Supporting information

Floating Ag-NPs@Cu-NWs bundles fabricated on cooper mesh for highly sensitive SERS detection of uric acid in Pretreatment-free urine

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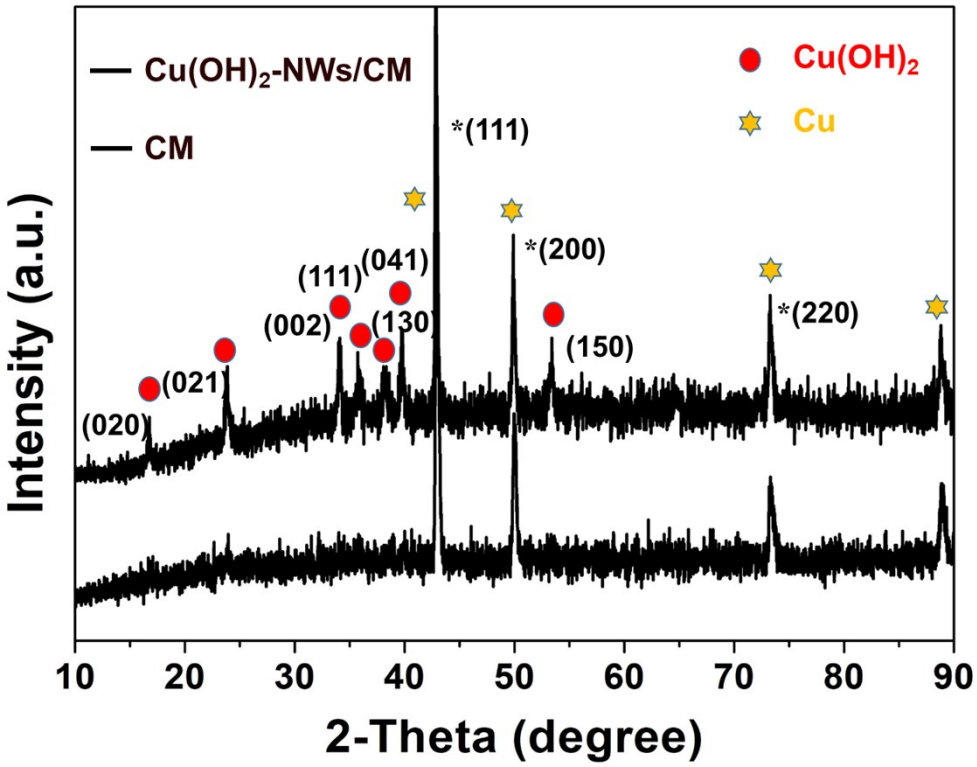

Fig. S1 XRD patterns of CM and $Cu(OH)_2$-NWs/CM substrate. The peaks marked with asterisks are from the CM, while the other peaks correspond to orthorhombic $Cu(OH)_2$ nanocrystals.

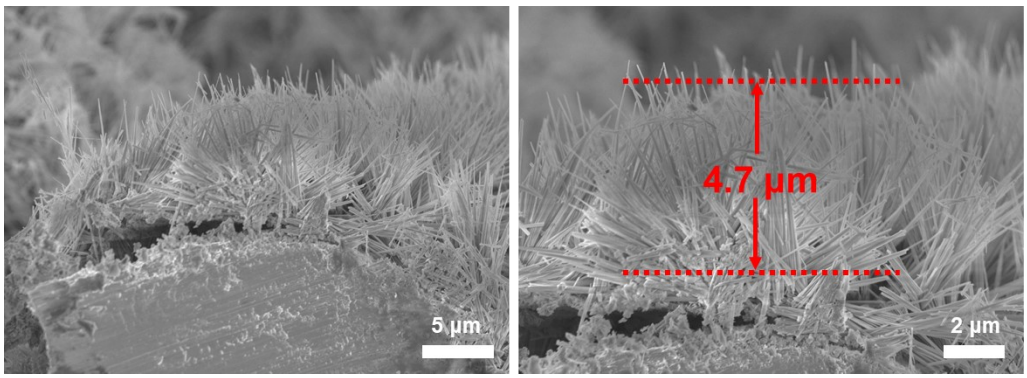

Fig. S2 Cross-section SEM images of the $Cu(OH)_2$-NWs on CM.

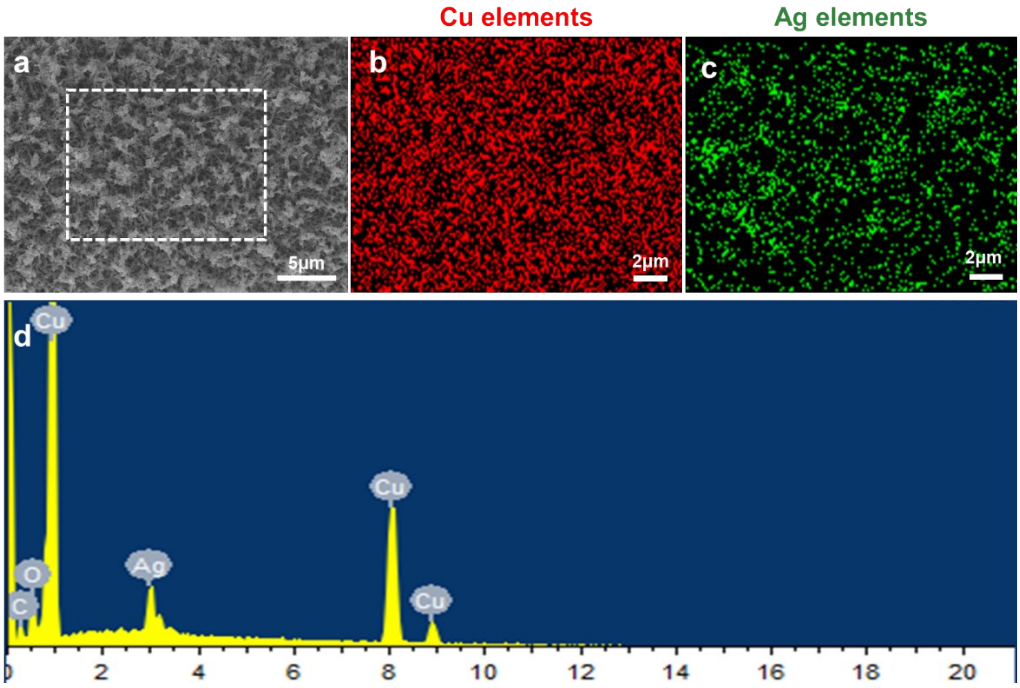

Fig. S3 SEM images of the Ag-NPs@Cu-NWs bundles/CM substrate and the corresponding elemental mappings of Cu, Ag.

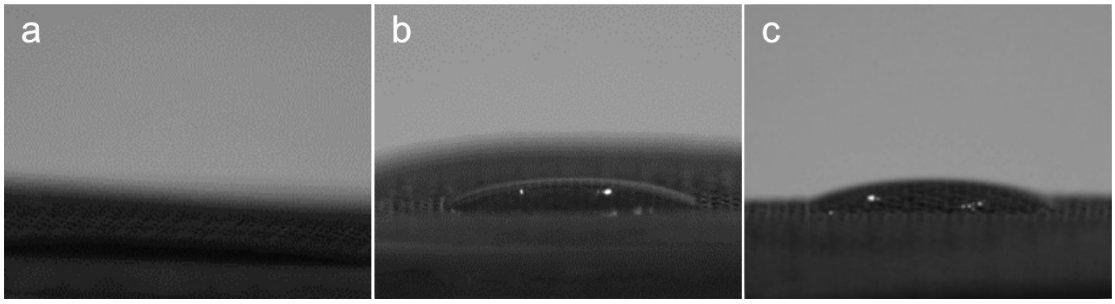

Fig. S4 Photograph of different CA between different solutions and substrates. (a) CTAB solution, (b) 2-Propanol, (c) DI water.

	r_{la}/Mn m^{-1} at 25°C	θ_0/°	$\cos^2\theta_0$	$r_{la}\cos^2\theta_0$
CTAB solution	38	~0	1	38
2-Propanol	21	33.1	0.70	15
DI water	73	31.2	0.73	53

Table S1 Surface tension (r_{la}), and apparent contact angle (θ_0) values for $Cu(OH)_2$-NWs arrays on CM dried in CTAB solution, 2-Propanol and DI water.

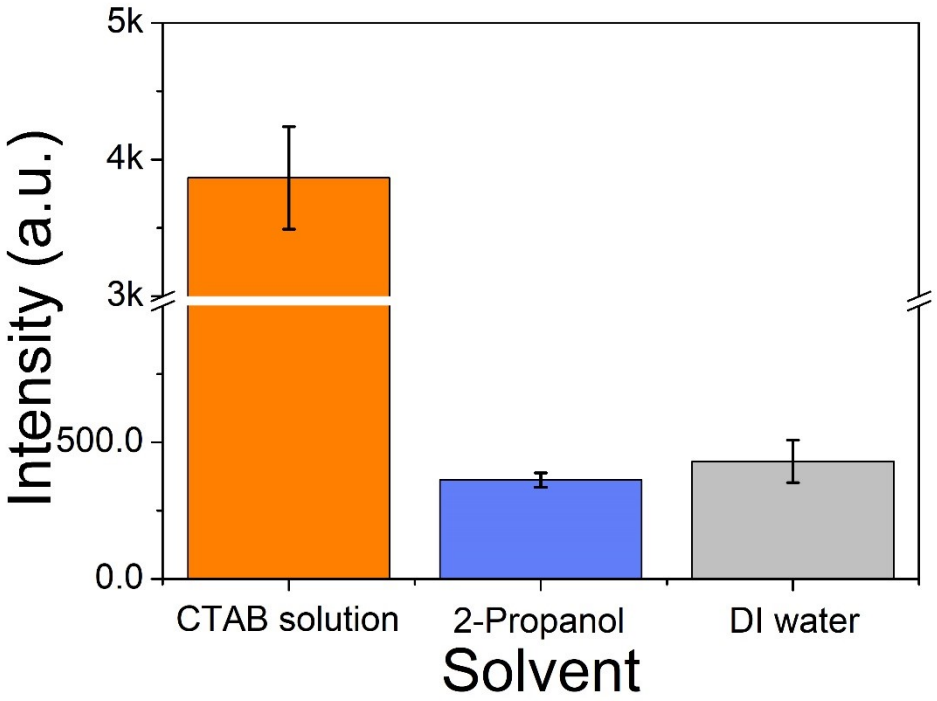

Fig. S5 Comparison of substrate detection effects (1 nM CV, Raman peak at 1617 cm^{-1}) induced by CTAB solution, 2-Propanol and DI water.

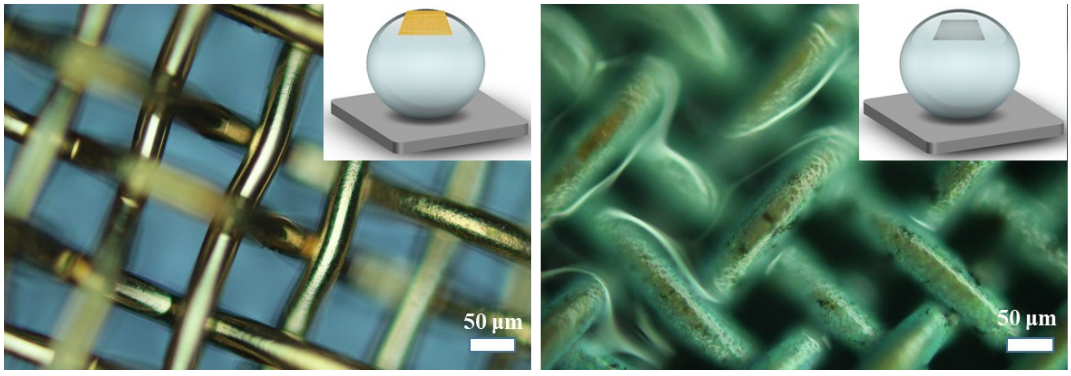

Fig. S6 Photograph of bare copper mesh and Ag-NPs@Cu-NWs bundles/CM substrate floating on water under light microscope, the illustration represents the different wetting states of the surfaces.

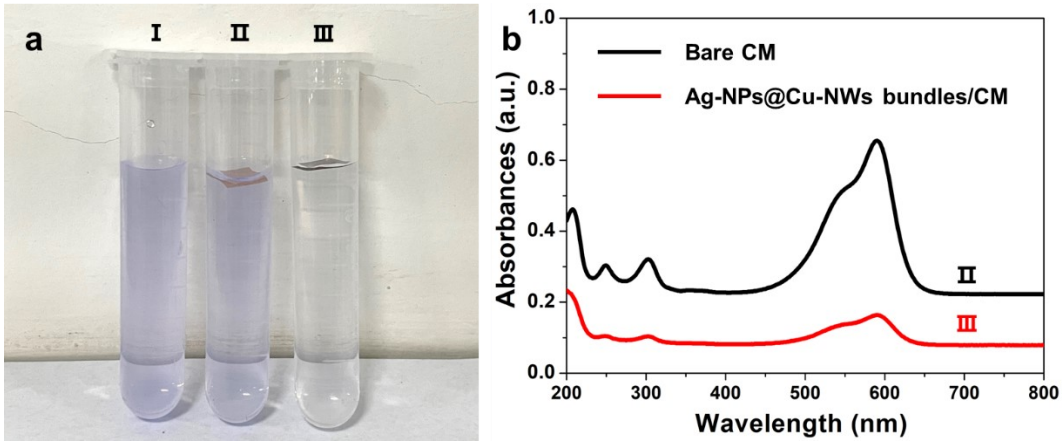

Fig. S7 Typical pictures (a) of CM (II) and substrate (III) after immersing in the identical concentration of 10 μM CV (I) for 2 h. It reveals that the CV molecules were easily absorbed by a piece of prepared SERS substrate.

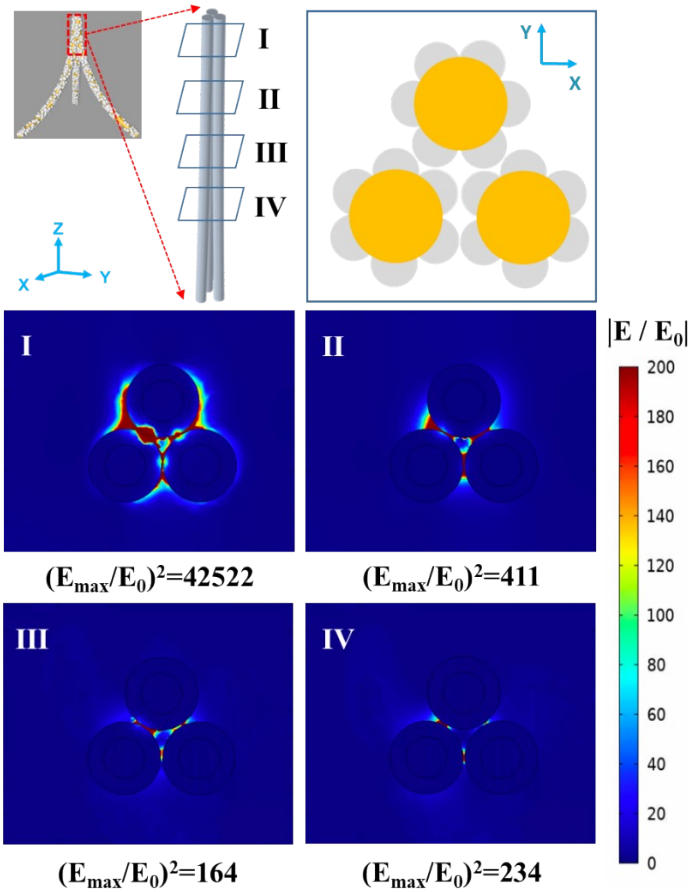

Fig. S8 In the FDTD simulation, the Ag-NPs@Cu-NWs bundles model used to simulate the electric field distribution at 4 different locations.

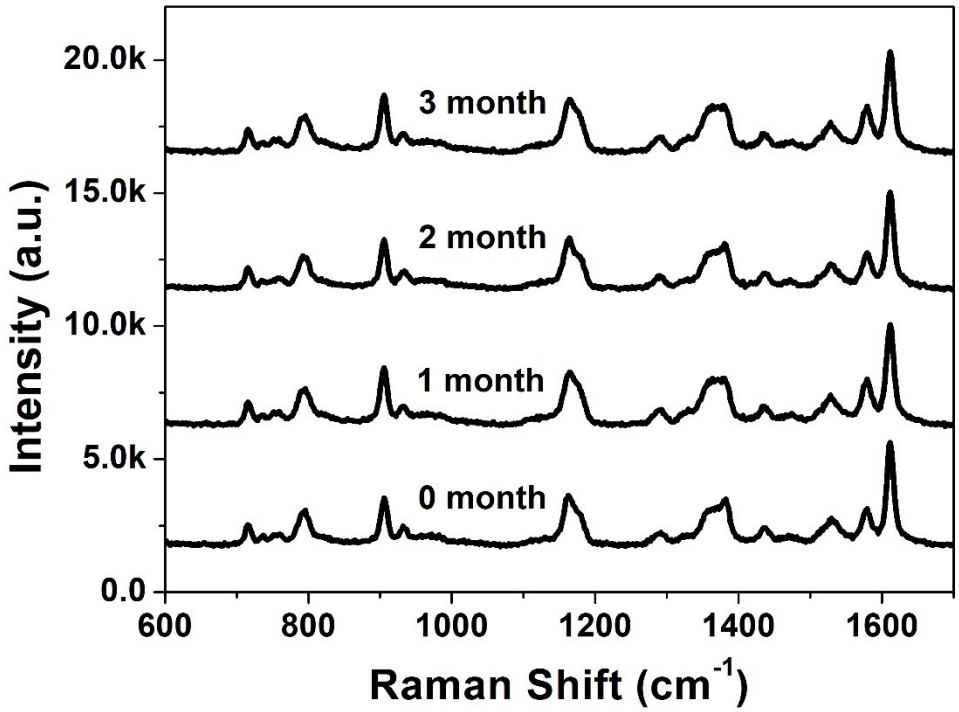

Fig. S9 Stability characterization: the SERS detection performance (1 nM, CV) of the substrate remained basically unchanged after one month, two months and three months.

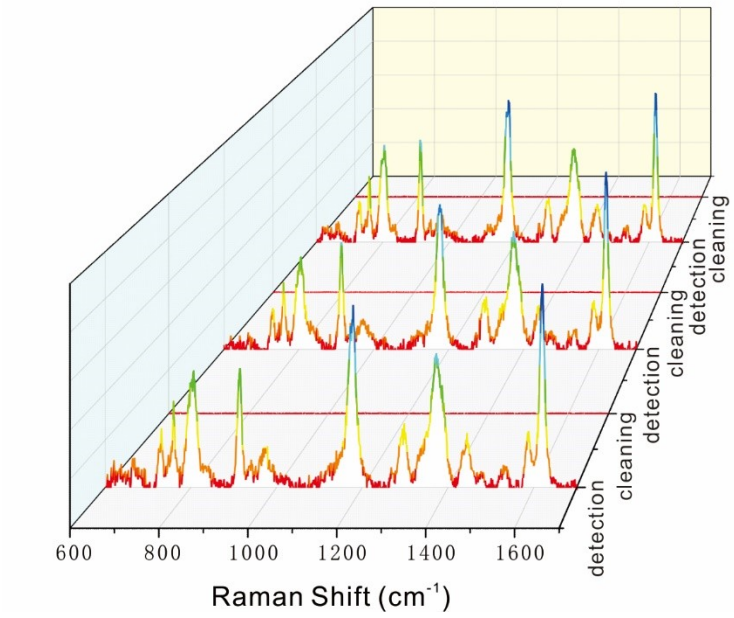

Fig. S10 SERS spectra of 10 nM CV after three cycles.

Raman Shift (cm^{-1})	SERS peak (cm^{-1})	Tentative band assignment
380		
	508 (vwsh)	C-N-C ring vibration

	534 (vw)	
626 (w)	640 (S)	Skeletal ring vibration
705 (w)	730 (w)	N-H bending
783 (m)	812 (m)	Ring vibration
884 (w)	889 (m)	N-H bending
998 (s)	1017 (w)	Ring vibration
1033 (vs)		
1122 (s)	1134 (vs)	C-N
1233 (s)	1206 (m)	N-C-C stretching and bending
1289 (s)	1266 (w)	
1355 (w)	1369 (s)	C-O
	1515 (vwsh)	Asymmetric deformation NH_3
1406 (vs)		
1499 (s)		
1596 (m)	1554 (m)	C-N
1679 (vs)	1684 (s)	

Table S2 Band assignments for normal Raman (solid) and tentative SERS band assignments for uric acid.

Component	SERS intensity at 640cm^{-1} (counts)	Recovery (%)
None	2293(±172)	
Urea	2132(±145)	93.0%
Ascorbic acid	2037(±103)	88.4%
Urea + Ascorbic acid	2183(±211)	95.2%

Table S3 The SERS intensities and corresponding recoveries of different component solutions, the concentration of each substance is 10 μM.