



Supporting Information

for

On the stability of microwave-fabricated SERS substrates – chemical and morphological considerations

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Additional figures and tables

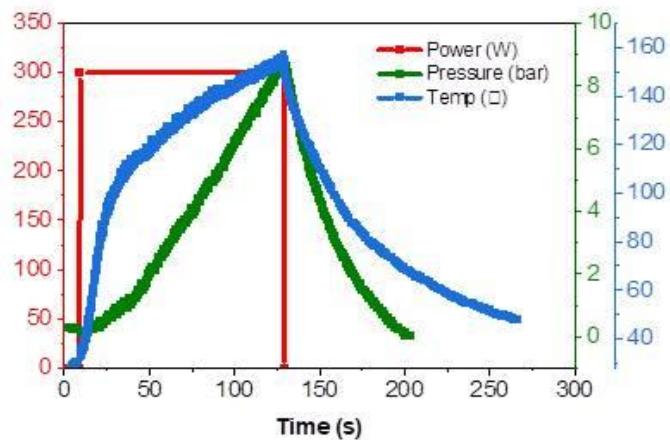


Figure S1: Representative diagram depicting the power, pressure, and temperature measured during the microwave-assisted coating of the glass substrate.

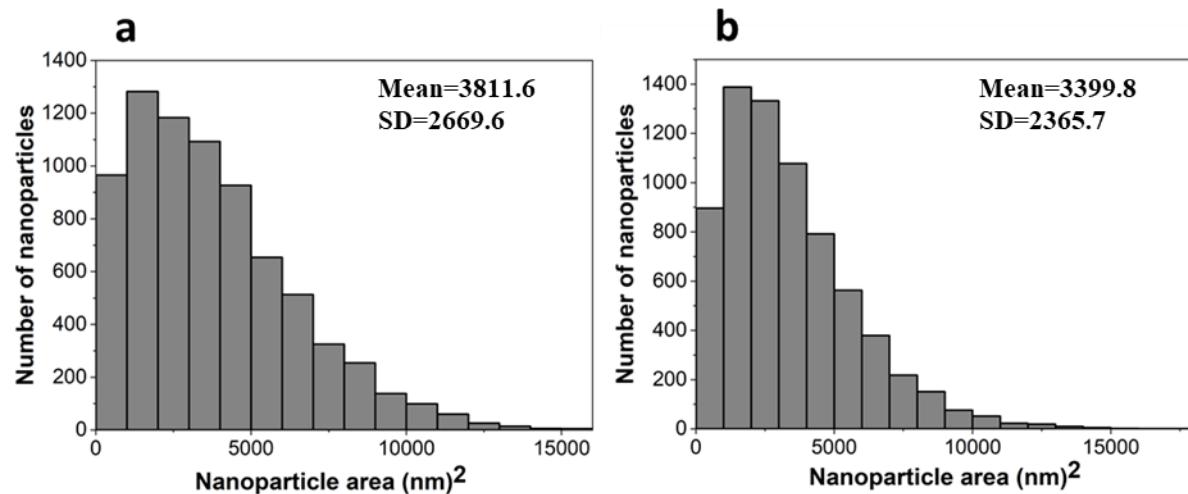


Figure S2: Histograms of SERS substrates from different batches after their preparation: (a) batch 1 and (b) batch 2.

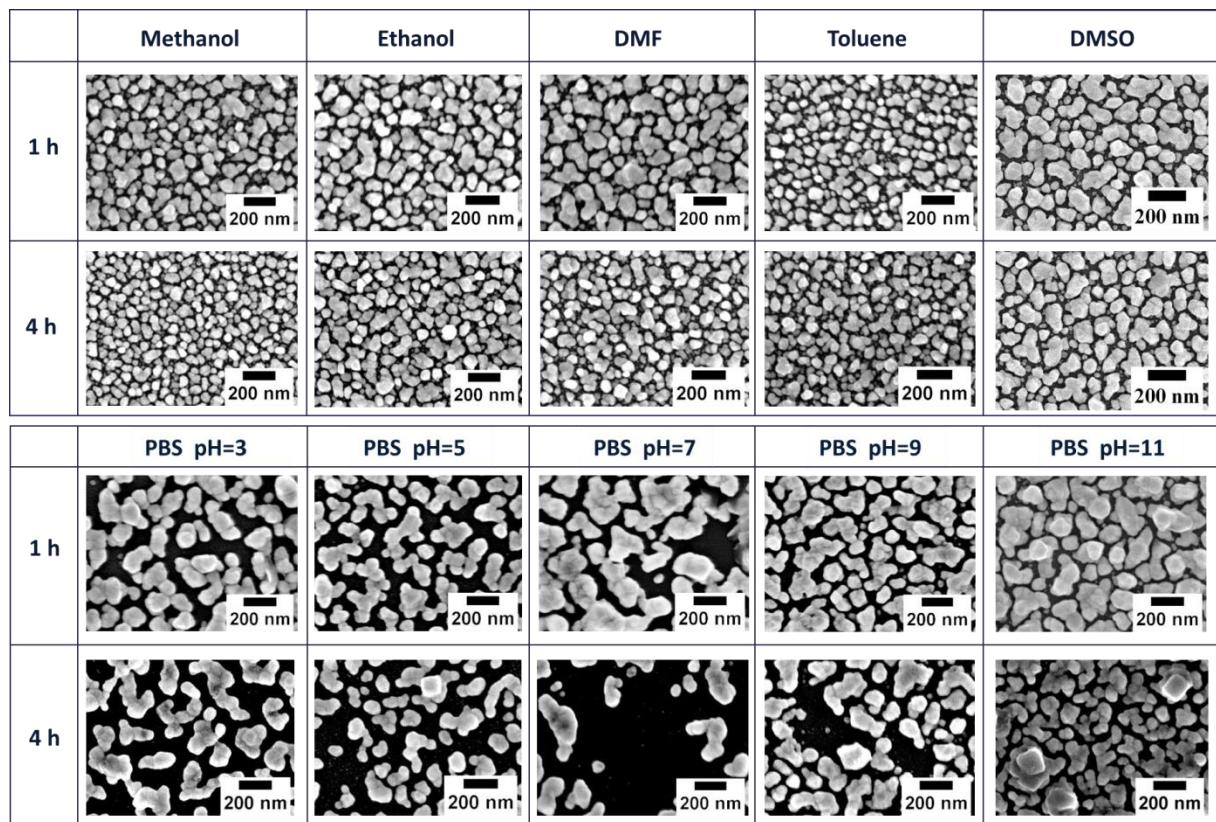


Figure S3: SEM images of the SERS substrates immersed into different organic solvents and PBS solutions for 1 and 4 h, respectively.

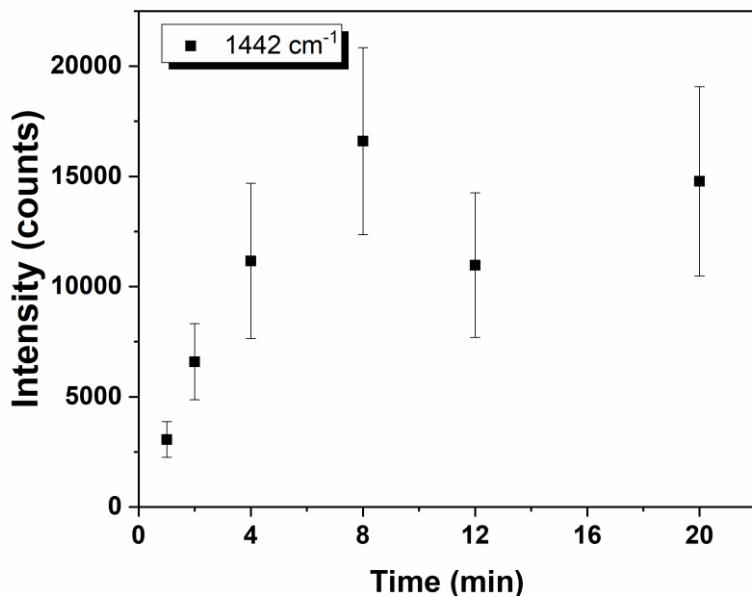


Figure S4: Raman intensities found for the marker peak at 1442 cm^{-1} of a monolayer prepared from 10^{-4} M 4-ATP. After eight minutes the peak intensity reaches a plateau, indicating the formation of a complete monolayer on the SERS substrates.

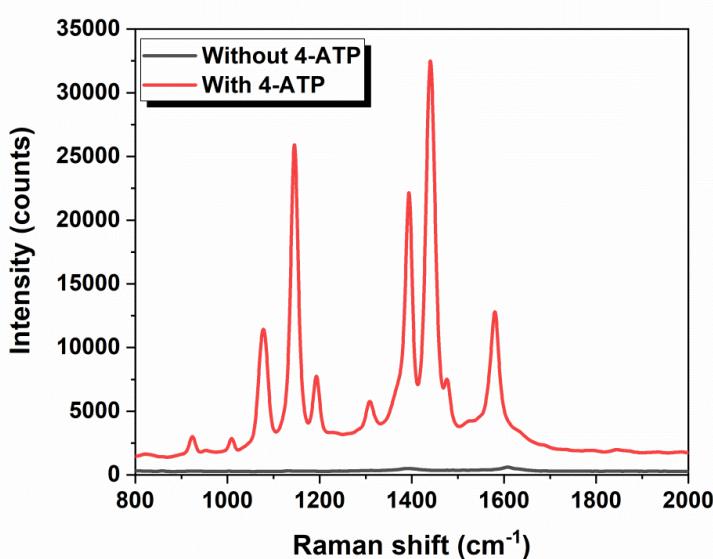


Figure S5: Reference Raman spectra of a 4-ATP-coated, non-treated, clean SERS substrate (red) and the Raman spectrum of the SERS substrate only (black). The corresponding peak assignment is provided in Table S1.

Table S1: Peak assignment for the SERS spectrum shown in Figure S5 [1,2]. A dimerization process takes place and leads to the transformation of 4-ATP into 4,4'-dimercaptoazobenzene (DMAB) as seen in the appearance of the b_2 modes or a_g , respectively [1].

SERS band frequency/cm⁻¹	Assignment (4-APT/DMAB)
1580	$v(CC)$, b_2/a_g mode
1440	$\delta(CH) + v(CC)$, b_2/a_g mode
1394	$v(CC) + \delta(CH)$, b_2/a_g mode
1145	$\delta(CH)$, a_1 mode
1078	$v(CS)$, a_1 mode

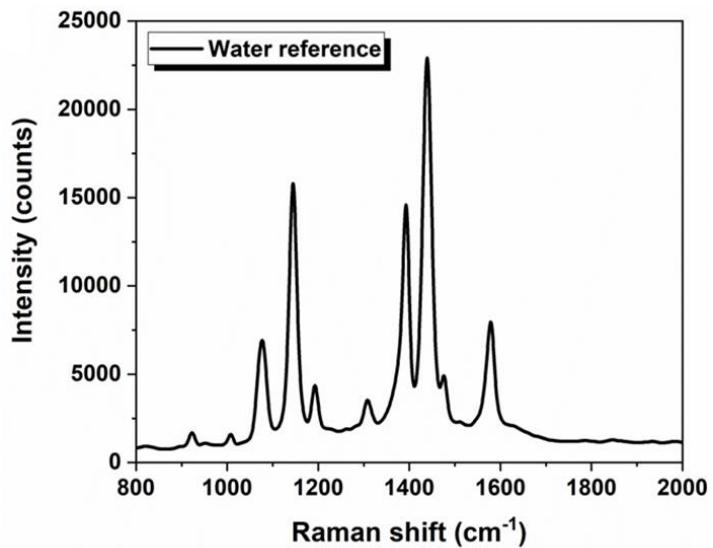


Figure S6: Reference Raman spectrum of a monolayer of 4-ATP self-assembled on a water-treated SERS substrate.

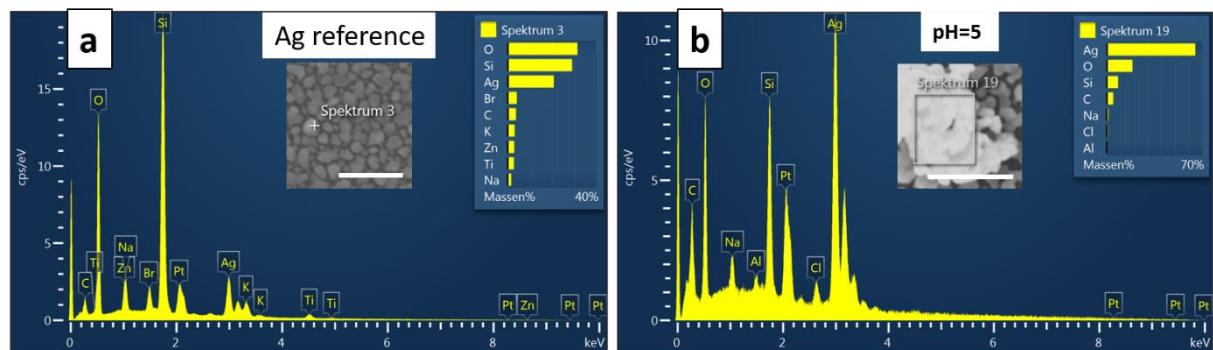


Figure S7: EDX elemental analysis of the SERS substrate without treatment (a) and treated with PBS buffer of pH 5 (b). The insets represent the SEM images. Scale bar: 500 nm. The elements O, Si, C, Na, and Al in (b) could be attributed to the glass substrate.

Table S2: Main components of different buffer solutions.

Different buffer solutions	Ingredients	Cations	Anions
PBS pH 3	NaCl, KCl, NaH ₂ PO ₄ , KH ₂ PO ₄	Na ⁺ , K ⁺	Cl ⁻ , H ₂ PO ₄ ⁻
PBS pH 5	NaCl, KCl, NaH ₂ PO ₄ , KH ₂ PO ₄	Na ⁺ , K ⁺	Cl ⁻ , H ₂ PO ₄ ⁻
Acetate pH 5	CH ₃ COONa, CH ₃ COOH	Na ⁺	CH ₃ COO ⁻
PBS pH 7	NaCl, KCl, Na ₂ HPO ₄ , KH ₂ PO ₄	Na ⁺ , K ⁺	Cl ⁻ , HPO ₄ ²⁻ , H ₂ PO ₄ ⁻
HBG pH 7	HEPES, glucose		
TBE pH 8	Tris base, boric acid, EDTA		
PBS pH 9	NaCl, KCl, Na ₂ HPO ₄ , K ₂ HPO ₄	Na ⁺ , K ⁺	Cl ⁻ , HPO ₄ ²⁻
Carbonate pH 10	NaHCO ₃ , Na ₂ CO ₃	Na ⁺	HCO ₃ ⁻ , CO ₃ ²⁻
PBS pH 11	NaCl, KCl, Na ₂ HPO ₄ , K ₂ HPO ₄	Na ⁺ , K ⁺	Cl ⁻ , HPO ₄ ²⁻

[1] Huang, Y.-F.; Wu, D.-Y.; Zhu, H.-P.; Zhao, L.-B.; Liu, G.-K.; Ren, B.; Tian, Z.-Q. *Phys. Chem. Chem. I Phys.*, **2012**, *14*, 8485–8497.

[2] Hu, X.; Wang, T.; Wang, L.; Dong, S. *J. Phys. Chem. C* **2007**, *111*, 6962–6969.