Electronic Supplementary Material (ESI) for Biomaterials Science.

Supporting Information

Gold dispersed hierarchical flower-like copper oxide microelectrodes for the sensitive detection of glucose and lactic acid in human serum and urine

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Table S1. Comparison of the recently developed sensor platforms with our present sensor platform towards the glucose and lactic acid.

Electrode	Sensing Material	Technique	Sensitivity (mA µM/cm^{-2})	Linear range (µM)	LOD [µM]	Ref.
Cu-Co/rGO /PGE	Glucose	Amperometry	0.240	2.0 - 4000	2.0	[1]
Cu NWs	Glucose	Amperometry	0.420	5.0 - 3000	35.0	[2]
CuNPs/rGO	Glucose	Amperometry	0.447	10.0 –1200	3.40	[3]
CuO-ZnO NRs/FTO	Glucose	Amperometry	2.961	1.0 – 3.45	0.40	[4]
Au@CuO MFs|CME	**Glucose**	**Amperometry**	**4.137**	**5.0 - 500.0**	**1.41**	**This Work**
MWCNT/Pt NPs/GCE	Lactic acid	Amperometry	0.063	200 - 2000	0.30	[5]
ZnO nanotetrapods	Lactic acid	Amperometry	0.028	3.6 - 600	1.20	[6]
Co-NCF	Lactic acid	Amperometry	1.108	0.1-1.0	13.70	[7]
MWCNT/Pt nanoparticle/GCE	Lactic acid	Amperometry	0.064	0.2-2.0	0.30	[6]
Au@CuO MFs|CME	**Lactic acid**	**Amperometry**	**6.196**	**0.1 - 88.0**	**0.027**	**This Work**

rGO: reduced graphene oxide; PGE: pencil graphite electrode; NPs: nanoparticles; GCE: glassy carbon electrode; MWCNT: multiwalled carbon nanotubes; FTO: fluorinated tin oxide; NWs: nanowires; NRs: nanorods; NCF- nitrogen containing carbon framework

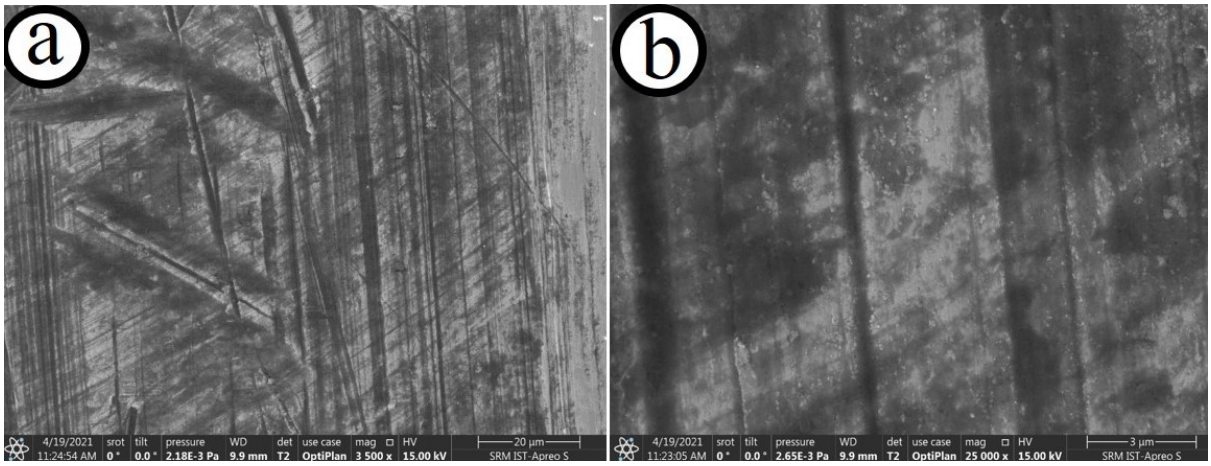

Fig. S1. FE-SEM images of the Cu electrode with low (a), and high (b) magnifications.

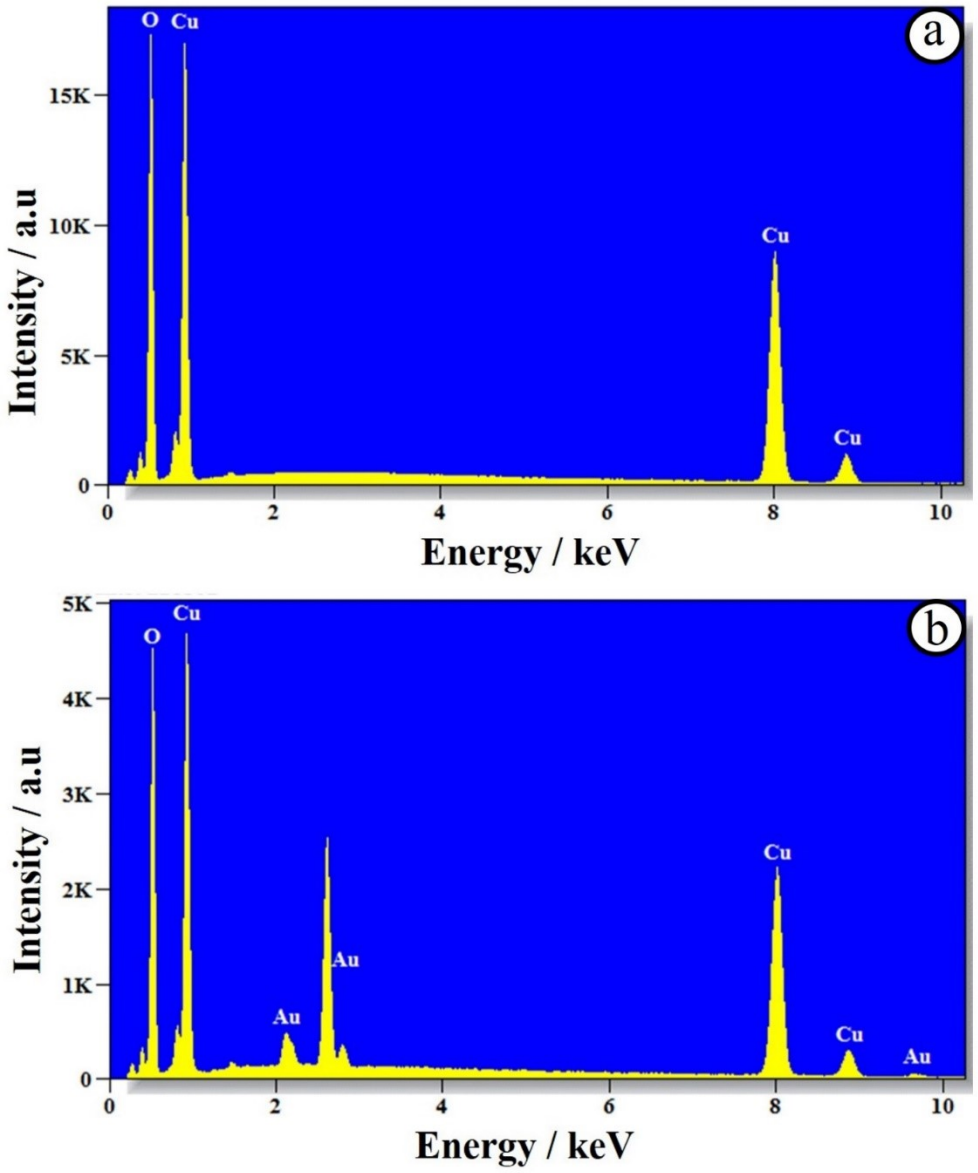

Fig. S2. EDX spectra of the obtained hierarchical CuO MFs|CME (a), and Au@CuO MFs|CME.

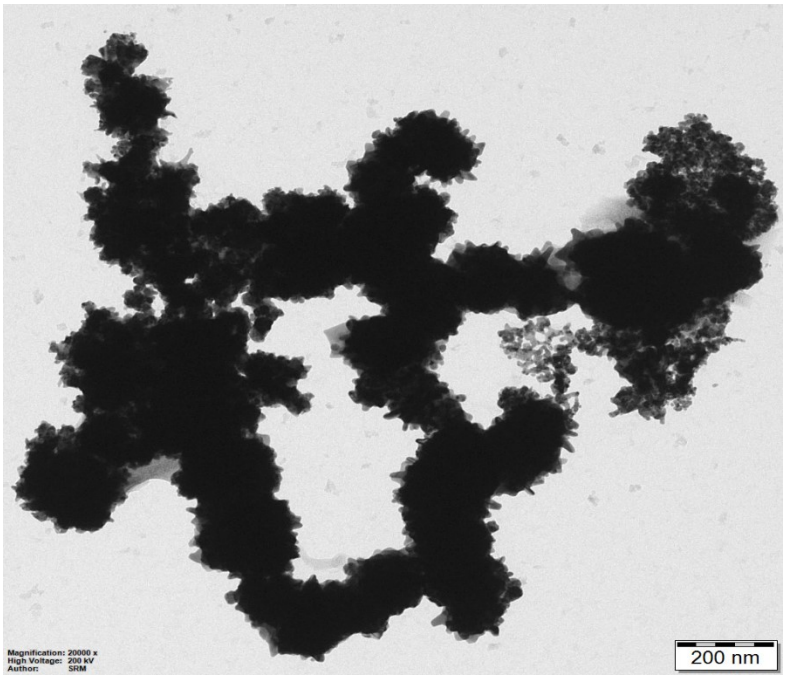

Fig. S3. TEM image of the Au@CuO MFs|CME.

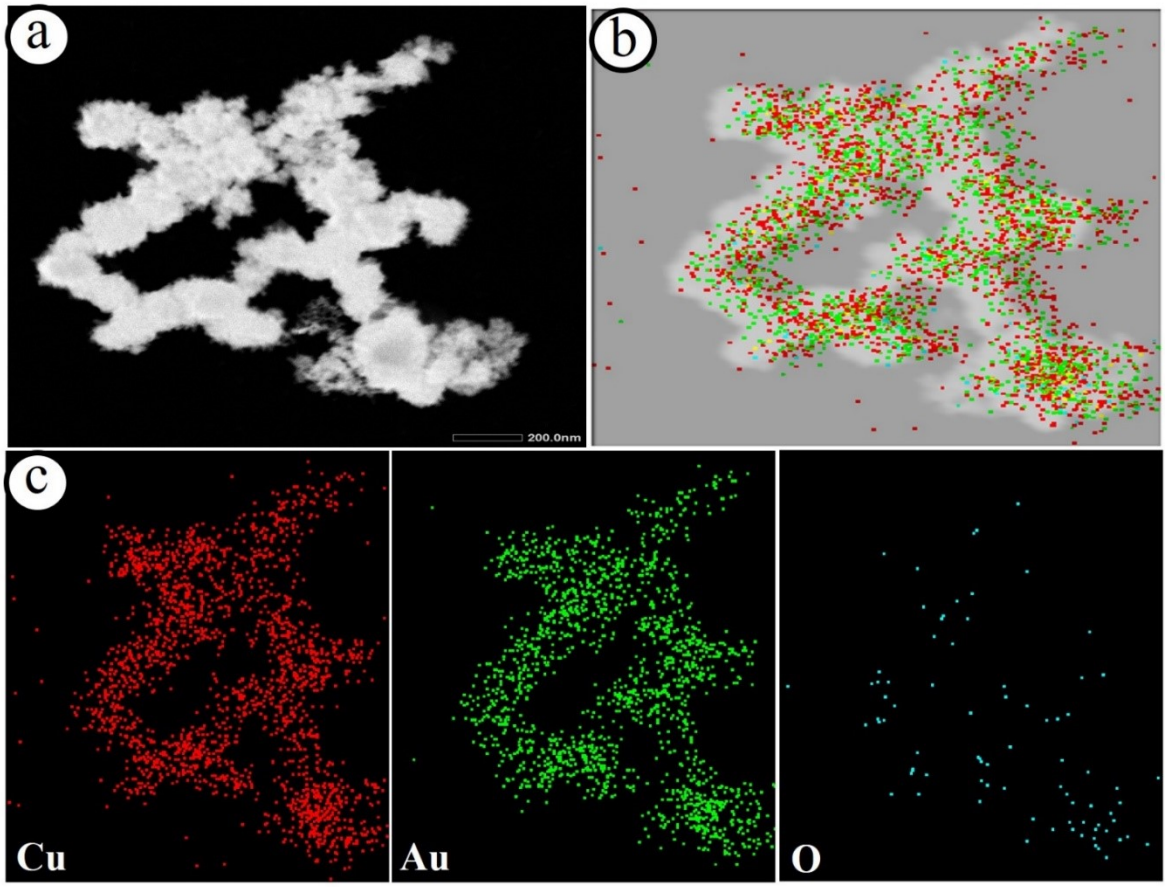

Fig. S4. HAADF image (a), STEM-EDX images (b), and elemental mapping (c) of Cu, O and Au elements for Au@CuO MFs|CME.

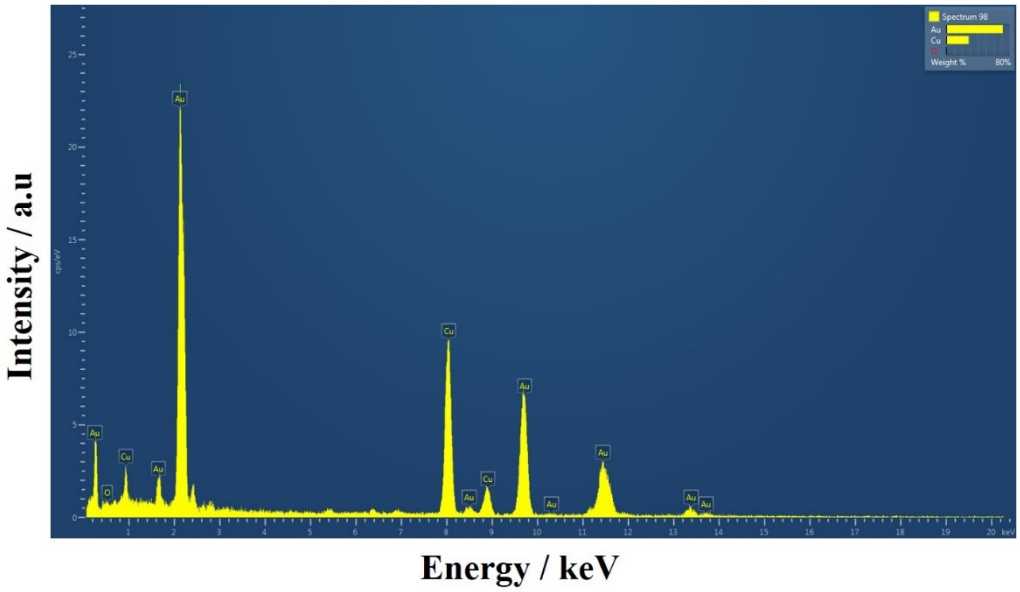

Fig. S5. EDX spectrum of the Au@CuO MFs|CME.

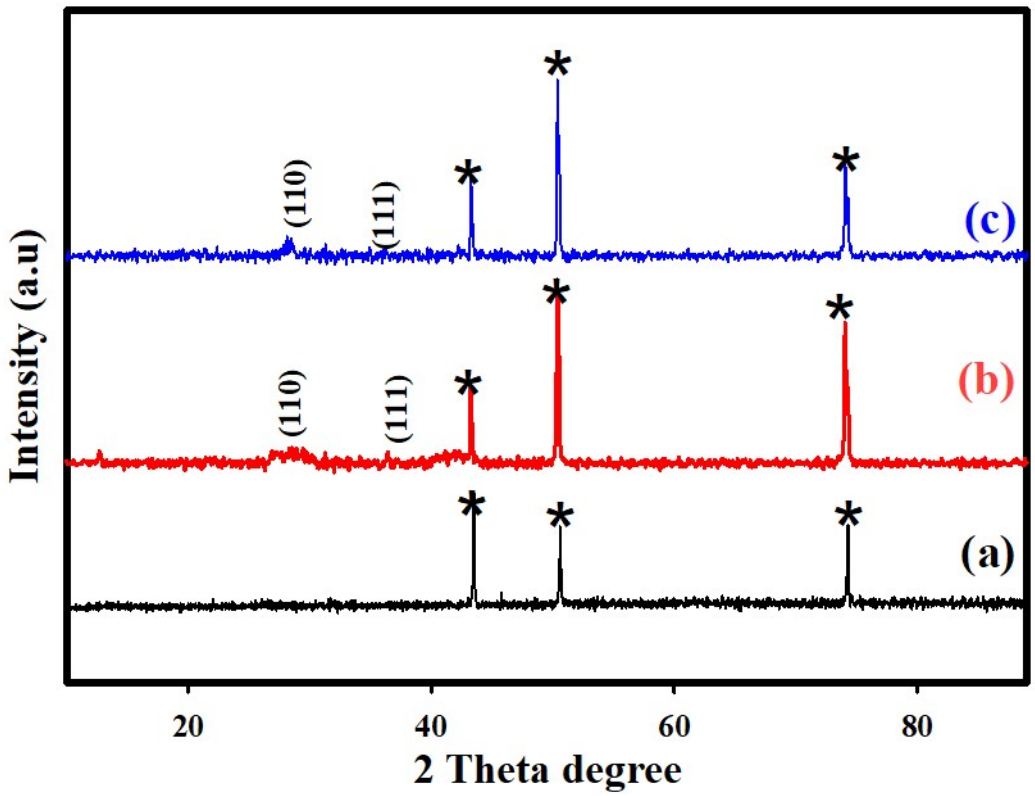

Fig. S6. XRD patterns of the bare Cu|CME (a), CuO MFs|CME (b), and Au@CuO MFs|CME (c).

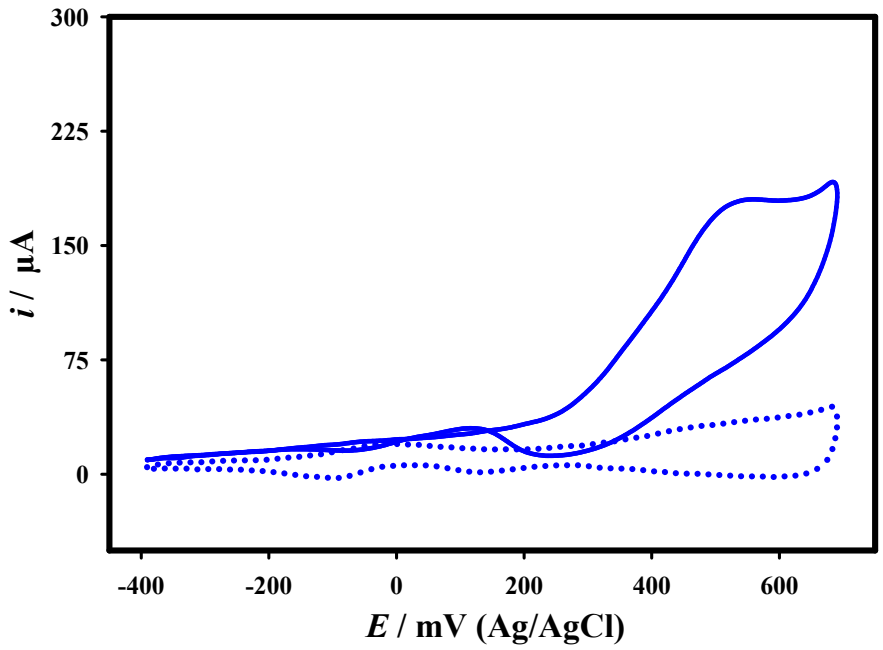

Fig. S7. CV curves of the Au|CME recorded in the absence (dotted line) and 10.0 mM of glucose (solid line) at a scan rate of 20 mVs^{-1} in 0.1 M KOH.

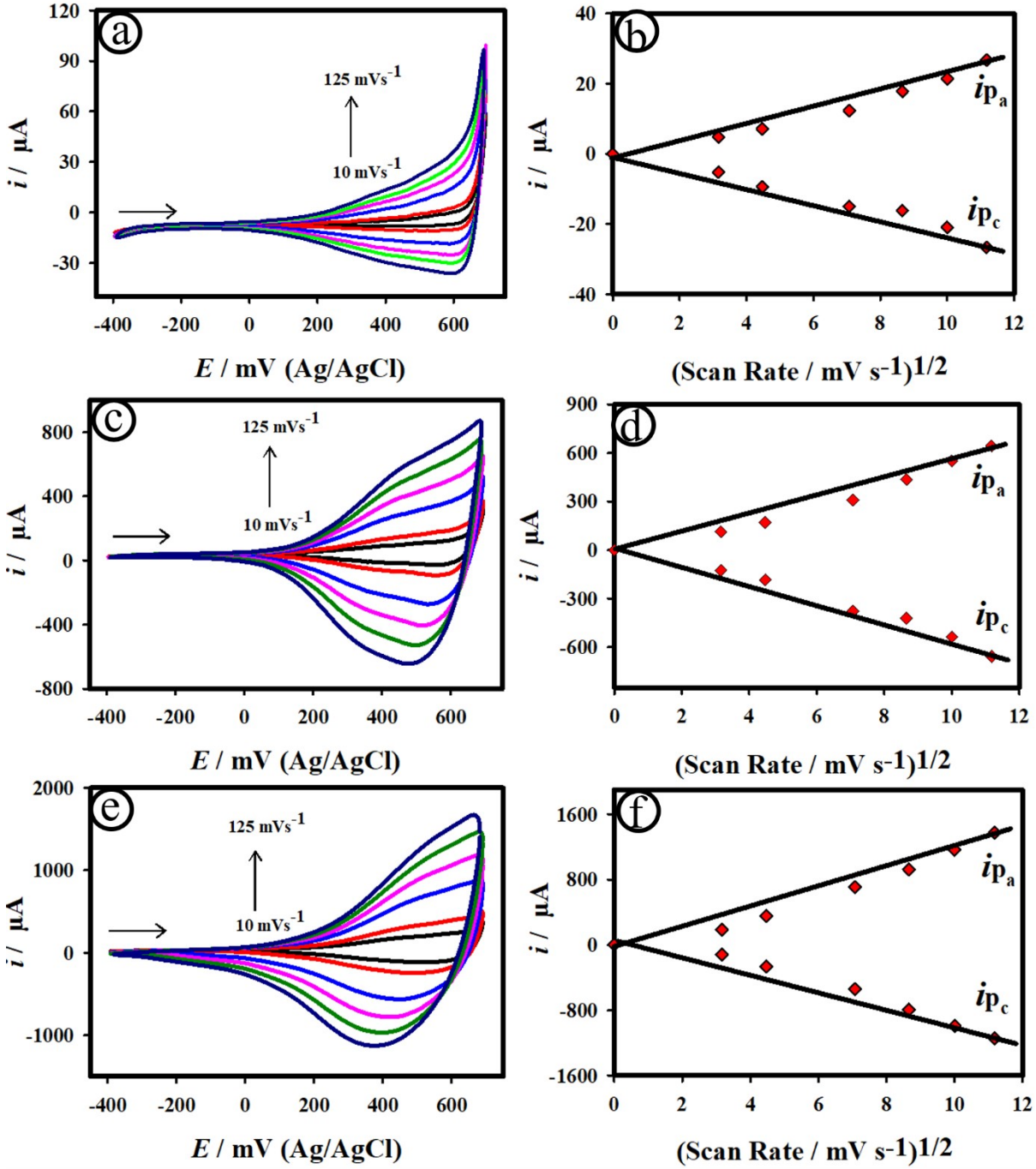

Fig. S8. CV curves of the bare CME (a), CuO MFs|CME (c), and Au@CuO MFs|CME (e) recorded in 0.1 M KOH at different scan rate, and their the corresponding plot of anodic and cathodic currents against the square root of scan rates(b,d,f).

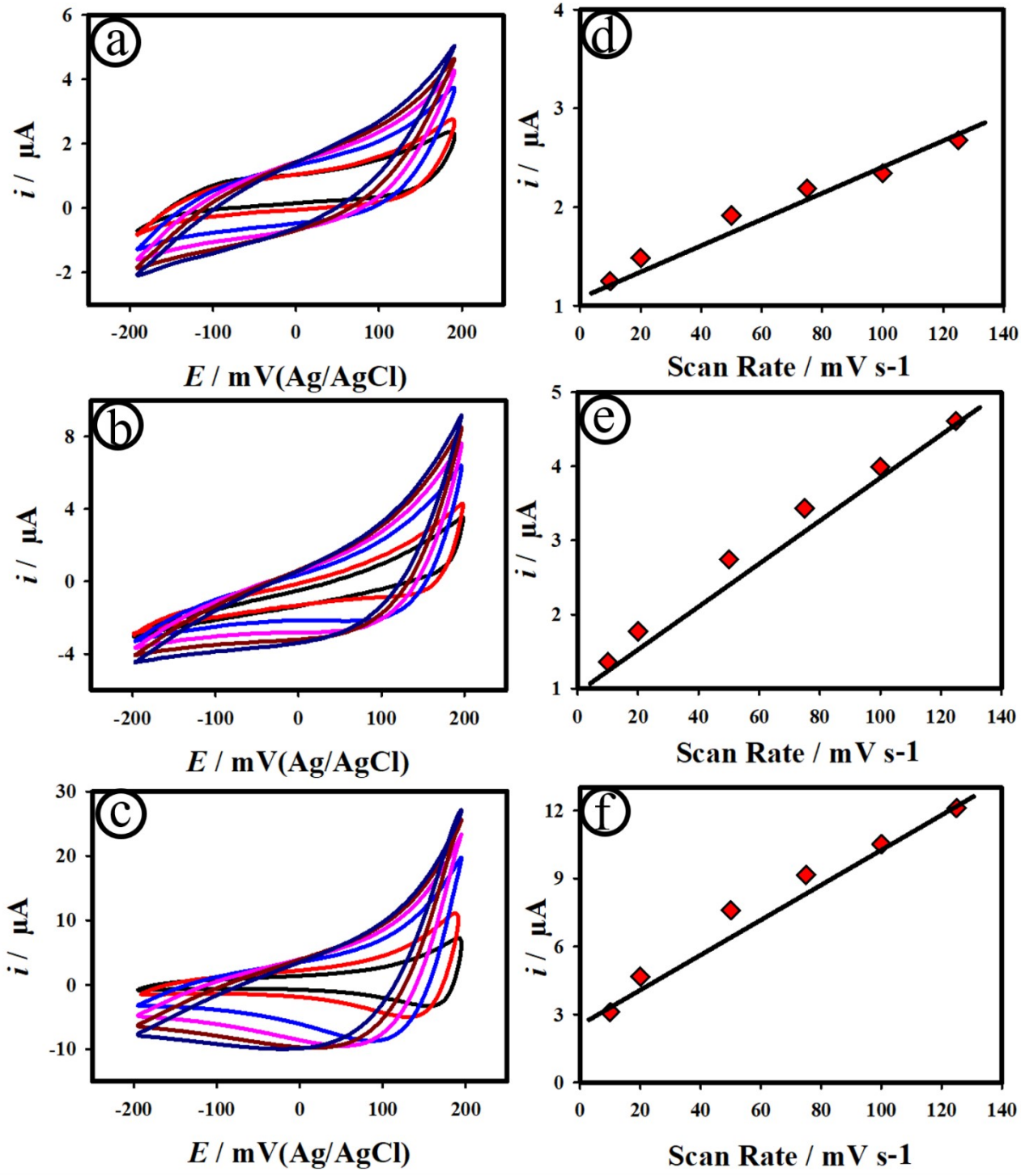

Fig. S9. CV curves of the bare CME (a), CuO MFs|CME (b), and Au@CuO MFs|CME (c) recorded in 0.1 M KOH at different scan rates, starting from 10 to 125 mVs^{-1}. Corresponding plot of anodic double layer currents against the square root of the scan rates (d-f).

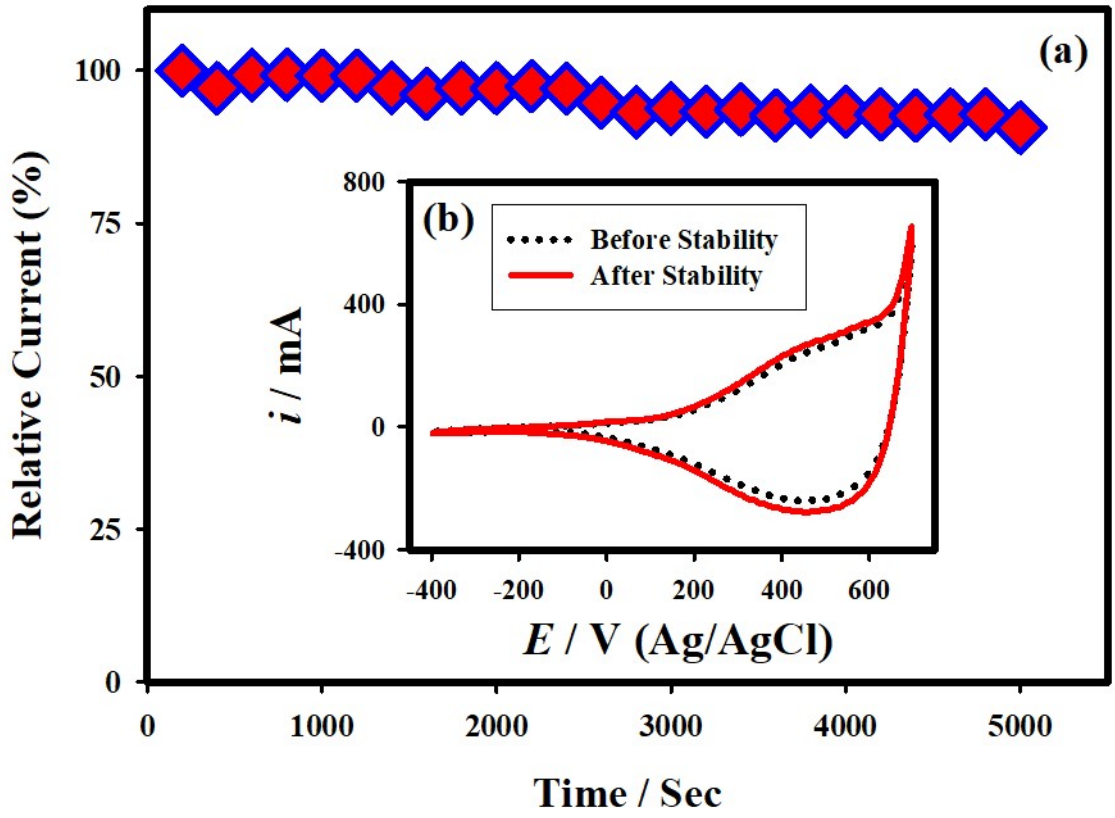

Fig. S10. (a) Amperometric responses obtained for the Au@CuO MFs|CME in 10 mM glucose + 0.1M KOH for 5000 sec (E_{app}: 0.6V). Inset (b): CVs curves of the Au@CuO MFs|CME at before (dotted) and after (solid) durability study.

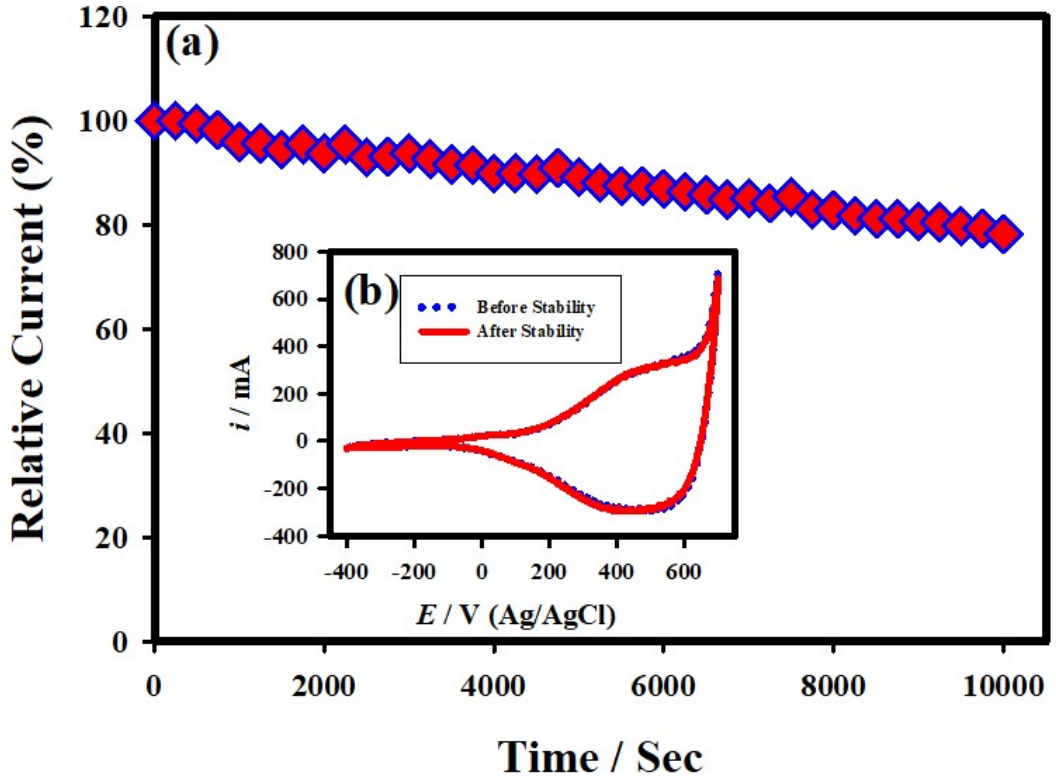

Fig. S11. Amperometric responses obtained for the Au@CuO MFs|CME in 0.1M KOH with the addition of 10 mM LA with applied potential of (E_{app}): 0.6V). Inset (b) CVs curves of Au@CuO MFs|CME at before (dotted) and after (solid) durability study.

References

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