# A Fully Integrated and Miniaturized Heavy-metal-detection Sensor Based on Micro-patterned Reduced Graphene Oxide

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**Supplementary Data**

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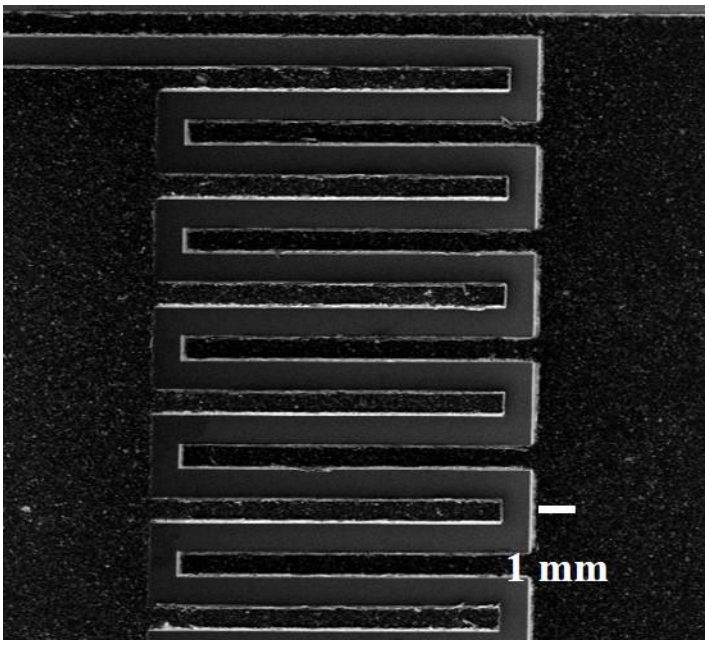


Figure S1. Top view of FE-SEM image of micro-patterned TRGO with an interdigital shape.

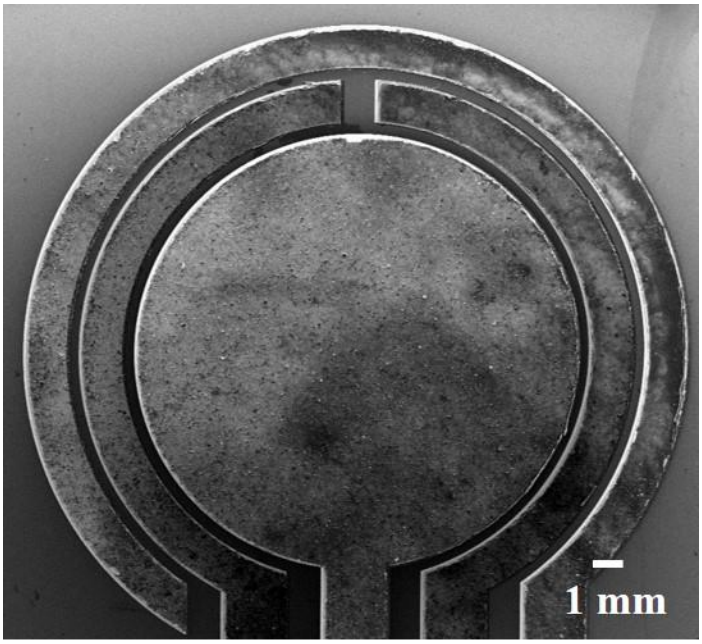


Figure S2. Top view of FE-SEM image of micro-patterned TRGO with a disk shape.

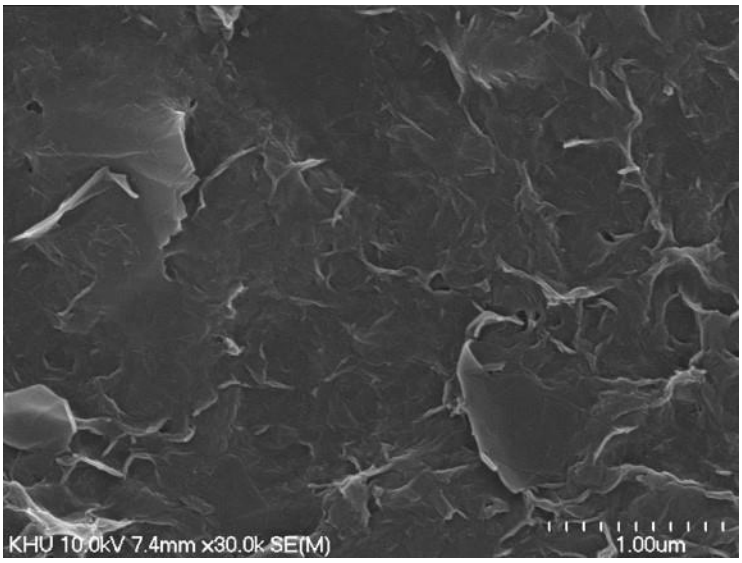


Figure S3. The FE-SEM image of the after patterning TRGO/Au electrode.

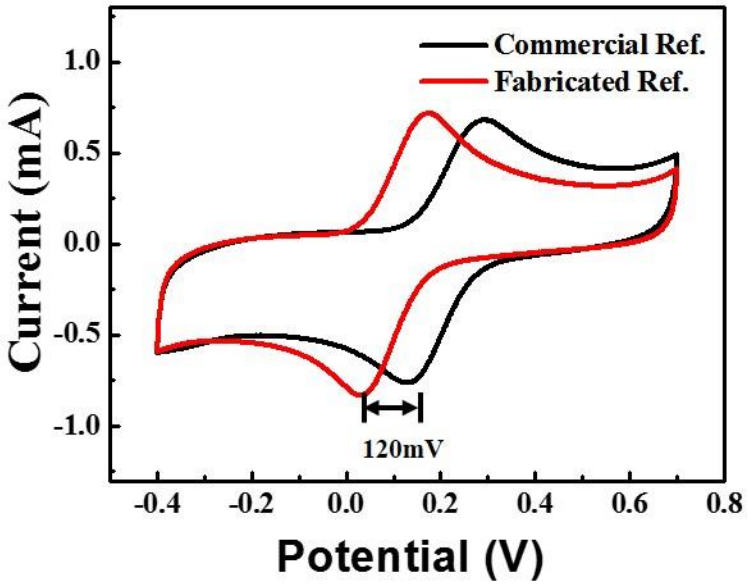


Figure S4. CV curves of fabricated reference electrode and commercial Ag/AgCl (3M NaCl) electrode in 0.1 M KCl solution containing 5 mM $[Fe(CN)_6]^{3-/4-}$.

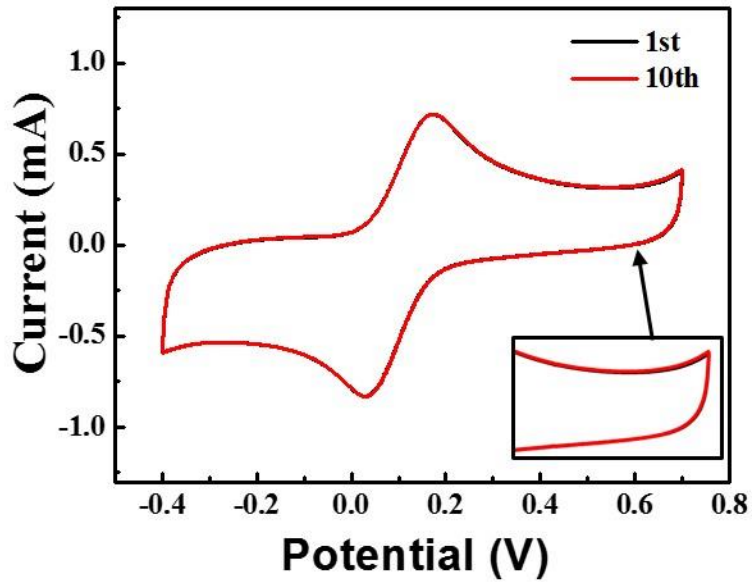


Figure S5. The stability of fabricated sensor with screen printed reference electrode.

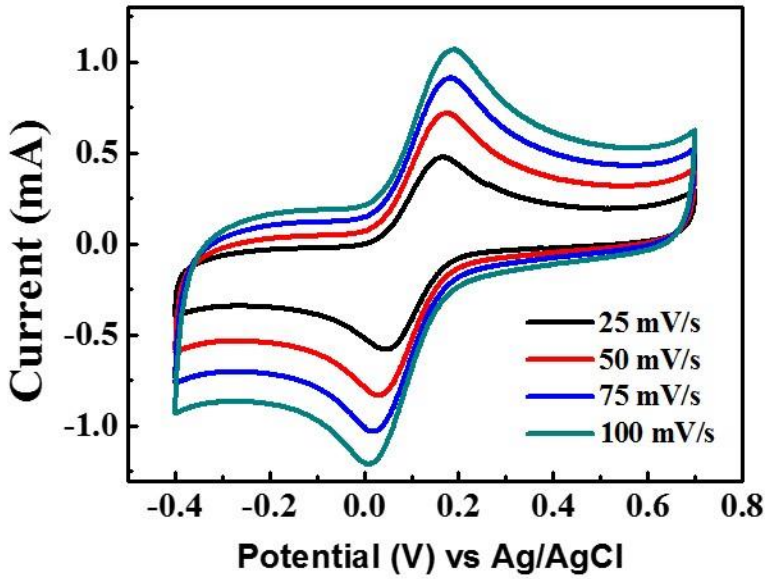


Figure S6. The CV curves of working electrode in 0.1 M KCl containing 5 mM $[Fe(CN)_6]^{3-/4-}$ at 25, 50, 75 and 100 mV/s scan rates .

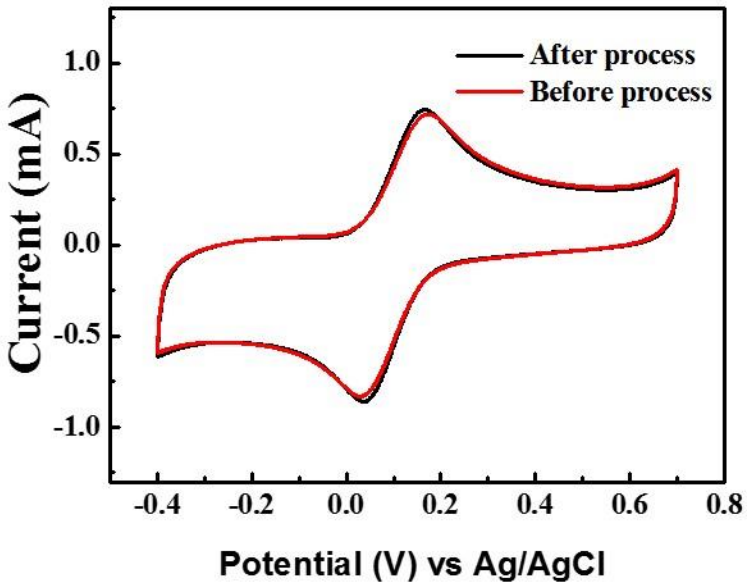


Figure S7. The TRGO/Au electrodes CV curves for solution containing 5 mM $[Fe(CN)_6]^{3-/4-}$ in 0.1 M KCl, (red line) before and (black line) after patterning process (Scan rate of 50 mV/s).

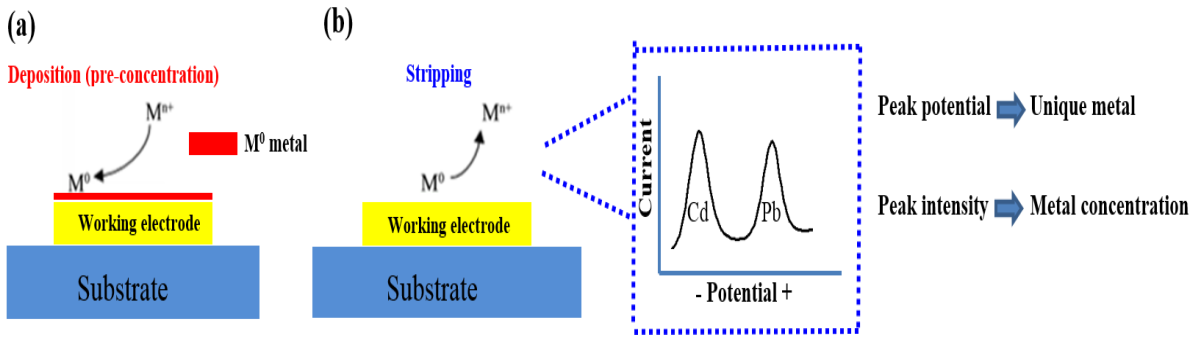


Figure S8. The heavy metal ions sensing principle using SWASV.