**Supplementary Information for**

# Highly sensitive cobalt encapsulated in bamboo-like N-doped carbon nanotube for electroanalysis of Pb(II): Enhancement based on adsorption and catalysis

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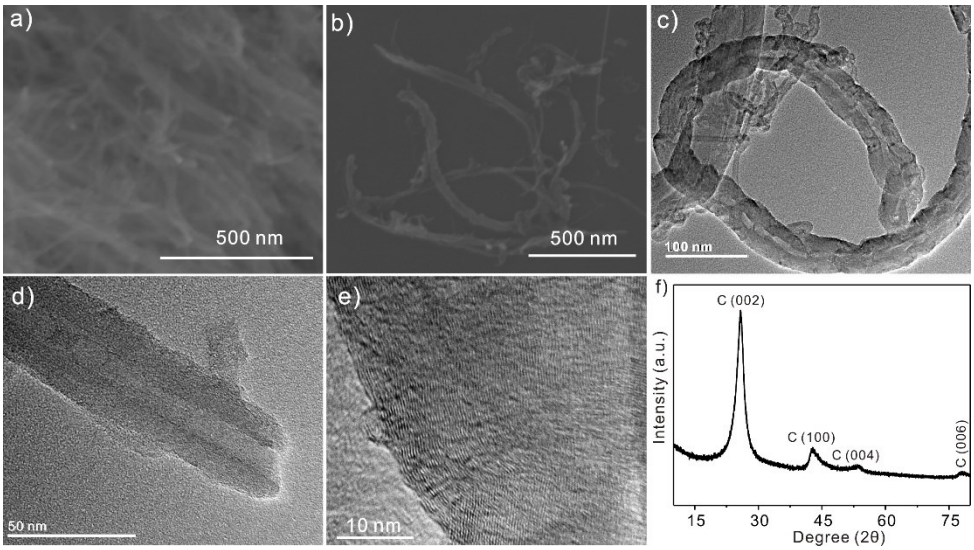


**Fig. S1.** (a, b) SEM image, (c, d) TEM image, (e) HRTEM image and (f) XRD pattern of commercially purchased pure CNTs.

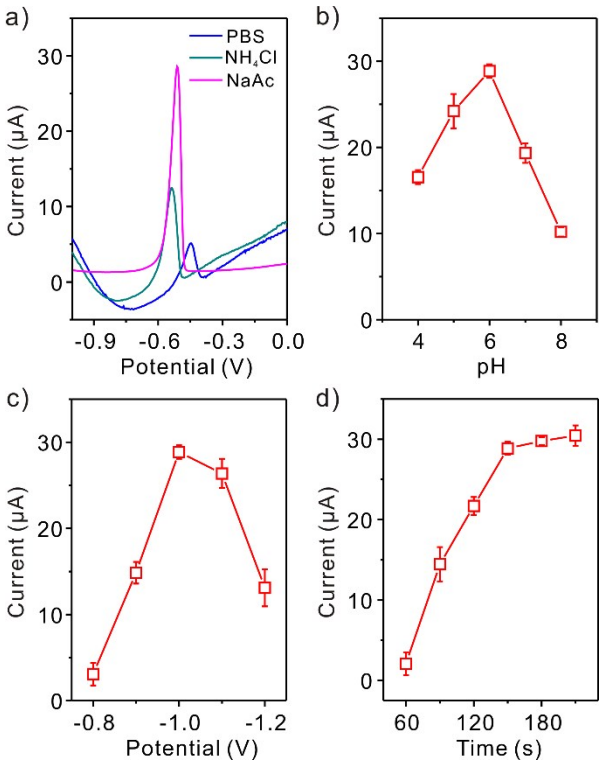


**Fig. S2.** The effect of (a) supporting electrolytes, (b) pH value, (c) deposition potential and (d) deposition time on Co/N-CNTs for the detection of 0.5 μM Pb(II).

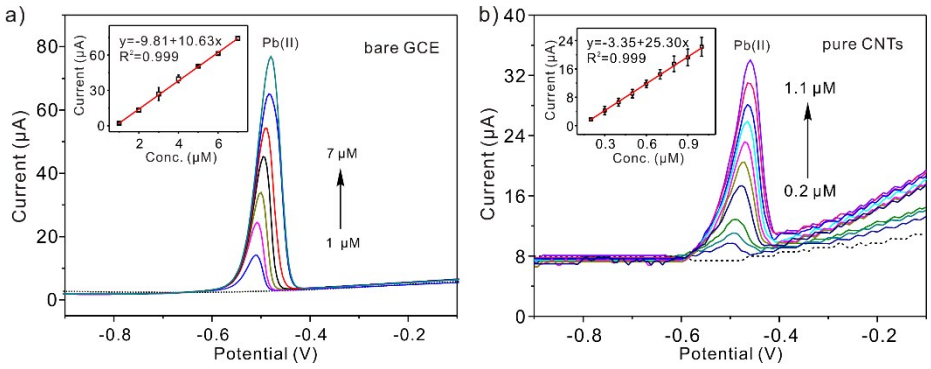


**Fig. S3.** SWASV responses to different concentration Pb(II) on bare (a) and pure CNTs (b), and their corresponding calibration plots in 0.1 M HAc-NaAc solution.

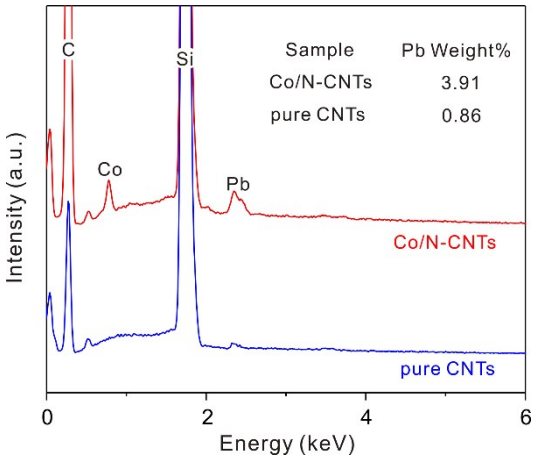


**Fig. S4.** EDS spectra of Co/N-CNTs and pure CNTs after adsorption with 5 mM Pb(II).

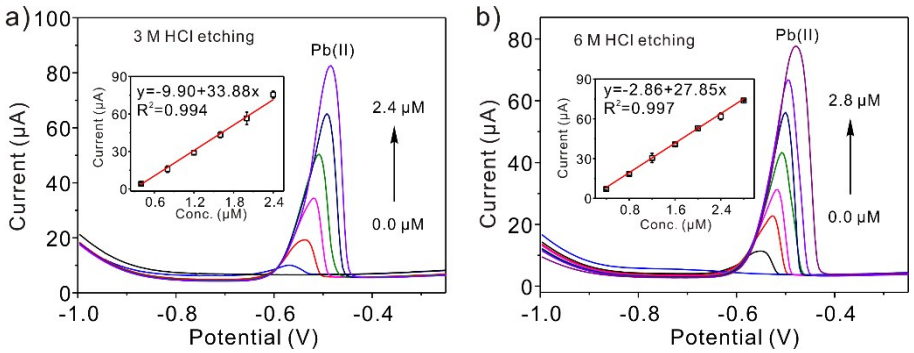


**Fig. S5.** SWASV responses to different concentration Pb(II) on Co/N-CNTs with (a) 3 M HCl and (b) 6 M HCl etching, and their corresponding calibration plots in 0.1 M HAc-NaAc solution.

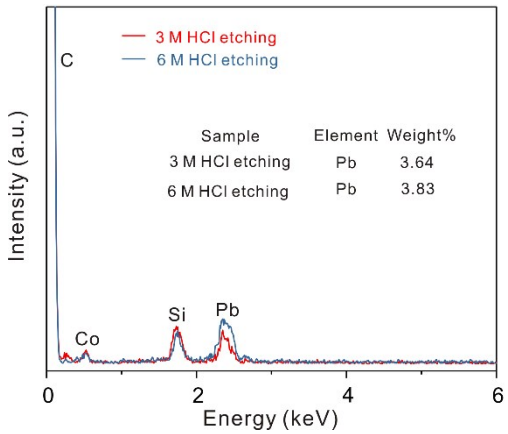


**Fig. S6.** EDS spectra of Co/N-CNTs with 3 M and (b) 6 M HCl etching after adsorption with 5 mM Pb(II).

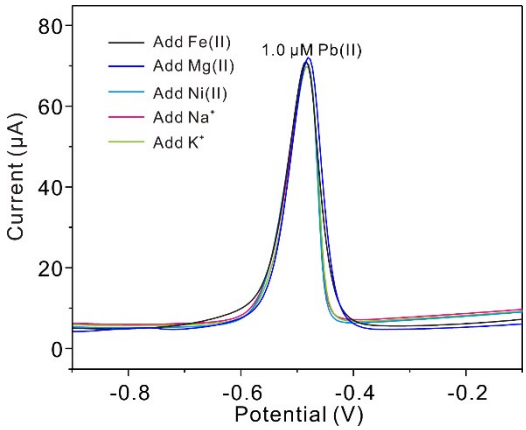


**Fig. S7.** The interference of 10 μM transition elements and alkaline metals (including Fe(II), Mg(II), Ni(II), $K^+$, and $Na^+$) towards 1.0 μM Pb(II) detection.

**Table S1.** Comparison of the sensitivities and LODs with previously works on various carbon based nanomaterials modified electrodes toward Pb(II).

| Electrodes | Sensitivity ($\mu A\ \mu M^{-1}$) | LOD ($\mu M$) | Ref. |
|---|---|---|---|
| Nitrogen-doped microporous carbon | 1.9 | 0.16 | [1] |
| Graphene modified carbon nanosheet | 92.9 | 1.12 | [2] |
| $O_2$-plasma-oxidized multi-walled CNTs | 3.55 | 0.057 | [3] |
| $MnO_2$/carbon composites | - | 0.027 | [4] |
| AlOOH-RGO GCE | 2.97 | $7.6*10^{-5}$ | [5] |
| EDTA_PANI/SWCNTs | - | 0.07 | [6] |
| EDTA-Ppy/SWCNTs | - | 1.65 | [7] |
| Co/N-CNTs | 69.74 | 0.039 | This work |

**References**


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