Supporting Information

Cyclodextrin-decorated Plasmonic Gold Nanosatellite Substrate for Selective Detection of Bipyridylium Pesticides

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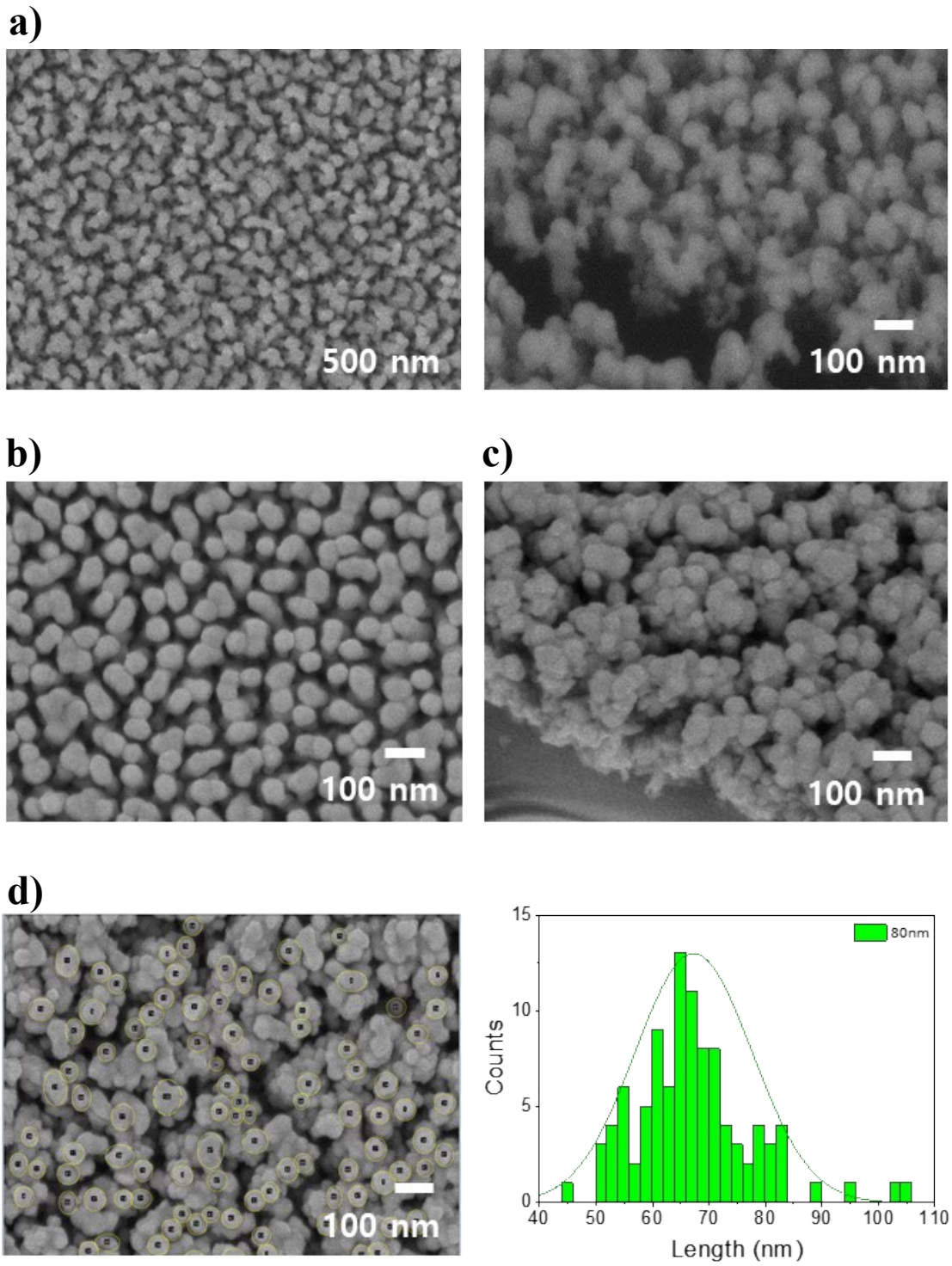


Figure S1. SEM images of (a) PET nano-protrusions (top view: left, tilting view: right), (b) Au nanopillars, (c) AuNSL at tilting view and (d) particle analysis (back points are particles counted for the analysis).

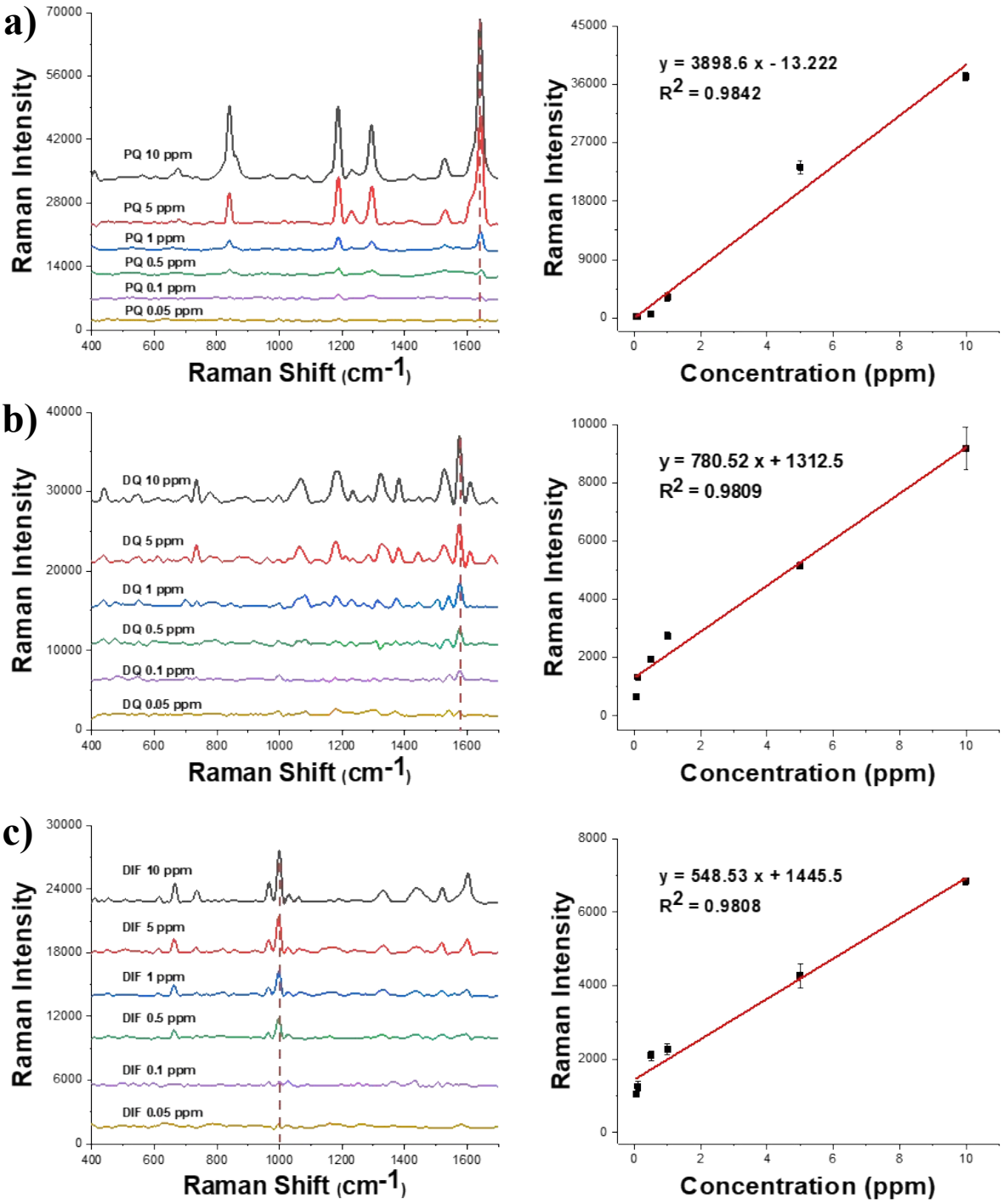


Figure S2. Raman spectra of (a) PQ, (b) DQ and (c) DIF on bare AuNSL substrate and their standard curve.

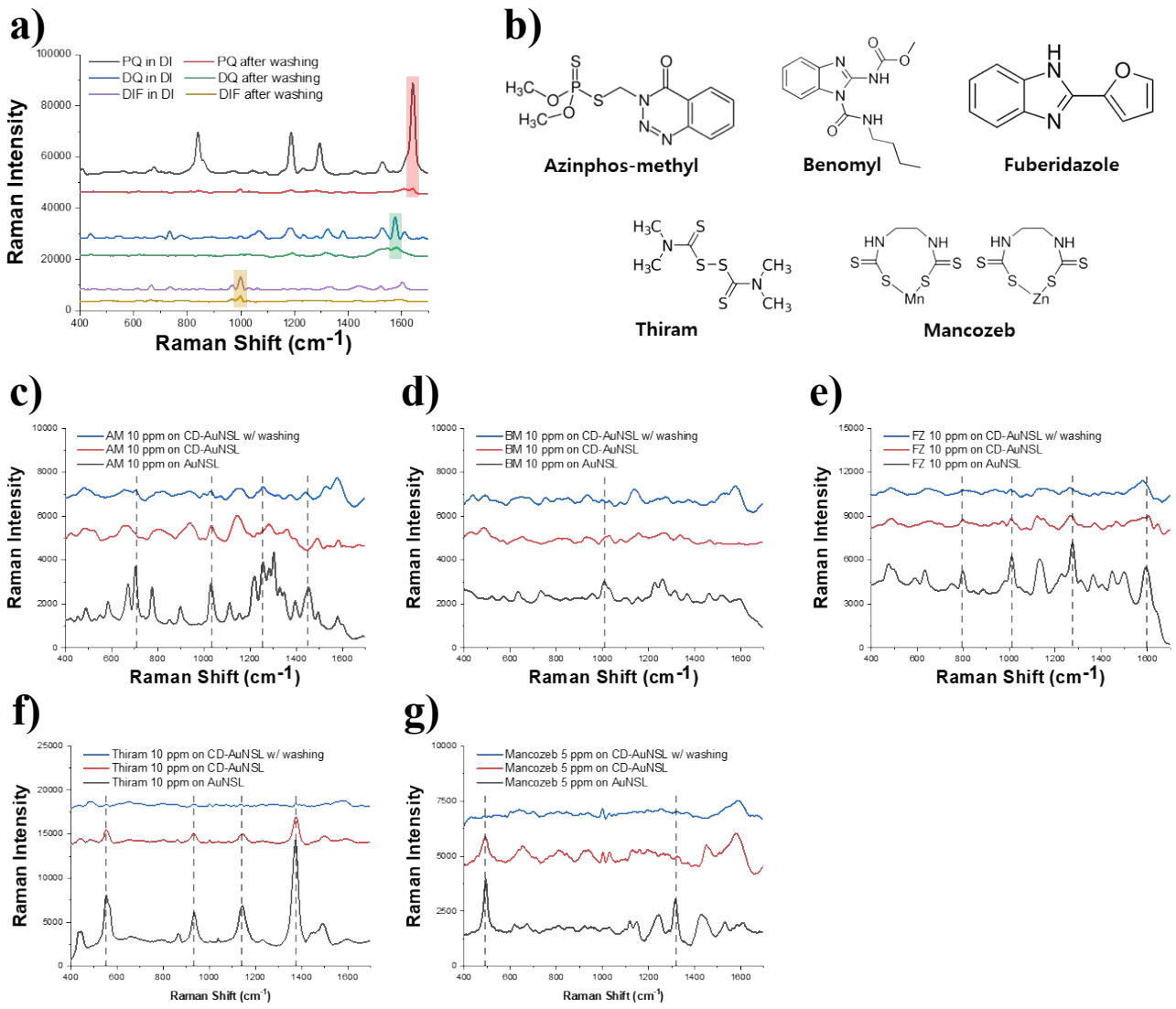
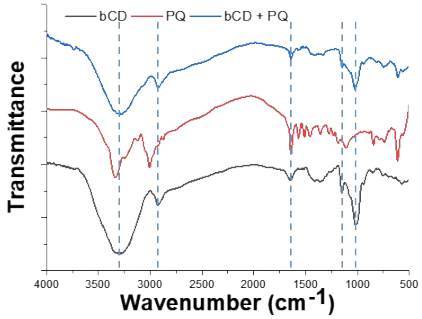
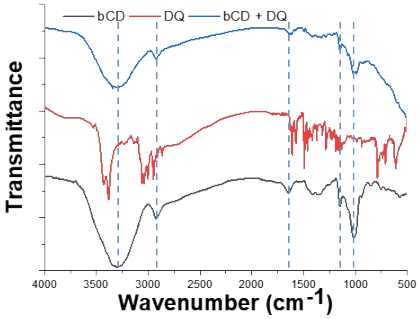


Figure S3. (a) Raman spectra of PQ, DQ, and DIF on AuNSL w/ and w/o washing (b) Chemical structures of control pesticides (c) Raman spectra of Azinphos-methyl, (d) Benomyl, (e) Fuberidazole (f) Thiram and (g) Mancozeb on AuNSL and CD-AuNSL with and without washing.

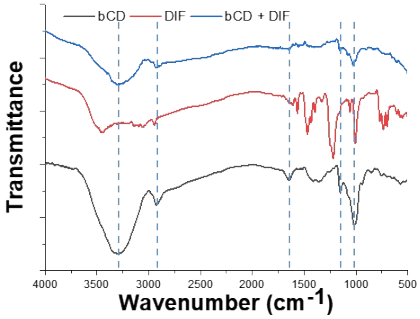
a)



b)



c)



d)

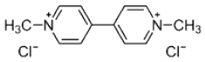
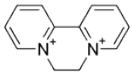
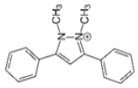
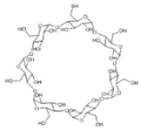
Pesticides	Wavenumber (cm^{-1})	Assigned vibrations
Paraquat 	3200-2800	C-H stretching
	1700-1100	Ring breathing, C-C stretching, in plane C-H deformation
	1644	C-N/C=N stretching
	1359, 1278, 850	Benzene ring, C-H
	1100-600	C-C in plane bending, C-C out of plane bending, out of plane C-H deformation
Diquat 	3432, 3390	O-H
	3049-3006, 2949	C-H stretch (aromatic and aliphatic)
	1618	C=N stretching
	1572,1526	C-C
	1319, 1283	C-N stretch aromatic amines
	1034	C-H in-plane bending (Aromatic)
	939	=C-H in-plane bending
	793	C-H bending (out-of-plane)
	643	C-H bending (out-of-plane) Aromatic ring
Difenzoquat 	1565	C=C stretching
	1435	Heterocyclic nitrogen stretching
	1394	CH_3 bending
	1210-1240	C-N stretching
SH-CD 	3265	O-H stretching
	2910	CH_2 stretching
	1646	H-O-H bending
	1151	C-C stretching
	1021	C-O-C stretching

Figure S4. FT-IR spectra of (a) PQ, PQ and CD mixture (b) DQ, DQ and CD mixture and (c) DIF, DIF and CD mixture, (d) IR peak assignment for PQ, DQ, DIF and SH-CD.

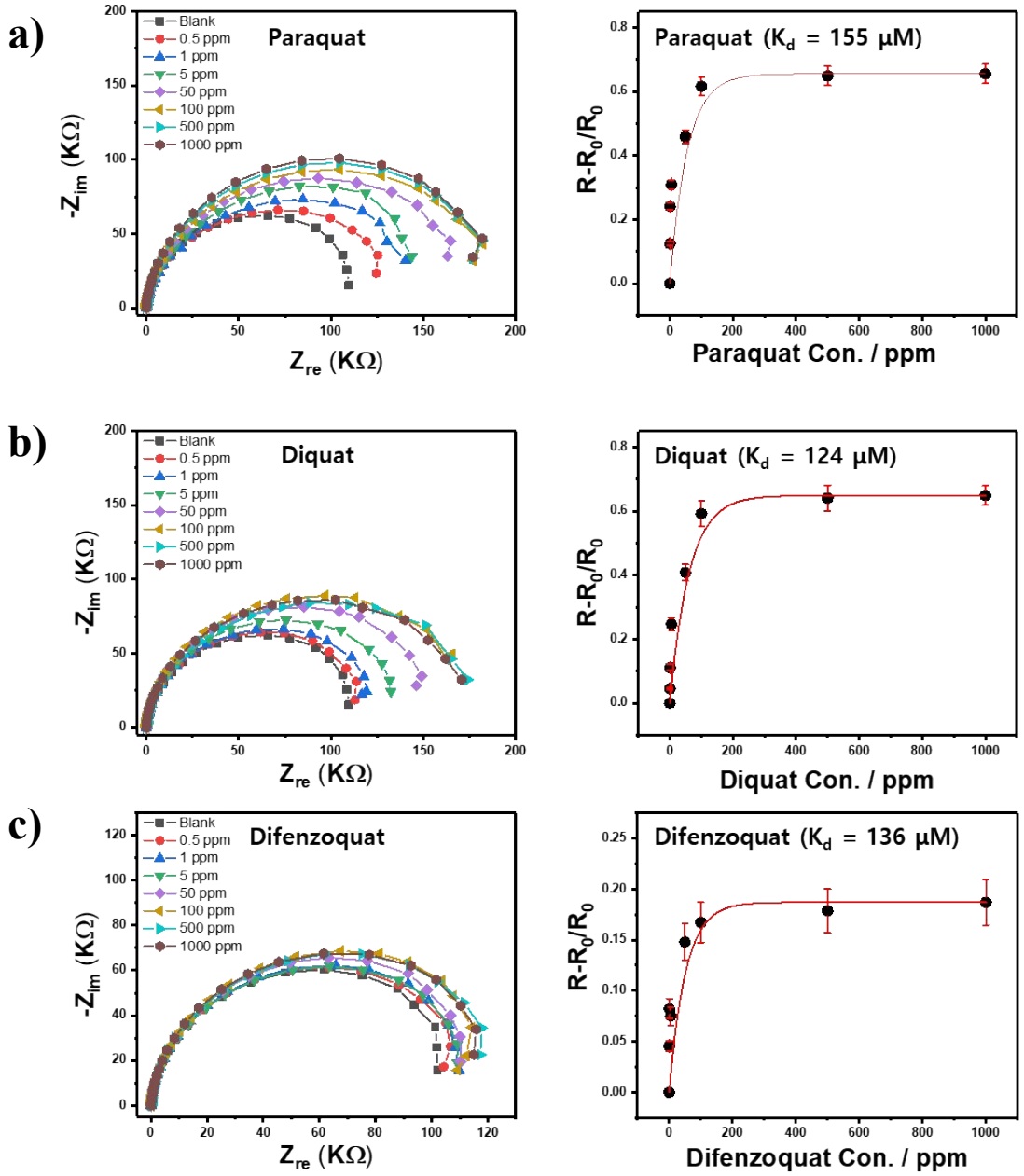


Figure S5. Impedance spectra of CD-coated Au electrode at various concentration of (a) PQ, (b) DQ, and (c) DIF.

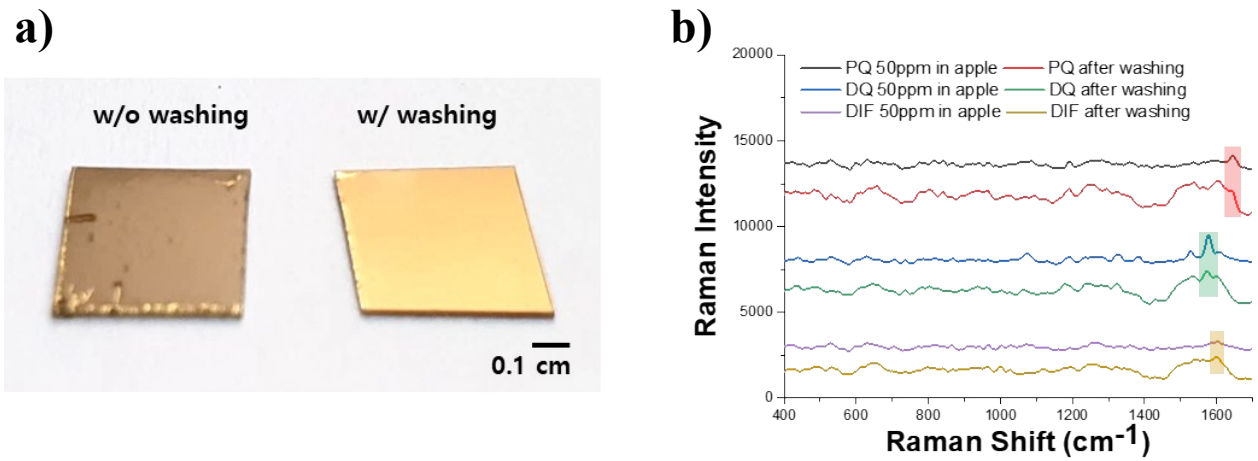


Figure. S6 (a) Photograph of CD-AuNSL dropped with ground-apple solution with and without washing (b) Raman spectra of PQ, DQ, and DIF (50 ppm for each) on bare AuNSL with and without washing.

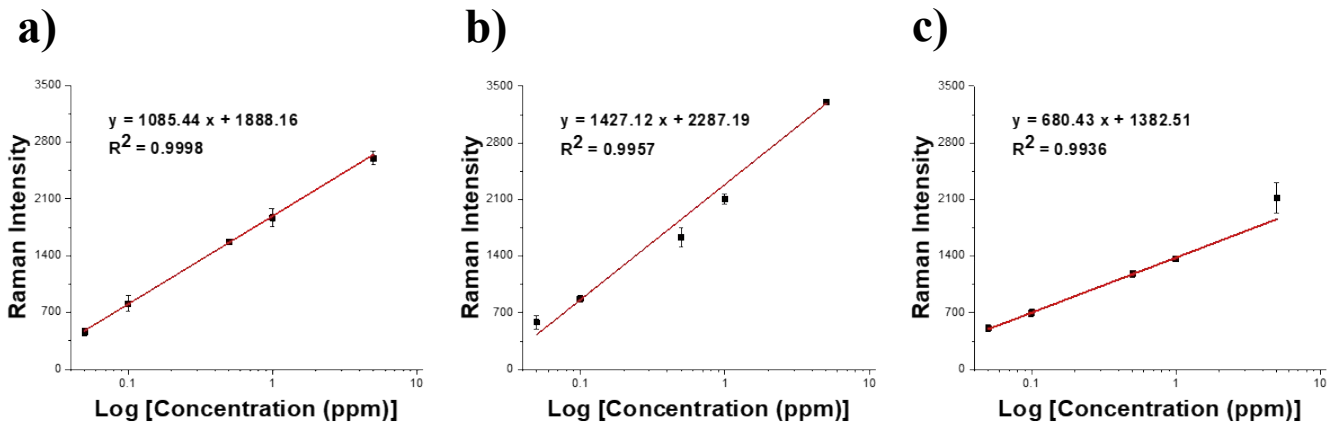


Figure S7. Standard curve of (a) PQ, (b) DQ and (c) DIF spiked in the ground-apple solution in the range of 5 ppm - 0.05 ppm on CD-AuNSL after washing.

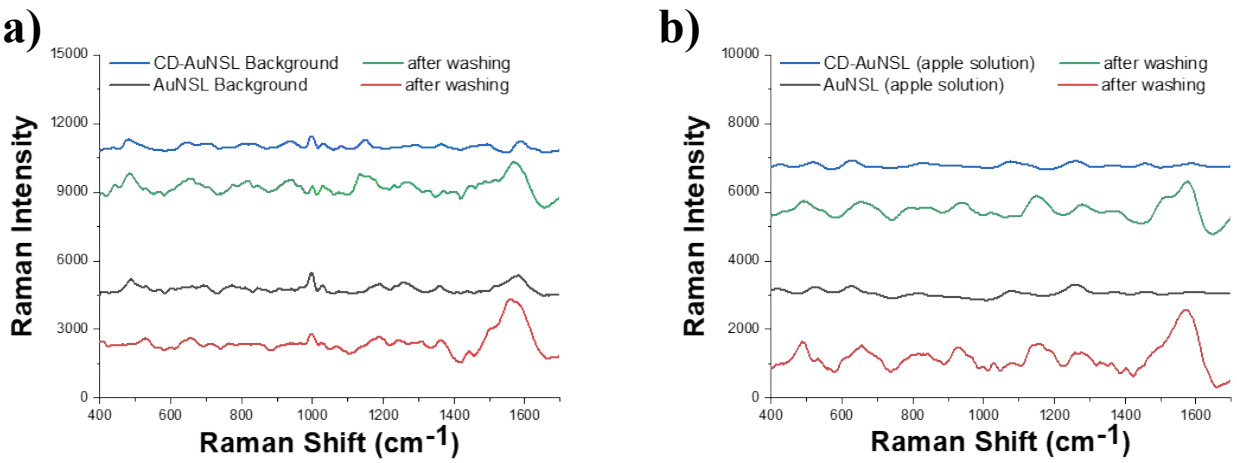


Figure S8. (a) Background Raman spectra of CD-AuNSL and bare AuNSL with and without washing (b) Raman spectra of ground-apple solution on CD-AuNSL and bare AuNSL with and without washing.