Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

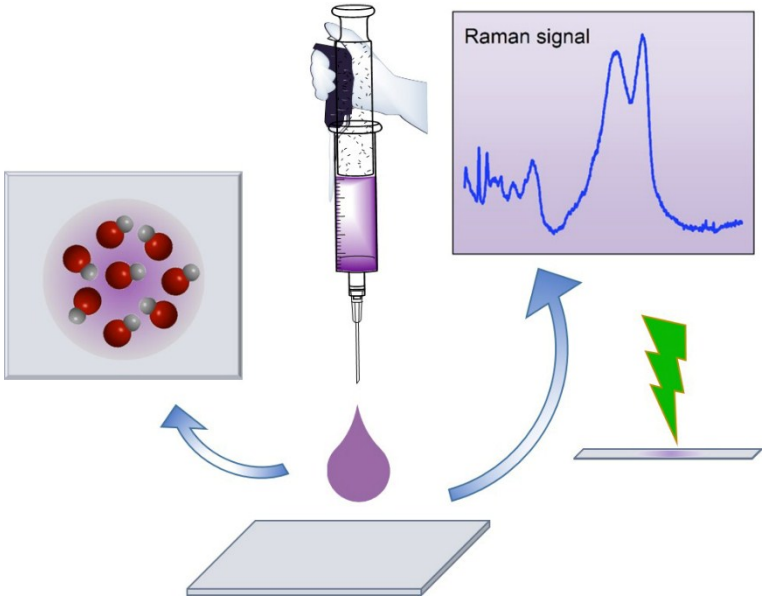

Fig. S1 The schematic illustration of how to prepare the samples for SERS tests.

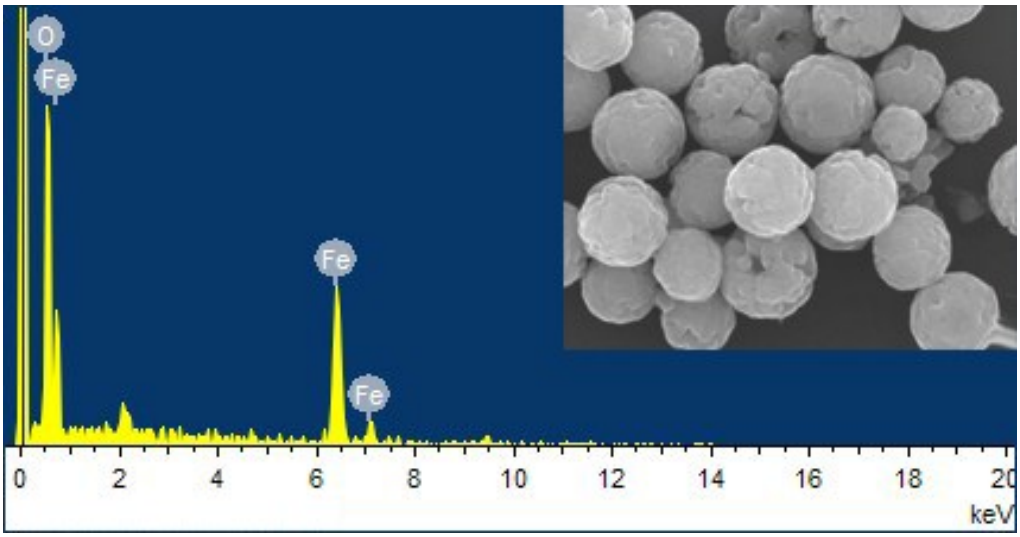

Fig. S2 EDX patterns of Fe_3O_4.

Element	Weight Percentage	Atom Percentage
O K	30.37	59.02
Fe K	69.63	40.98
Amounts	100.00	100.00

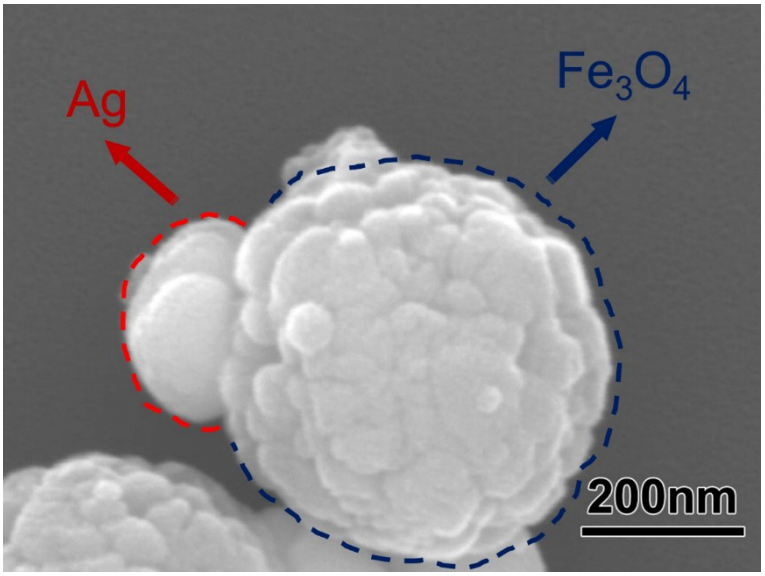

Fig. S3 Fe_3O_4-Ag Janus structure in SEM image.

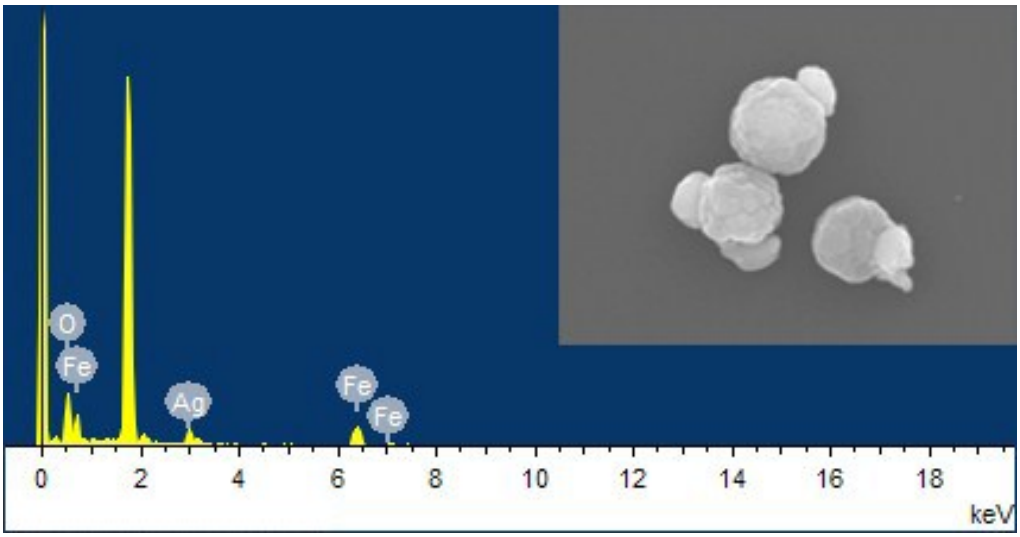

Fig. S4 EDX patterns of Fe_3O_4-Ag Janus 10.

Element	Weight Percentage	Atom Percentage
O K	22.87	48.51
Fe K	29.29	36.44
Ag L	47.84	15.05
Amounts	100.00	100.00

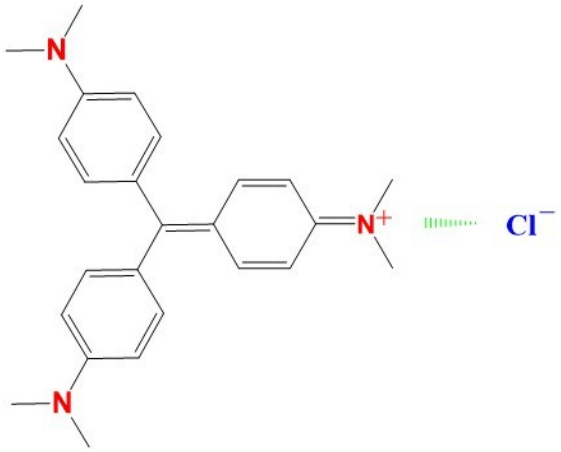

Fig. S5 The structural formula of CV molecule.

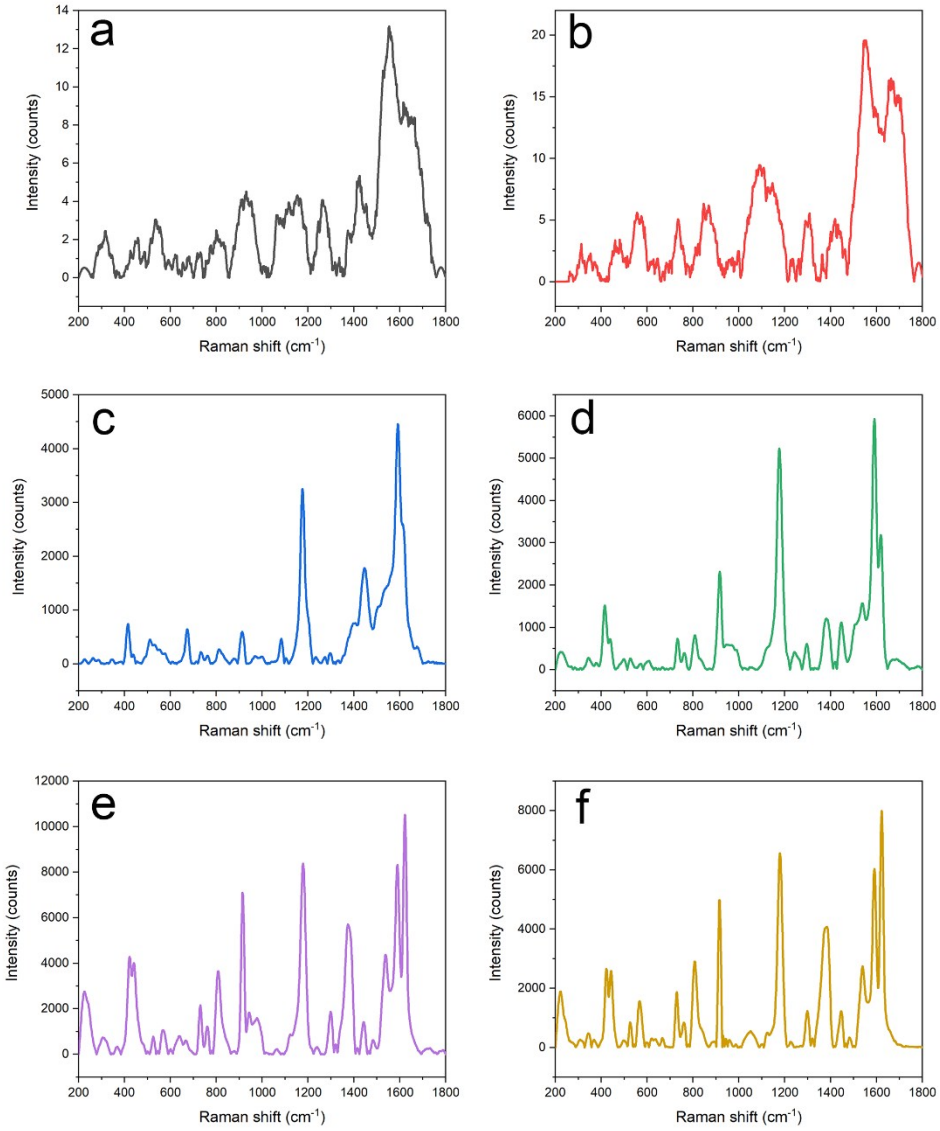

Fig. S6 SERS spectra for CV (a), Fe_3O_4 (b), Fe_3O_4-Ag Janus 1h (c), Fe_3O_4-Ag Janus 6h (d), Fe_3O_4-Ag Janus 10h (e), Fe_3O_4-Ag Janus 20h (f), respectively.

Tab. S1 Analysis of the vibrational assignment corresponding to the peak position of Raman

Wavenumbers/cm^{-1}	Vibrational assignment
420,440	Out-plane vibration of C-phenyl bend
526, 563, 914	Ring skeletal vibration of radical orientation
732, 760, 810	Out of plane vibration of ring C-H bend
1179	In plane vibration of ring C-H
1300	Phenyl ring C-C stretching
1375	N-phenyl stretching
1443	Phenyl ring C-C stretching + ring deformation
1539	Phenyl ring C-C stretching+ $=N^+$ Phenyl stretching
1589	Phenyl ring C-C stretching and bend
1622	Phenyl ring C-C stretching+ N-phenyl stretching

Tab. S2 The values of Raman intensity in the wavenumber of 1622cm^{-1} and calculated Raman EF of samples

Sample	Intensity (1622cm^{-1})	EF
CV	8	/
Fe_3O_4	12	1.79×10^6
Janus 1h	2047	3.04×10^8
Janus 6h	2926	4.35×10^8
Janus 10h	10527	1.57×10^9
Janus 20h	7994	1.19×10^9

Tab. S3 Comparison of SERS detection limit or EF with different reported references

SERS substrates	Probe molecules	Detection limit	EF
Ag-coated Fe_3O_4 microspheres[1]	4-ATP	1.0×10^{-12} M	/
Ag@Fe_3O_4 nanospheres[2]	R6G	1.0×10^{-11} M	/
Ag–Fe_3O_4 nanohybrids[3]	2-naphthalenethiol	/	1.14×10^{3}
Fe_3O_4–Ag Janus microspheres[4]	Thiram	1.0×10^{-7} M	/
Ag-Fe_3O_4 nanocomposites[5]	CV	1.0×10^{-9} M	/
Ag-decorated α-Fe_2O_3 NFs[6]	R6G	10^{-10} M	8.1×10^{6}
Ag/Fe_3O_4 nanocomposites[7]	R6G, MB	/	1.58×10^{8}, 1.46×10^{8}
Our sample (Fe_3O_4–Ag Janus)	CV	$> 10^{-13}$ M	1.57×10^{9}

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