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## **Electronic Supplementary Information**

## Hierarchical Porous Ni/NiO Core-Shell with Superior Conductivity

## for Electrochemical Pseudo-Capacitor and Glucose Sensor

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**Fig. S1** HRTEM images of hierarchical porous Ni/NiO core-shell with a) 30 s and b) 120 s plasma treatment.



Fig. S2 HRTEM image of hierarchical porous Ni/NiO core-shell after 60 s plasma treatment.



**Fig. S3** CV comparison of hydroxide precursor, hierarchical porous Ni and Ni/NiO in 1 M KOH. The inset is enlarged curve of hydroxide precursor and hierarchical porous Ni in 1 M KOH.



**Fig. S4** a) The CV curve of the hierarchical porous Ni/NiO electrodes measured at a potential scan rate of 20 mV s<sup>-1</sup> in 0.1 M NaOH with 1 mM glucose; b) Amperometric responses of the electrodes to sequential additions of 1 mM glucose into the stirred 0.1 M NaOH solution; c) the corresponding calibration curves of (b); d) Sensitivity of the Ni/NiO electrodes plotted as a function of the plasma treatment time.



Fig. S5 Cyclic voltammograms of the Ni/NiO core-shell electrode in 0.1 M NaOH solution with and without 1 mM glucose at a scan rate of 20 mV s<sup>-1</sup>.



Fig. S6 CV curves of hydroxide precursor, hierarchical porous Ni and Ni/NiO in 0.1MNaOHatthepresenceof1mMglucose.



Fig. S7 Calibration curve of the amperometric sensor as a function of glucose concentration.



**Fig. S8** a)Amperometric responses of the same Ni/NiO electrode to sequential additions of 1 mM glucose into the stirred 0.1 M NaOH solution at different time. The inset is the corresponding calibration curves; b) Variation of the response current of the non-enzymatic glucose sensor with time.



**Fig. S9** TEM images of the Ni/NiO electrodes with different plasma treatment time. a) 30 s; b) 120 s; c) 240 s; d) 360 s.



Fig. S10 Cross-sectional SEM image of porous Ni/NiO electrode with 60 s plasma treatment.

Electrode structure	Thickness	Capacitance	Literature
Hierarchical porous Ni/NiO core-shell	6-8 µm	255 mF cm <sup>-2</sup>	This work
3D porous Ni/NiO	2-4 μm	657.9 mA h g <sup>-1</sup>	[1]
MnO <sub>2</sub> supported on 3D-Ni	-	837.6 mF cm <sup>-2</sup>	[2]
Ni@NiO core-shell	1 mm	2.0 F cm <sup>-2</sup>	[3]
Ni(OH)2@three-dimensional Ni	-	2868 F g-1	[4]
NiO platelet on FTO glass	3-4 μm	less than 64 mF cm <sup>-2</sup>	[5]
Ni-NiO core-shell inverse opals	-	10 mF cm <sup>-2</sup>	[6]

Table S1 Performance comparison of Ni based composite electrochemical electrodes

References

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