Electronic Supporting Information

Carbon-coated NiSe nanoparticles anchored on reduced graphene oxide: a high-rate and long-life anode for potassium-ion batteries

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Supporting Figures and Table

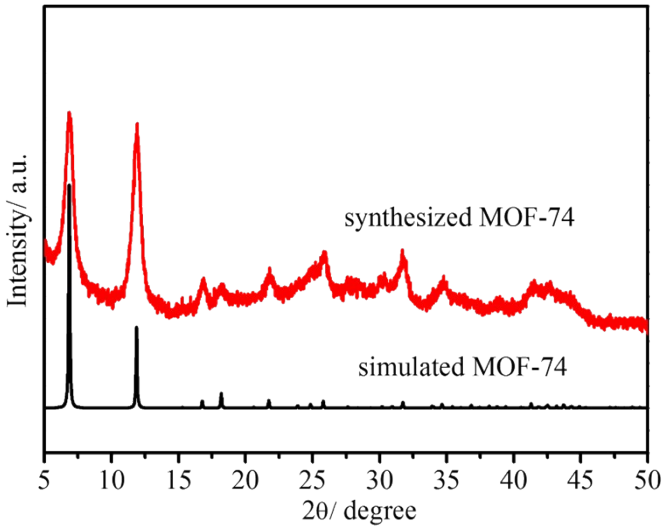

Fig. S1 XRD patterns of as-synthesized MOF-74-Ni/GO and simulated MOF-74.

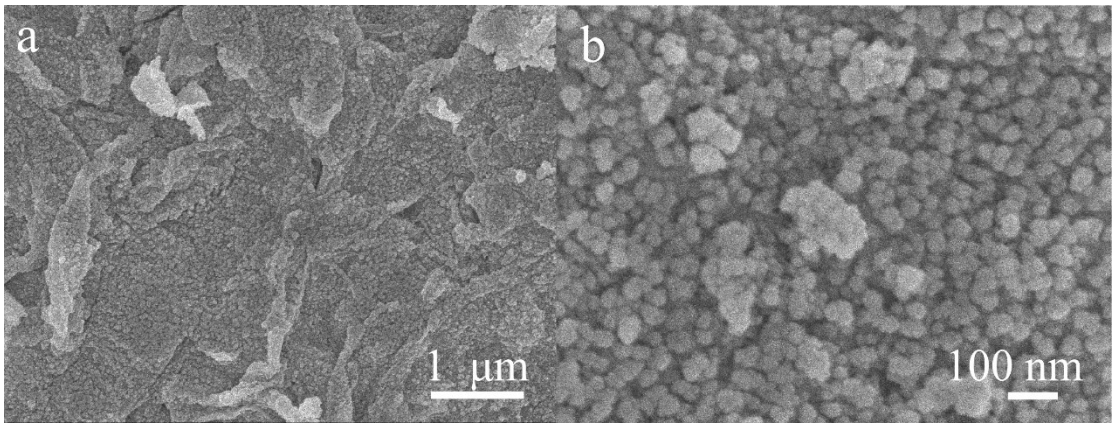

Fig. S2 SEM images of as-synthesized MOF-74-Ni/GO.

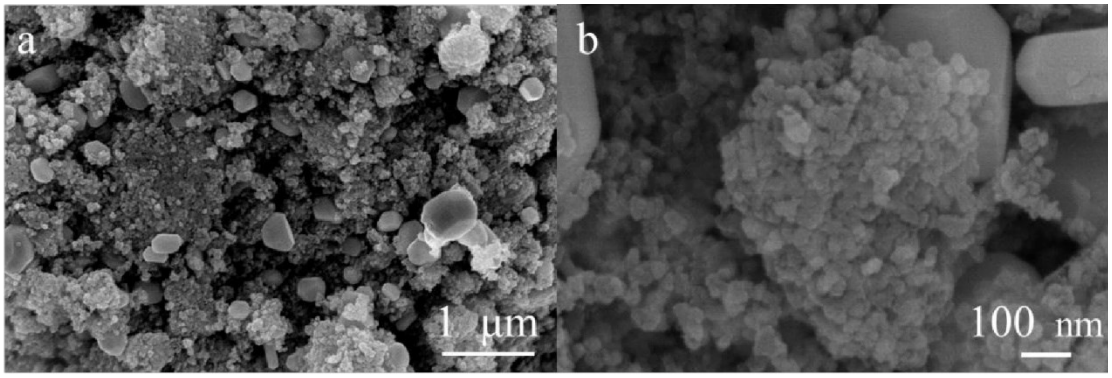

Fig. S3 SEM images of NiSe@C nanocomposites.

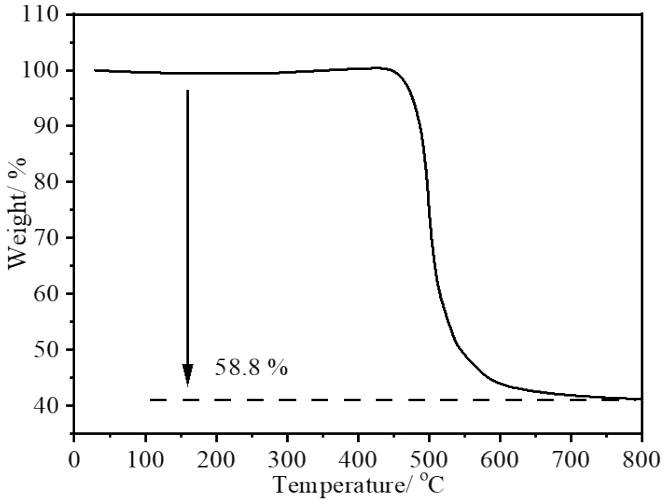

Fig. S4 TG curve of NiSe@C/rGO in air at a heating rate of 10 ^{o}C min^{-1}.

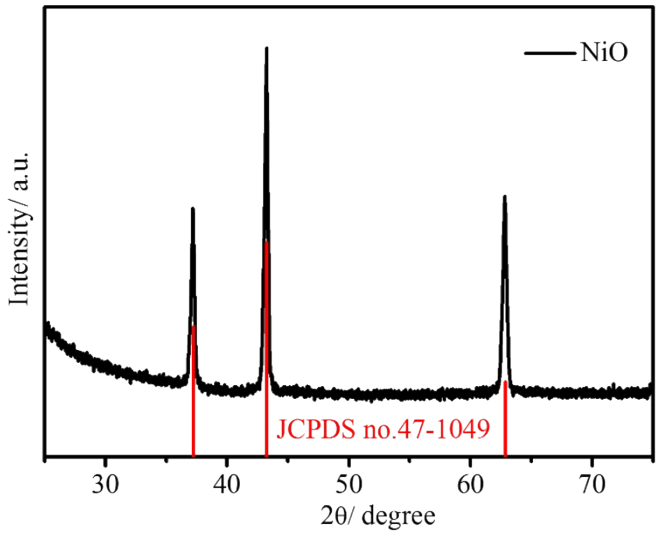

Fig. S5 XRD pattern of the product obtained by the annealing of NiSe@C/rGO at 800 ^{o}C in air at a heating rate of 10 ^{o}C min^{-1}.

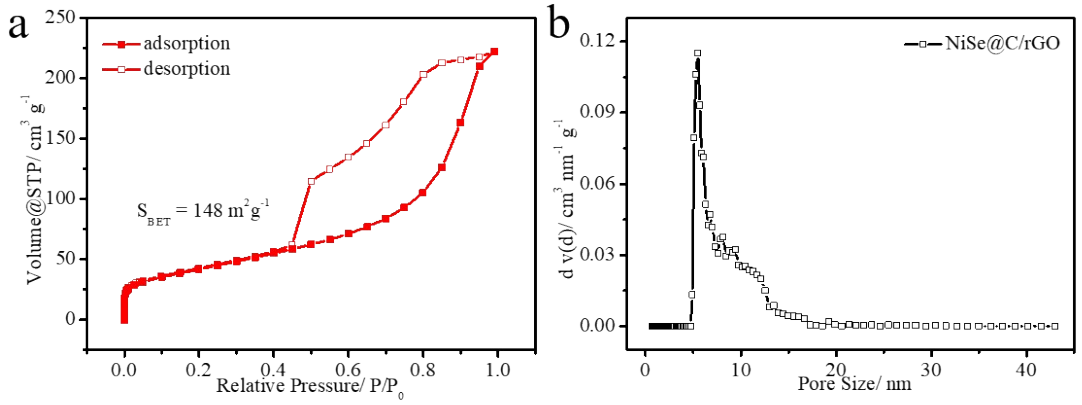

Fig. S6 (a) N_2 sorption isotherm, and (b) pore-size distribution curve of NiSe@C/rGO.

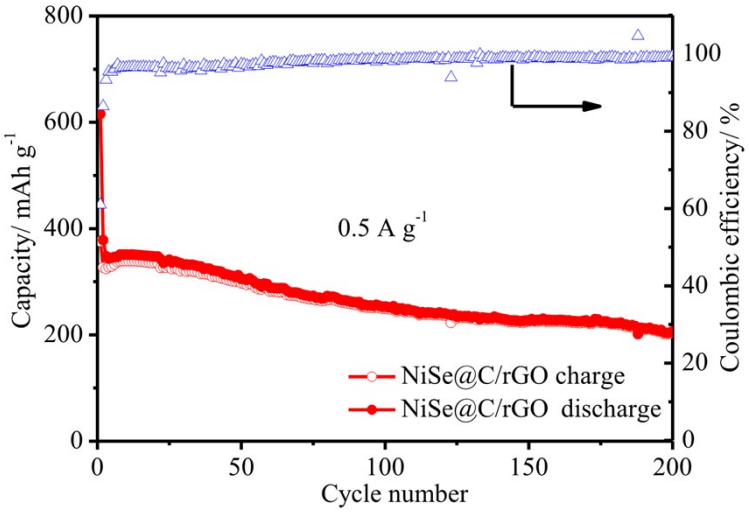

Fig. S7 Cycling performance of NiSe/C@rGO electrode at 0.5 A g^{-1}.

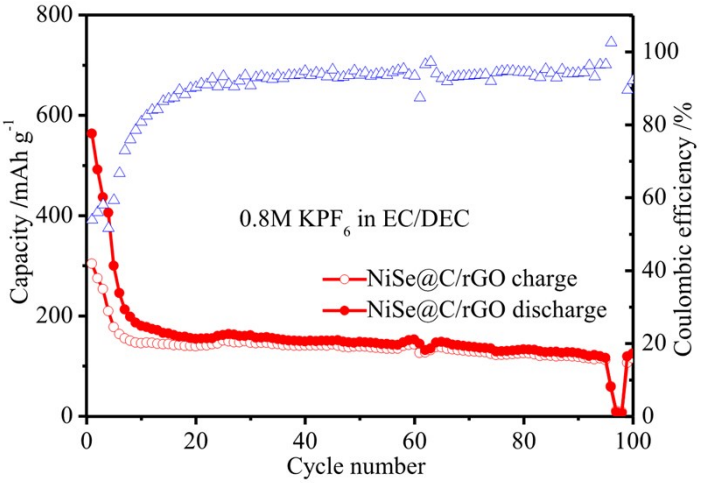

Fig. S8 Cycling performance of NiSe/C@rGO electrode in KPF_6 electrolyte at 0.2 A g^{-1}, and the corresponding coulombic efficiencies.

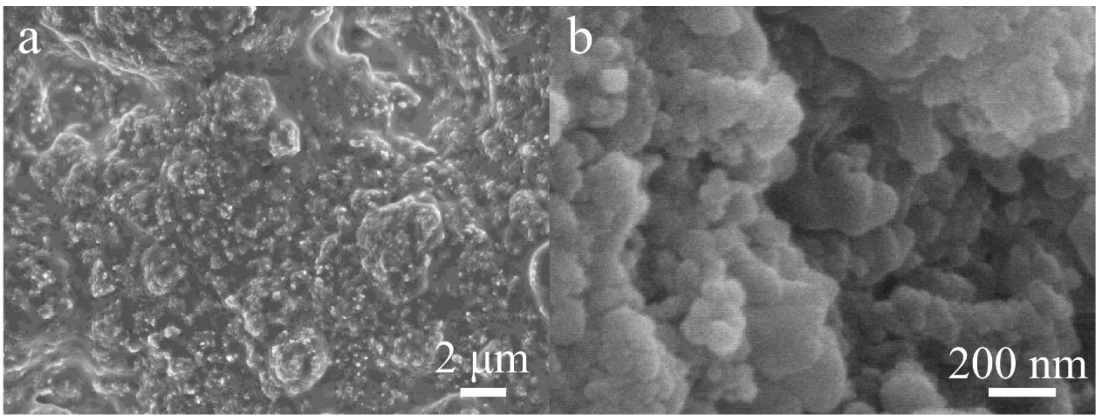

Fig. S9 SEM images of NiSe@C/rGO electrode after 50 cycles.

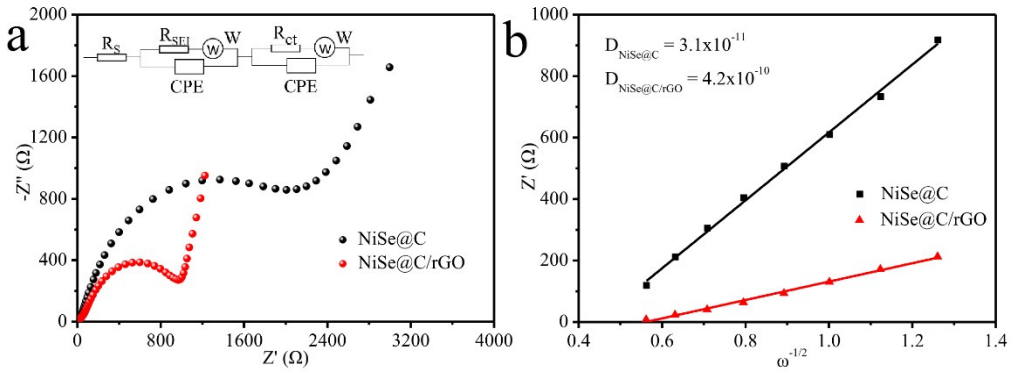

Fig. S10 (a) Nyquist plots and equivalent circuit of NiSe@C/rGO and NiSe@C, (b)

The relationship between Z' and $\omega^{-1/2}$ for NiSe@C/rGO and NiSe@C.

Table S1 Electrical conductivities for NiSe@C/rGO and NiSe@C.

Sample	1	2	3	4	5	Average ($S\ m^{-1}$)
NiSe@C/rGO	17.0	18.2	16.7	17.5	17.0	17.3
NiSe@C	11.6	11.4	11.5	10.4	10.2	11.0

Table S2. Conversion and alloying materials for PIBs.

Anode material	**Reversible capacity ($mAh\ g^{-1}$) @cycle number**	**Current density ($mA\ g^{-1}$)**	**Reference**
NiSe@C/rGO	**301@700**	**200**	**This work**
ZnSe NP@NHC	132@1200	100	[1]
CPL-CuSe	280@340	5000	[2]
$Co_{0.85}Se$ QDs/C	402@50	100	[3]
$MoSe_2$/C	322@100	200	[4]
$CoSe_2$/N-C	253@100	200	[5]
VSe_2	335@200	200	[6]
$Co_{0.85}Se$@NC	114@250	1000	[7]
$FeMoSe_4$@N-C	298@100	200	[8]
$MoSe_2$/Mxene/C	335@100	200	[9]
$MoSe_2$/C-700	316@100	100	[10]
Sb_2Se_3 NDs@C	312@200	1000	[11]
Sb_2Se_3@C	313@40	100	[12]
Se/C	396@100	200	[13]
FeS_2@C	308@100	300	[14]
CoS@G	311@100	500	[15]
VS_2 nanosheet	360@100	500	[16]
MoS_2/N-C	212@200	100	[17]
Sb_2S_3/C	404@200	500	[18]
Sn_4P_3@C	403@200	50	[19]
red P@N-C	650@100	100	[20]

Supporting references

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