Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

ZIF-8/ZIF-67-derived 3D amorphous carbon-encapsulated CoS/N-CNTs supported on CoS-coated carbon nanofibers as an advanced potassium-ion battery anode

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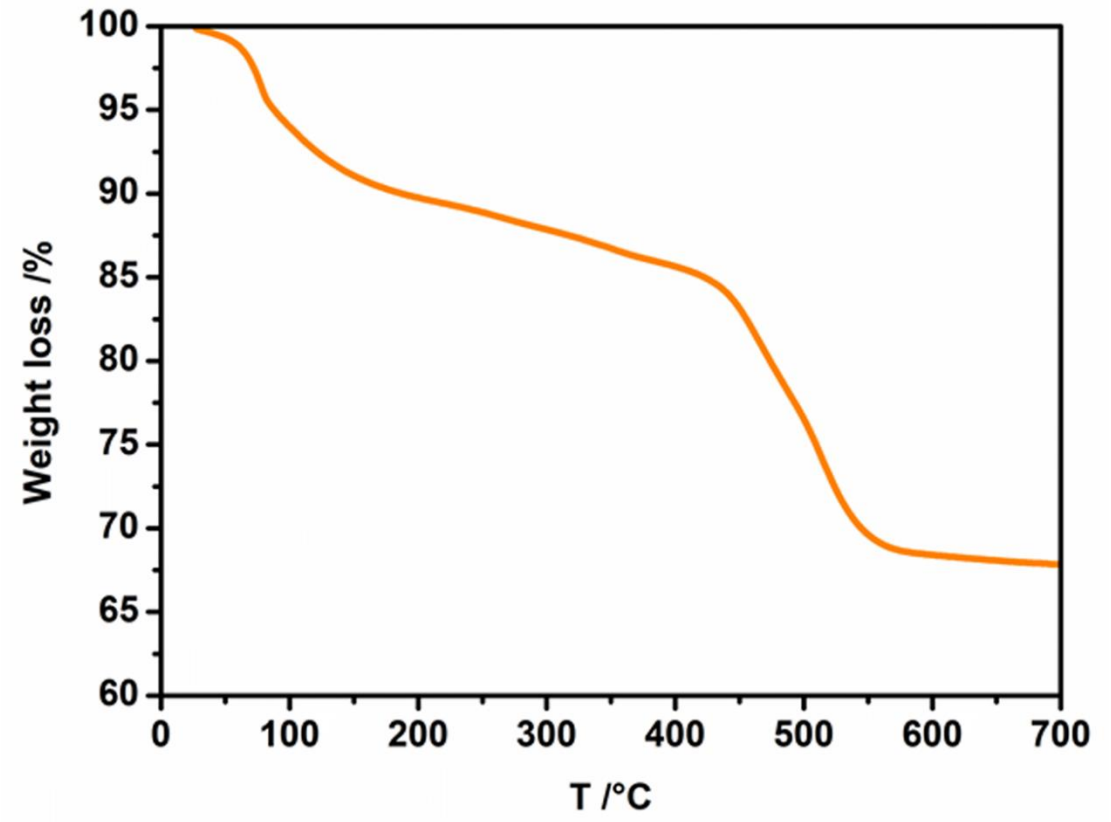

Fig. S1. Thermogravimetric analysis (TGA) curve of AC@CoS/NCNTs/CoS@CNFs.

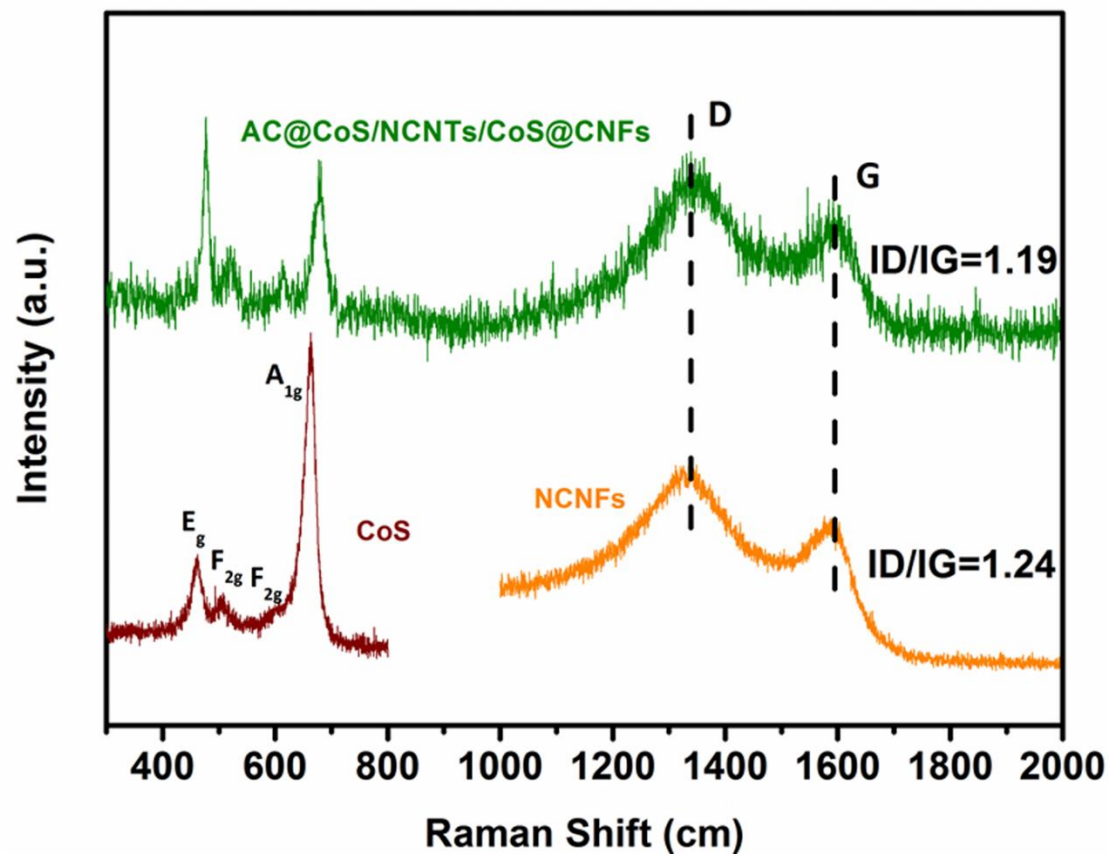

Fig. S2. Raman spectra of CoS, NCNFs, and AC@CoS/NCNTs/CoS@CNFs.

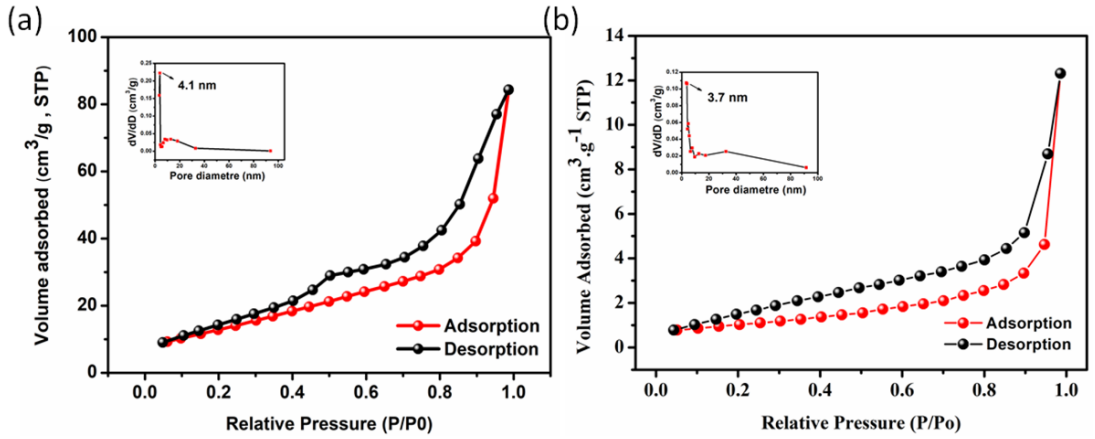

Fig. S3. N_2 adsorption/desorption isotherms and the corresponding BJH distributions (inset) of (a) CoS and (b)NCNFs.

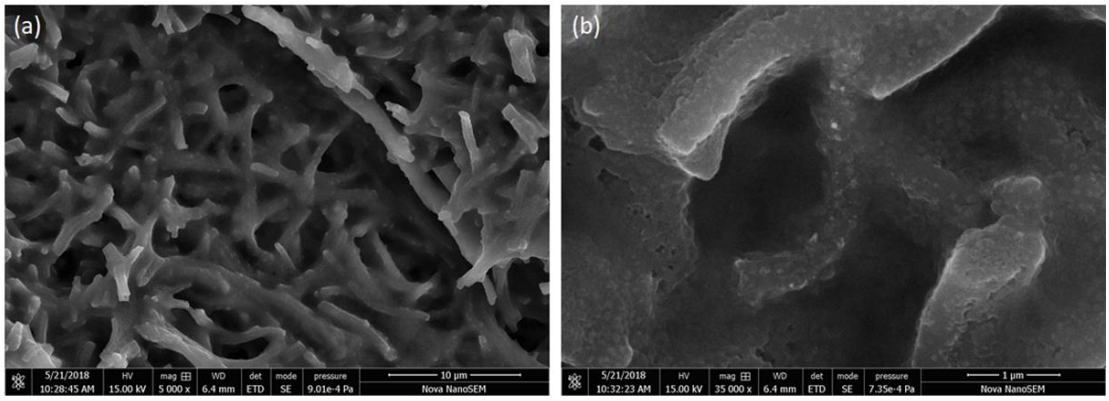

Fig. S4. SEM images (a, b) of the AC@CoS/NCNTs/CoS@CNFs electrode after 100 charge/discharge cycles.

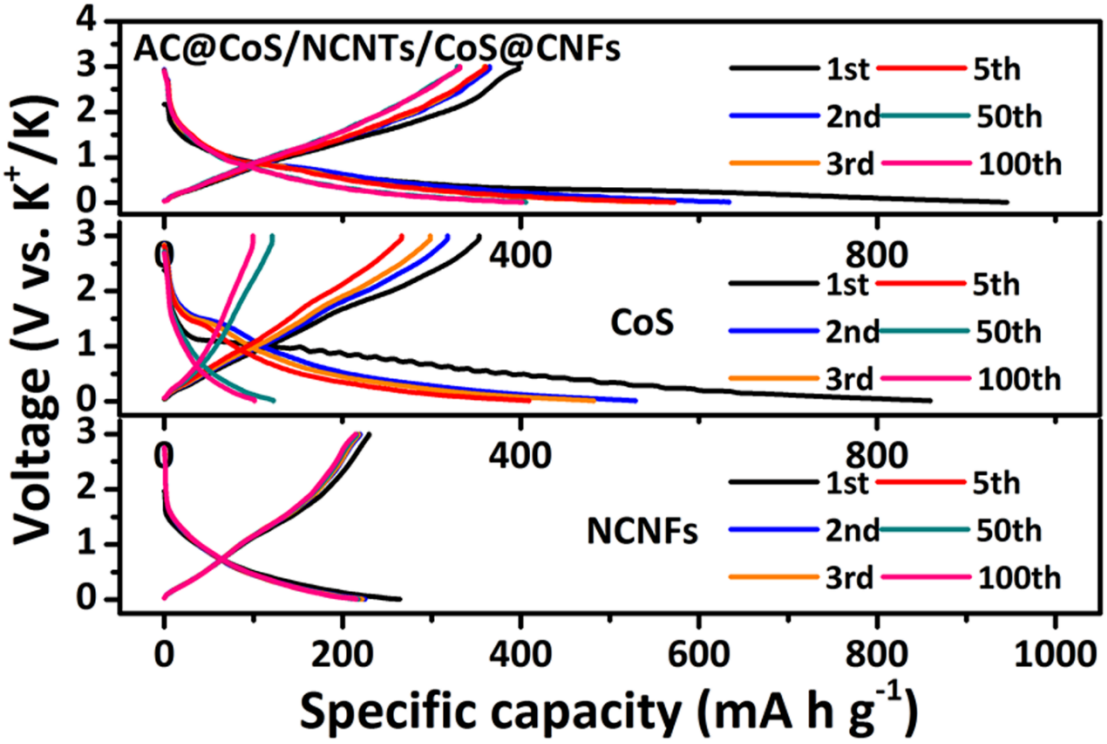

Fig. S5. Charge/discharge curves of the (a)AC@CoS/NCNTs/CoS@CNFs composite, (b) CoS and (c)NCNFs at 0.1 A g^{-1}.

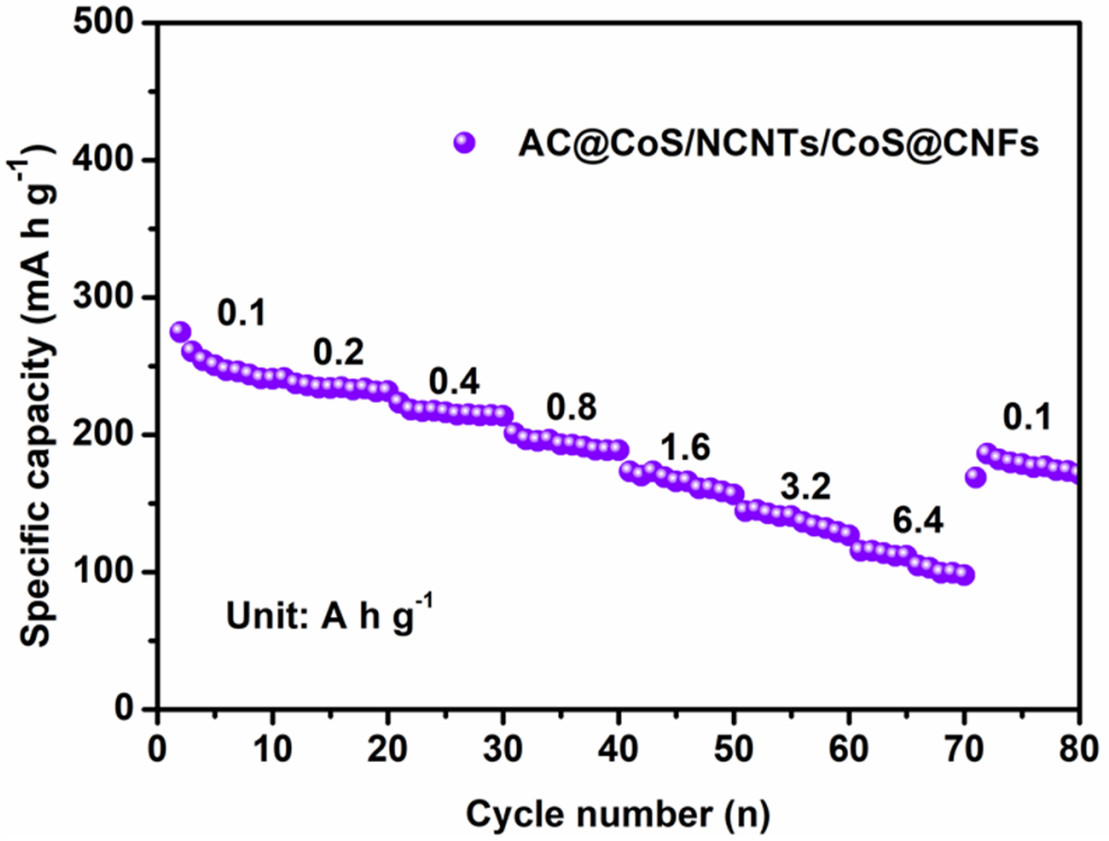

Fig. S6. Rate capabilities measured at various current densities from 0.1 to 6.4 A g^{-1} of the AC@CoS/NCNTs/CoS@CNFs anode in NIBs.

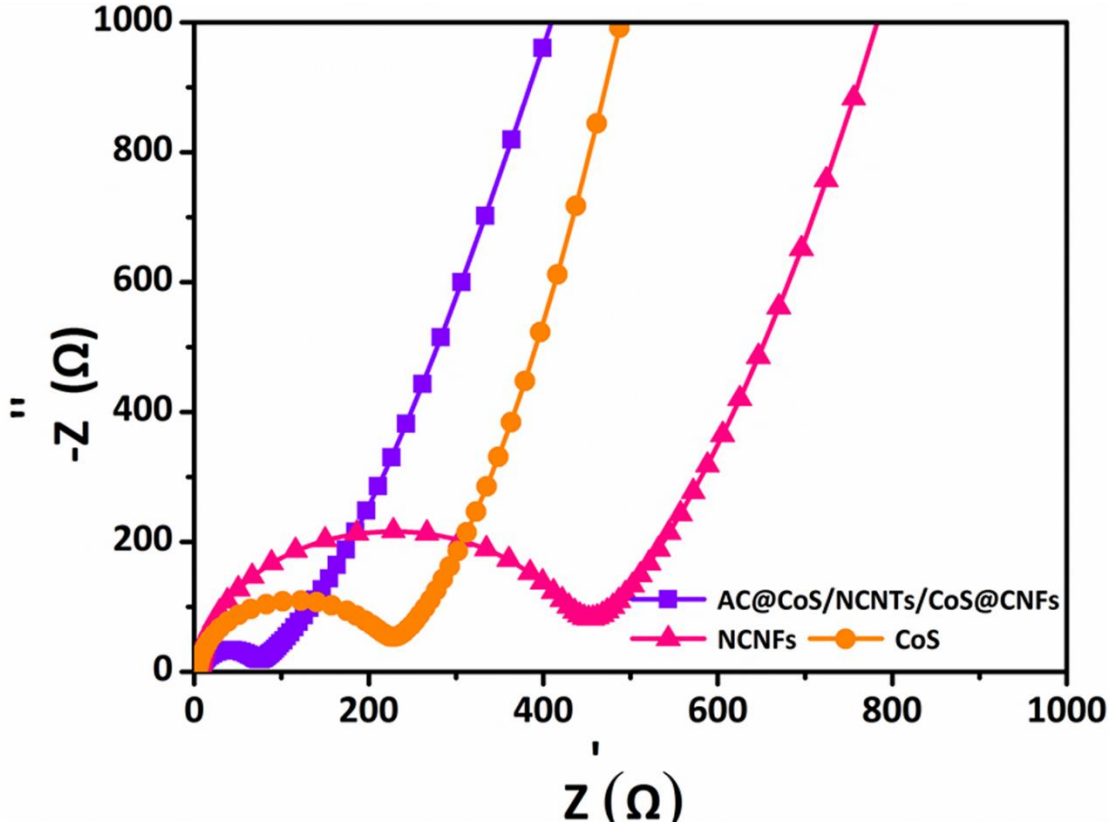

Fig. S7. EIS curves and the corresponding equivalent circuit of the electrodes in NIBs.

Materials	High rate capacity (mA h g^{-1})	Cyclic performance
Expanded Graphite [1]	175 mA h g^{-1} （0.2 A g^{-1}）	228 mA h g^{-1} at 0.05 A g^{-1}, 200 cycles
Nitrogen-Doped Graphene [2]		250 mA h g^{-1} at 0.1 A g^{-1}, 100cycles
Graphite [3]	80 mA h g^{-1} (0.27 A g^{-1})	100 mA h g^{-1} at 0.14 A g^{-1}, 50 cycles
PODG [4]	165 mA h g^{-1} (2 A g^{-1})	500 mA h g^{-1} at 0.05 A g^{-1}, 50cycles
Activated carbon [5]	30 mA h g^{-1} (1.5 A g^{-1})	62 mA h g^{-1} at 0.2 A g^{-1}, 100 cycles
Carbon Nanospheres [6]	150 mA h g^{-1} (1.4 A g^{-1})	212 mA h g^{-1} at 0.58 A g^{-1}, 100 cycles
Hard–Soft Carbon [7]	121 mA h g^{-1} (2.8 A g^{-1})	200 mA h g^{-1} at 0.3 A g^{-1}, 100 cycles
Porous Carbon Nanofiber[8]	80 mA h g^{-1} (7.7 A g^{-1})	200 mA h g^{-1} at 0.2 A g^{-1}, 1200 cycles
NCNTs [9]		254 mA h g^{-1} at 0.05 A g^{-1}, 300 cycles; 100 mA h g^{-1} at 2 A g^{-1}, 500cycles
Pencil-Trace [10]	70 mA h g^{-1} (1.1 A g^{-1})	110 mA h g^{-1} at 0.4 A g^{-1}, 350cycles
OMC [11]	146 mA h g^{-1} (1 A g^{-1})	130 mA h g^{-1} at 1 A g^{-1}, 1000 cycles; 270 mA h g^{-1} at 0.05 A g^{-1}, 100 cycles
NOHPHC [12]	118 mA h g^{-1} (3 A g^{-1})	230 mA h g^{-1} at 0.05 A g^{-1}, 100 cycles
This work	133.1 mA h g^{-1} (6.4 A g^{-1})	401 mA h g^{-1} at 0.1 A g^{-1}, 100 cycles 130 mA h g^{-1} at 3.2 A g^{-1}, 600 cycles

Table S1. The comparison of electrochemical performance between AC@CoS/NCNTs/CoS@CNFs and other reported anode materials for KIBs.

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