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## **SUPPORTING INFORMATION**

5 **Studies of simultaneous electrochemical sensing of Hg<sup>2+</sup> and Cd<sup>2+</sup>**

6 **ions and catalytic reduction properties of 4-nitrophenol by CuO,**

7 **Au, CuO@Au composite nanoparticles, synthesised using a graft**

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## **copolymer as a bio template**

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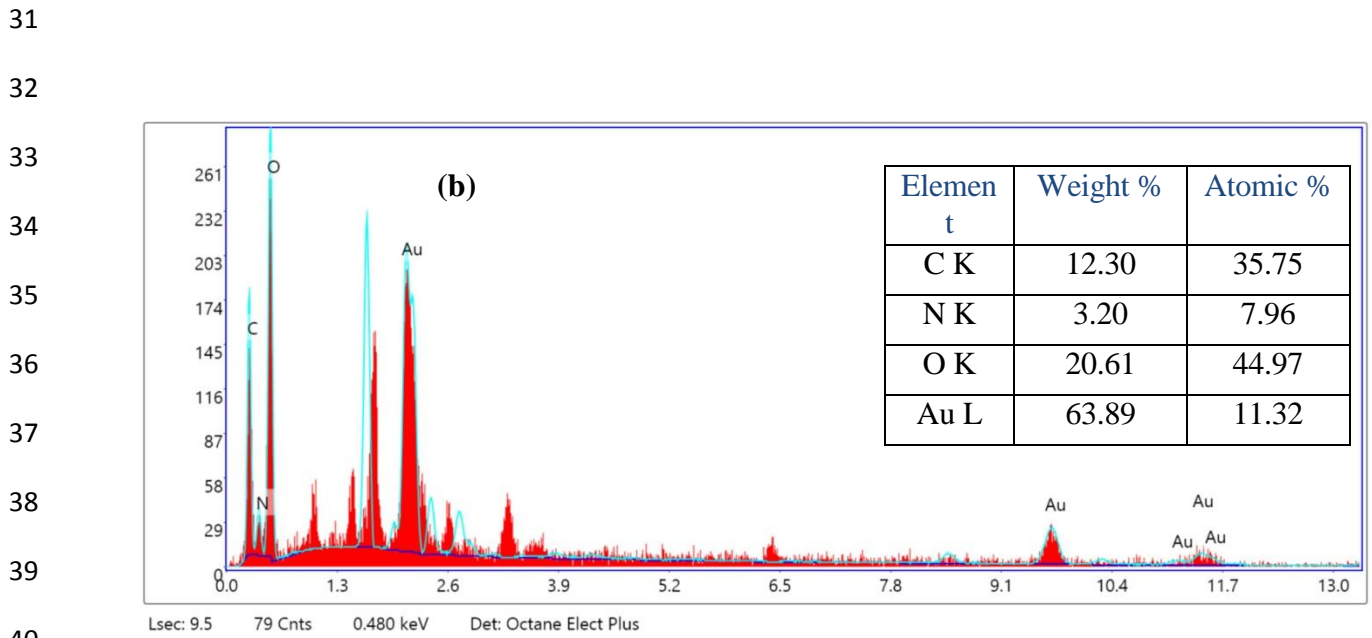
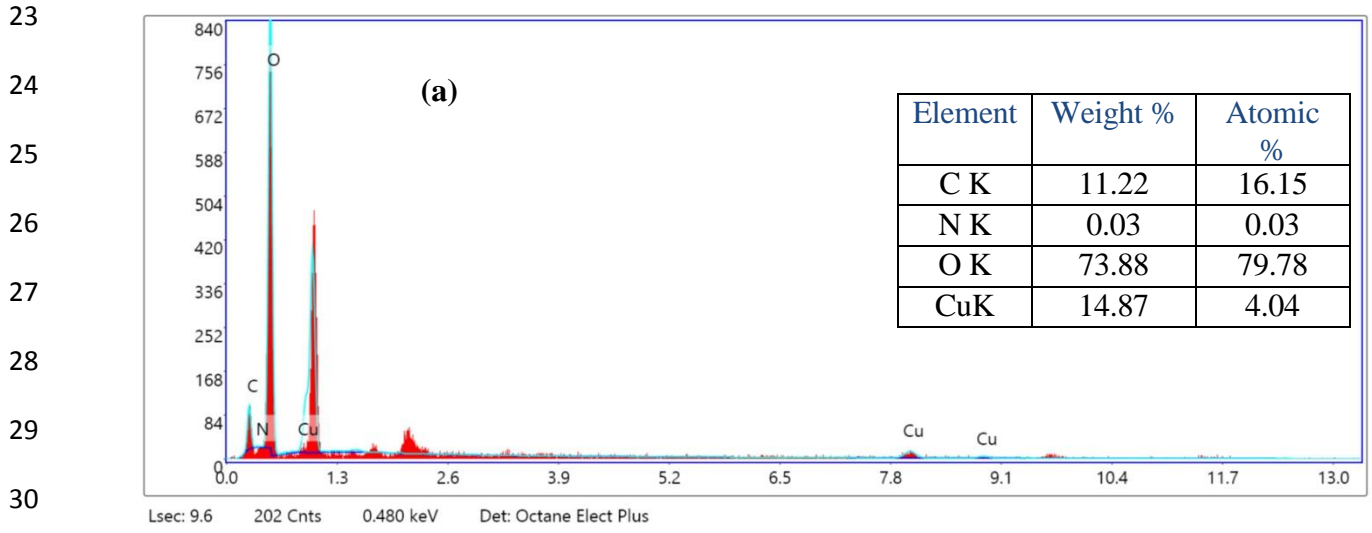
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42 **Fig. S1.** (a) EDAX analysis of SAGAMA-CuO NPs (b) SAGAMA-Au NPs.

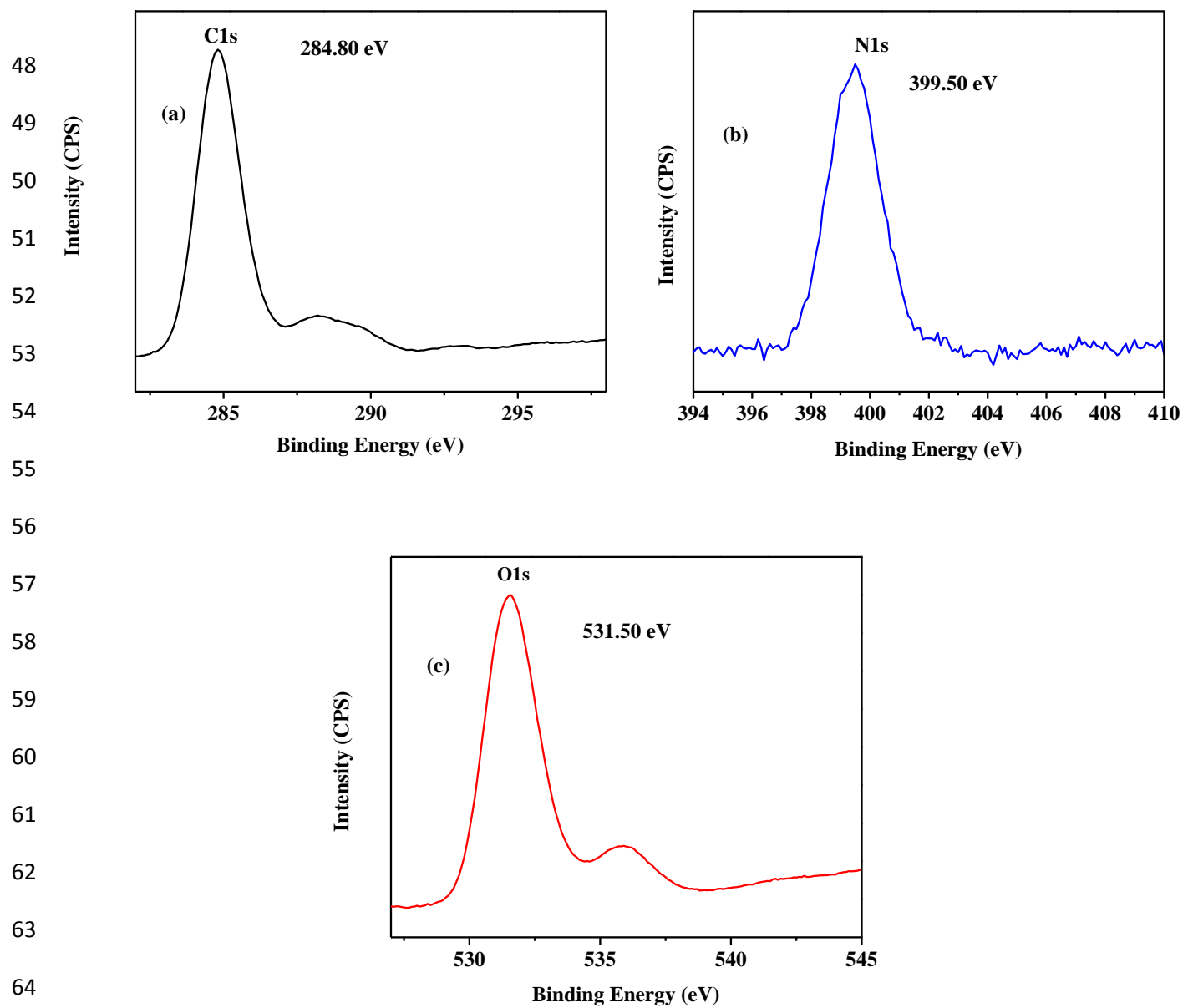
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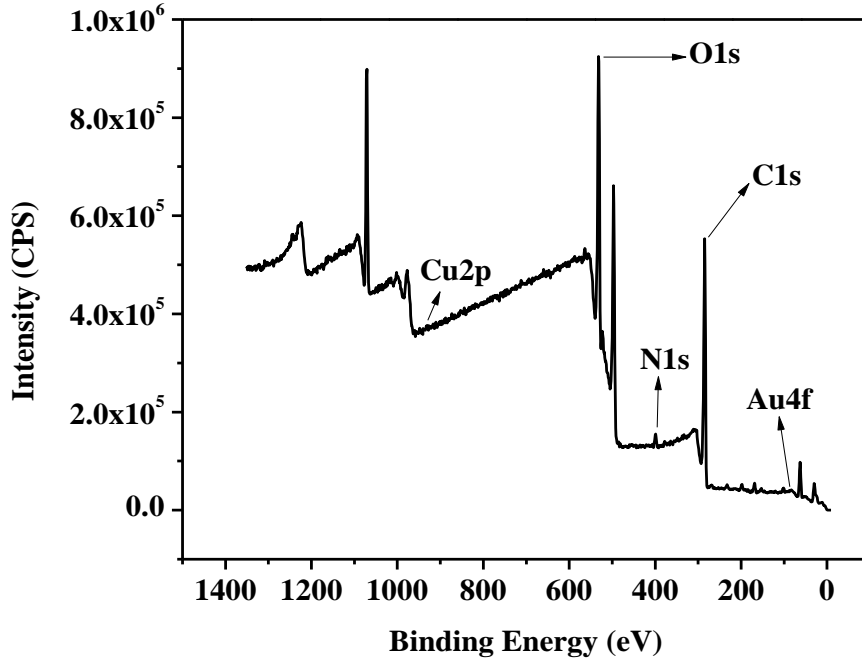
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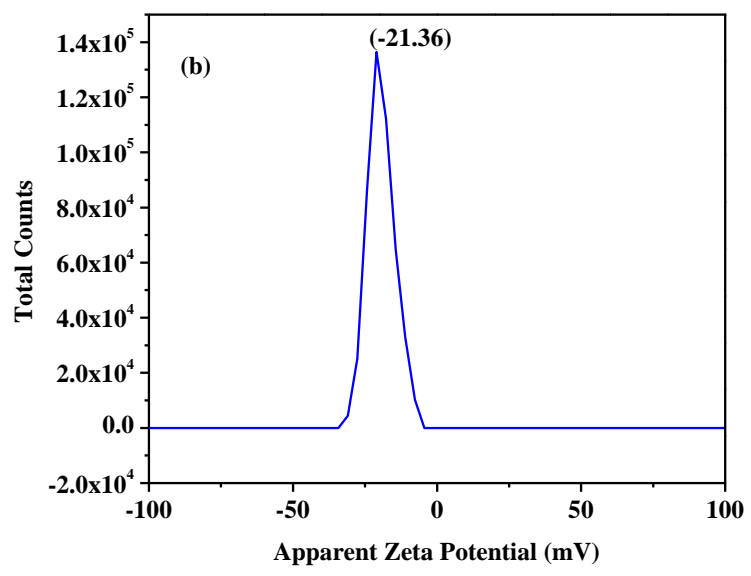
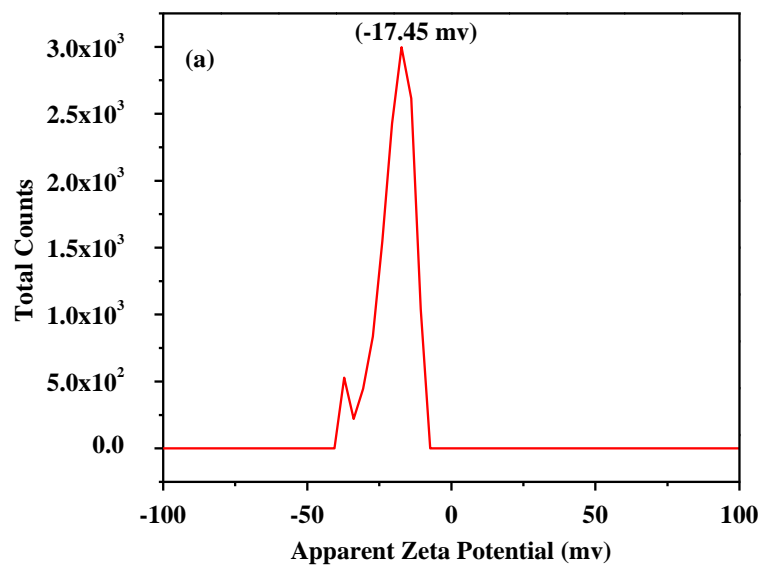
67 **Fig. S2.** XPS analysis of (a) C1s (b) N1s (c) O1s at SAGAMA-CuO@Au NPs

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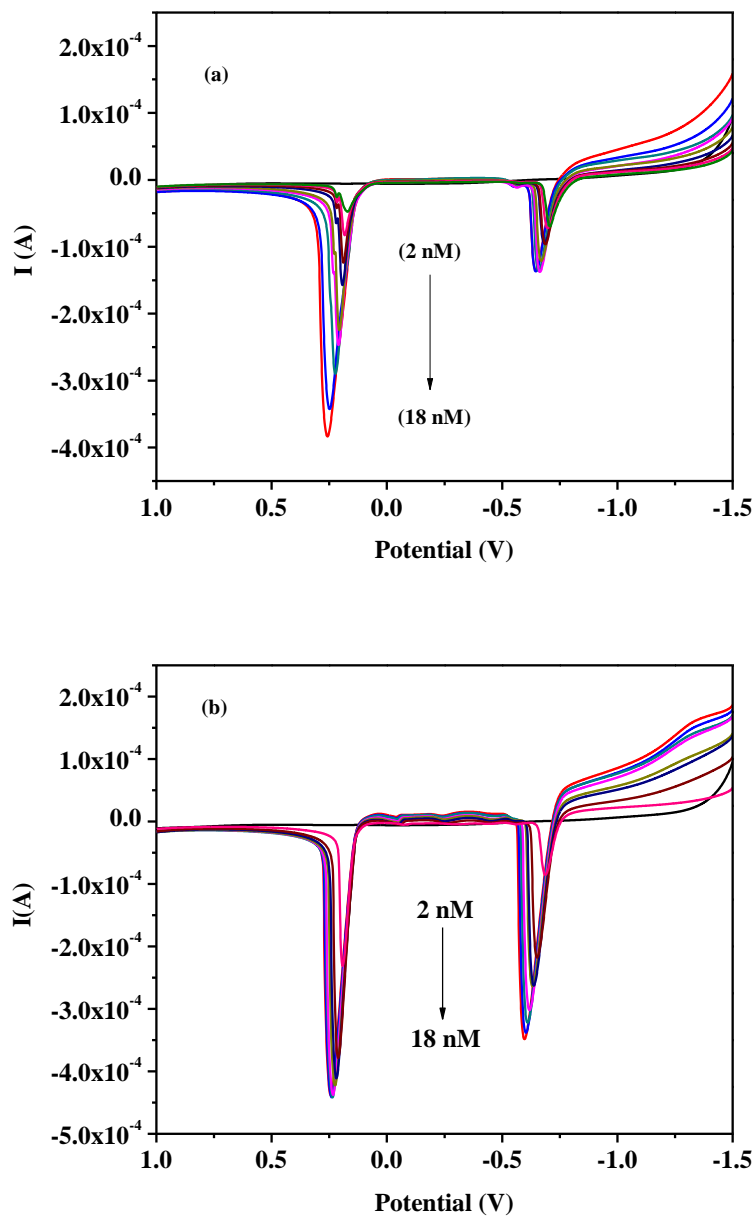
**Fig. S3.** Full range XPS spectra of SAGAMA-CuO@Au NPs

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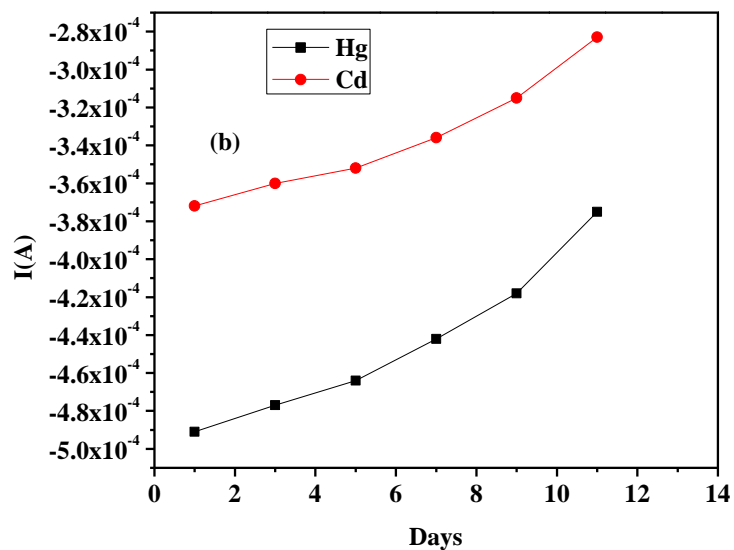
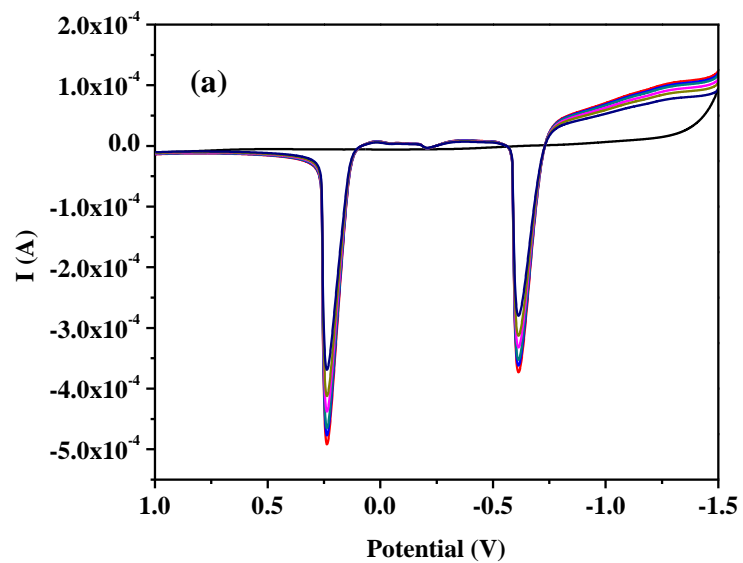
**Fig. S4.** Zeta potential values of (a) SAGAMA-CuO NPs (b) SAGAMA-Au NPs.

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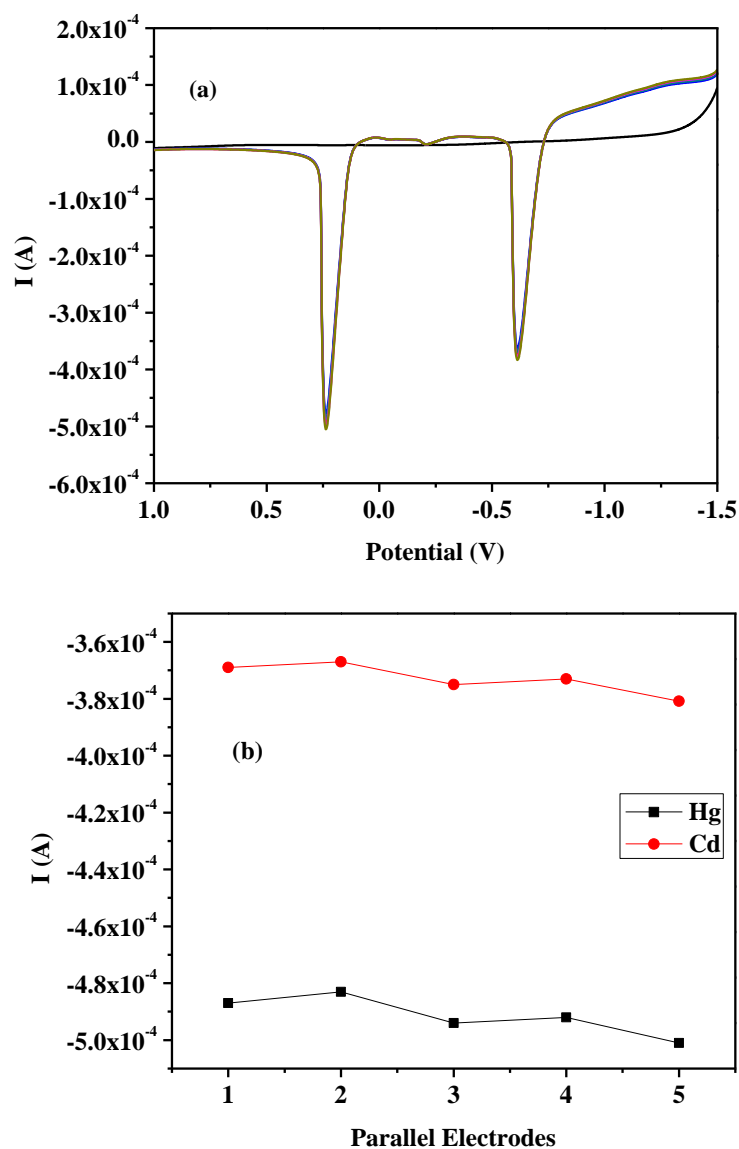
**Fig. S5.** LSV analysis of (a) SAGAMA-CuO NPs/GCE and (b) SAGAMA-Au NPs/GCE with different concentration of equimolar mixture (2 to 16 nM) of  $\text{Hg}^{2+}$  and  $\text{Cd}^{2+}$  ions.

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**Fig. S6** (a) LSV plot of stability test (b) Calibration curve of cathodic peak current  $I$  (A) vs. days

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**Fig. S7** (a) LSV plot of reproducibility test at SAGAMA-CuO@ Au NPS/GCE (b) Calibration curve of cathodic peak current I (A) vs parallel electrodes.



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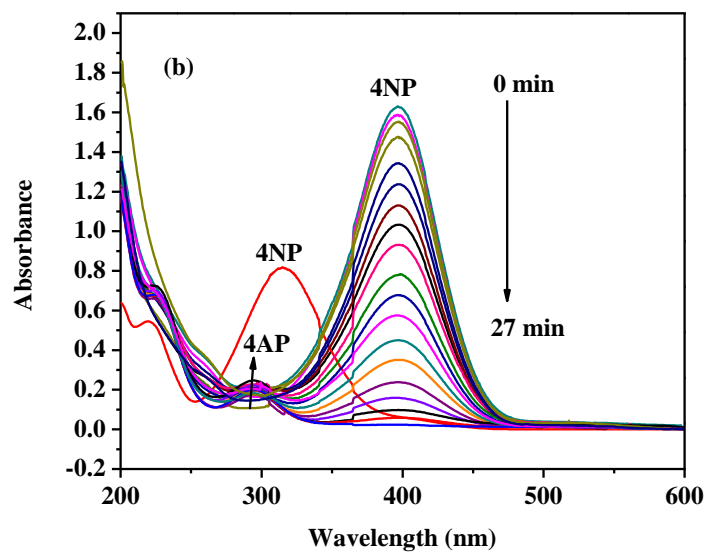
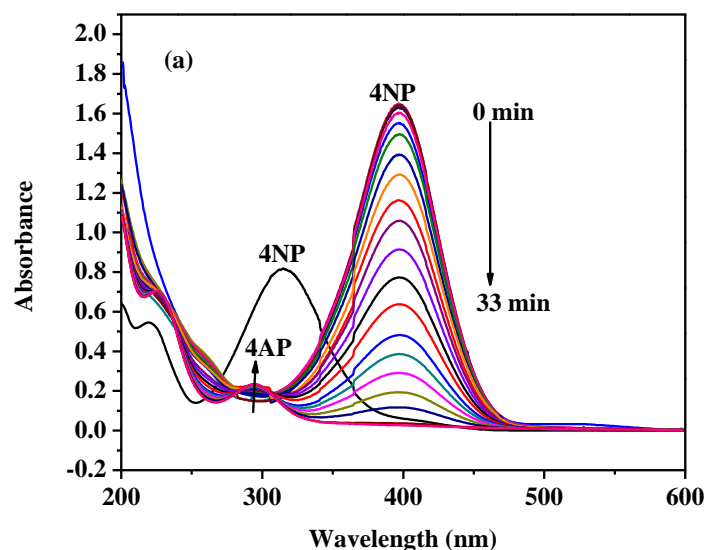
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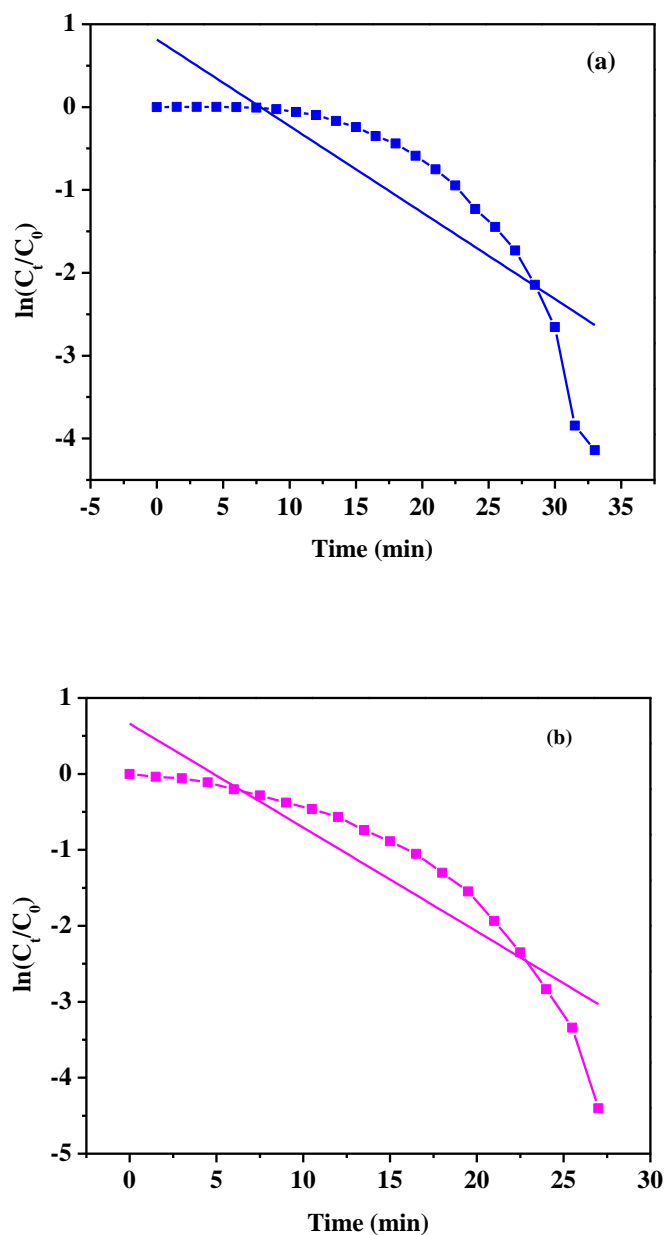
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219 **Fig. S8** (a) UV-visible spectra of SAGAMA-CuO NPs (1.17 mg ml<sup>-1</sup>) for catalytic reduction of  
220 4NP into 4AP in aqueous medium in presence of 0.002 mg ml<sup>-1</sup> 4NP and 10mM NaBH<sub>4</sub>. (b)  
221 UV-visible spectra of SAGAMA-Au NPs (1.17 mg ml<sup>-1</sup>) for catalytic reduction of 4NP into 4AP  
222 in aqueous medium in presence of 0.002 mg ml<sup>-1</sup> 4NP and 10mM NaBH<sub>4</sub>.

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**Fig. S9** (a) Plot of  $\ln(C_t/C_0)$  vs. time for catalytic reduction of 4NP ( $0.002 \text{ mg ml}^{-1}$ ) into 4Ap in aqueous medium in presence of  $1.17 \text{ mg ml}^{-1}$  SAGAMA-CuO NPs with  $10 \text{ mM NaBH}_4$ . (b) Plot of  $\ln(C_t/C_0)$  vs. time for catalytic reduction of 4NP ( $0.002 \text{ mg ml}^{-1}$ ) into 4Ap in aqueous medium in presence of  $1.17 \text{ mg ml}^{-1}$  SAGAMA-Au NPs with  $10 \text{ mM NaBH}_4$ .