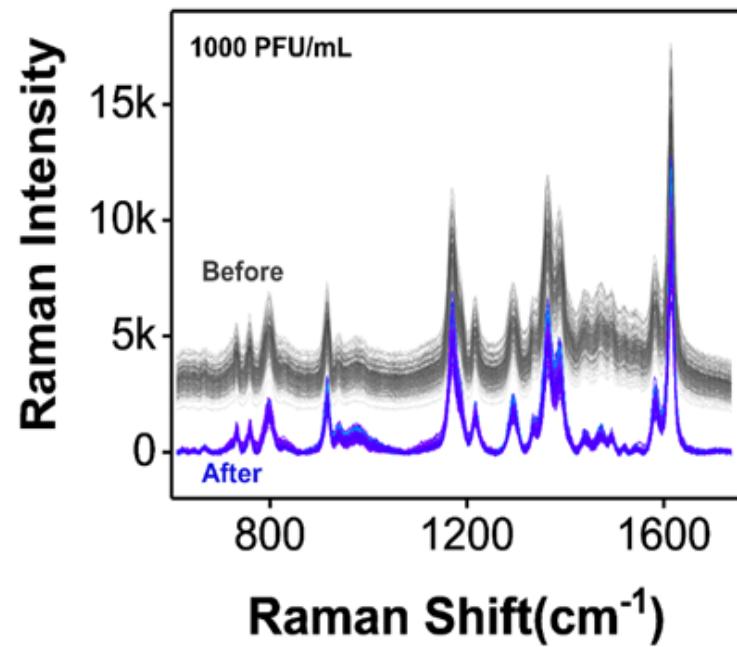


**Fig. S1.** TEM images of (a) AuNPs and (b) SERS nanotags. (c) DLS size distributions, (d) corresponding UV-vis absorption spectra of AuNPs (black) and SERS nanotags (red).

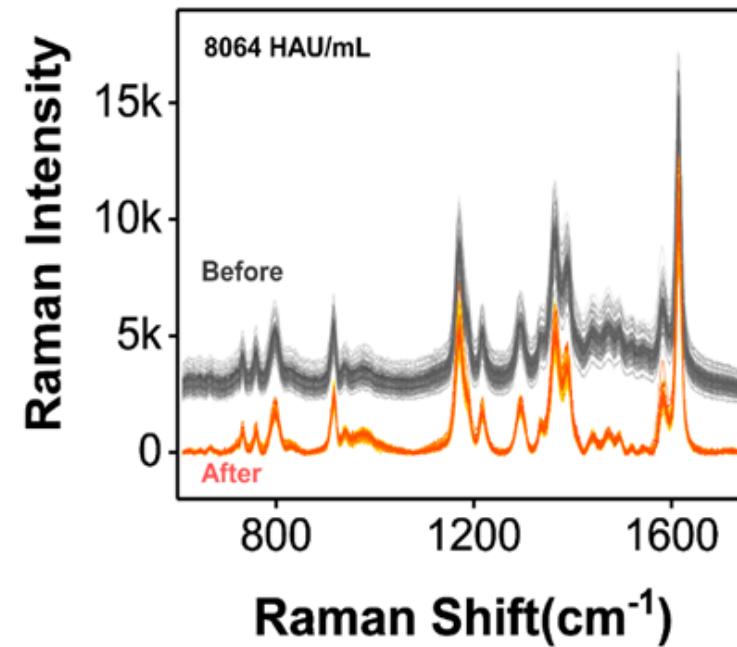


**Fig. S2.** SEM images for test lines: (a) in the absence (0 PFU/mL) and presence (1000 PFU/mL) of SARS-CoV-2, and (b) in the absence (0 HAU/mL) and presence (8064 HAU/mL) of influenza A virus.

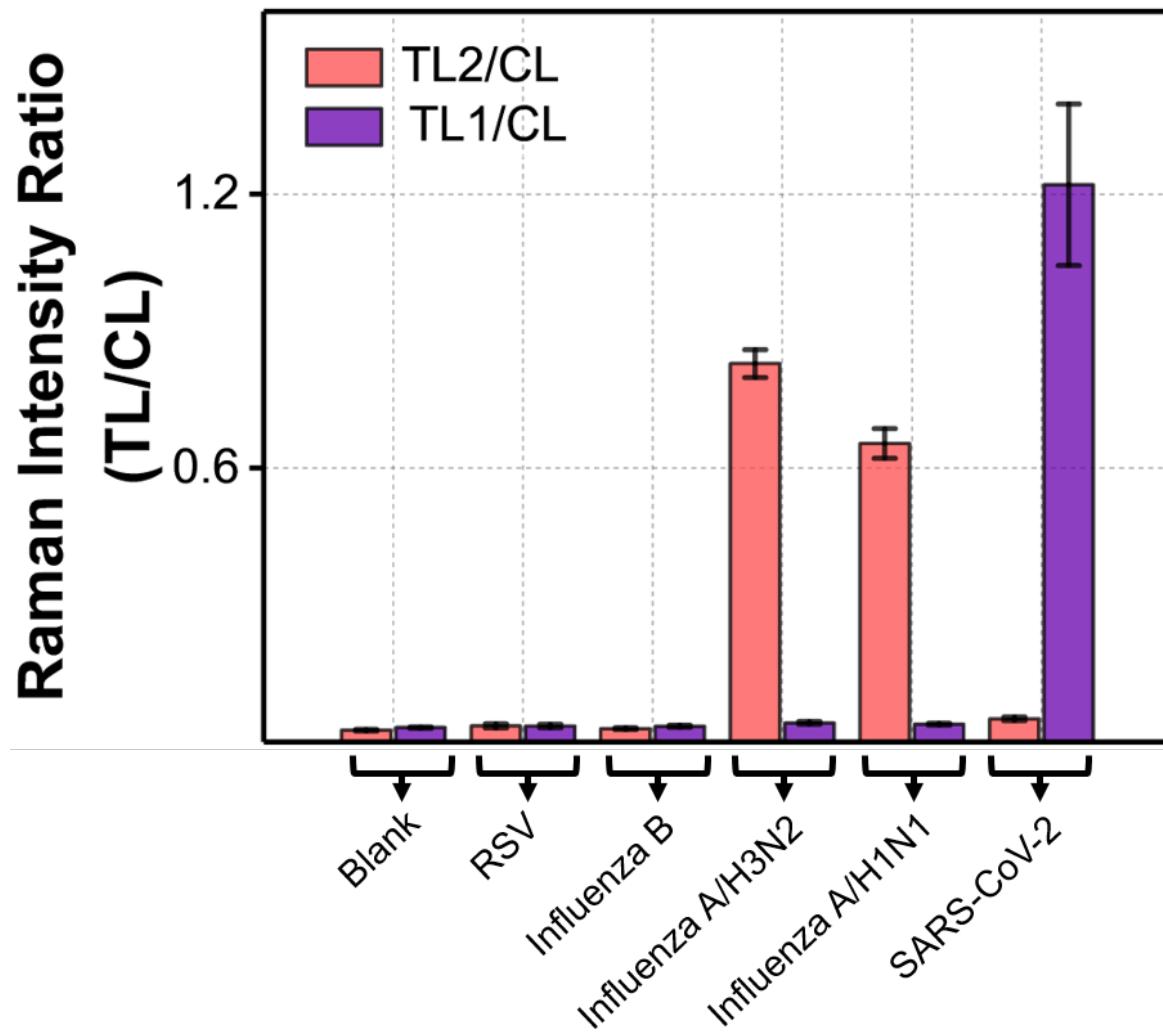
(a) SARS-CoV-2



(b) Influenza A



**Fig. S3.** Raman spectra of 130 mapping points before (gray) and after (blue/red) base line corrections for (a) 1000 PFU/mL SARS-CoV-2 and 8064 HAU/mL influenza A virus.



**Fig. S4.** Selectivity tests for five different respiratory viruses (RSV, influenza B, influenza A/H3N2, influenza A/H1N1, and SARS-CoV-2) using a SERS-LFA strip.

**Table S1.** SERS intensity ratios for eight different SARS-CoV-2 concentrations.

Concentration (PFU/mL)	1000	500	100	50	10	5	1	0
TL1	12978.3	10458.4	2879.09	2230.93	861.36	734.36	657.40	600.08
CL	9395.64	10036.1	10551.9	10370.2	8763.94	10694.8	11194.6	11540.2
Ratio (TL1/CL)	1.381	1.042	0.273	0.215	0.098	0.068	0.058	0.052

**Table S2.** SERS intensity ratios for eight different influenza A virus concentrations.

Concentration (HAU/mL)	8064	4032	2016	1008	504	168	56	0
TL2	7806.26	7113.04	4748.64	3456.06	2244.07	1292.90	938.26	671.16
CL	10137.6	10644.36	2937.67	13607.2	14169.5	12389.7	11483.5	22906.5
Ratio (TL2/CL)	0.770	0.668	0.367	0.254	0.158	0.104	0.082	0.029

**Table S3.** Determination of LoDs using four-parameter sigmoidal function and calculated LoD values for ELISA and dual-mode SERS-LFA.

Methods	Model	Equation	Parameters	
			Term	Value
ELISA (SARS-CoV-2)		$y = \frac{A_1 - A_2}{1 + (x/x_0)^p} + A_2$	$A_1$	0.09579
			$A_2$	0.57348
			$x_0$	713.13
			$p$	2.0520
ELISA (Influenza A virus)			$A_1$	0.07502
			$A_2$	0.88293
			$x_0$	18502
			$p$	1.4707
Dual-mode SERS-LFA (SARS-CoV-2)	Four-parameter sigmoidal function		$A_1$	0.05980
			$A_2$	2.51215
			$x_0$	807.95
			$p$	1.0412
Dual-mode SERS-LFA (Influenza A virus)			$A_1$	0.03143
			$A_2$	1.9543
			$x_0$	13759
			$p$	0.74507