Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

Femtosecond Laser Patterned Silicon Embedded with Gold Nanostars as SERS Substrate for Pesticide Detection

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Table T1: Raman peaks and their assignments of NB[11]

Peak position (cm^{-1})	Assignment (NB)
496	C-C-C deformation
590	C-C-C and C-N-C deformations
663	In-plane CCC or NCC deformations
1185	C-H bending
1350, 1484 and 1629	Ring stretching

Figure S1: Raman spectra of thiram

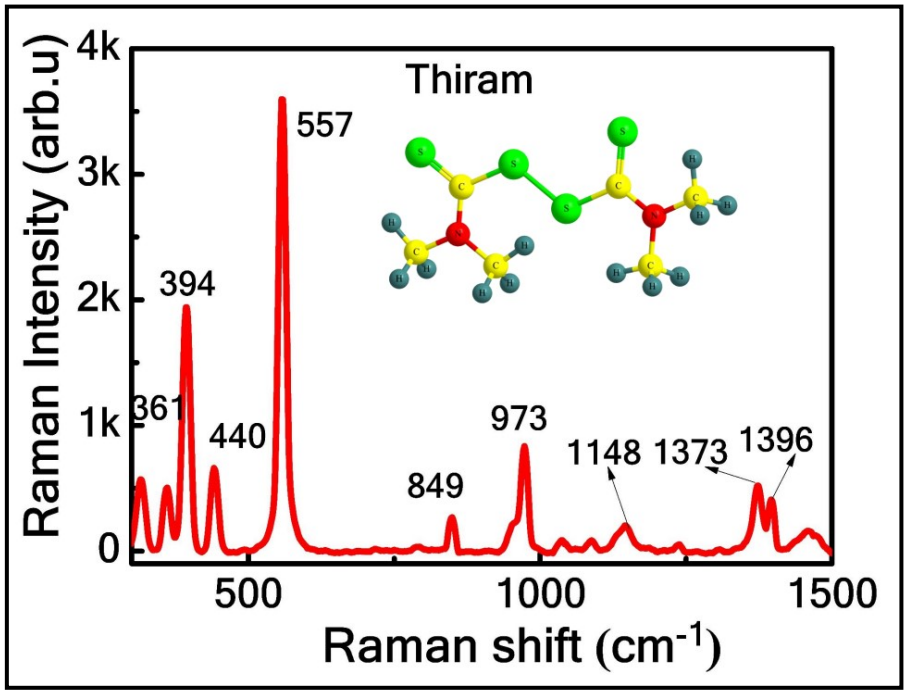


Table T2: Thiram Raman vibrational modes and their corresponding assignments

Raman Peak (cm^{-1})	(Thiram) Assignment
361	SCS deformation
440	CH3NC deformation and C-S stretching
557	S-S symmetric stretching
849	CH3N stretching
973	C-S and CH3N stretching
1148	C-N stretching mode
1373	CN stretching and symmetric deformation CH3
1396	-

Figure S2: Raman spectra of TBZ

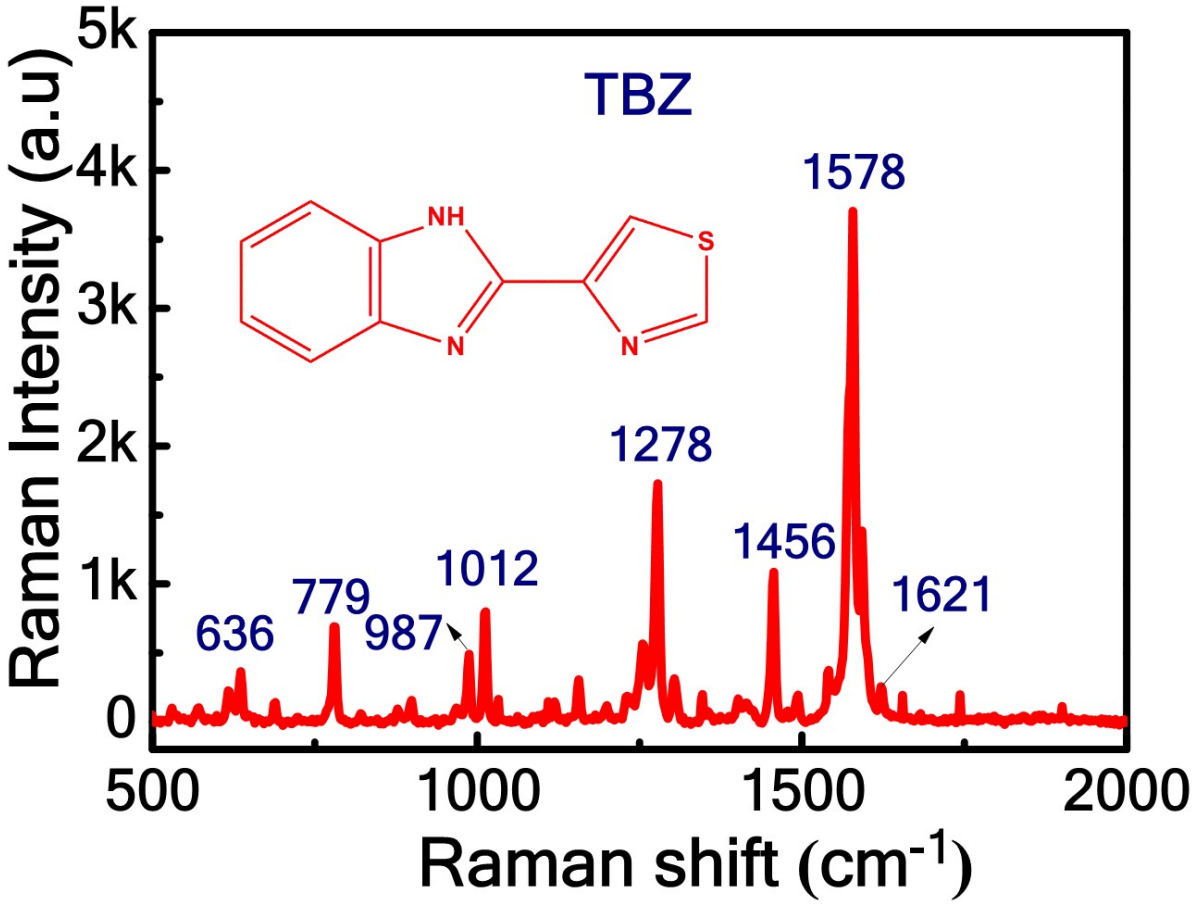


Table T3: TBZ Raman vibrational modes and their corresponding assignments:

Peak position (cm^{-1})	Assignment (TBZ)
638	In plane C-C-C bending, In plane S-C-N bending
778	Out-of-plane C-H bending, C-S stretching, in-plane C=N bending
983	C-S stretching
1007	Out of plane C-H bending, C-N stretching, C-C stretching
1278	Ring stretching vibrations
1456	C=N stretching
1578	C=N stretching, Ring stretching
1622	C=N stretching

Figure S3:
Raman spectra of TBZ 25 mM using bare Si and Si_05C (without Au NSs)

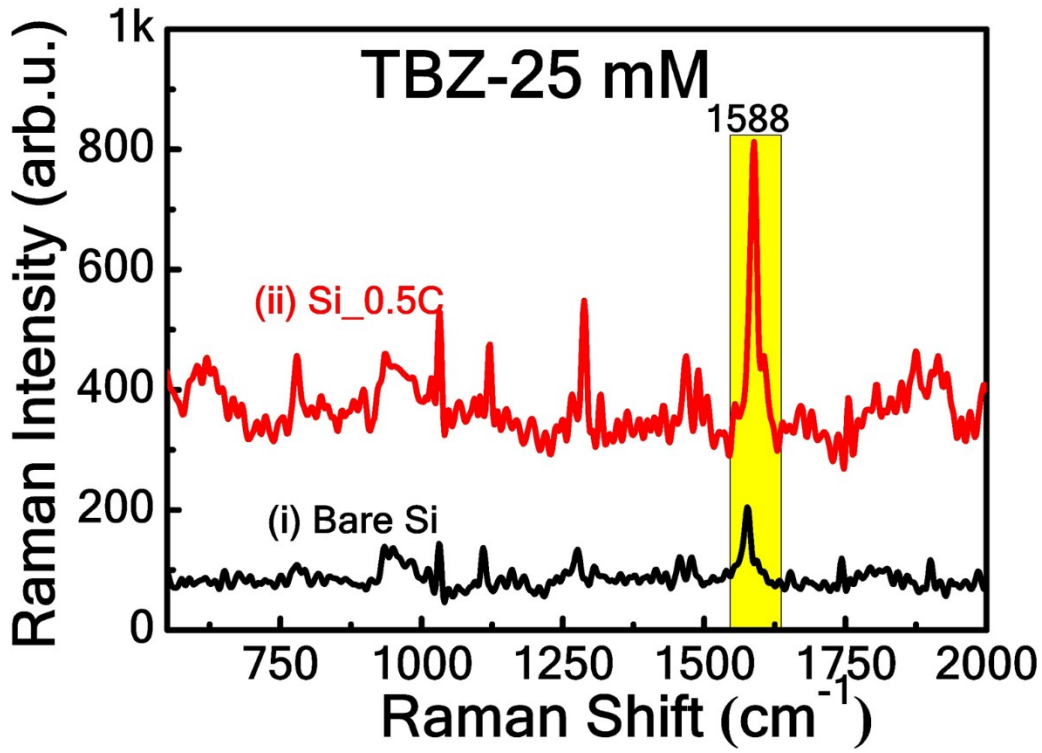
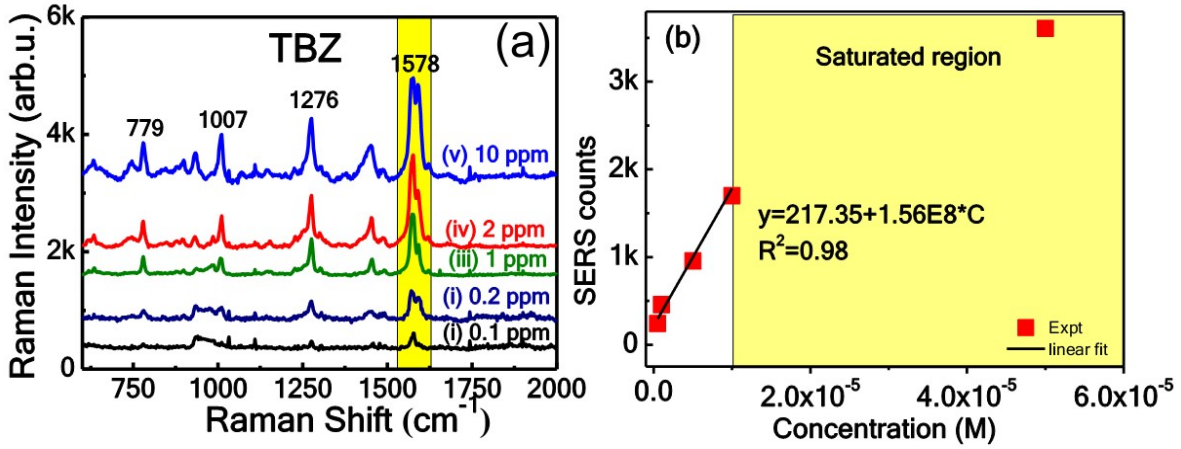


Figure S4: (a) concentration dependent SERS spectra of TBZ (b) SERS intensity as a function of concentration for 1578 cm^{-1} using Si_0.5C with Au nanostars.



LOD value was calculated using the formula LOD = 3 σ/b, where 'σ' is the standard deviation of the blank, and 'b' is the gradient of the linear equation. The slope "b" is obtained from the Intensity Vs Concentration plots. To calculate the LOD for TBZ, the concentration dependent SERS spectra of TBZ shown in figure below (a). The most prominent peak 1578 cm^{-1} was chosen to calculate LOD. Figures (b) represent the I Vs C plot, consists of saturation region and shown in yellow colour. The linear curve fit (R^2 =0.98) slope "b" used to calculate LOD and was ~11 ppb

Figure S5:
SERS spectra of MB+NB mixture solution from 10 different locations using Si_0.5C with Au nanostars

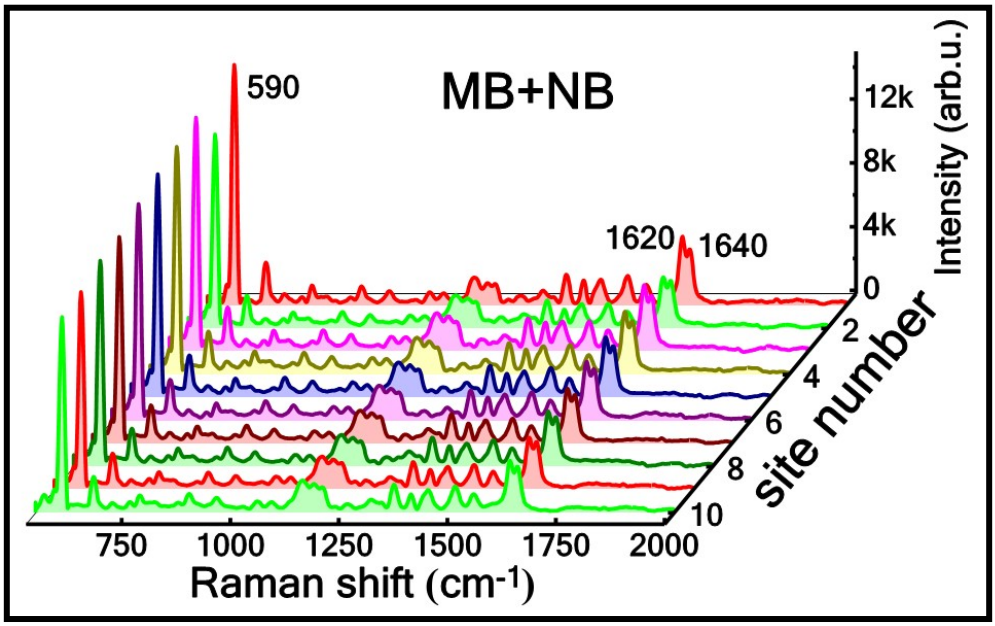
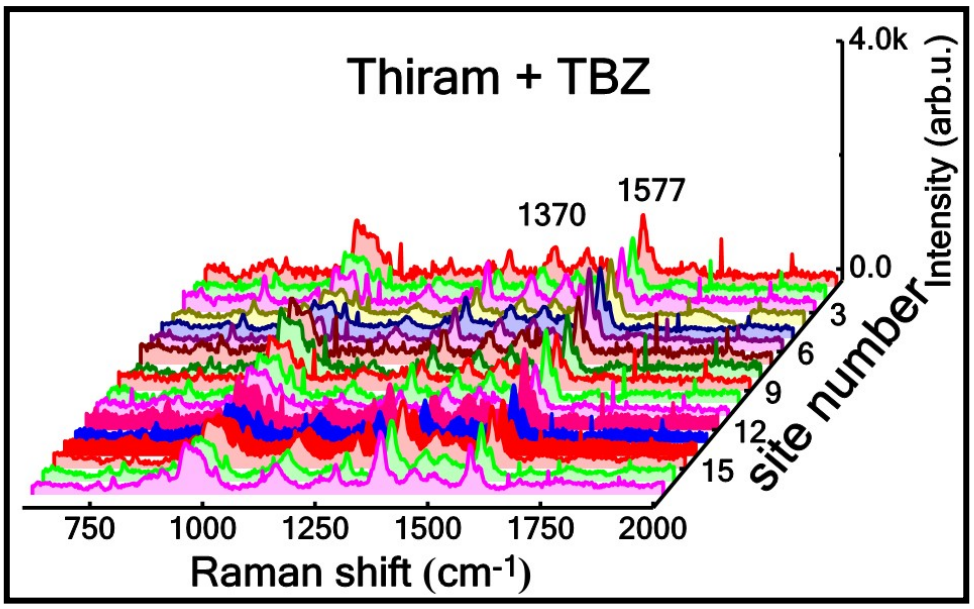


Figure S6: SERS spectra of thiram+TBZ mixture solution from more than 10 different locations using Si_0.5C with Au nanostars



References:

[1] G. Bodelón, V. Montes-García, C. Fernández-López, I. Pastoriza-Santos, J. Pérez-Juste and L. M. Liz-Marzán, 2015, *Small*, **11**, 4149-4157.

[2] J. Zhu, M.-J. Liu, J.-J. Li, X. Li and J.-W. Zhao, 2018, *Spectrochim. Acta A Mol. Biomol. Spectrosc.*, **189**, 586-593.

[3] F. K. Alsammarraie, M. Lin, A. Mustapha, H. Lin, X. Chen, Y. Chen, H. Wang and M. Huang, 2018, *Food Chem.*, **259**, 219-225.