Supporting information

Fast and Low-cost Surface-enhanced Raman Scattering (SERS) Method for On-site Detection of Flumetsulam in Wheat

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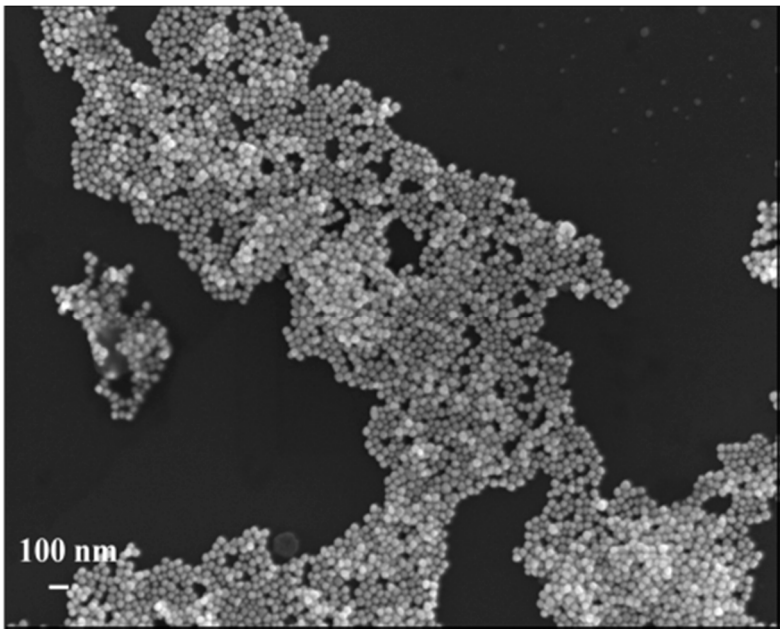


Figure S1. The SEM image of NaCl modified AuNPs with flumetsulam (without addition of $MgSO_4$).

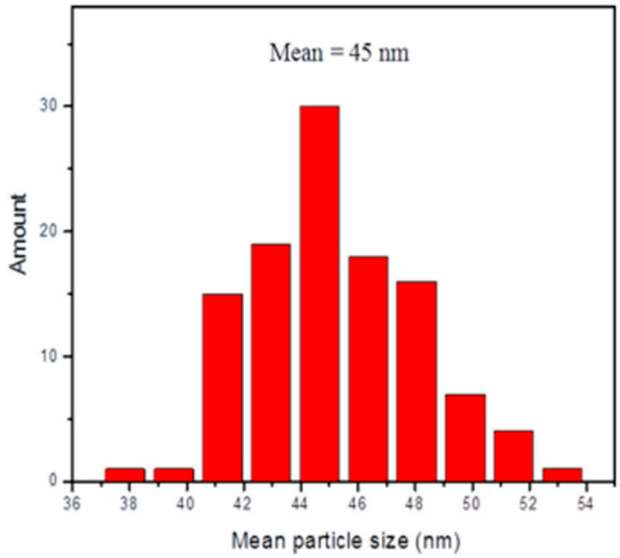


Figure S2. The statistics of particle size distribution of AuNPs.

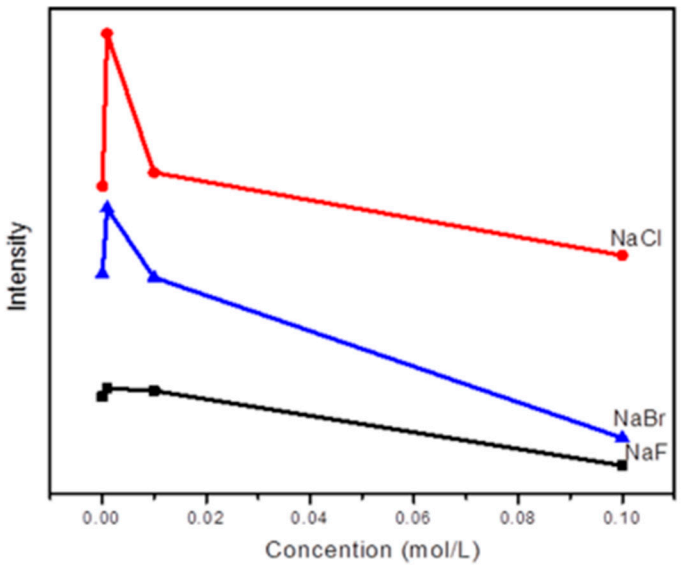


Figure S3. The peak intensity at 786 cm^{-1} of flumetsulam adsorbed on different concentrations (10^{-1}~10^{-4} mol/L) of NaF, NaCl and NaBr modified AuNPs substrates.

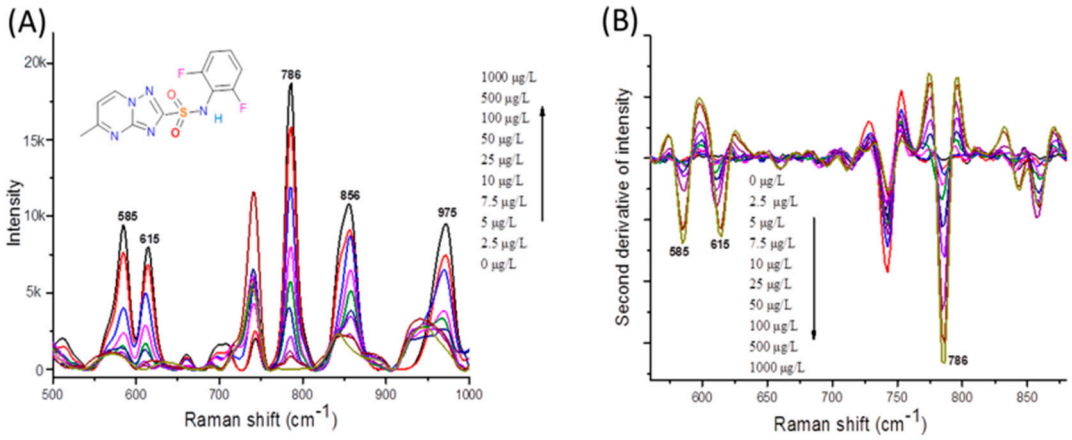
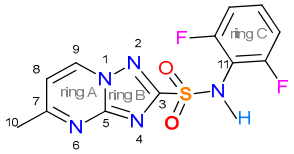


Figure S4. (A): SERS spectra of flumetsulam standard solution with different concentrations absorbed on the two-step modified concentrated AuNPs substrate. (**B**): The second derivative transformation of SERS spectra of flumetsulam in the range of 580~850 cm^{-1}.

Table 1. The Raman shifts and band assignments of flumetsulam molecule.

Flumetsulam	Raman (cm^{-1})	SERS (cm^{-1})	Vibrational modes
		585	β(ring A); β(ring B); γ(-SO_2)
		615	β(ring A); ν(C_3-S)
	776	786	β(ring A); ν(N-S); ν(C_7-C_{10}); β(ring C)
	844	856	β(ring A); β(ring B); ν(C_3-S)
	992	975	change of angle $N_2C_3N_{4(ring\ B)}$; δ(-$C_{10}H_3$); ν(C_3-S)
	1060	1064	β(-CH)$_{ringC}$
	1622	1614	β(ring C); ν(C_{11}-N)

i: ν-stretching vibrations; β -bending in-plane; γ -bending out-of-plane; δ -deformation.