

**Green synthesis of copper oxide nanoparticles using *Ficus elastica* extract for
the electrochemical simultaneous detection of Cd²⁺, Pb²⁺, and Hg²⁺**

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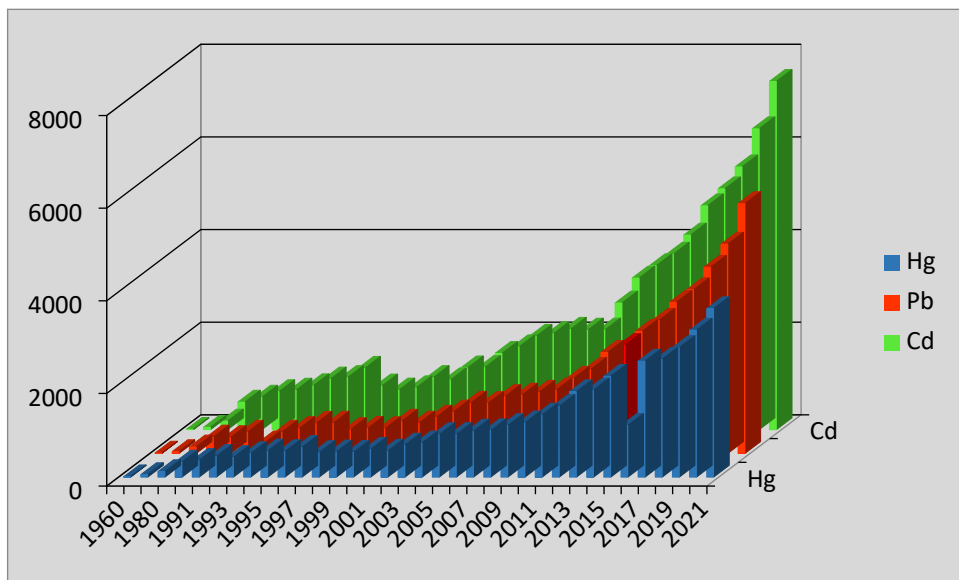
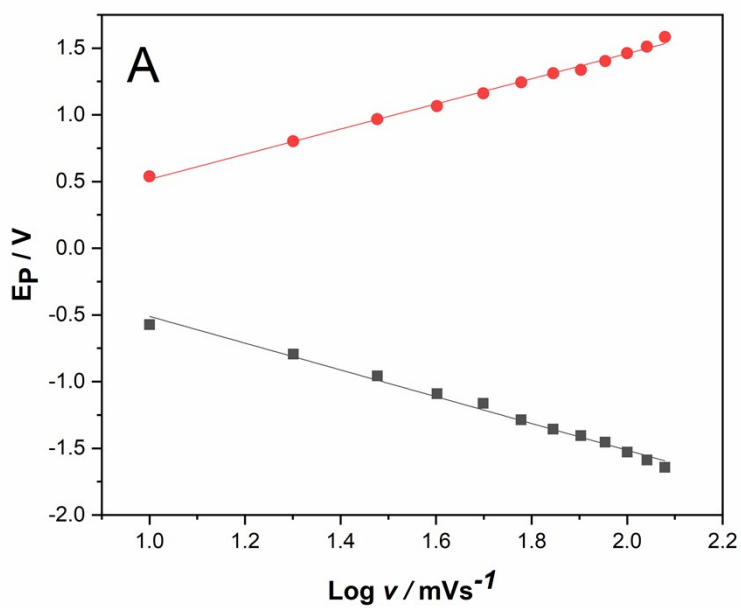


Fig.S.1.Published documents per year related to Cd²⁺, Pb²⁺, and Hg²⁺ detection (from Science Direct database).



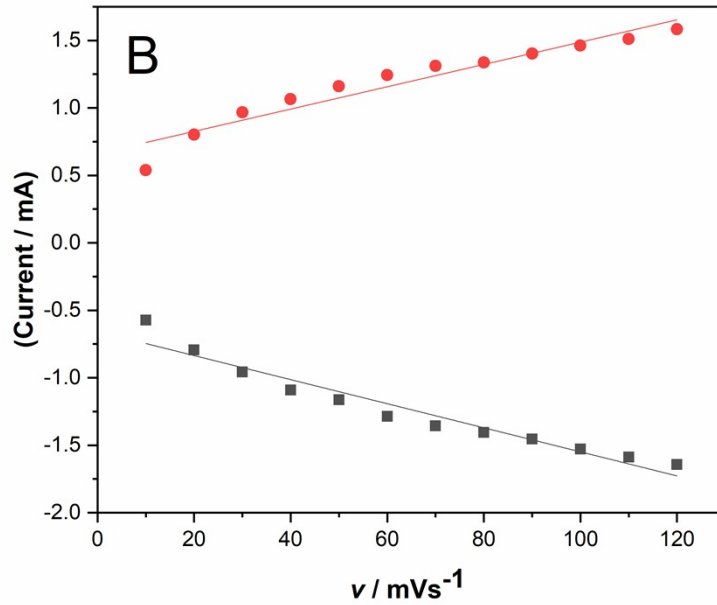


Fig.S.2 (A) Laviron plot for CuONPs/PANI-CPE and (B) Peak currents vs. scan rates.

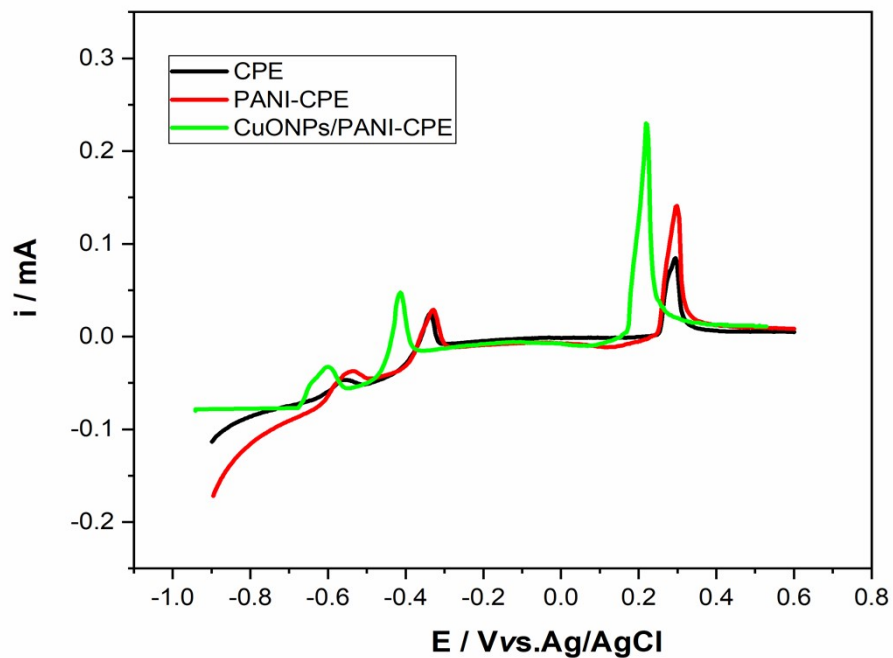


Fig.S.3 Comparison of SWV on CPE (Black), PANI-CPE (red), and CuONPs/PANI-CPE (Green) electrodes for simultaneous detection of $4.8 \mu\text{gL}^{-1}$ Cd^{2+} , Pb^{2+} , and Hg^{2+} in HCl solution (0.01M).

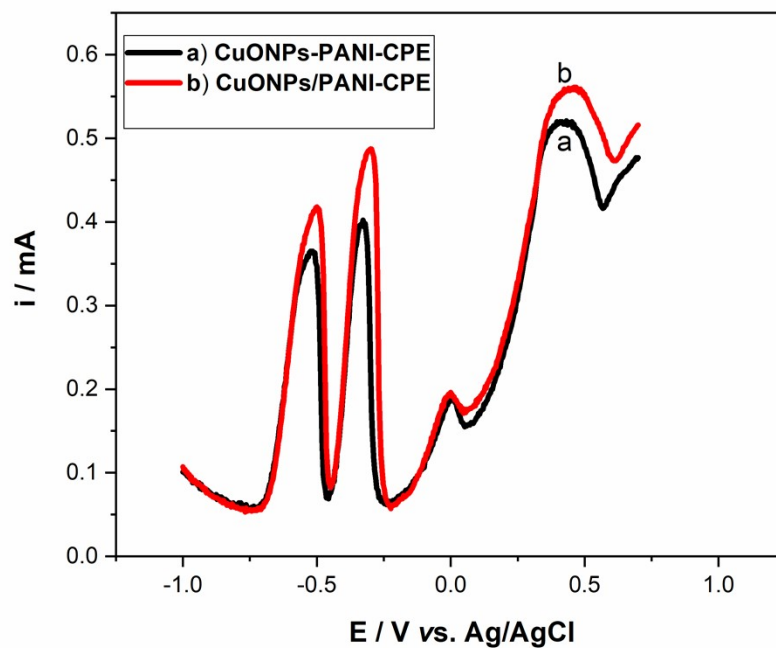
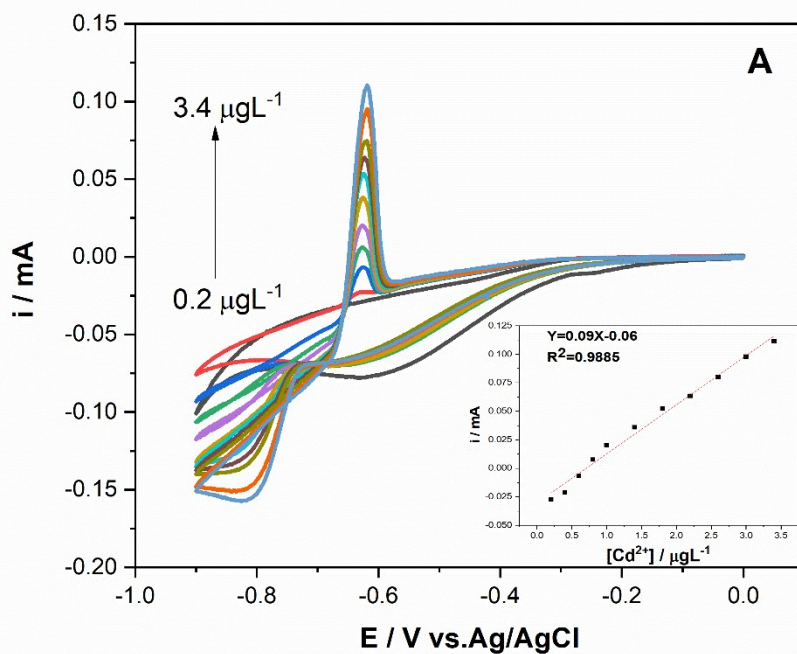


Fig.S.4 Anodic peak currents on CuONPs/PANI-CPE in $HCl(0.01M)$ $100.0 \mu g L^{-1}$ Cd^{2+} , Pb^{2+} and Hg^{2+} obtained by SWV as function of (a) CuONPs-PANI-CPE, (b) CuONPs/PANI-CPE.



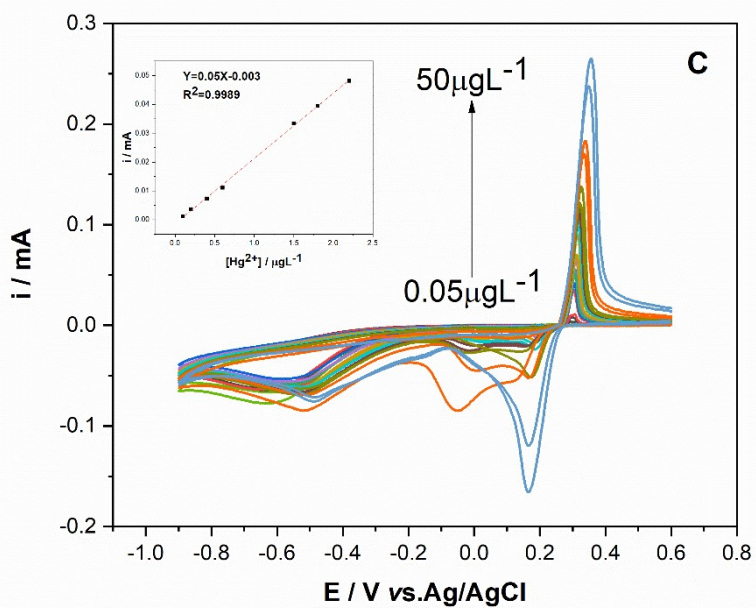
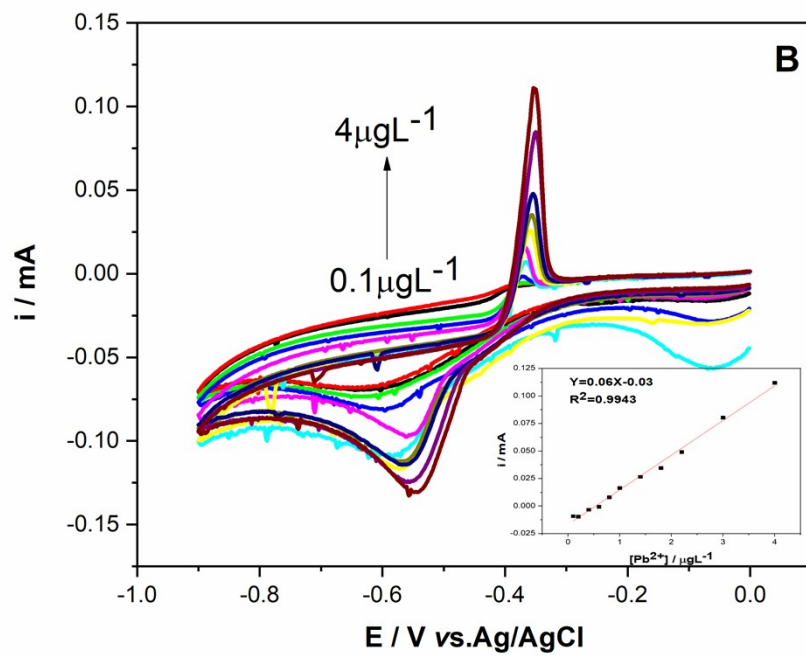


Fig.S.5 (A) CV Curves of CuONPs/PANI-CPE in HCl (0.01M) containing single different concentration of A: Cd^{2+} , B: Pb^{2+} , C: Hg^{2+} . Insets: the corresponding calibration curves.

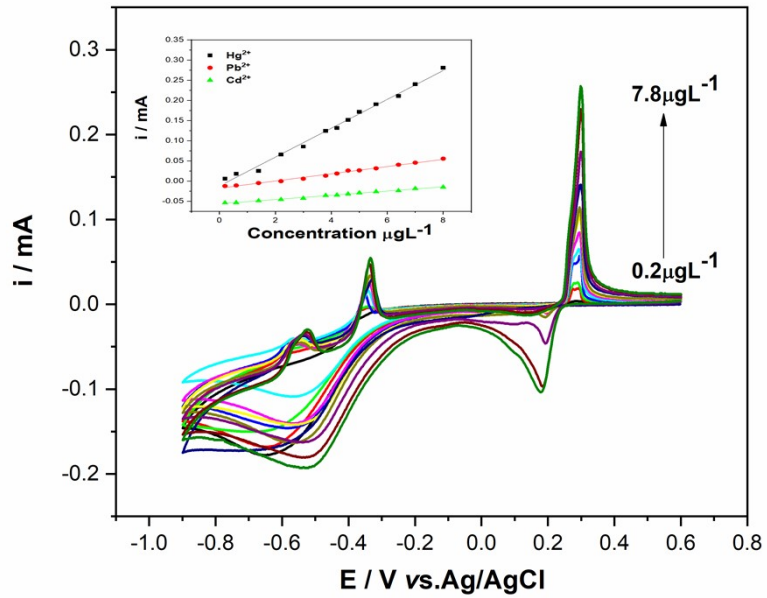


Fig.S.6 CV Curves for simultaneous analysis of CuONPs/PANI-CPE in HCl (0.01M) containing $[0.2 - 7.8] \mu\text{g/L}$ of Cd^{2+} , Pb^{2+} and Hg^{2+} at scan rate of 50 mVs^{-1} . Inset : the calibration curve.

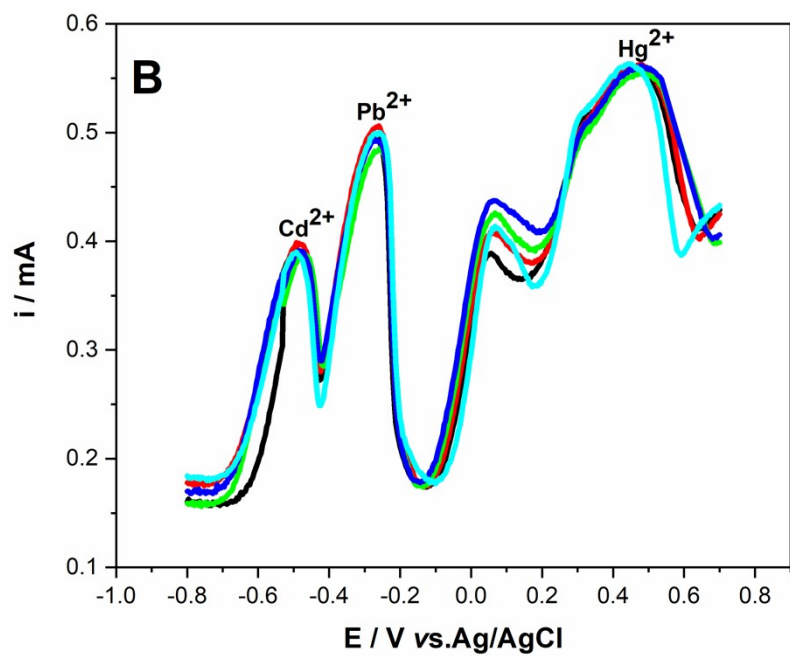
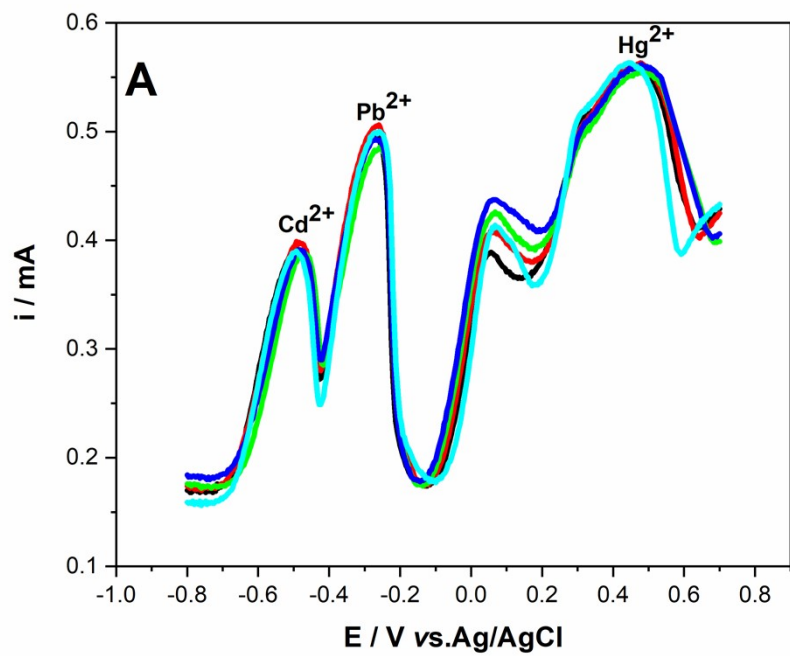


Fig. S.7 SWV recorded in Cd^{2+} , Pb^{2+} and Hg^{2+} ($2.6 \mu\text{gL}^{-1}$) in HCl (0.01 M) on CuONPs/PANI-CPE for A : repeatability experiments and B : sensor stability over a month.

Table. S.1. Detection of Cd²⁺, Pb²⁺, and Hg²⁺ in real waters using CuONPs/PANI-CPE electrode by SWV method.

Sample	Cd ²⁺ Spiked (µg L ⁻¹)	Cd ²⁺ Found (µg L ⁻¹)	Recovery (%) Cd ²⁺	Pb ²⁺ Spiked (µg L ⁻¹)	Pb ²⁺ Found (µg L ⁻¹)	Recovery (%) Pb ²⁺	Hg ²⁺ Spiked (µg L ⁻¹)	Hg ²⁺ Found (µg L ⁻¹)	Recovery (%) Hg ²⁺
Sea water	0.0	0.0	-	0.0	0.0	-	0.0	0.4	-
	0.6	0.7	116.66	0.6	0.6	100	0.6	0.7	116.66
	1.0	1.1	110	1.0	0.98	98	1.0	1.1	110
	1.4	1.5	107.14	1.4	1.3	92.86	1.4	1.6	114.29
	2.6	2.8	107.69	2.6	2.8	107.69	2.6	3.0	115.38
River water	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
	0.6	0.6	100	0.6	0.6	100	0.6	0.7	116.66
	1.0	0.9	90	1.0	1.1	110	1.0	0.9	90
	1.4	1.3	92.85	1.4	1.4	100	1.4	1.6	114.29
	2.6	2.4	92.31	2.6	2.7	103.85	2.6	2.8	107.69
Tap water	0.0	0.0	-	0.0	0.0	-	0.0	0.0	-
	0.6	0.6	100	0.6	0.7	116.66	0.6	0.7	116.66
	1.0	0.9	90	1.0	1.1	110	1.0	0.9	90
	1.4	1.5	107.14	1.4	1.6	114.29	1.4	1.3	92.86
	2.6	2.7	103.85	2.6	2.7	103.85	2.6	2.9	111.54
Mineral water	0	0.0	-	0.0	0.0	-	0.0	0.0	-
	0.6	0.6	100	0.6	0.7	116.66	0.6	0.6	100
	1.0	0.9	90	1.0	1.0	100	1.0	0.9	90
	1.4	1.3	92.85	1.4	1.5	107.14	1.4	1.3	92.86
	2.6	2.7	103.84	2.6	2.4	92.31	2.6	2.5	96.15

Real-sample analysis of water

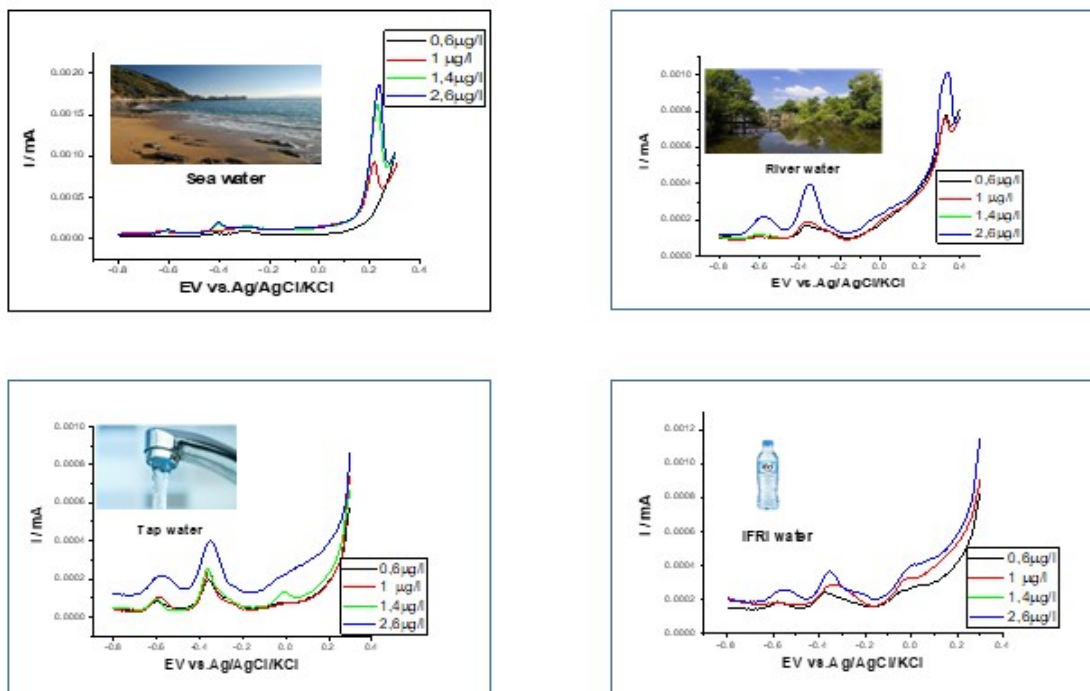


Fig.S.8 Schematic illustration of simultaneous determination of Cd^{2+} , Pb^{2+} and Hg^{2+} in real applications.