Electronic Supplementary Material (ESI) for Analytical Methods.

Supporting information

for

Regulated Synthesis of Au NB-DT@Ag Bimetallic Core-Molecule-Shell Nanostructure for Reliable SERS Detection.

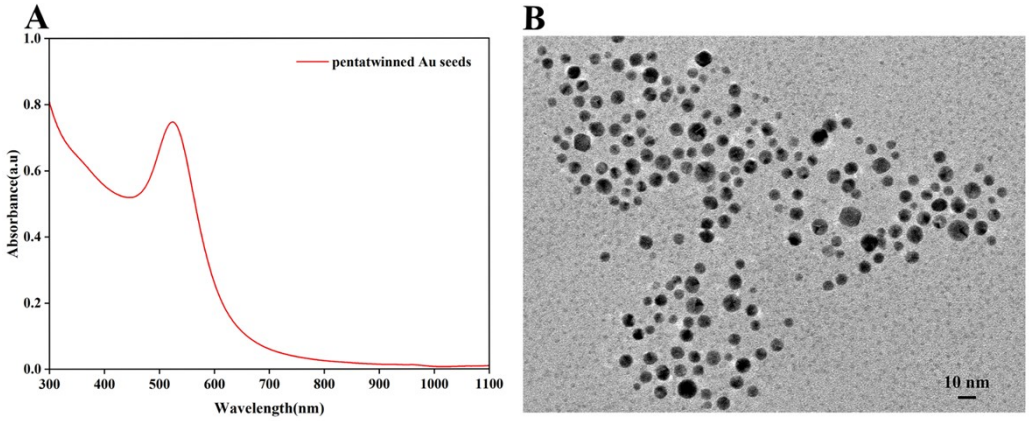

Figure S1. (A) UV-vis spectrum of Au seeds and (B) TEM image of Au seeds.

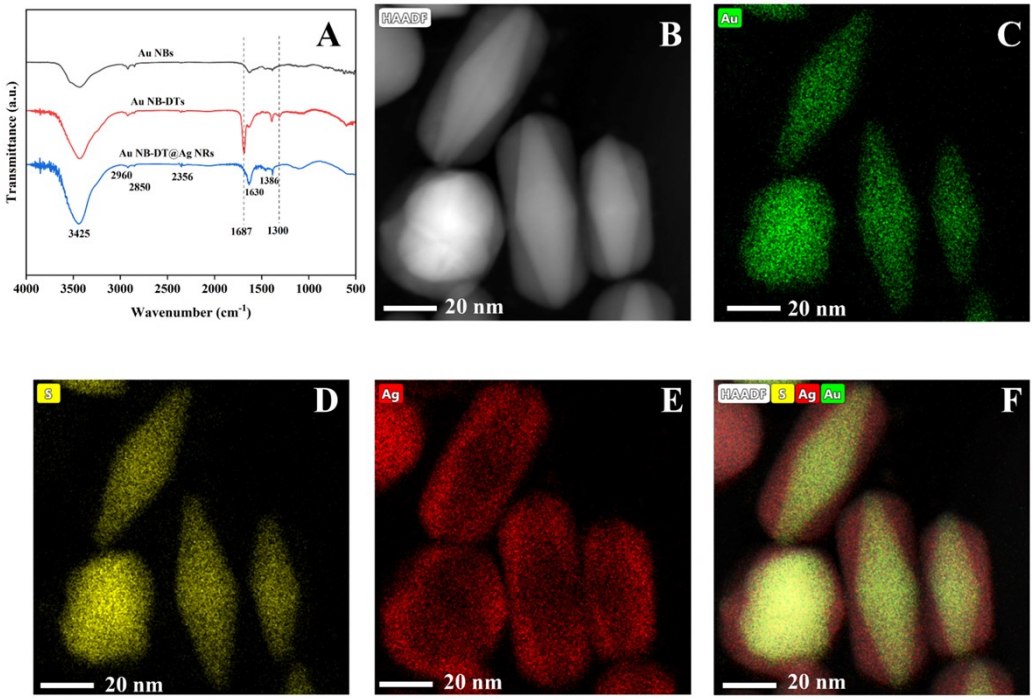

Figure S2. (A) FTIR spectra of Au NBs, Au NB-DTs and Au NB-DT@Ag NRs；(B-F)TEM images and elements mapping of Au NB-DT@Ag NRs；

Table S1：Comparison of enhancement factors of Au@Ag core-shell SERS base materials in recent years

Substrate	Analyte	AEF	Ref
Au @Fe_3O_4 NPs	MG	1.10×10^5	[1]
Ag/PDMS	MG	2.06×10^5	[2]
Au NP@GQDs	MG	1.70×10^3	[3]
ZnO NR@Au	MG	5.30×10^5	[4]
Fe_3O_4@Ag	MG	1.00×10^5	[5]
Au NB-DT@Ag NRs	MG	3.73×10^5	This work

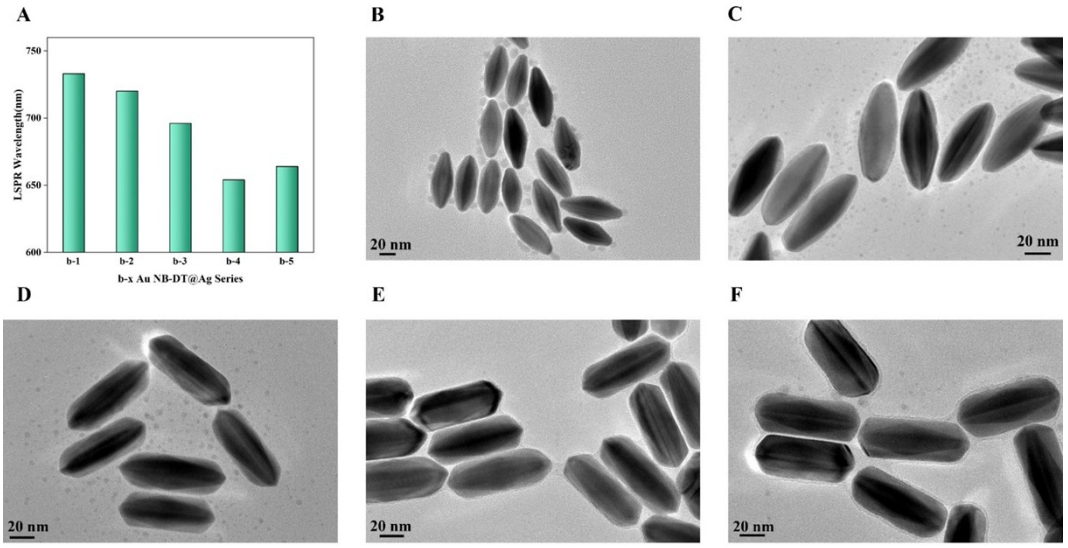

Figure S3： UV-vis spectra and TEM images of Au NB-DT@Ag NRs with controlled Ag shell thickness；(A) UV-vis spectra of b-1~b-5 Au NB-DT@Ag NRs； (B~F) TEM images of Au NB-DT@Ag NRs (B) b-1；(C) b-2 ； (D) b-3 ； (E) b-4 ； (F) b-5 ；

Table S2：Comparison of the Au NB-DT@Ag with recent reported SERS substrates used for the analysis of MG

SERS Substrate	Analyte	LOD (mol/L)	AEF	Ref
Ag-coated PDMS	MG	1.0×10^{-7}	2.06×10^{5}	[2]
Au@Ag NCs	MG	5.0×10^{-9}	-	[6]
Au NP/HMM	MG	1.0×10^{-8}	1.56×10^{5}	[7]
Au Nanowires	MG	1.0×10^{-6}	-	[8]
Au NPs/GDY/CC	MG	1.0×10^{-9}	5.4×10^{5}	[9]
Au-coated ZnO NRs	MG	5.0×10^{-9}	5.3×10^{5}	[10]
Fe_3O_4@Au MCS	MG	1.0×10^{-7}	1.10×10^{5}	[11]
Au NB-DT@Ag NRs	MG	5.0×10^{-9}	3.73×10^{5}	This work

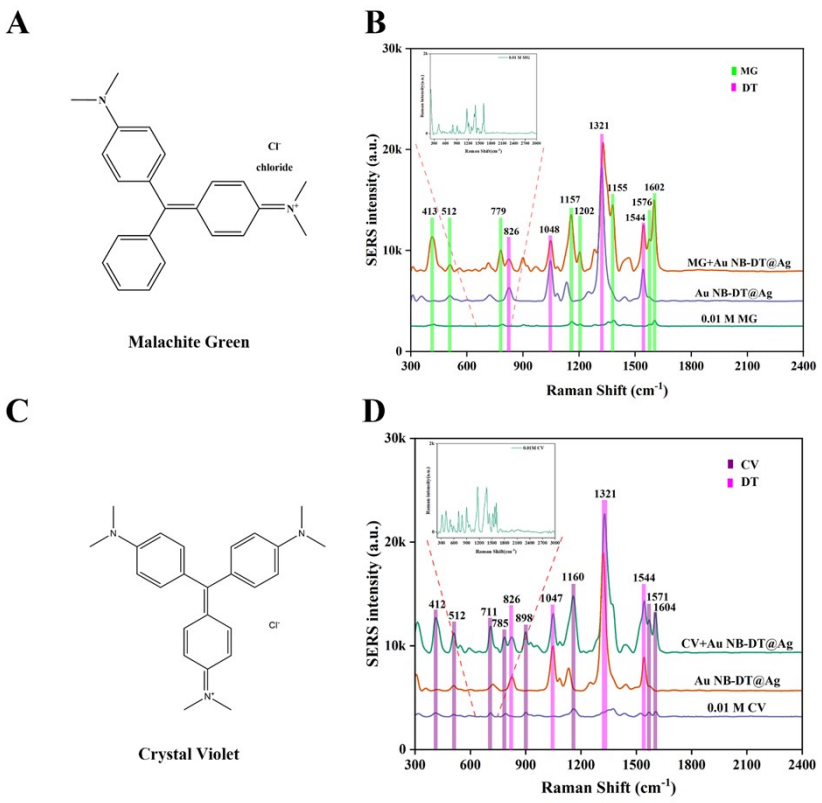

Figure S4. (A) Molecule structures of MG; (B) Raman spectra of Au NB-DT@Ag NRs and Au NB-DT@Ag NRs+MG and 0.01M MG solution, insected the Raman spectrum of MG (C) Molecule structures of CV; (D) Raman spectra of Au NB-DT@Ag NRs and Au NB-DT@Ag NRs+CV and 0.01M CV solution, insected the Raman spectrum of CV.

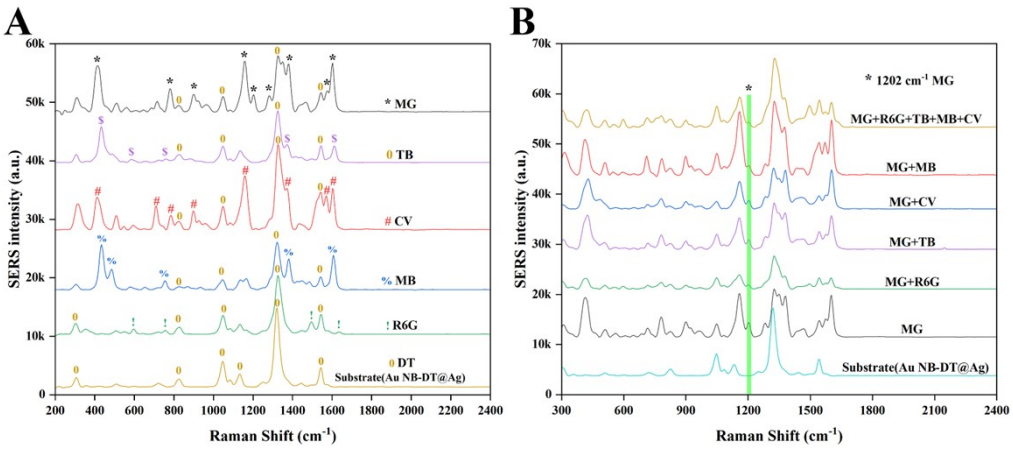

Figure S5. (A) SERS spectra of MG, TB, CV, MB and R6G with the substrate (Au NB-DT@Ag). (B) SERS spectra of MG+MB, MG+CV, MG+TB, MG+R6G mixtures, MG with the substrate and the blank substate.

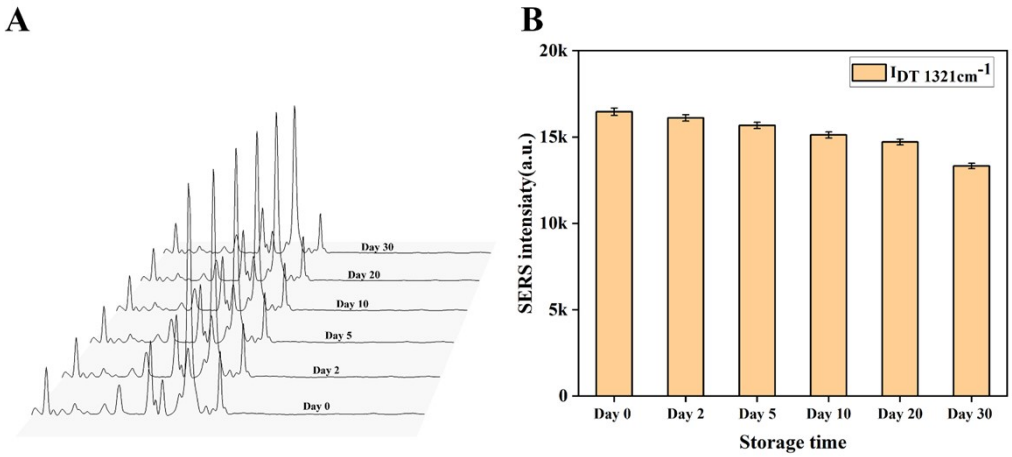

Figure S6：(A) SERS intensity of DT at 1321 cm^{-1} under different storage time；(B) Histogram of SERS intensity of 1321 cm^{-1} of different storage time.

Table S3 Assignments of Raman and SERS peaks of DT, MG and CV on the substrate

Molecule	Raman peak position(cm^{-1})	SERS peak position(cm^{-1})	Assignment	
DT	1062	1047	CH_3 rocking	[12]
	1150	1131	C-N stretching; C-N bending	
	1333	1326	Symmetric NO_2 stretching	
	1556	1544	Aromatic ring stretching	
MG	424	413	C-phenyl out-of-plane	[2, 3]
	518	512	bending	
	780	779	C-H out-of-plane bending	
	903	898	C-H out-of-plane bending	
	1160	1157	C-H in-plane bending in ring	
	1206	1202	C-H in-plane bending in ring	
	1579	1576	N-phenyl stretching bending	
	1602	1602	Ring C-C stretching vibration	
CV	412	412	C-N-C bending	[13]
	517	512	C-N-C bending	
	711	711	C-N-C symmetric stretching	
	790	785	Ring C-H bending	
	903	898	Phenyl ring breathing mode	
	1160	1160	C-phenyl C-H in-plane stretching	
	1575	1572	Ring C-C stretching	
	1606	1604	Ring C-C stretching	

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