# Electronic Supplementary Information (ESI)

## Synthesis of $MnCo_2O_4$ nanofibers by electrospinning and calcination: application for a highly sensitive non-enzymatic glucose sensor

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## *XPS analysis*

Fig. S1 shows XPS spectra of (A) Mn 2p, (B) Co 2p for the synthesized MCFs. The Mn 2p spectra of $MnCo_2O_4$ features two main spin-orbit lines of $2p_{3/2}$ at 642.0 eV and $2p_{1/2}$ at 653.5 eV, assigned to the Mn $2p_{3/2}$ and Mn $2p_{1/2}$ peaks, respectively. Both Mn 2p spectra can be assigned to the existence of Mn(II) and Mn(III) cations.[1] Meanwhile, the Co 2p XPS spectra of the spinel cobaltite consists of two main peaks with the Co $2p_{3/2}$ at a binding energy of 780 eV and the Co $2p_{1/2}$ at 796 eV, which can be assigned to the existence of Co(II) and Co(III) cations.[2] These data show that the prepared MCFs belongs to the mixed valence compound containing Mn(II), Mn(III), Co(II) and Co(III).

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## *Optimization of sensing conditions*

To improve the electrocatalytic performance of MCFs/GCE towards glucose, influence factors were optimized, including the concentration of supporting electrolyte (NaOH), applied potential and the concentration of modifier.

The pH value of supporting electrolyte has a great influence on the electrocatalytic oxidation of glucose by MCFs. Fig. S2A shows the effect of the concentration of NaOH in the range of 0.005 to 0.5 M on the oxidation current of 10 μM glucose at the MCFs/GCE. The current response of glucose increased strikingly with the increase of NaOH concentration from 0.01 to 0.2 M, and then leveled off. Therefore, 0.2 M NaOH solution was selected in subsequent experiments.

The applied potential is a key factor influencing the performance of the non-enzymatic glucose sensor. Fig. S2B illustrates the effect of the applied potential varying from +0.40 to +0.60 V on the response current of 10 μM glucose. The peak current response increased with the increment of applied potential from +0.40 to +0.55 V, and then decreased at potentials high than +0.55 V. Therefore, potential of +0.55 V was chosen for further experiments.

Fig. S2C shows the effect of MCFs concentration on the amperometric response of 10 μM glucose. The current response of glucose increased rapidly upon the increase of MCFs from 1.0 to 3.0 mg/mL, and then decreased with concentration shifting from 3 to 5 mg/mL. Thus, 3.0 mg/mL MCFs was selected for the amperometric detection of glucose.

## References

1 L. Yu, L. Zhang, H. B. Wu, G. Q. Zhang and X. W. Lou, *Energy Environ. Sci.*, 2013, **6**, 2664–2671.

2 J. Gomez and E. E. Kalu, *J. Power Sources*, 2013, **230**, 218–224.

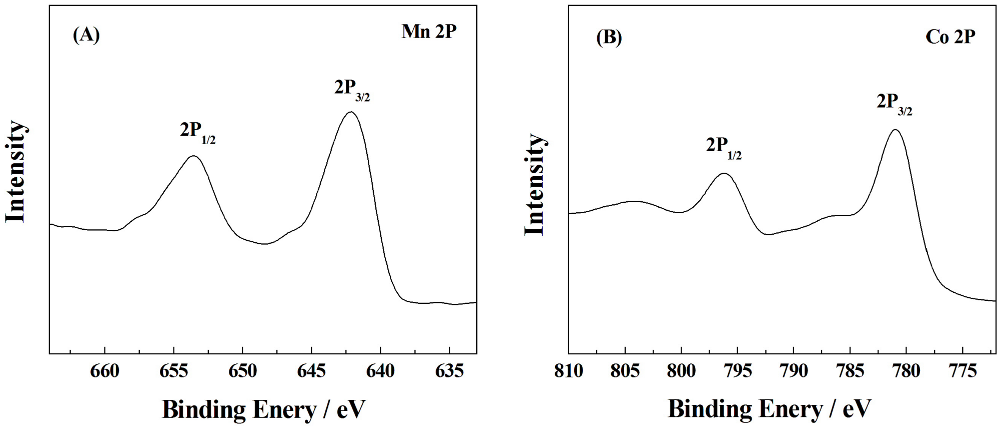
## Figure captions

**Fig. S1** XPS spectra of (A) Mn 2p, (B) Co 2p for the synthesized MCFs.

**Fig. S2** Effect of experimental conditions on the amperometric response of 10 μM glucose (A) NaOH concentration; (B) Applied potential; (C) The concentration of MCFs.

**Fig. S3** Amperometric response to injections of 100 μM glucose, 5 μM interferents of galactose, lactose, sucrose and maltose at the MCFs/GCE under +0.55 V.

**Fig. S1**


(A)
Mn 2P
2P1/2
2P3/2
Intensity
660
655
650
645
640
635
Binding Enery / eV
(B)
Co 2P
2P1/2
2P3/2
Intensity
810
805
800
795
790
785
780
775
Binding Enery / eV

# Fig. S2

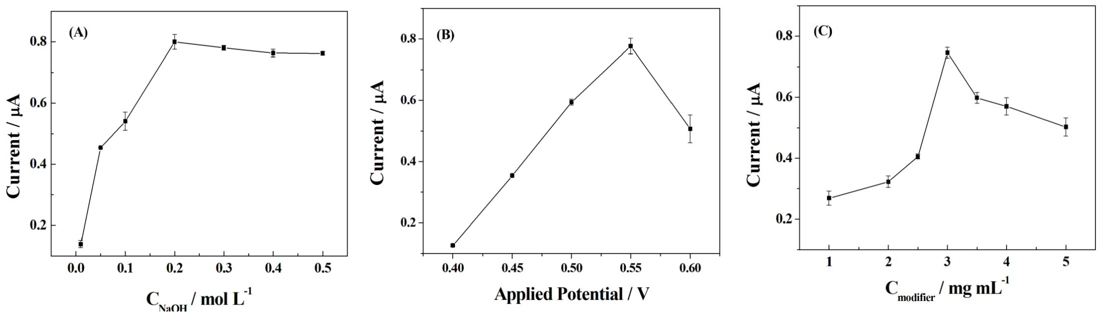
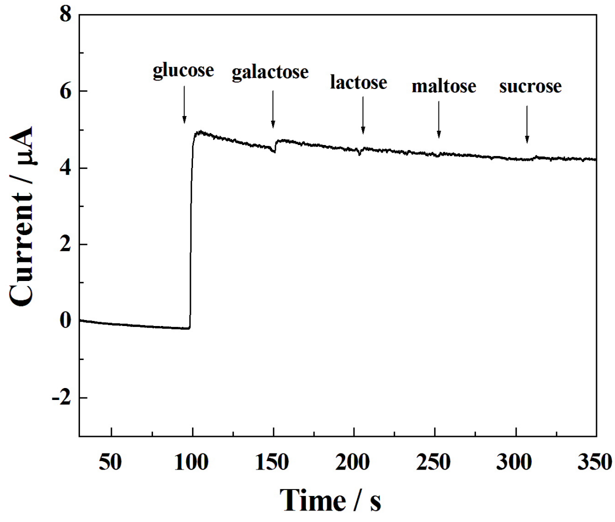

(A)
Current / μA
0.2
0.4
0.6
0.8
0.0
0.1
0.2
0.3
0.4
0.5
C_NaOH / mol L^-1
(B)
Current / μA
0.2
0.4
0.6
0.8
0.40
0.45
0.50
0.55
0.60
Applied Potential / V
(C)
Current / μA
0.2
0.4
0.6
0.8
1
2
3
4
5
C_modifier / mg mL^-1

**Fig. S3**


8
6
4
2
0
-2
Current / μA
glucose
galactose
lactose
maltose
sucrose
50
100
150
200
250
300
350
Time / s