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Supporting Information

for

Effect of wavelength and liquid on formation of Ag, Au, Ag/Au nanoparticles via picosecond laser ablation and SERS-based detection of DMMP

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Additional figures and tables

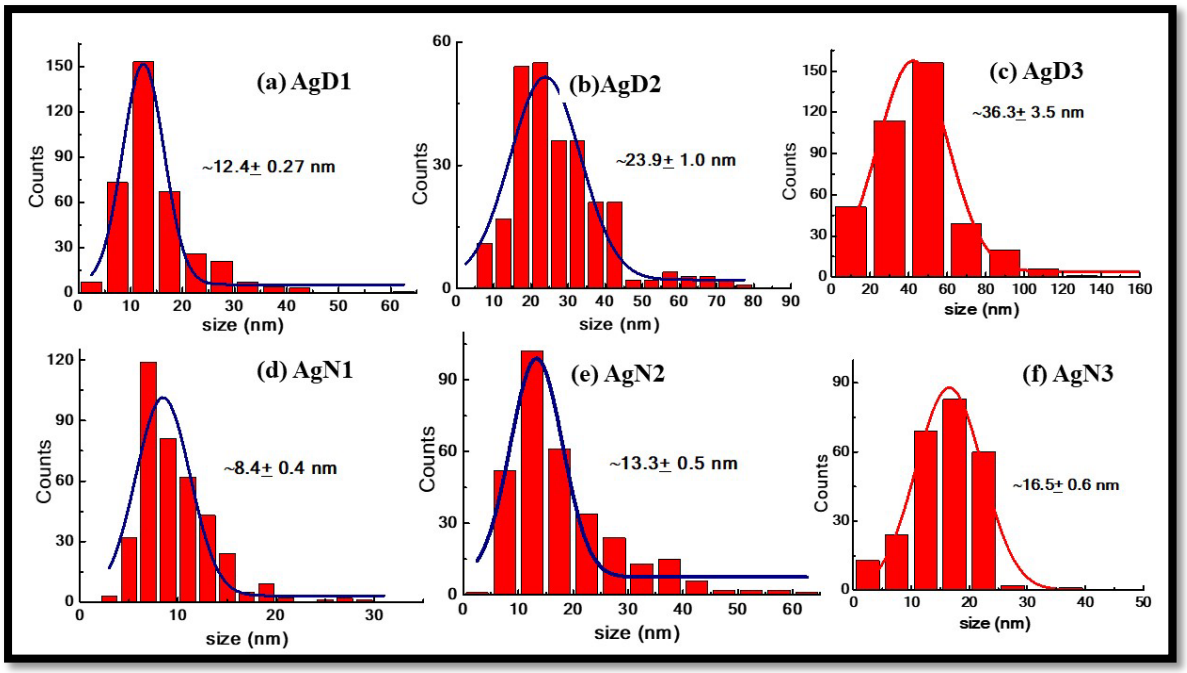


Figure S1: Size distribution histogram plots of Ag NPs [(a) AgD1, (b) AgD2, (c) AgD3, (d) AgN1, (e) AgN2, and (f) AgN3].

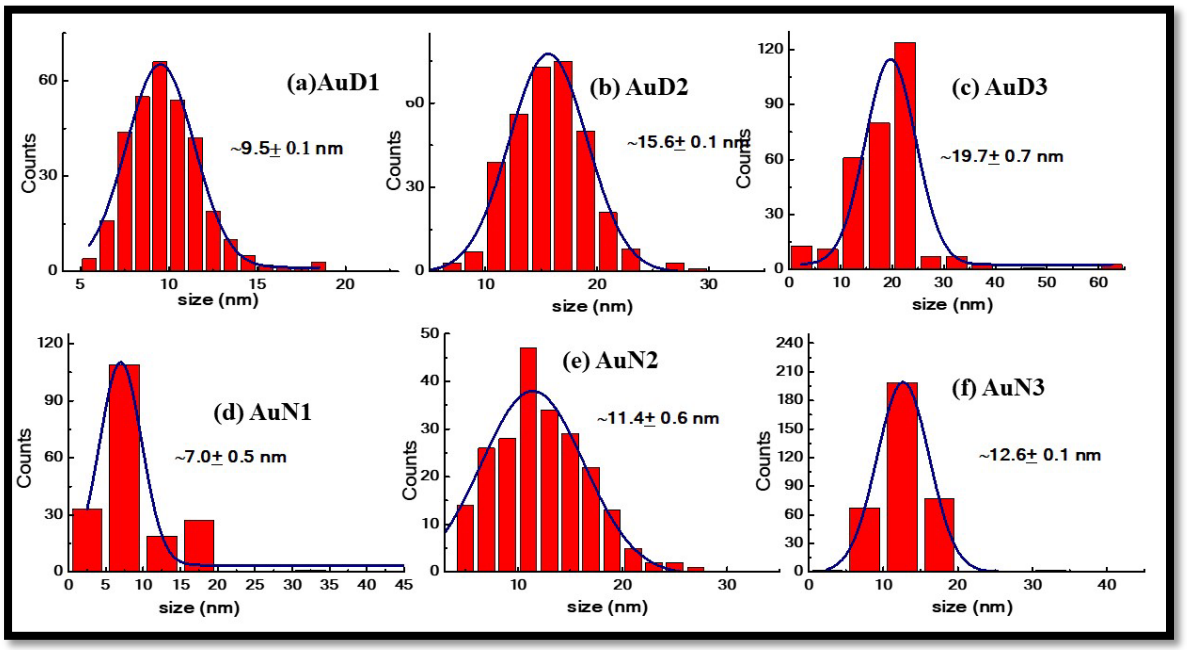


Figure S2: Size distribution histogram plots of Au NPs [(a) AuD1, (b) AuD2, (c) AuD3, (d) AuN1, (e) AuN2, and (f) AugN3].

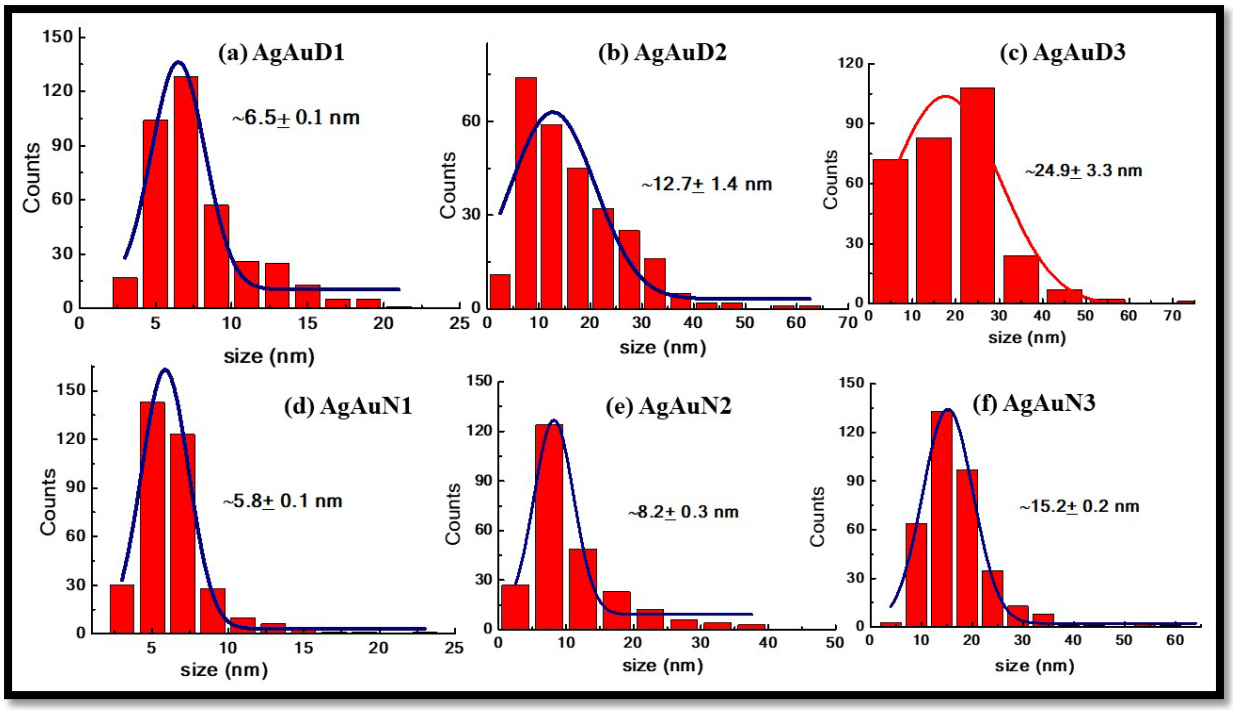


Figure S3: Size distribution histogram plots of AgAu NPs [(a) AgAuD1, (b) AgAuD2, (c) AgAuD3, (d) AgAuN1, (e) AgAuN2, and (f) AgAuN3].

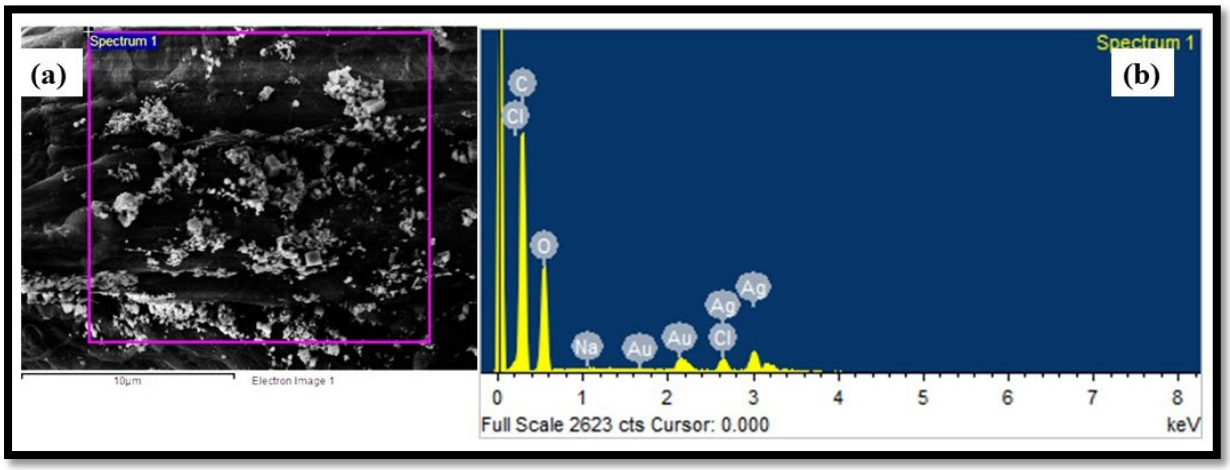


Figure S4: FP with (a) AgAuN3 and the corresponding (b) EDX spectra.

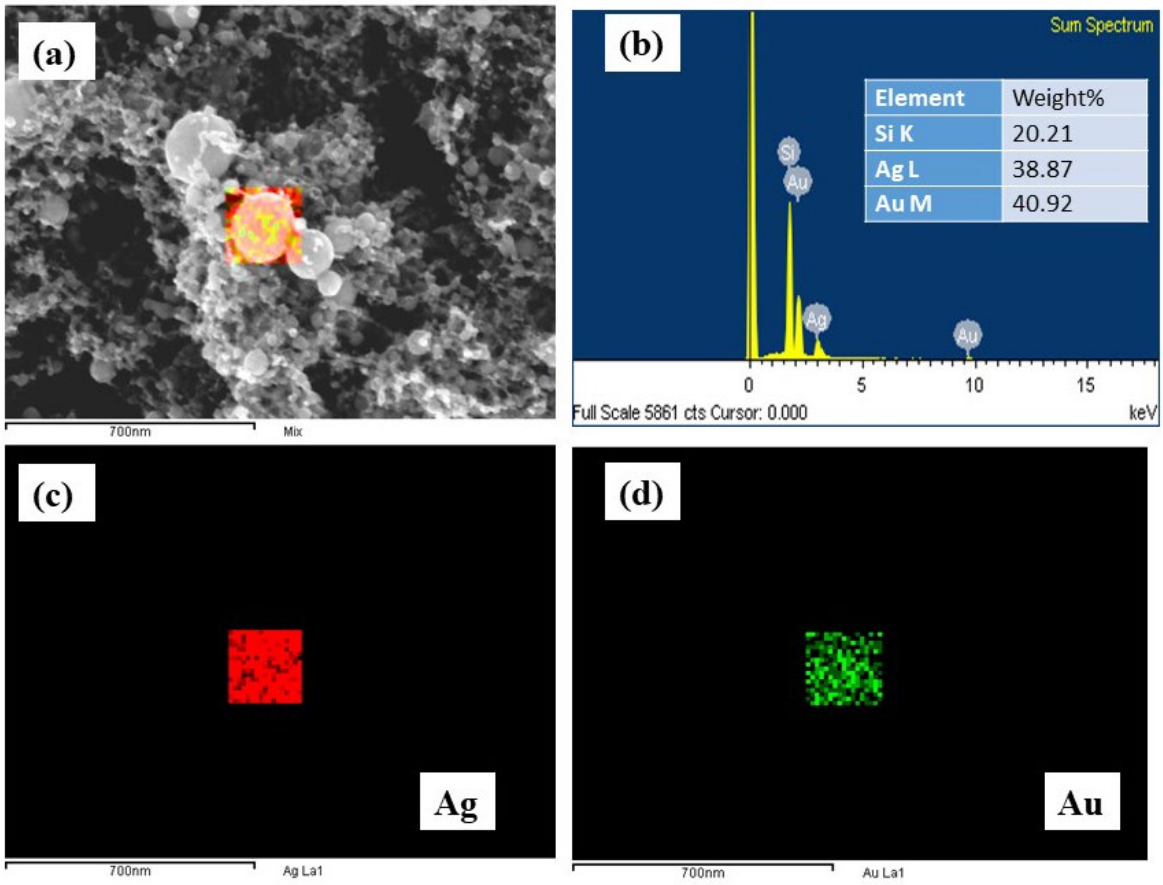


Figure S5: (a) FESEM–DES mapping image of AgAuD3 NPs on SI (b) EDX spectra (inset wt%) (c) Ag (d) Au.

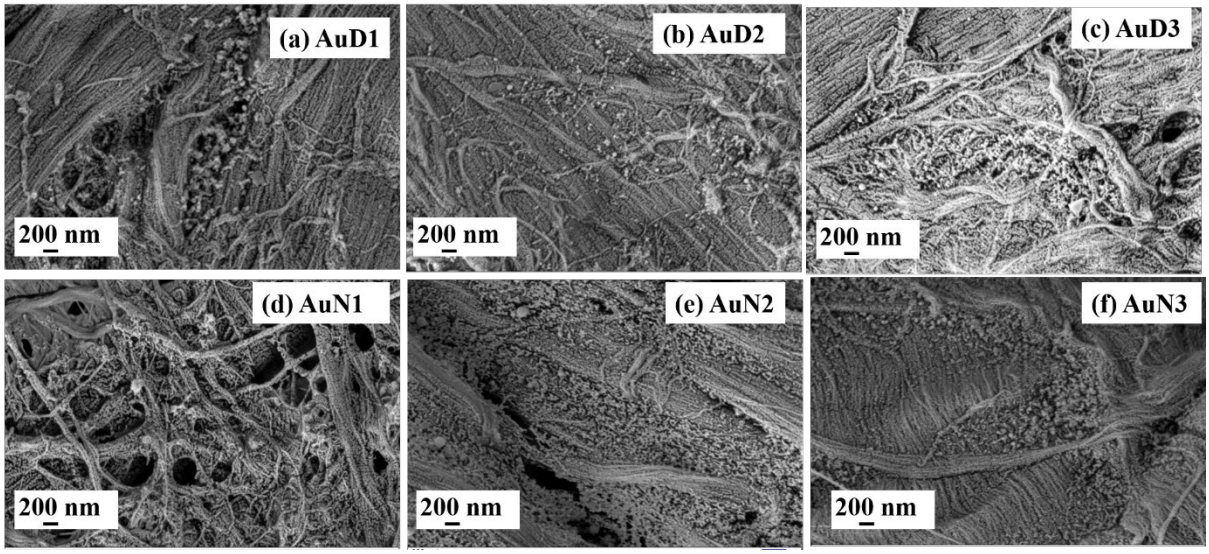


Figure S6: FESEM images of the filter paper loaded with Au NPs obtained in (a)–(c) DW and (d)–(f) NaCl.

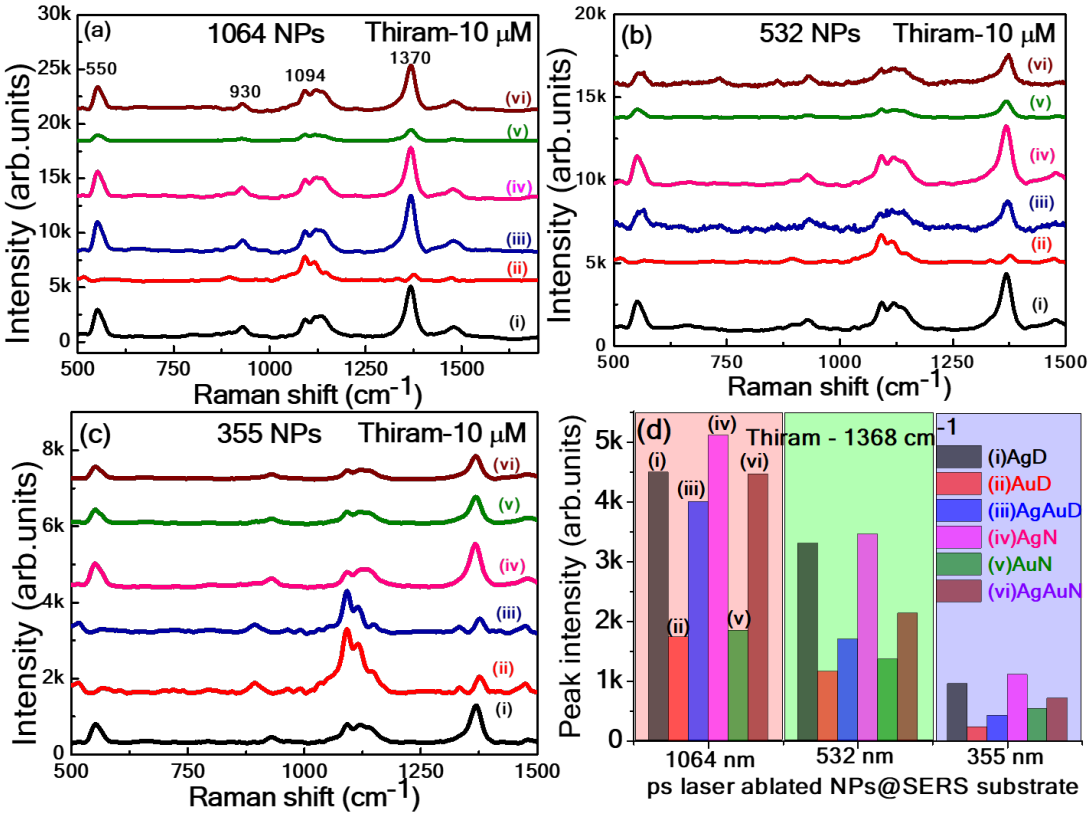
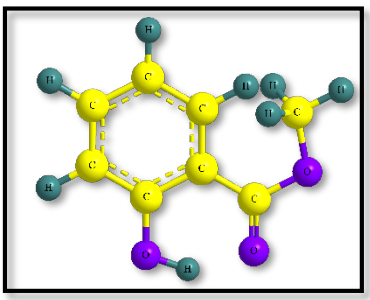


Figure S7: SERS spectra of thiram (10 μM) using filter paper loaded with ps laser-ablated AgD, AuD, AgAuD, AgAuN, AuD, and AuN NPs at (a) 1064, (b) 532, and (c) 355 nm. (d) Prominent peak (1368 cm^{-1}) intensity histogram.

Table S8: MS Raman peak and their assignments [1]

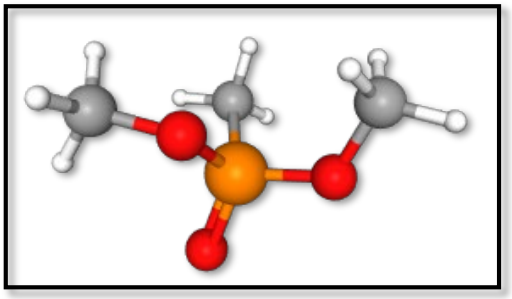
Methyl salicylate (MS): $C_8H_8O_3$



S. No.	Peak position	Assignment
1	562	Out-of-plane of the benzene ring
2	661	Out-of-plane and in-plane of a benzene ring
3	808	Stretching vibration of C–H
4	1033	In-plane of a benzene ring
5	1250	Stretching vibration of C–O

Table S9: DMMP Raman peak and their assignments [2]

Dimethyl methylphosphonate (DMMP): $C_3H_9O_3P$



S. No.	Raman Peak position	Assignment
1	714 (strong)	Stretching P–CH_3 + stretching P–O + bending P–O–CH_3
2	794	Asymmetric stretching O–P–O
3	825	Stretching P–CH_3
4	1028	Stretching O–CH3 + asymmetric stretching (O–P–O)
5	1057	Stretching O–CH3 + stretching (O–P–O)

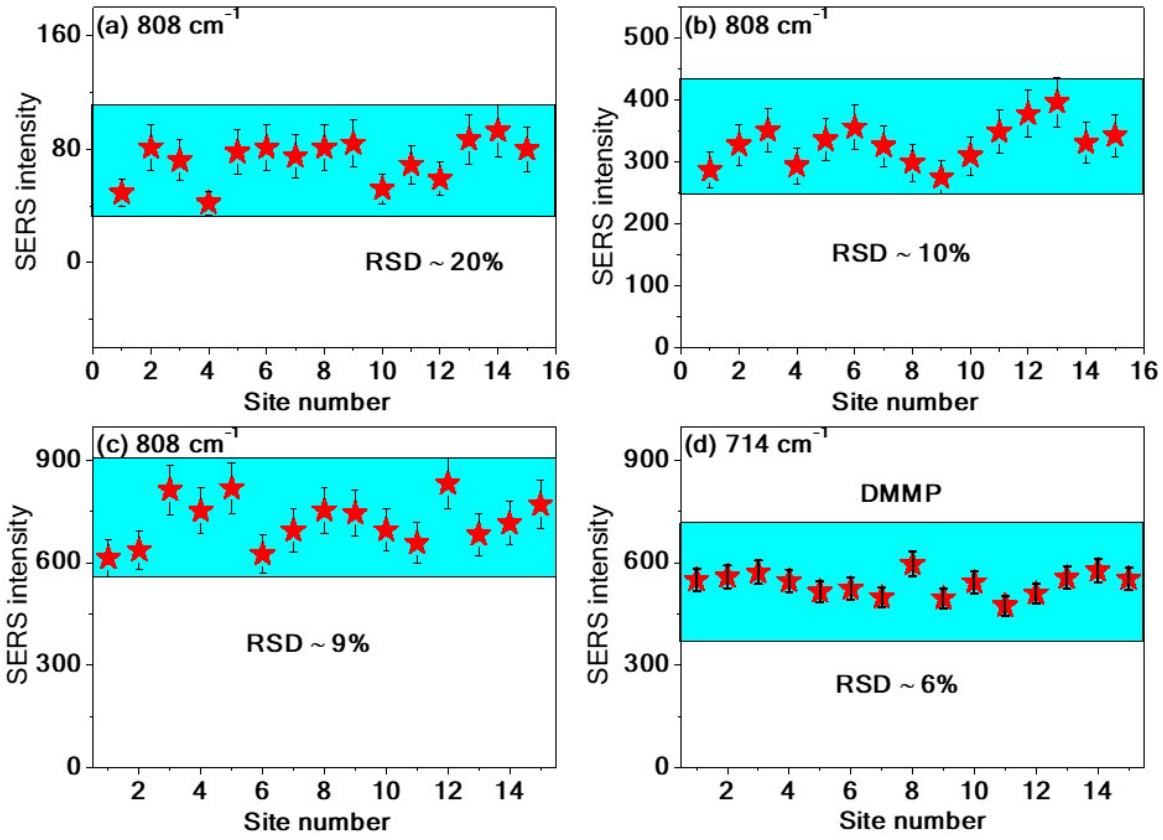


Figure S10: Reproducibility data of SERS MS (1 mM) at the following Raman excitations: (a) 632, (b) 532, and (c) 325 nm. (d) Reproducibility data of SERS DMMP (500 μM) at Raman excitations of 325 nm.

Reference:

(1) Li, Y.; Li, Q.; Wang, Y.; Oh, J.; Jin, S.; Park, Y.; Zhou, T.; Zhao, B.; Ruan, W.; Jung, Y. M. A reagent-assisted method in SERS detection of methyl salicylate. *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* **2018**, *195*, 172-175. DOI: https://doi.org/10.1016/j.saa.2018.01.073.

(2) Costa, J. C. S.; Ando, R. A.; Sant'Ana, A. C.; Corio, P. Surface-enhanced Raman spectroscopy studies of organophosphorous model molecules and pesticides. *Physical Chemistry Chemical Physics* **2012**, *14* (45), 15645-15651, 10.1039/C2CP42496G. DOI: 10.1039/C2CP42496G.