Electronic Supplementary Material (ESI) for Nanoscale.

Sensitive and selective determination of trace amounts of mercury ions using dimercaprol functionalized graphene quantum dot modified glassy carbon electrode

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Fig. 1S. Cyclic voltammograms of the GQD-DMC modified electrode after dipping in PBS containing 0.5 µM Hg(II) for 300 s applying -0.6 V and then scanning the potential with various scan rates of 10, 20, 40, 100 and 200 mV s^{-1} (from inner to outer profiles), respectively; Inset: plot of I_p versus v.

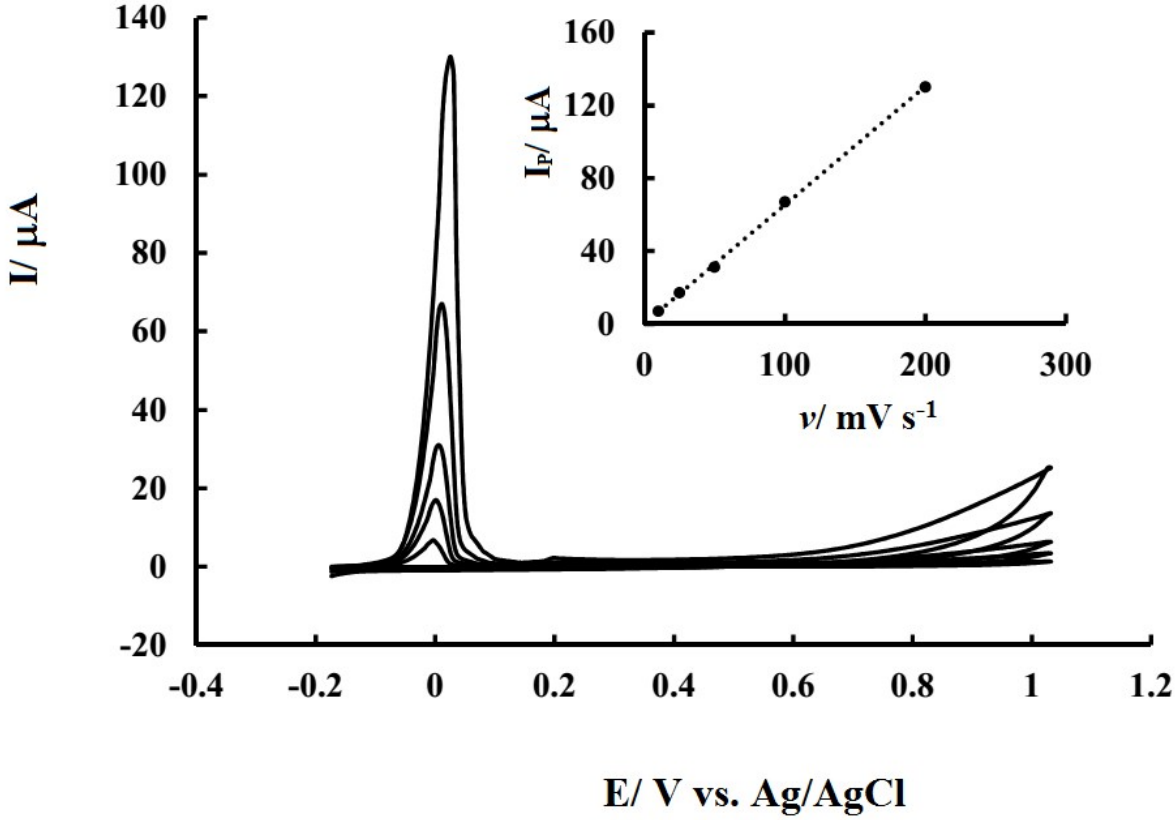

Fig. 2S. Tafel plot (variation of log I versus η) for oxidation of adsorbed Hg obtained from CV studies.

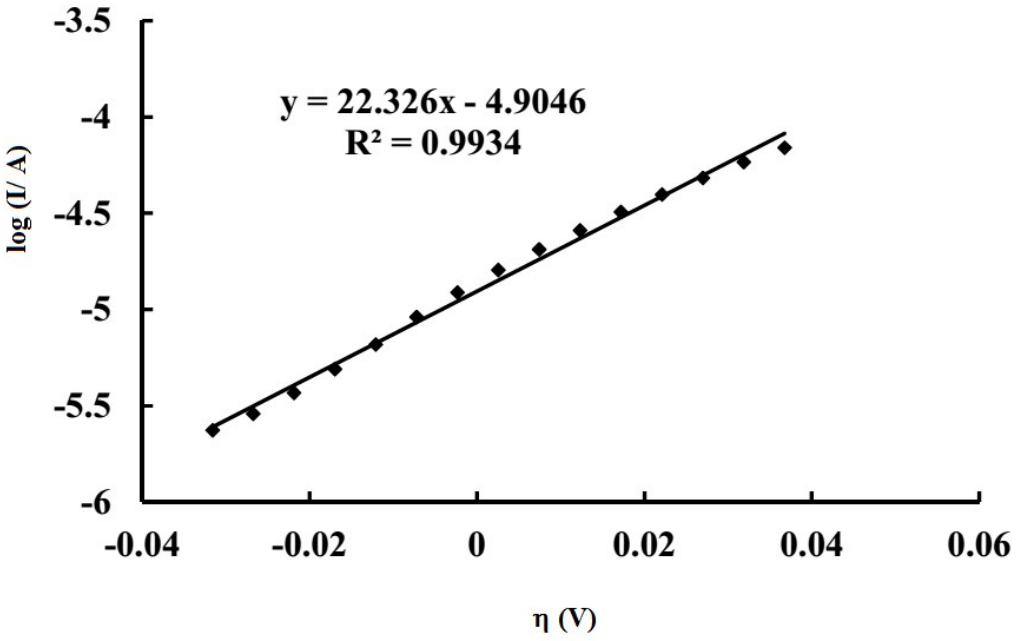

Fig. 3S. The effect of three inert supporting electrolytes (a) 0.1 M acetate buffer containing 0.5 M KNO_3, (b) 0.1 M phosphate buffer containing 0.5 M KNO_3, (c) 0.1 M Tris-HCl buffer and (d) 0.1 M phosphate buffer containing 0.05 M KCl as pre-concentration solution matrix on the DPV peak current of 0.5 nM mercury cations.

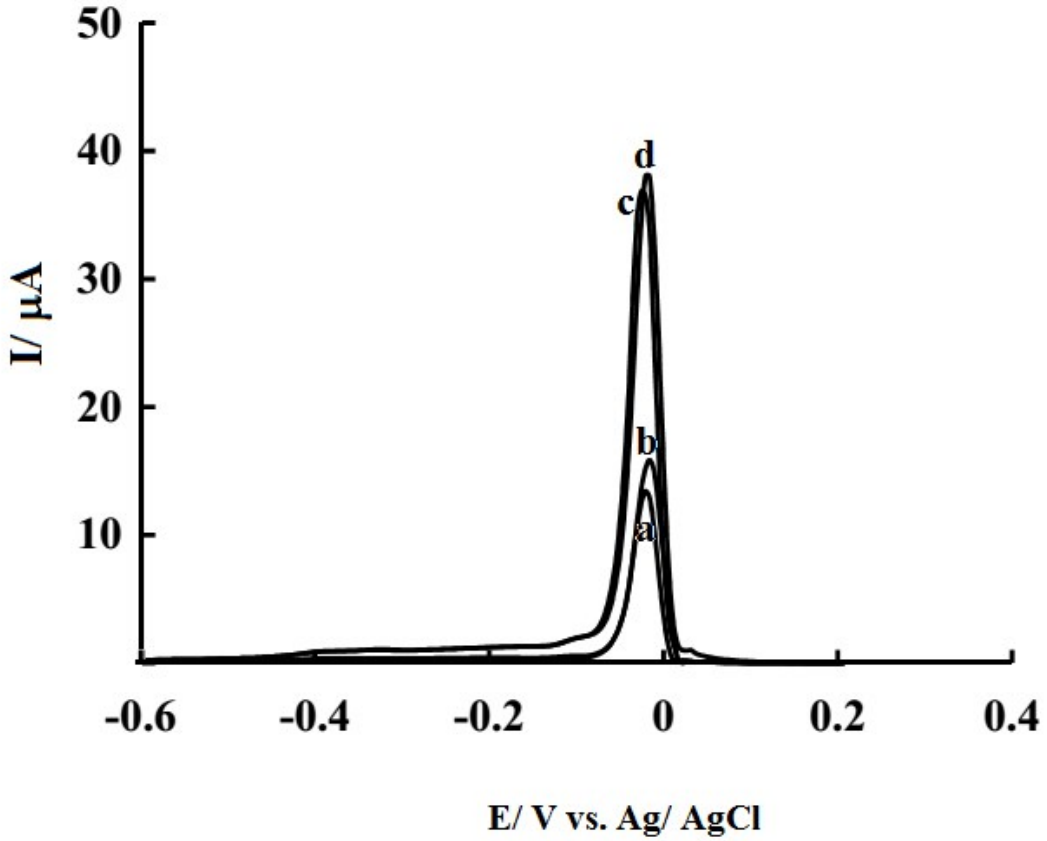

Fig. 4S. The effect of different concentrations of potassium chloride of the pre-concentration solution on the voltammetric peak current of 0.5 nM mercury ions.

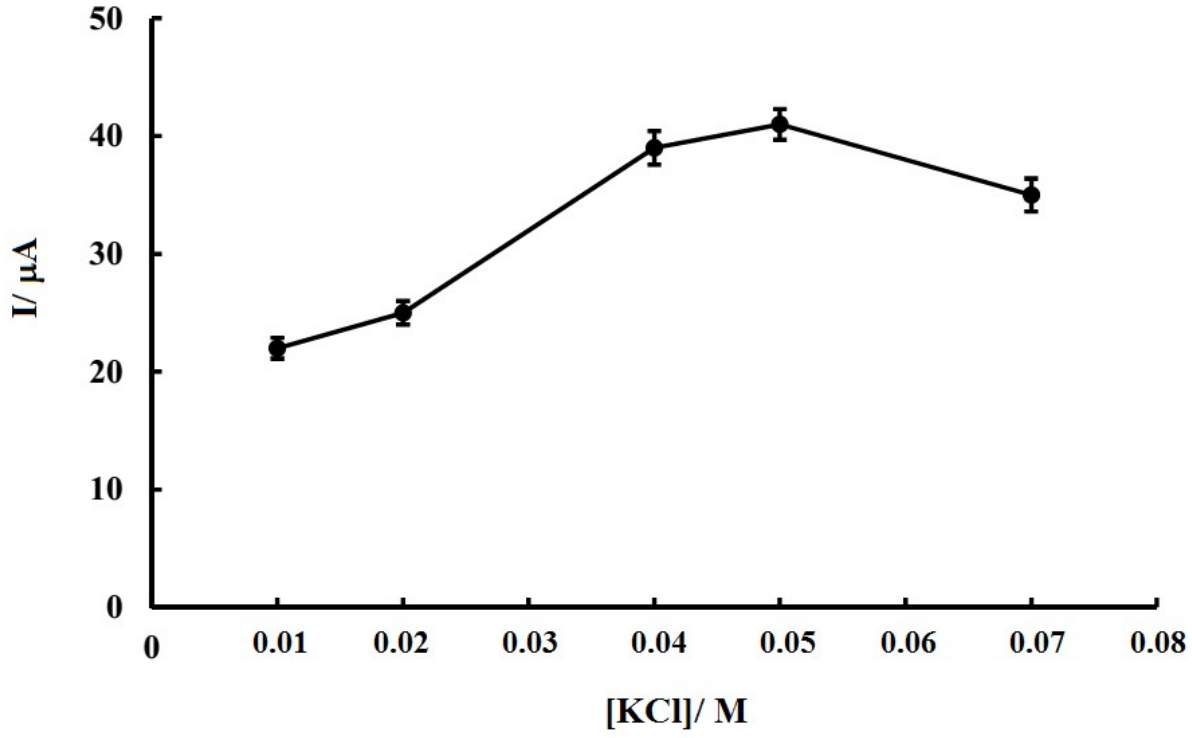

Fig. 5S. Differential pulse voltammetric signal of GQD-DMC modified GCE recorded after dipping in 0.5 nM mercury(II) with for various times of: 5, 60, 120, 180, 240 s under OCP condition; inset: Variation of DPV signal versus accumulation time. Determination condition: Hg(II) free PBS after reductive pre-treatment applying -0.6 V for 120 s.

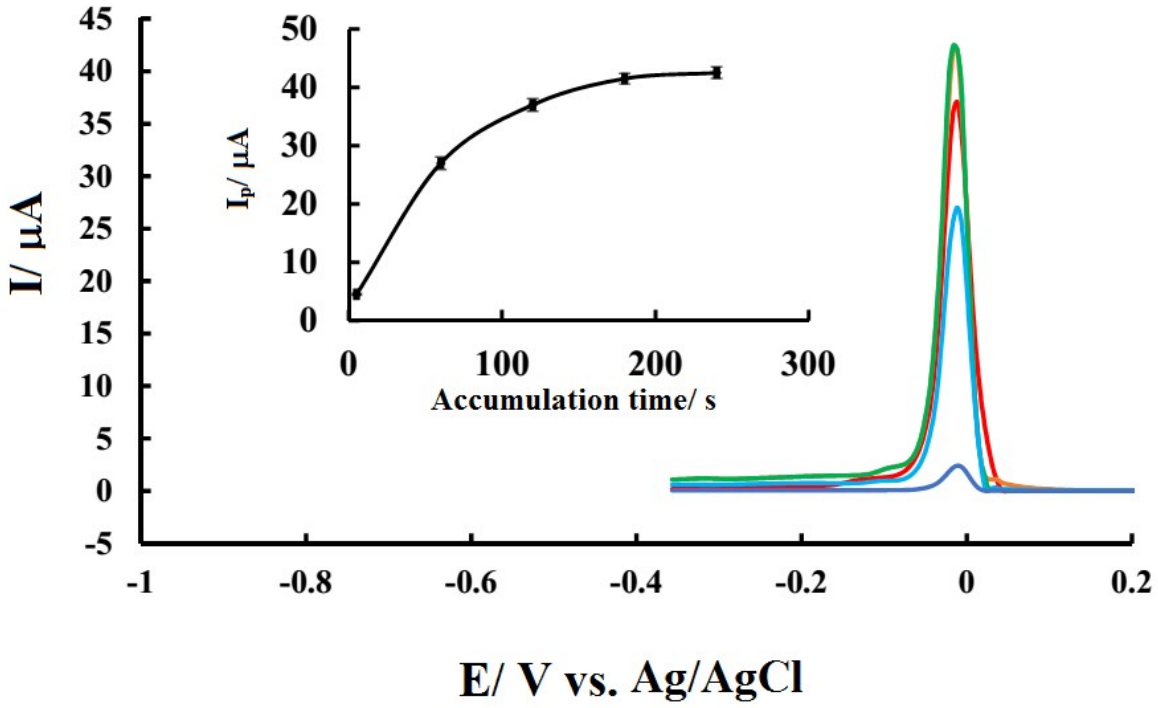

Fig. 6S. Histogram shows variation of DPV signal of GQD-DMC/GCE after immersion in 0.1 nM of Hg(II) ions or a mixture of 0.1 nM Hg(II) ions and other ions as presented in figure. Accumulation conditions: Chloride containing PBS (pH 6) in OCP condition for 180 s, with determination at mercury-free PBS after reduction applying -0.6 V for 120 s.

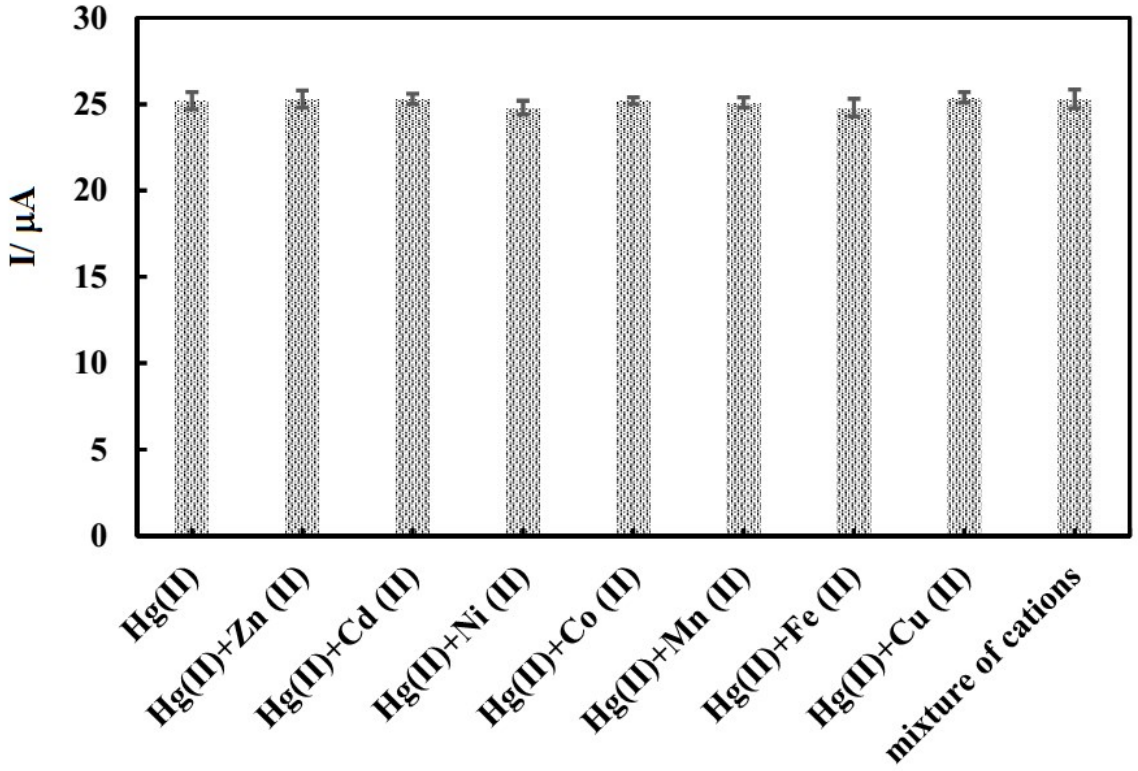

Fig. 7S. Differential pulse voltammograms obtained for 0.5 nM Hg(II) using five independently prepared electrodes; Accumulation conditions: Chloride containing PBS (pH 6) in OCP condition for 180 s, with determination at mercury-free PBS after reduction applying -0.6 V for 120 s.

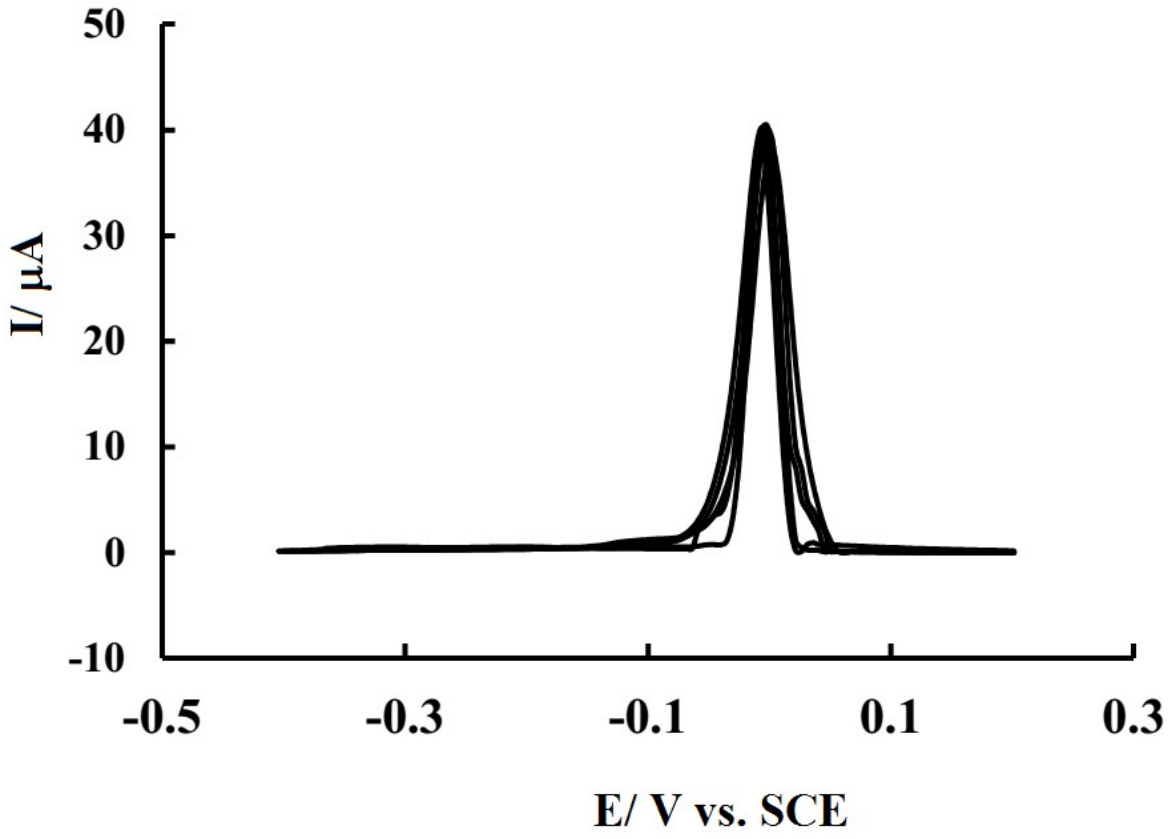

Fig. 8S. Differential pulse voltammograms obtained for 0.5 nM Hg(II) using newly prepared electrode and after storage for 8 days; Accumulation conditions: Chloride containing PBS (pH 6) in OCP condition for 180 s, with determination at mercury-free PBS after reduction applying -0.6 V for 120 s.

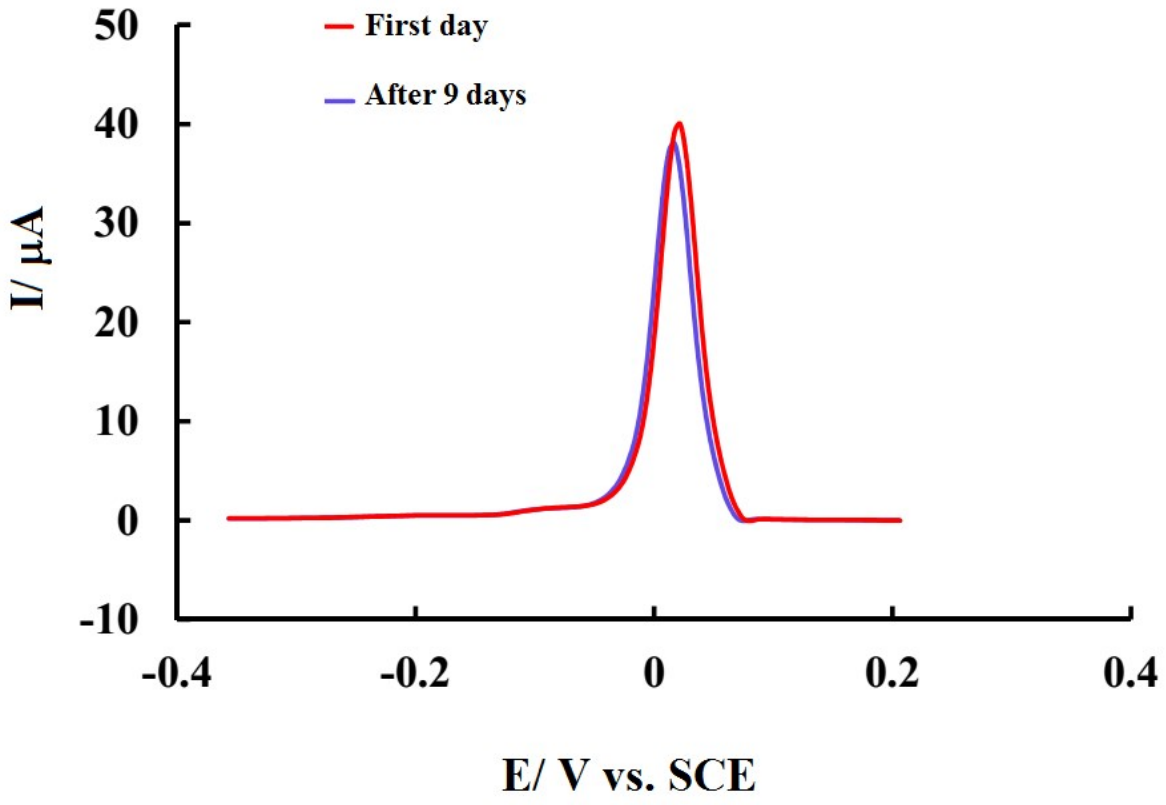

Fig. 9S. Differential pulse voltammograms obtained for 1:100 diluted rever water (a) before and after addition of (b) 100, (c) 400, (d) 900 and (e) 5000 pM of Hg(II) standard solution.