Supporting Information for

Trash to treasure: recycling discarded agarose gel for practical Na/K-ion batteries

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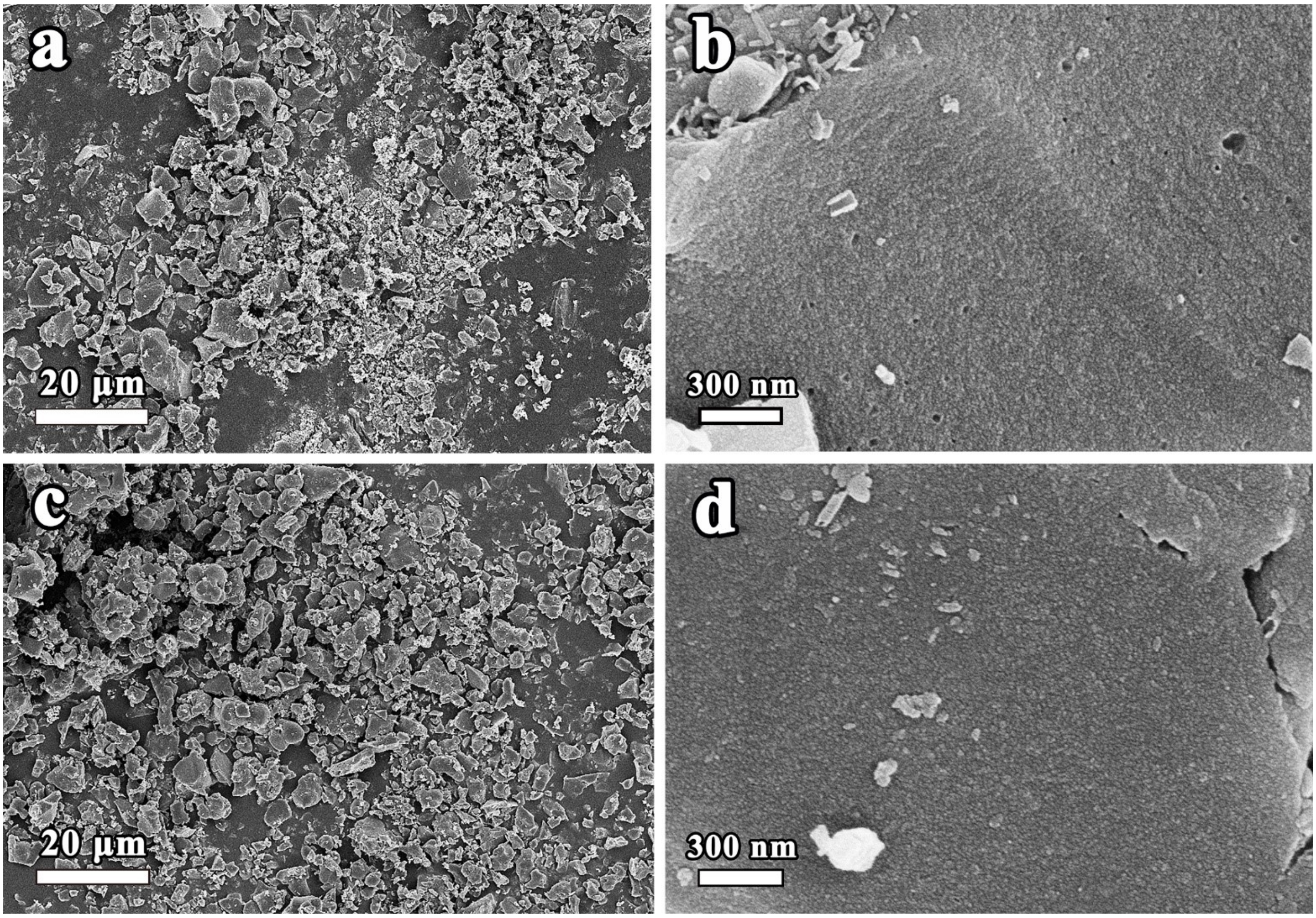

Figure S1 SEM images of (a-b) AGC and (c-d) AGC-N.

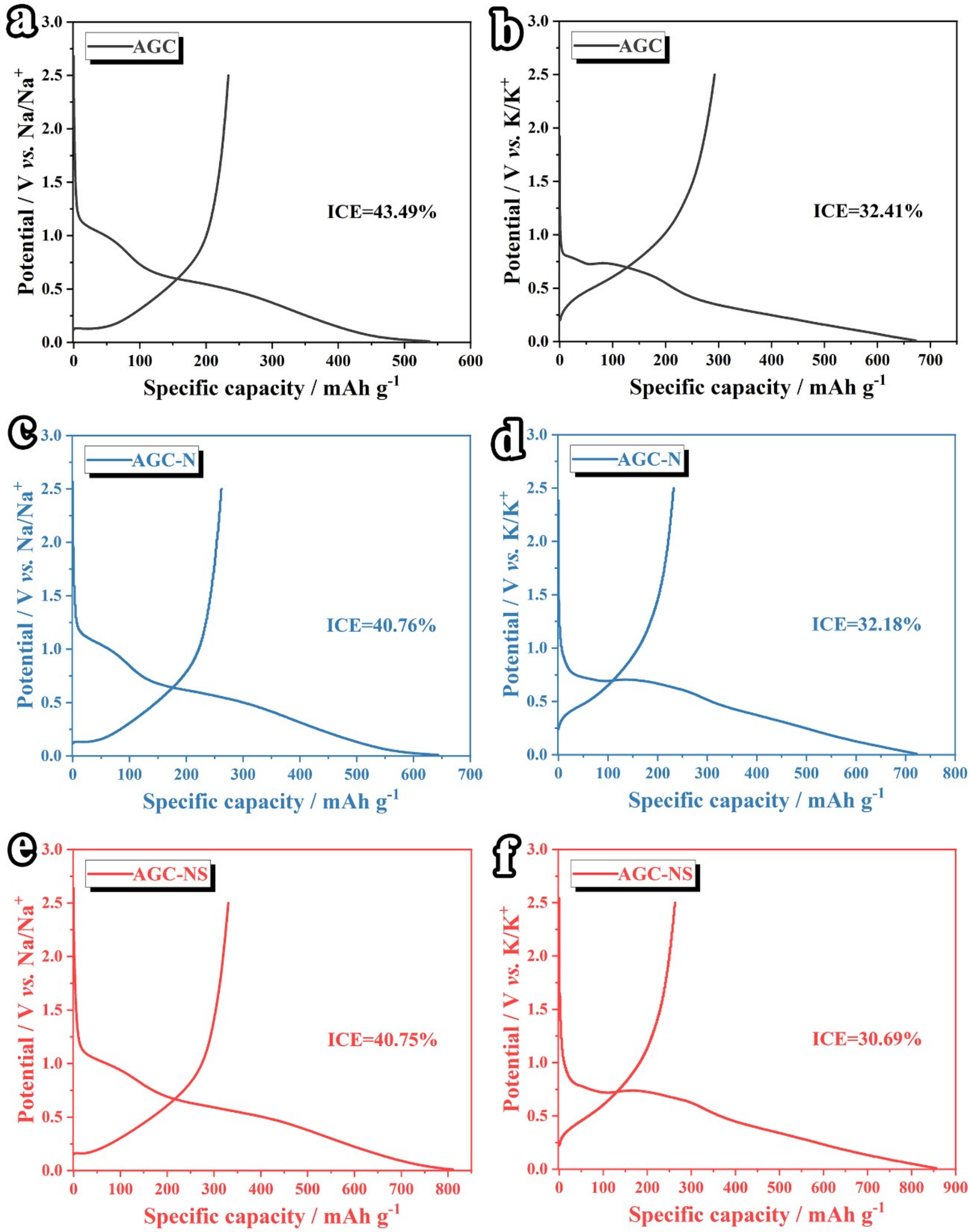

Figure S2 Galvanostatic charge-discharge profiles in SIBs (a) AGC, (c) AGC-N, (e) AGC-NS. Galvanostatic charge-discharge profiles in PIBs (b) AGC, (d) AGC-N, (f) AGC-NS.

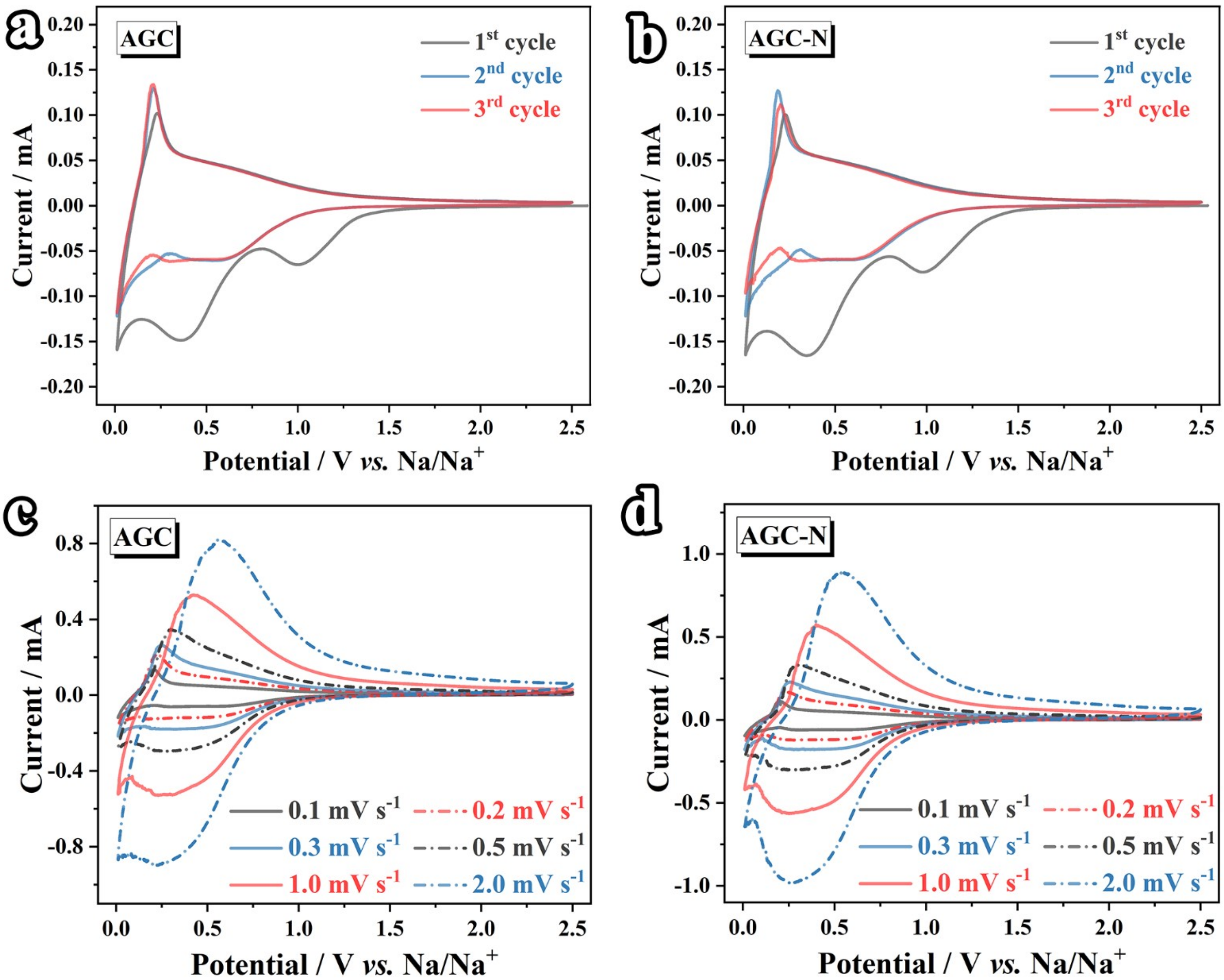

Figure S3 Cyclic voltammetry profiles of (a) AGC and (b) AGC-N at 0.1 mV s^{-1}, Cyclic voltammetry profiles of (c) AGC and (d) AGC-N at various scan rates from 0.1 mV s^{-1} to 2.0 mV s^{-1} in SIBs.

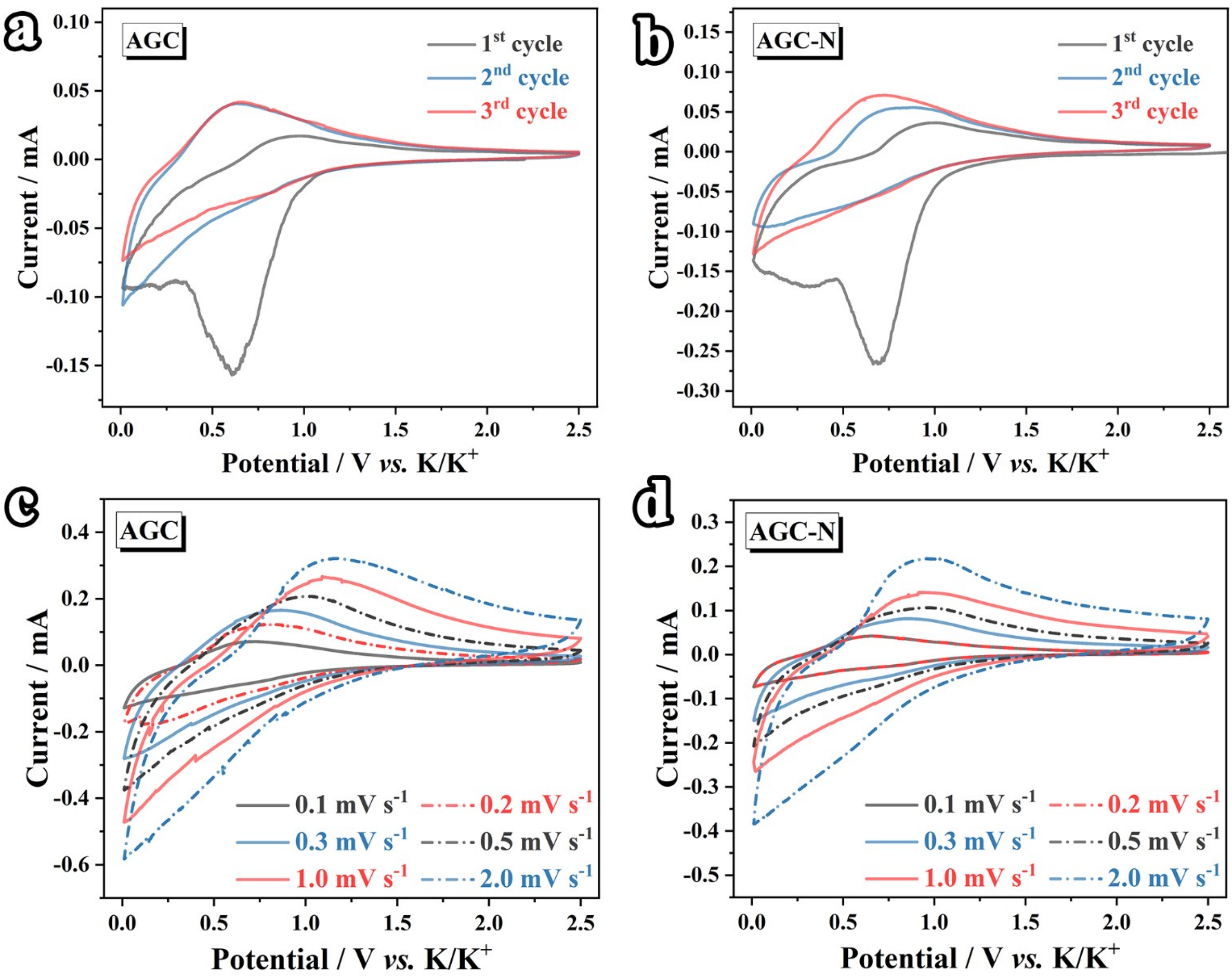

Figure S4 Cyclic voltammetry profiles of (a) AGC and (b) AGC-N at 0.1 mV s^{-1}, Cyclic voltammetry profiles of (c) AGC and (d) AGC-N at various scan rates from 0.1 mV s^{-1} to 2.0 mV s^{-1} in PIBs.

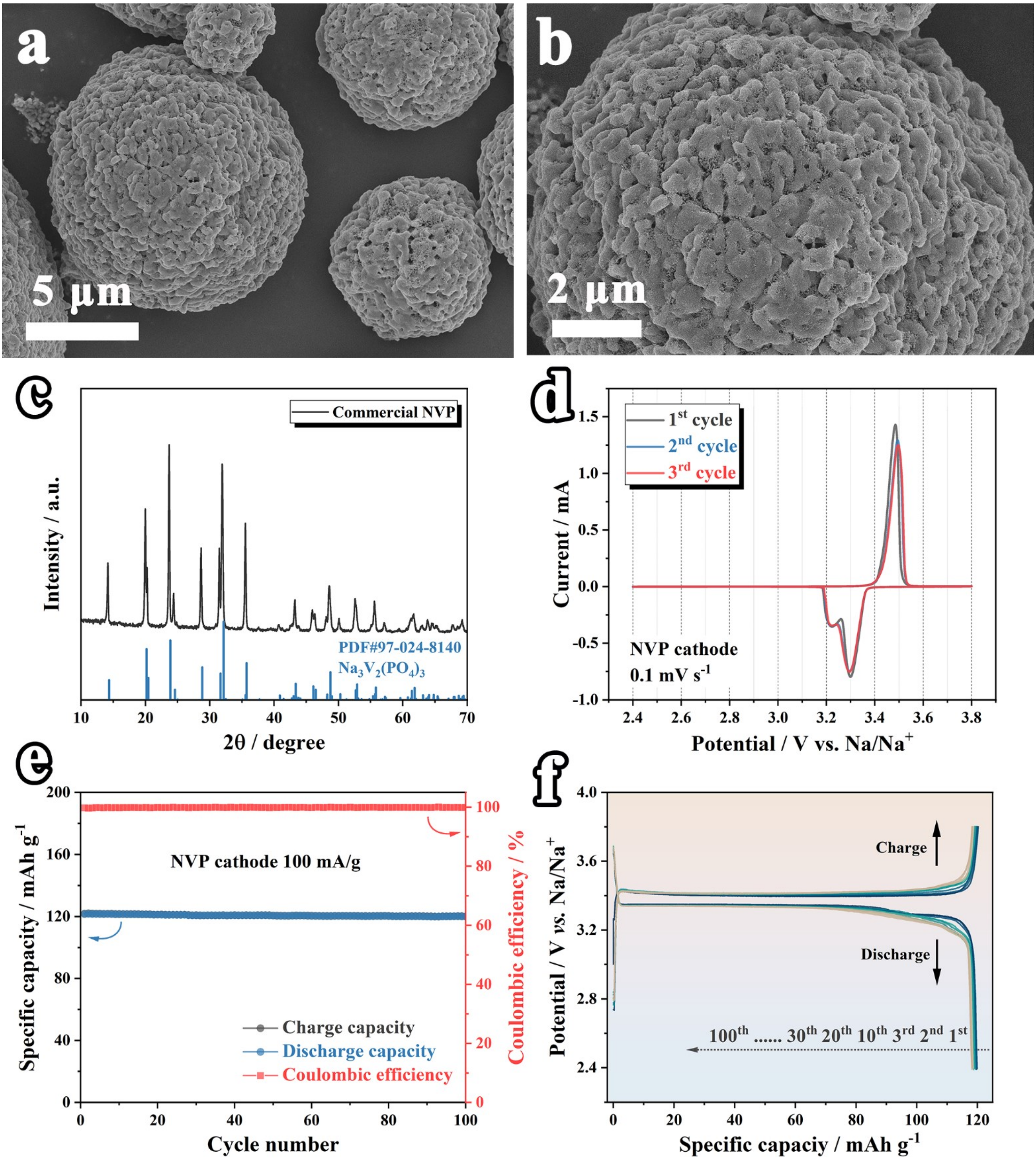

Figure S5 Electrochemical performance of NVP cathode in SIBs. (a-b) SEM images, (c) XRD pattern, (d) CV profile, (e) cycling stability at 100 mA/g, and (f) GCD profiles at 100 mA/g.

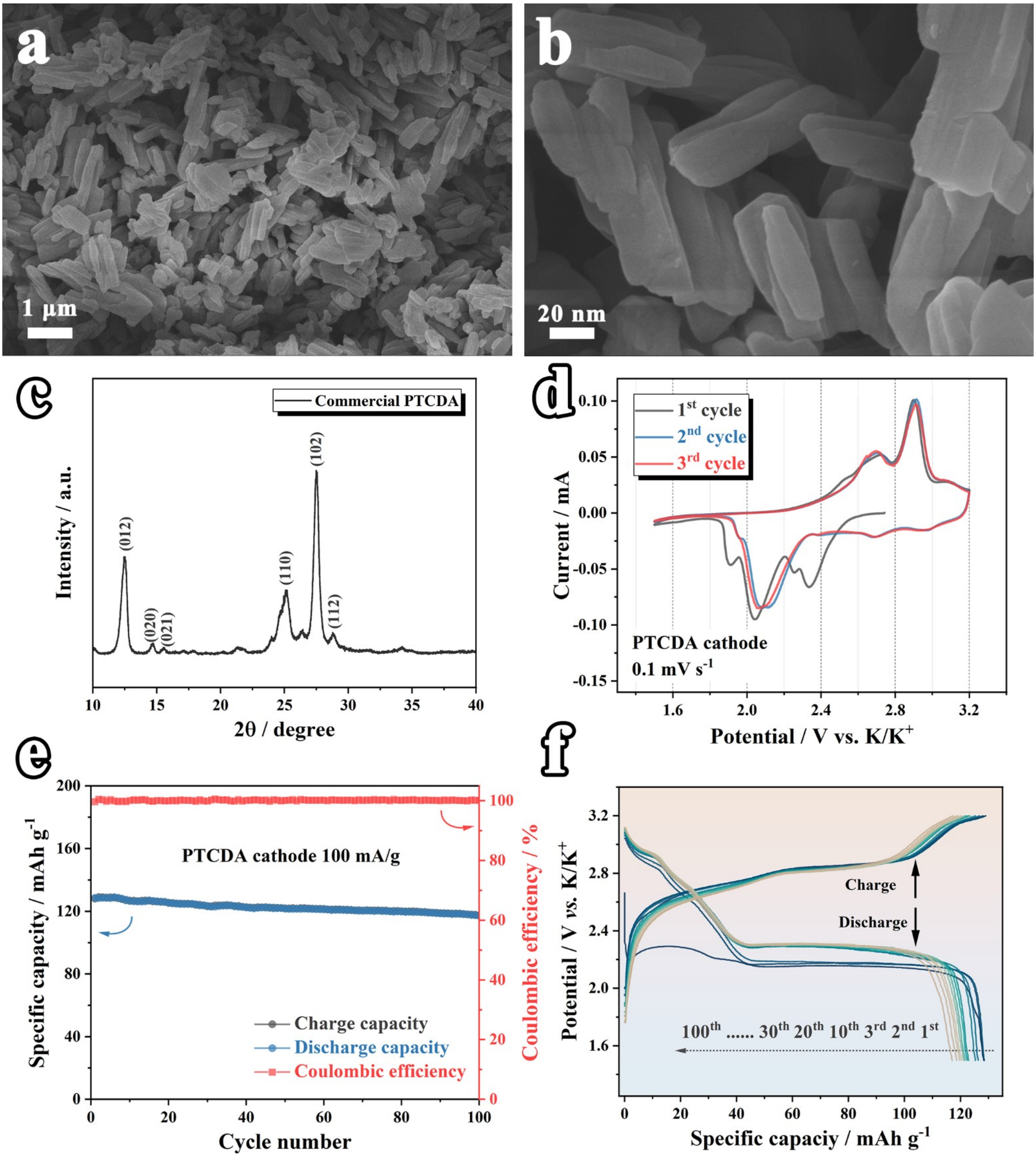

Figure S6 Electrochemical performance of PTCDA cathode in PIBs. (a-b) SEM images, (c) XRD pattern, (d) CV profile, (e) cycling stability at 100 mA/g, and (f) GCD profiles at 100 mA/g.

Table S1 A comparison of recently reported hard carbon anodes employed in both SIBs and PIBs.

Name	Reversible capacity (mAh g^{-1}@A g^{-1})		Rate Capacity (mAh g^{-1}@A g^{-1})		ICE		Cycle life (Cycle number @A g^{-1})	
	SIBs	PIBs	SIBs	PIBs	SIBs	PIBs	SIBs	PIBs
This work AGC-NS	314.8@0.1	283.7@0.1	181.0@1.0 148.7@2.0	147.0@1.0	40.75%	30.69%	2000@1.0	1000@1.0
3D-ENTC[1]	435@0.05 364@0.1	420@0.05 399@0.1	195@5	93@5	61.6%	48.7%	500@1.0	700@1.0
HC-MX[2]	368.5@0.03	280.6@0.03	98.2@2 66.7@10	210@0.05	/	/	300@0.05	100@0.05
NPHC[3]	281@0.025	339@0.025	52@3.0	98@2.0	/	/	120@0.1	200@0.1
HCG[4]	343.1@0.025 148@0.25	292.4@0.025 190@0.25	106@1.0	102@2.0	80.1%	76.4%	200@0.1	200@0.1
FAC[5]	179.5@0.05 142.4@0.1	276.7@0.05 142.4@0.1	95@0.8	121.2@0.8	53.2%	63.4%	2000@0.4	1000@0.4
CS[6]	252@0.05 236@0.1	331@0.05 298@0.1	104@2.0	153@2.0	/	/	/	500@2.0
CSHP[7]	210.2@0.1	264.5@0.1	145@0.5 123@1.0	164@0.5 143@0.8	44.1%	45.1%	100@0.1	100@0.1
VCA[8]	298@0.03	258@0.0279	209@0.3	148@2.0	/	/	100@2.0	100@2.0
Co-HMT[9]	293@0.1 225@0.5	326@0.1 232@0.5	131@10	105@10	45%	35%	5000@2.0	5000@2.0
Fe-N/C[10]	289.2@0.1 266.7@0.2	328.1@0.1 274.7	214.7@1.0 190.8@2.0	176.6@1 152.5@2	44.7%	47.6%	1000@0.5	1000@0.5
CNT/SNCF[11]	370.8@0.2	/	249.5@1.0 200.5@2.0	230.1@1 190.6@2	49.1%	41.6%	1000@1.0	5000@5.0
NPDCs[12]	369@0.5	360@0.5	183@3.0 150@5.0	216@3 179@5	40.5%	44%	2000@2.0	2000@2.0
HNC-550[13]	474@0.05	510.2@0.05	205.1@1.0 135.2@5.0	143.9@1 93@5	76.5%	75.6%	2000@10	1000@5.0
NS-HCS[14]	279.4@0.05	232.3@0.1	142.6@1 94.9@5	114.8@1 41.6@5	29.4%	/	500@0.1	700@1.0

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