Electronic Supplementary Information (ESI)

Cu2+1O/graphene nanosheets supported on three dimensional copper foam for sensitive and efficient non-enzymatic detection of glucose

Liang Yang, Daoping Liu, Guomin Cui*, Yingming Xie

Institute of New Energy Science and Engineering, School of Energy and Power Engineering, University of Shanghai for Science and Technology, Shanghai 200093, China

* *Corresponding author. Tel/Fax: +86 21 55272320.E-mail address: cgm1226@163.com (G.M. Cui).*

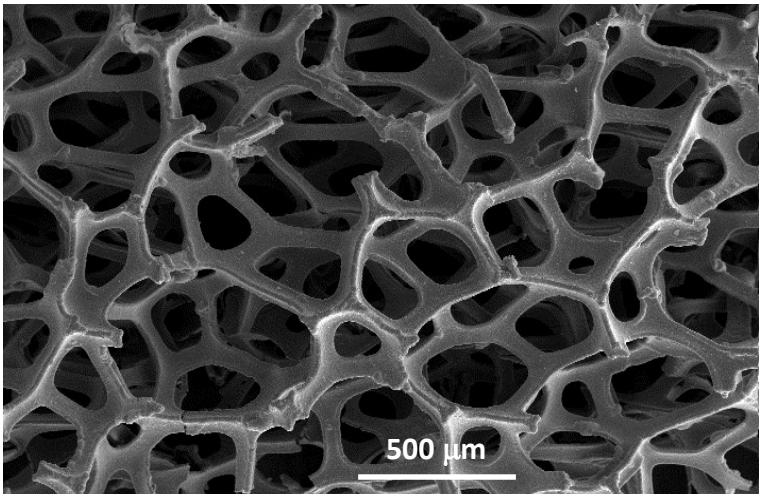

Fig. S1 SEM images of CF

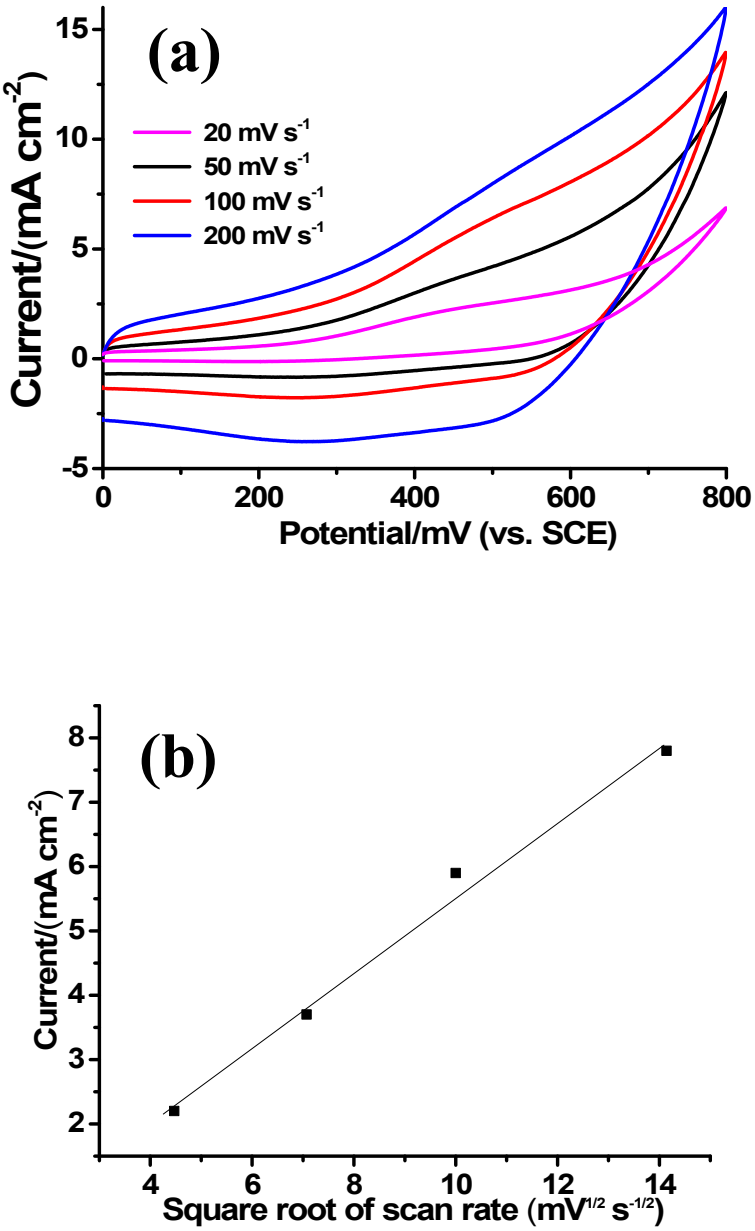

Fig. S2 (a) Cyclic voltammograms of GN/$Cu_{2+1}O$/CF electrodewith addition of 5mM glucose in 0.1 M NaOH at various scan rates from 20, 50, 100, and200 mV s^{-1}, respectively.(b) plot of peak current vs. square root of scan rate.

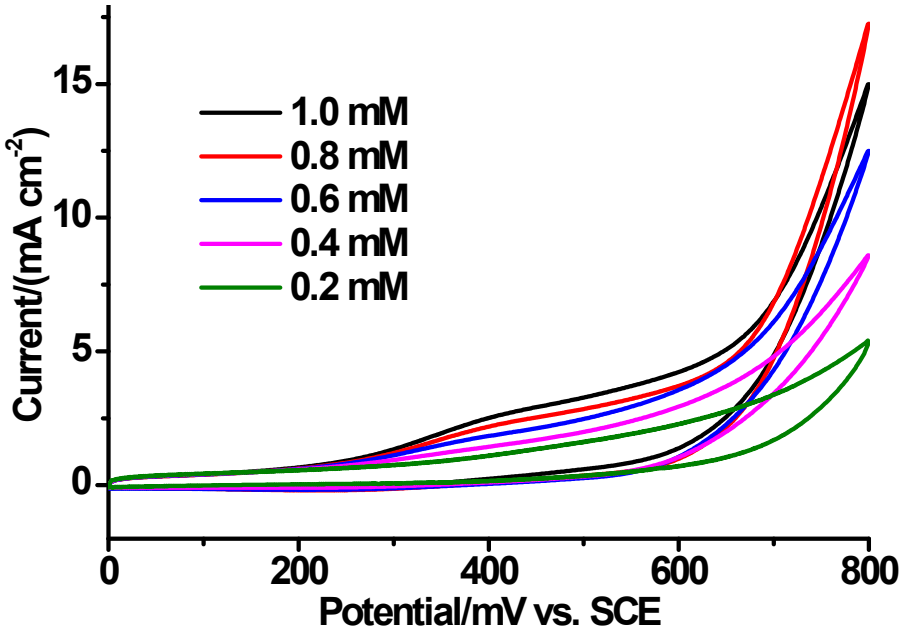

Fig. S3 Cyclic voltammograms of GN/$Cu_{2+1}O$/CF electrodewith different concentrations of glucose in 0.1 M NaOH. Scan rate is20 mV S^{-1}.

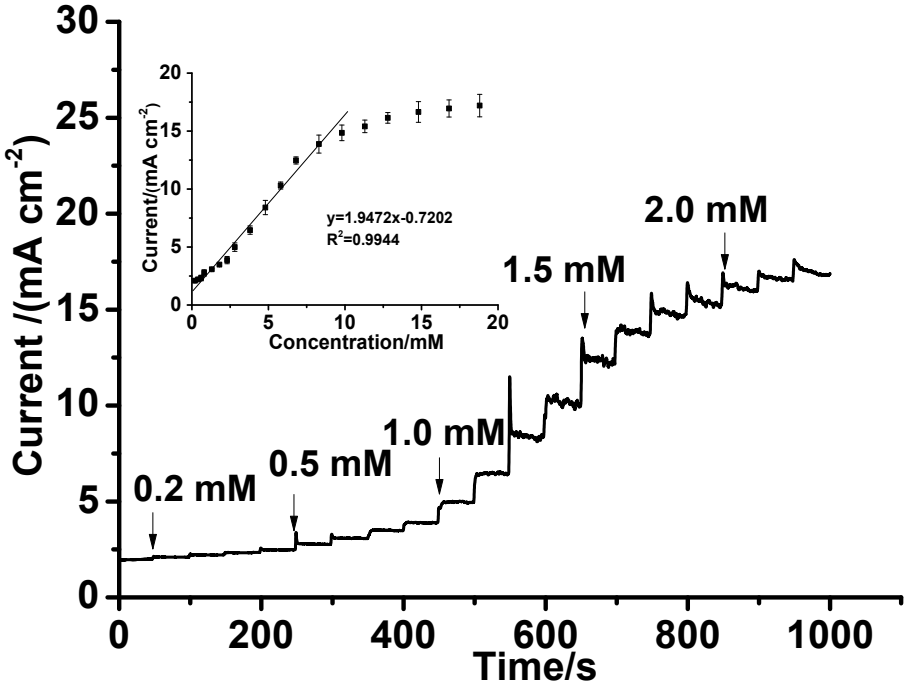

Fig. S4 Amperometric responses of $Cu_{2+1}O$/CF and electrode upon successive addition of glucose in 0.1 M KOH at 450 mV (vs. SCE). And inset is the corresponding calibration curves.

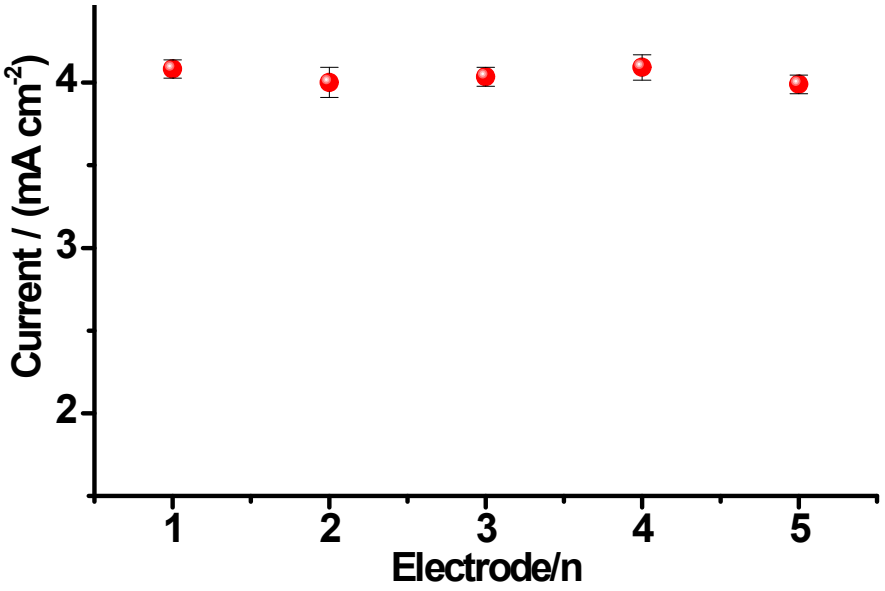

Fig. S5 Reproducibility of five GN/$Cu_{2+1}O$/CF electrodes for detection of 1.0 mM glucose.

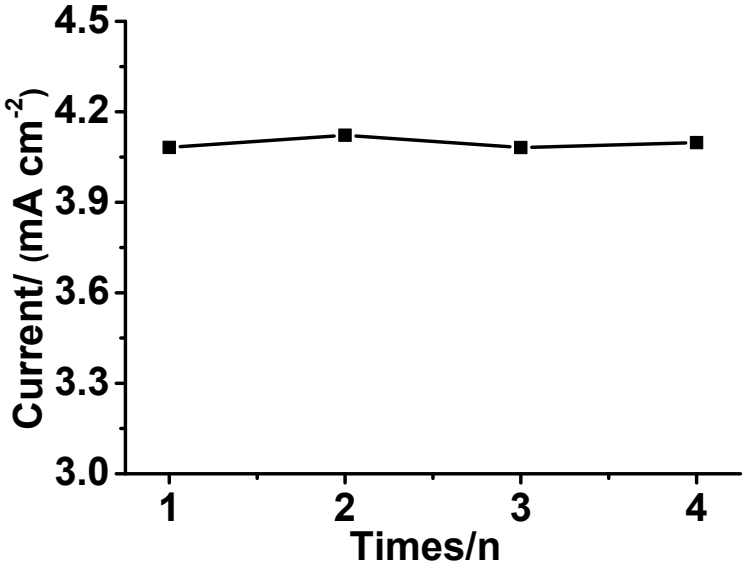

Fig. S6 The repeatability of GN/$Cu_{2+1}O$/CF electrode for detecting 1.0 mM glucose for four times.

Table S1 Comparison of the performance of electrode withpreviouslyreported non-enzymatic glucose sensors.

Samples	**Sensitivity ($\mu A \cdot mM^{-1} \cdot cm^{-2}$)**	**Detection limit (μM)**	**Applied potential (V)**	**Ref.**
GN/$Cu_{2+1}O$/CF	3076	5.0	0.45 V vs. SCE	This work
Copper foam	2570	0.98	0.50 V vs. Ag/AgCl	1
Copper foam	1810	0.98	0.50 V vs. Ag/AgCl	1
hollow CuO polyhedron	1112	0.33	0.50 V vs. Ag/AgCl	2
CuO/SG	1298	0.08	0.50 V vs. Ag/AgCl	3
Cu foam	3397	12.96	0.50V vs. Ag/AgCl	4
CuO nanoellipsoids	2555	0.072	0.55 V vs. Ag/AgCl	5
CuO NT arrays	1890	0.1	0.32 V vs. Ag/AgCl	6
CuO nanowires/ copper foam	2217	0.3	0.35 V vs. Ag/AgCl	7
CuO nanotubes/copper foil	1890	0.1	0.32 V vs. Ag/AgCl	8
CuO nanourchins	2682	1.52	0.50 V vs. Ag/AgCl	9
inkjet printed CuO nanoparticles	2762.5	0.5	0.60 V vs. Ag/AgCl	10
CuO nanospheres	404.53	1.0	0.60 V vs. Ag/AgCl	11
CuO nanoparticles	1430	5.0	0.40 V vs. Ag/AgCl	12
CuO nanowires	648.2	2.0	0.55 V vs. Ag/AgCl	13
Cu nanowires/Cu	490	0.049	0.33 V vs. Ag/AgCl	14
CuO nanofibers	431.3	0.8	0.40 V vs. Ag/AgCl	15
CuO nanoflowers	2657	1.71	0.50 V vs. Ag/AgCl	16

References

S1. X. H. Niu, M. B. Lan, H. L. Zhao, C. Chen, Anal. Chem., 2013, 85, 3561-3569.

S2. C. Kong, L. Tang, X. Zhang, S. Sun, S. Yang, X. Song, Z. Yang, J. Mater. Chem. A, 2014, 2, 7306-7312.

S3. Y. Tian, Y. Liu, W. P. Wang, X. Zhang, W. Peng, Electrochim. Acta, 2015, 156, 244-251.

S4. J. Jin, G. Zheng, Y. Ge, S. Deng, W. Liu, G. Hui, Electrochim. Acta, 2015, 153, 594-601.

S5. X. Zhang, S. Sun, J. Lv, L. Tang, C. Kong, X. Song, Z. Yang, J.Mater. Chem. A, 2014, 2, 10073-10080.

S6. L. Xu, Q. Yang, X. Liu, J. Liu, X. Sun, RSC Adv., 2014, 4, 1449-1455.

S7. Z. Z. Li, Y. Chen, Y. M. Xin, Z. H. Zhang, Sci Rep., 2015, 5, 16115.

S8. S. Yuan, X. L. Huang, D. L. Ma, H. G. Wang, F. Z. Meng, X. B. Zhang, Adv. Mater., 2014, 26, 2273–2279.

S9. S.D. Sun, X.Z. Zhang, Y.X. Sun, S.C. Yang, X.P. Song, Z.M. Yang, ACS Appl. Mater. Interfaces, 2013, 5, 4429-4437.

S10. R. Ahmad, M. Vaseem, N. Tripathy, Y.B. Hahn, Anal. Chem., 2013, 85, 10448–10454.

S11. E. Reitz, W.Z. Jia, M. Gentile, Y. Wang, Y. Lei, Electroanalysis, 2008, 20, 2482-2486.

S12. F.Y. Huang, Y.M. Zhong, J. Chen, S.X. Li, Y.C. Li, F. Wang, S. Q. Feng, Anal. Methods., 2013, 5, 3050-3055.

S13. X. Wang, C. G. Hu, H. Liu, G.J. Du, X.S. He, Y.Xi, Sensor Actuat B: Chem, 2010, 144, 220–225.

S14. Z. Zhuang, X. Su, H. Yuan, Q. Sun, D. Xiao, M.M. Choi, Analyst, 2008, 133, 126–132.

S15. W. Wang, L. Zhang, S. Tong, X.Li, W. Song, Biosens. Bioelectron., 2009, 25, 708–714.

S16. S. Sun, X. Zhang, Y. Sun, S. Yang, X. Song, Z. Yang, Phys. Chem. Chem. Phys., 2013, 15, 10904–10913.