

## **Au-ZnO bullet-like heterodimer nanoparticles: synthesis and use for enhanced nonenzymatic electrochemical determination of glucose**

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### **Fabrication of Au-ZnO/MWCNTs/GC modified electrode**

5 mg of MWCNTs and 1 mg of Au-ZnO were dispersed in 0.5 % nafion in ethanol solution with the aid of ultrasonication for 10 minutes in order to get homogeneous suspension. 5  $\mu$ L of as prepared Au-ZnO/MWCNTs suspension was drop casted onto a pre-polished GC electrode surface and allowed to dry under ambient conditions.

**Table S1** Cyclic voltammetry of different modified electrode containing 2 mM  $[\text{Fe}(\text{CN})_6]^{3/4-}$  at scan rate 50  $\text{mVs}^{-1}$

| Electrode        | $i_{pa}$ ( $\mu\text{A}$ ) | Electrochemical active area ( $\text{cm}^2$ ) | $\Delta E_p$ (mV) | $k^0$ ( $\text{cm s}^{-1}$ ) |
|------------------|----------------------------|---|-------------------|------------------------------|
| GC               | 23.00                      | 0.0763  | 140               | $1.821 \times 10^{-3}$       |
| MWCNTs/GC        | 27.86                      | 0.0925  | 89                | $5.203 \times 10^{-3}$       |
| Au/MWCNTs/GC     | 32.77                      | 0.1063  | 86                | $5.918 \times 10^{-3}$       |
| Au-ZnO/MWCNTs/GC | 57.11                      | 0.1897  | 66                | $22.01 \times 10^{-3}$       |

**Table S2** Comparison of the analytical performance of the Au-ZnO/MWCNTs/GC modified electrode to nonenzymatic glucose determination and other Au and ZnO nanoparticles modified electrodes.

| Electrode                   | Applied potential (V) | Detection limit( $\mu\text{M}$ ) | Linear range ( $\mu\text{M}$ ) | Reference |
|-----------------------------|-----------------------|----------------------------------|--------------------------------|-----------|
| AuNP/BSA/RGO/GCE            | 0                     | 500.0                            | 20-160                         | 1         |
| Nf/Pt HNPCs/porous AuNPs-CS | 0.35                  | 1.0                              | 0.3-770                        | 2         |
| Cu-NPs/ZnO                  | 0.8                   | 0.2                              | 1.0-1530                       | 3         |
| POT-Au-SAM (MPB) electrode  | -                     | 200.0                            | 500-3000                       | 4         |
| Au NW array electrode       | -0.4                  | 30.0                             | -                              | 5         |
| GNPs/MWCNTs/IL GCE          | 0.0                   | 2.0                              | 5.0-120.0                      | 6         |
| Au-ZnO/MWCNTs/GC            | 0.42                  | 0.19                             | 19-291                         | This work |

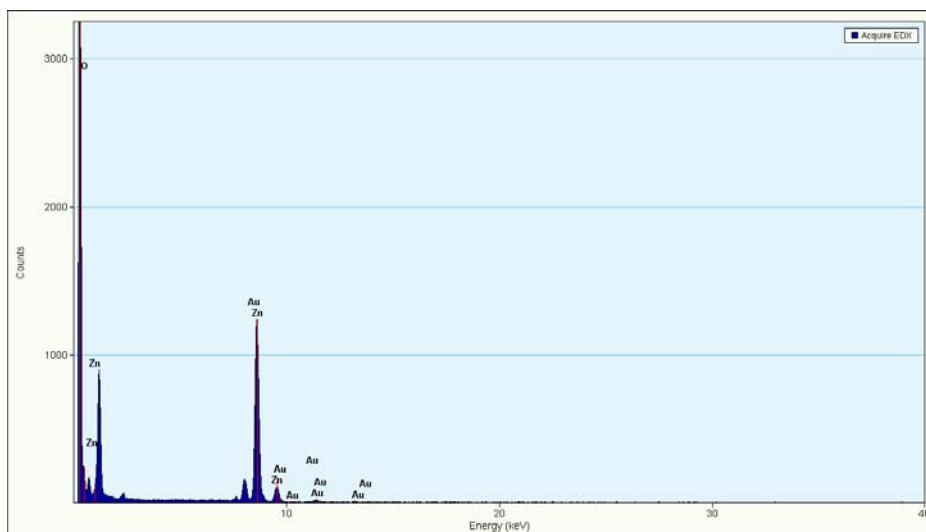
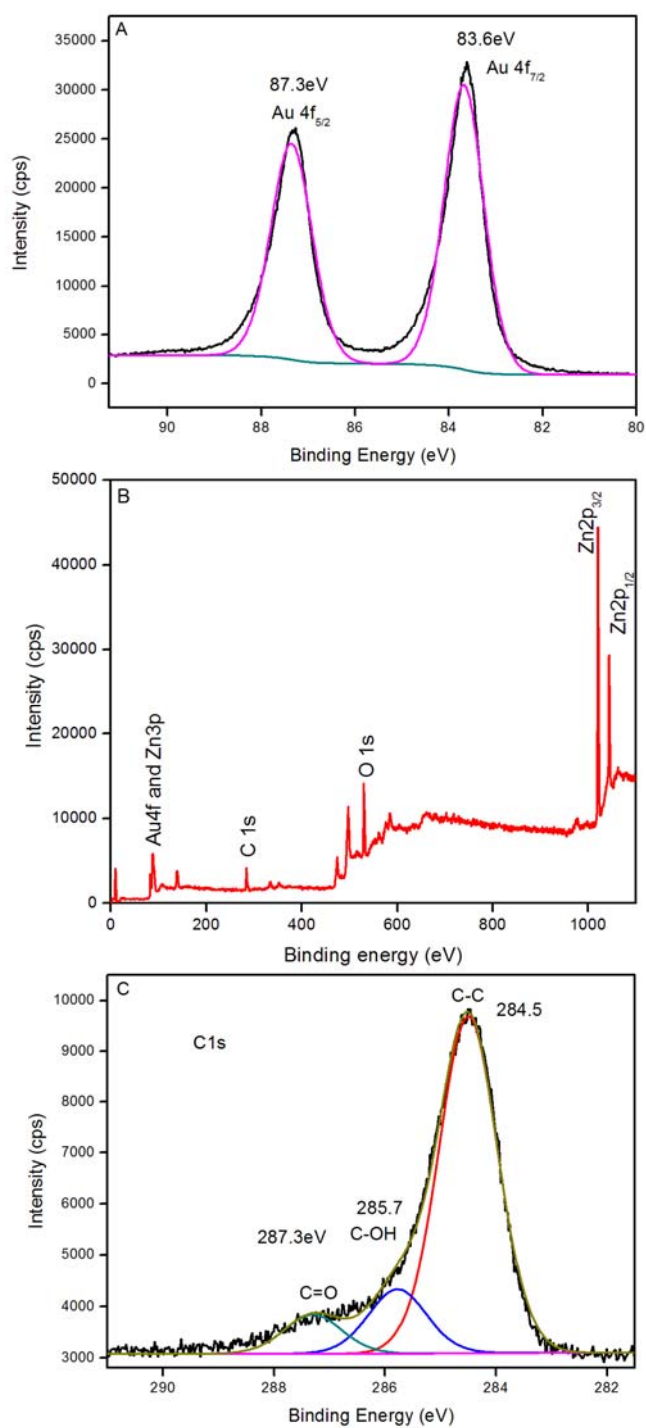
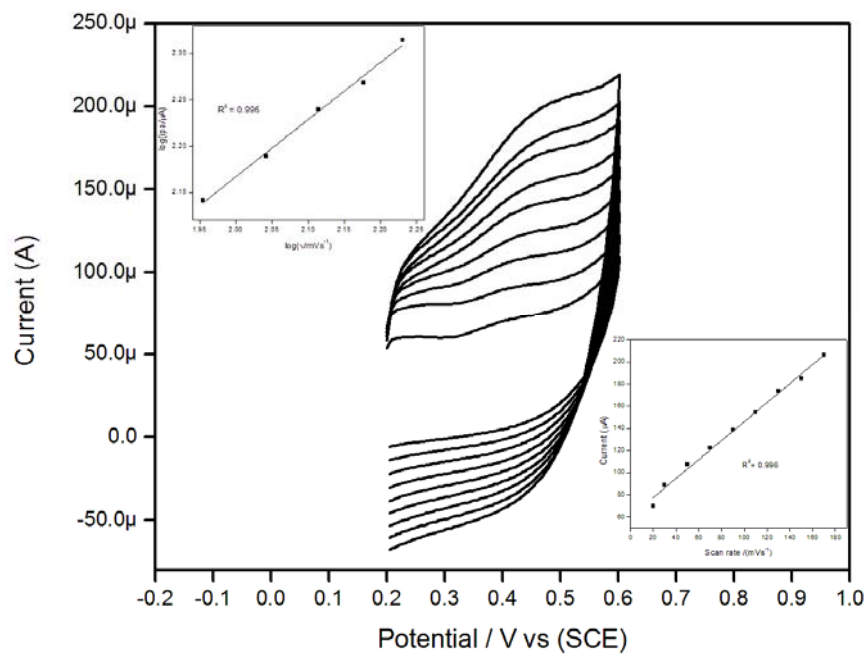


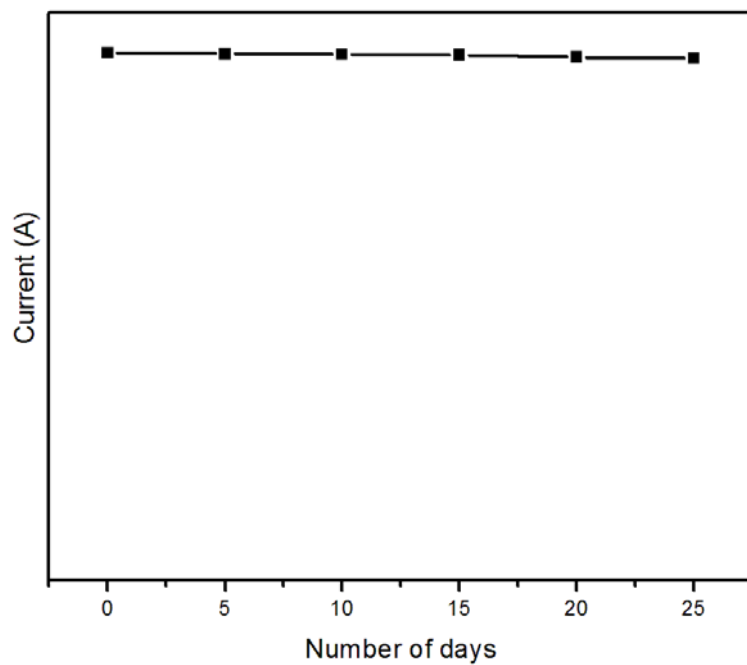
Figure S1 EDX spectra of Au-ZnO HNP



**Figure S2** XPS spectra of (A) Au nanoseed (B) Survey spectra of bullet-like Au-ZnO HNPS (C) C 1s



**Figure S3** CV of 2 mM glucose in 0.1 M NaOH at Au-ZnO/MWCNTs/GC modified electrode with different scan rates: (a) 20, (b) 30, (c) 50, (d) 70, (e) 90, (f) 110, (g) 130, (h) 150, (i) 170 mVs<sup>-1</sup>. Inset: the double log plot of scan rate vs. peak current and scan rate (mVs<sup>-1</sup>) vs peak current.



**Figure S4** Stability test of the Au-ZnO/MWCNTs/GC modified electrode at every five days once tested current response.

## References

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