

Supplemental Information for

Surface-enhanced Raman scattering enhancement using a hybrid gold nanoparticles@carbon nanodots substrate for herbicide detection

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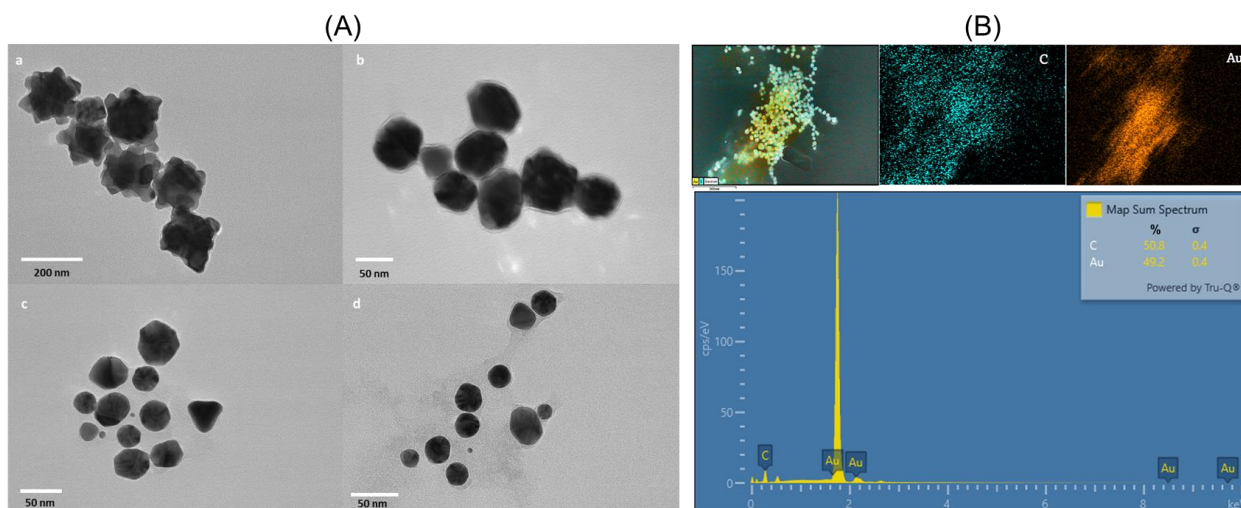


Figure S1. (A). TEM images of AuNPs@CNDs at different HAuCl₄ volume from 70-190 μ L (HAuCl₄/CNDs mass ratio of 5.2, 3.3, 2.4, and 1.9 from (a) to (d), respectively). (B). SEM image and SEM-EDS giving the element mapping of the AuNPs@CNDs.

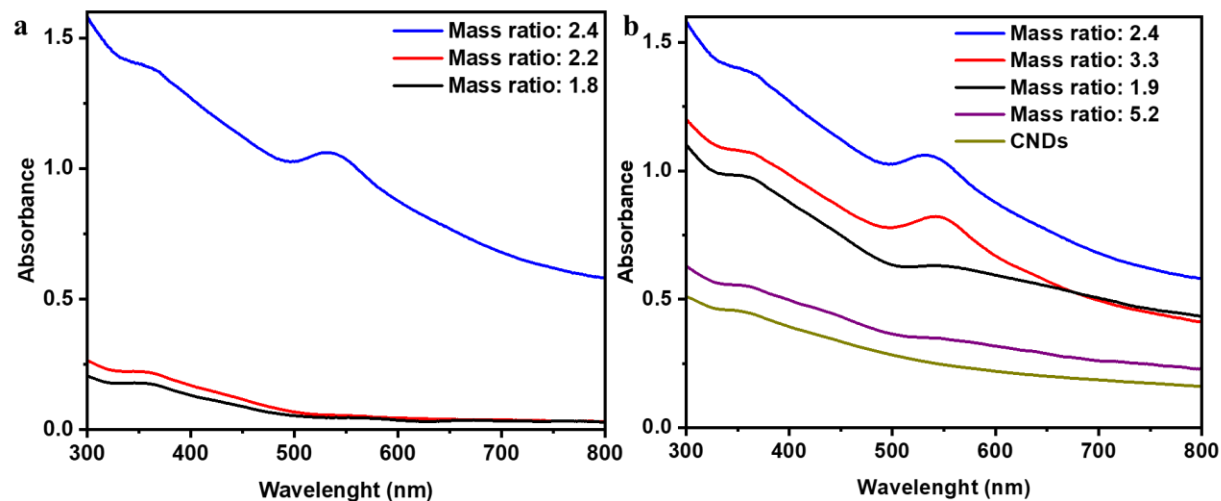


Figure S2. UV-vis spectra of AuNPs@CNDs (concentration of CNDs was 0.09, 0.11, and 0.12 mg mL⁻¹ while concentration of HAuCl₄ was 1 mg mL⁻¹) (a). UV-vis spectra of AuNPs@CNDs with different mass ratio of HAuCl₄/CNDs from 5.2-1.9 while the volume of HAuCl₄ was 70, 110, 150, and 190 μ L and concentration of CNDs was 0.12 mg mL⁻¹ (b).

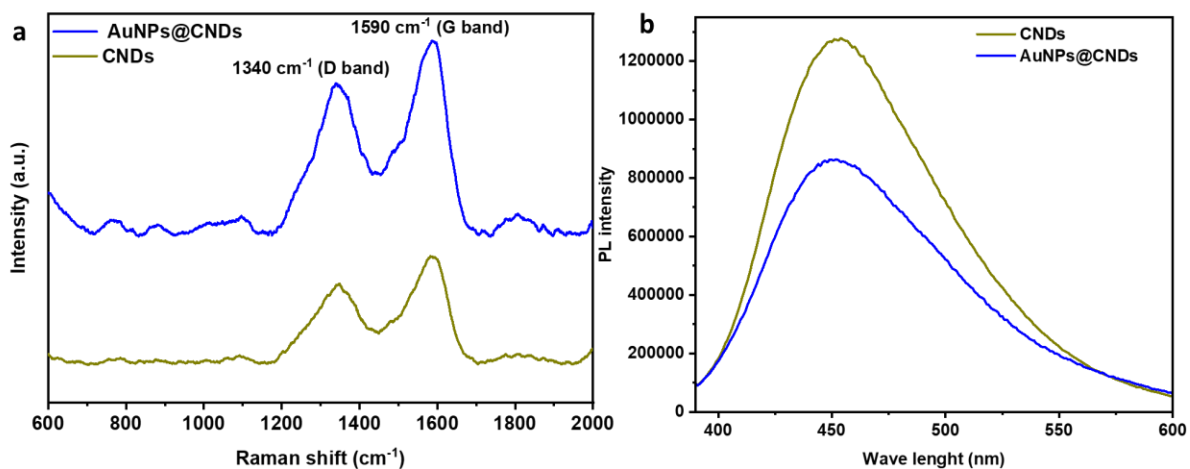


Figure S3. Raman spectra of AuNPs@CNDs and CNDs (a). PL spectra of AuNPs@CNDs and CNDs aqueous suspension excited at 380 nm (b).

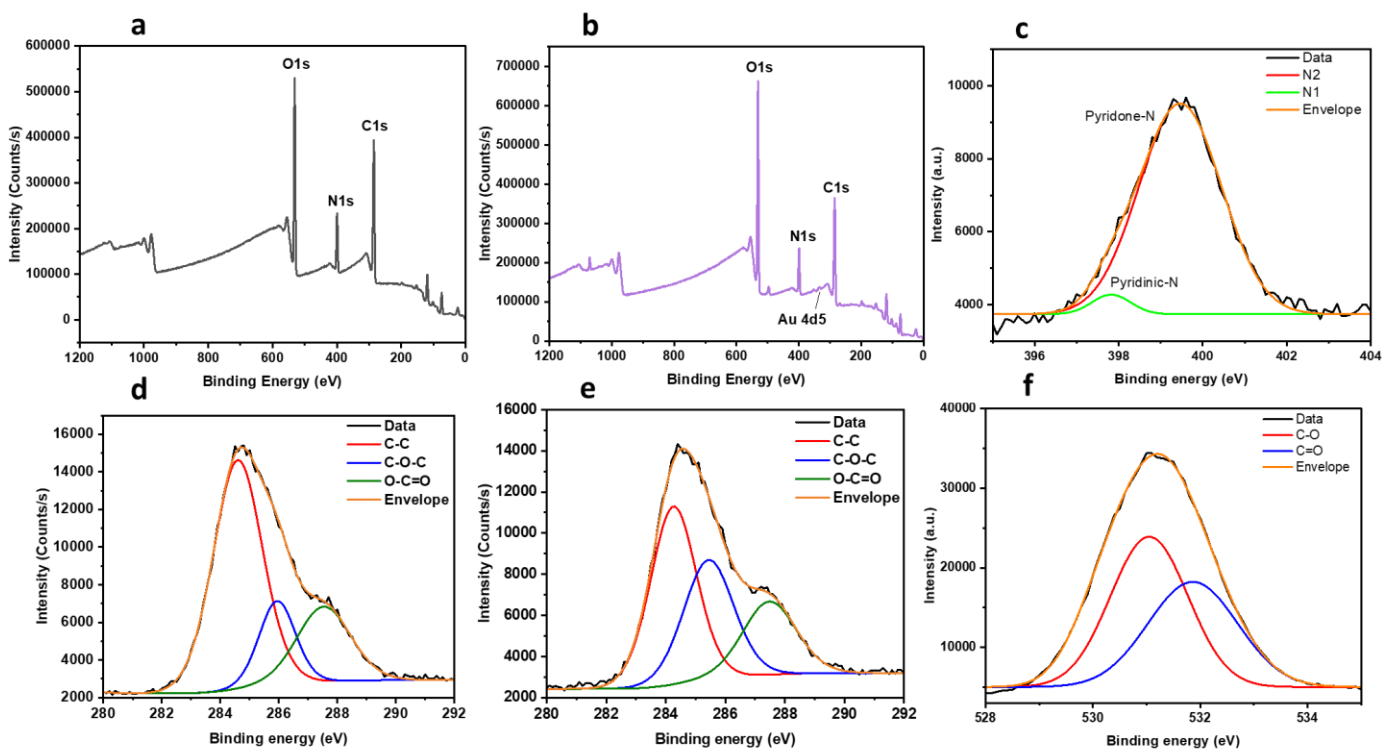


Figure S4. Full-scan XPS spectra of CNDs (a) and AuNPs@CNDs (b); The N1s XPS spectra of AuNPs@CNDs (c); The C1s XPS spectra of CNDs (d) and AuNPs@CNDs (e); The O1s XPS spectra of AuNPs@CNDs (f).

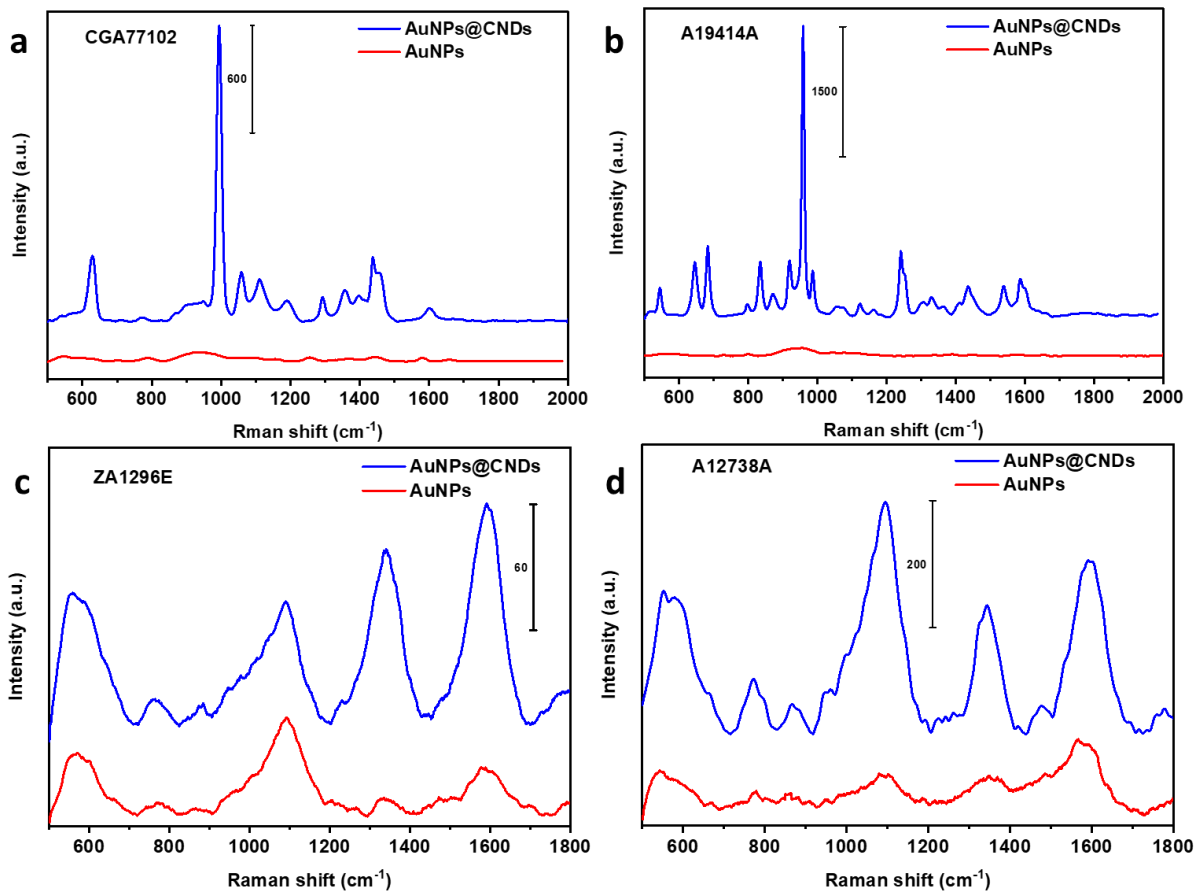


Figure S5. SERS spectra of (a) 10^{-3} M CGA77102, (b) A19414A, (c) 10^{-3} M ZA1296E, and (d) 10^{-3} M A12738A using AuNPs@CNDs and AuNPs, respectively, which show the largely increased Raman signal using AuNPs@CNDs as probes in sensing.

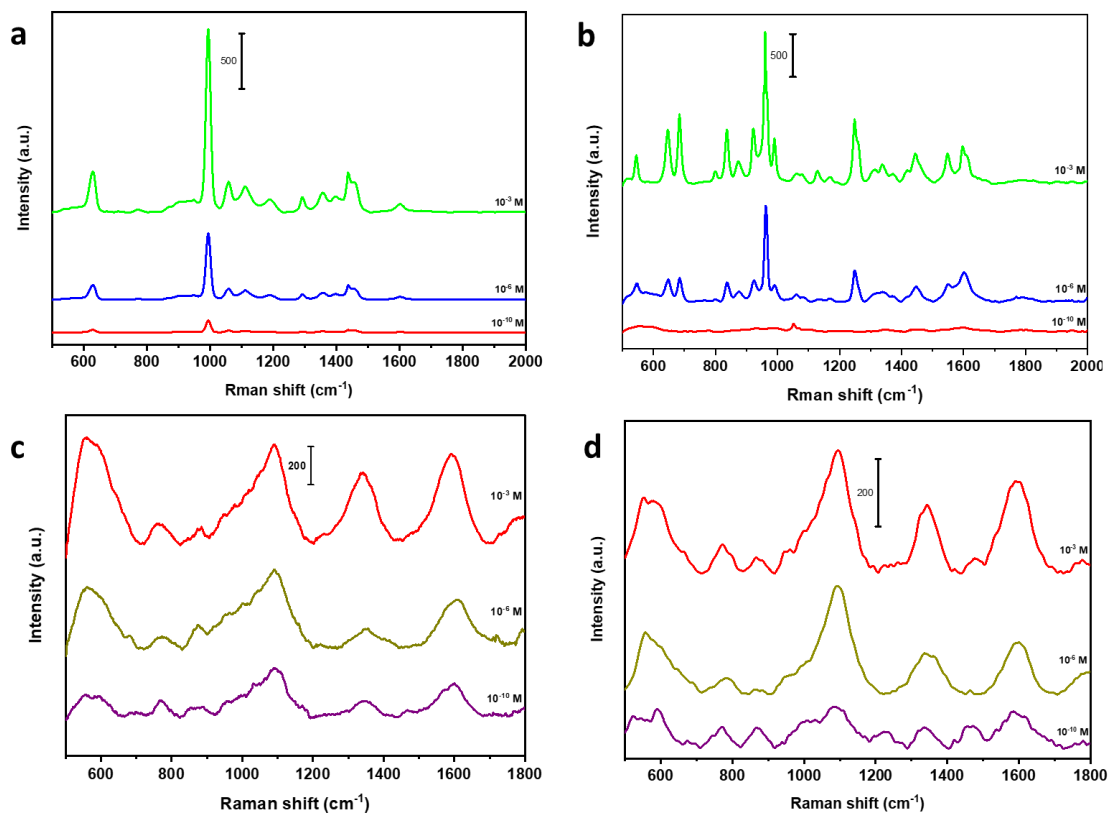


Figure S6. SERS spectra of spiked samples at three different concentrations 10^{-10} , 10^{-6} and 10^{-3} M for (a) CGA77102, (b) A19414A, (c) ZA1296E, and (d) A12738A using AuNPs@CNDs for SERS detection.