

Shenzhen Pittar Power Co., Ltd. is a high-tech enterprise focusing on the R&D, production and innovative application of sodium-ion battery technology.

With the mission of "Driving the Future of Green Energy", the company is committed to providing efficient, environmentally friendly and low-temperature resistant start-stop power solutions for the global transportation sector, helping the transformation and upgrading of traditional power systems to new energy.

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01

# Overview of Sodium Ion Batteries



## Definition and principle of sodium ion battery

**01**

Sodium ion battery is a type of secondary battery that uses sodium ions as the active material, and has advantages such as high energy density, long lifespan, and low cost.

**03**

The positive electrode material of sodium ion batteries is usually sodium ion compounds, and the negative electrode material is usually carbon material.



**02**

The working principle of sodium ion batteries is to achieve charge storage and release through the migration of sodium ions between the positive and negative electrodes.

**04**

The electrolyte of sodium ion batteries is usually an organic solvent or aqueous solution, which contains salts of sodium ions.

## Characteristics and advantages of sodium ion batteries



Low power start stop: Sodium ion batteries can start cars in their own low power state;



Ultra low temperature start-up: Sodium ion batteries can start cars in extremely cold weather environments of  $-40\text{ }^{\circ}\text{C}$ ;



Ultra long standby maintenance: Sodium ion batteries can continue to be used even after being discharged to 0V and charged without affecting their lifespan



High safety: Sodium ion batteries are non flammable and have better safety performance than lithium batteries



## Characteristics and advantages of sodium ion batteries



**Low cost:** Sodium resources are abundant and inexpensive, which is conducive to reducing battery costs



**Long cycle life:** Sodium ion batteries have a long cycle life and can last as long as a car



**Environmentally friendly:** Sodium ion batteries do not contain harmful substances, are environmentally friendly, and comply with the concept of sustainable development



# 02

## Introduction to Sodium Ion Battery Products



## Sodium ion battery product series

### Battery specification parameters:

Type	H5/PN1-30Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	30
Minimum capacity(Ah)	≥29
rated energy(Wh)	360
Maximum discharge power @3秒(W)	4800
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	30
Recommended charging current(A)	≤30
Maximum charging current(A)	90
Standard discharge current(A)	30
maximum discharge current(A)	≤90
CCA (CCA)	750
internal resistance(mΩ)	≤6
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S3P
Protection grade	IP65
Weight(kg)	约: 5.5
Diemension(长*宽*高,mm)	244*176*190



H5/PN1-30Ah



适用车型

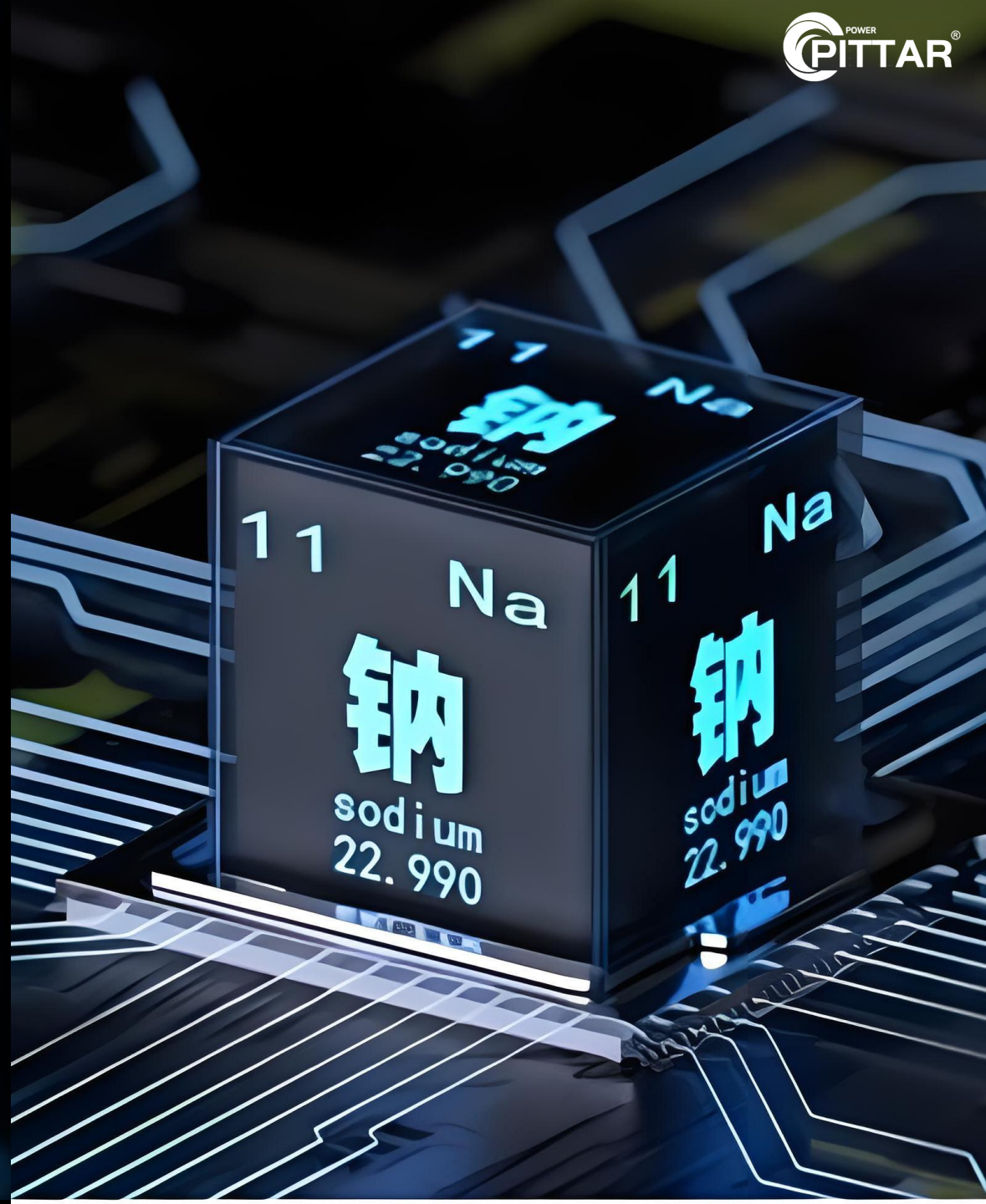
上汽大众/一汽大众/斯柯达/  
东风本田/一汽奥迪/哈佛/

## Sodium ion battery product series

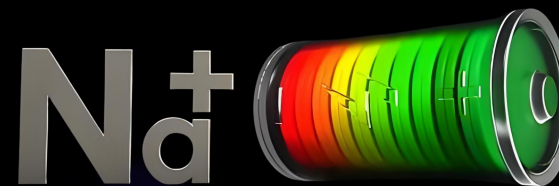
电池规格参数:	
型号	H6/PN2-30Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	30
Minimum capacity(Ah)	≥29
rated energy(Wh)	360
Maximum discharge power@3秒(W)	4800
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	30
Recommended charging current(A)	≤30
Maximum charging current(A)	90
Standard discharge current(A)	30
maximum discharge current(A)	≤90
CCA (CCA)	750
internal resistance(mΩ)	≤14
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S3P
Protection grade	IP65
Weight(kg)	约: 5.8
Diemension(长*宽*高,mm)	280*176*180
适用车型	奥迪Q3/A6/宝马3系/奔驰E级和C级/奔驰(进口)A级和B级/昂科拉(别克)/大众甲壳虫等



H6/PN2-30Ah

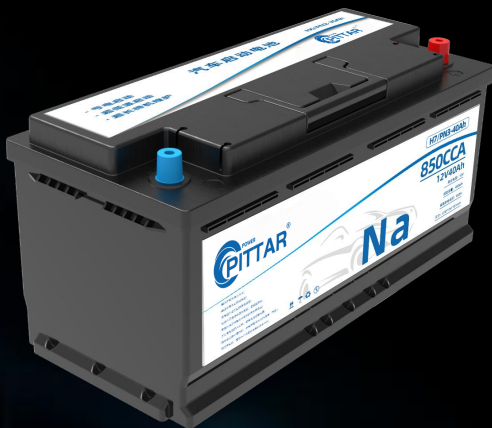


支持 0V 充电



Sodium ion battery product series

电池规格参数:	
型号	H7/PN3-40Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	40
Minimum capacity(Ah)	≥39
rated energy(Wh)	480
Maximum discharge power@3秒(W)	7200
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	40
Recommended charging current(A)	≤40
Maximum charging current(A)	120
Standard discharge current(A)	40
maximum discharge current(A)	≤120
CCA (CCA)	850
internal resistance(mΩ)	≤13
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S4P
Protection grade	IP65
Weight(kg)	约: 7.0
Diemension(长*宽*高,mm)	318*176*187
	奥迪A4L/Q5/A6L/A8/宝马3系/



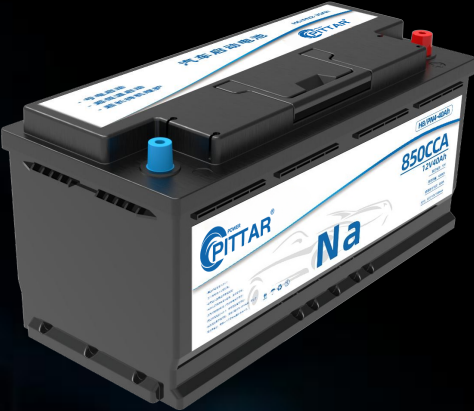
H7/PN3-40Ah



## Sodium ion battery product series

### 电池规格参数:

型号	H8/PN4-40Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	40
Minimum capacity(Ah)	≥39
rated energy(Wh)	480
Maximum discharge power@3秒(W)	7200
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	40
Recommended charging current(A)	≤40
Maximum charging current(A)	120
Standard discharge current(A)	20
maximum discharge current(A)	≤120
CCA (CCA)	850
internal resistance(mΩ)	≤13
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S4P
Protection grade	IP65
Weight(kg)	约: 7.2
Diemension(长*宽*高,mm)	355*176*188



H8/PN4-40Ah

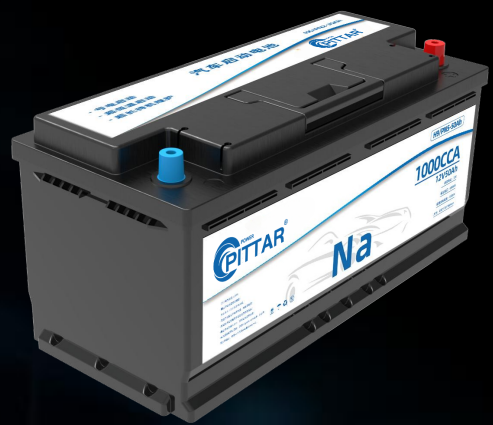
适用车型  
 宝马 (进口) / 奔驰 (进口) / 一汽奥迪/北京奔驰/保时捷 MACAN



## Sodium ion battery product series

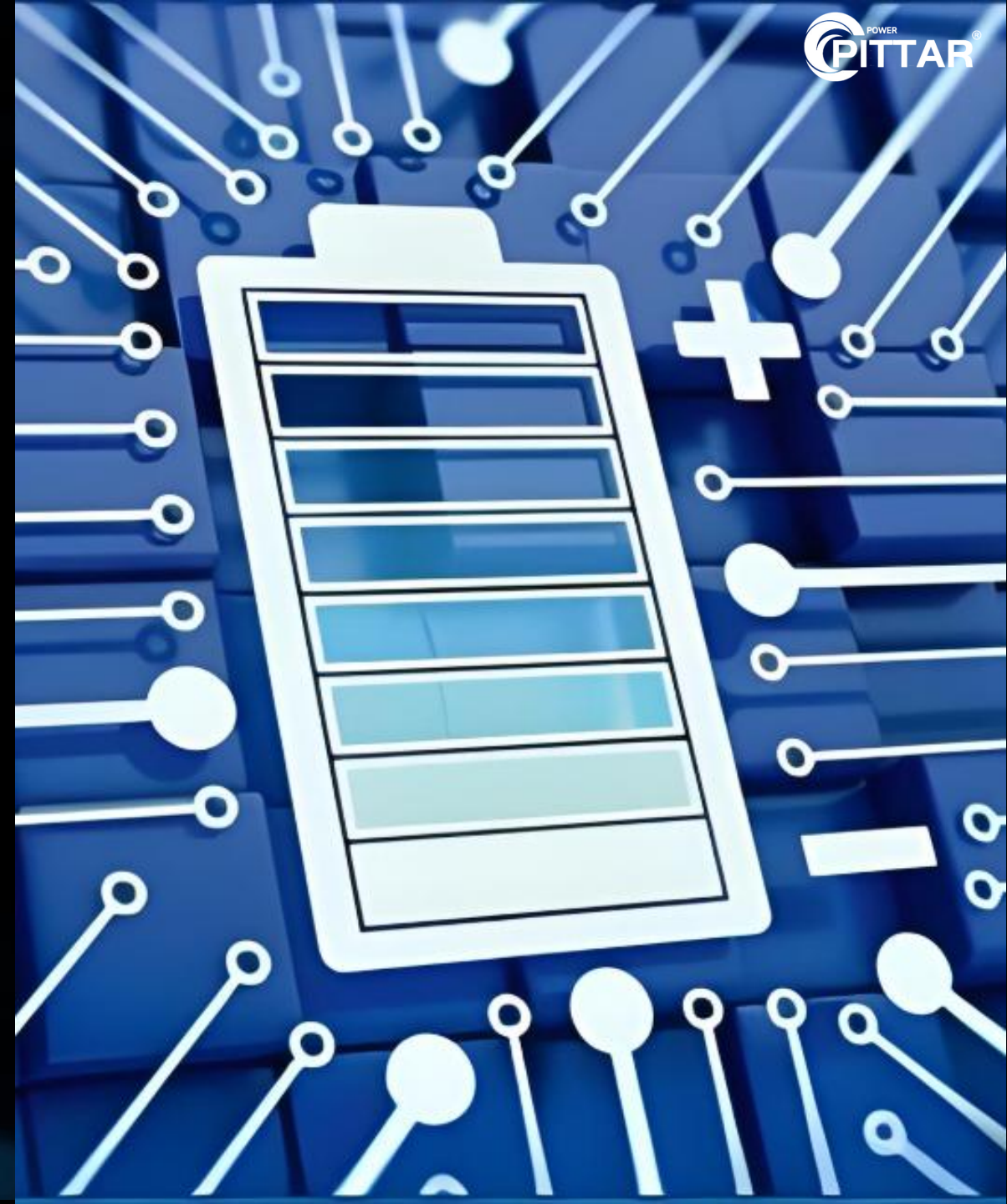
电池规格参数:

型号	H9/PN5-50Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	50
Minimum capacity(Ah)	≥49
rated energy(Wh)	600
Maximum discharge power@3秒(W)	9600
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	50
Recommended charging current(A)	≤50
Maximum charging current(A)	150
Standard discharge current(A)	50
maximum discharge current(A)	≤150
CCA (CCA)	1000
internal resistance(mΩ)	≤13
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S5P
Protection grade	IP65
Weight(kg)	约: 8.2
Diemension(长*宽*高,mm)	398*176*188



H9/PN5-50Ah

奥迪Q5/Q7/A8/A6L/A4L/宝马5系/X3/X4/X5/X6/保时捷



## Sodium ion battery product series

电池规格参数:	
型号	H9/PN6-30Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	30
Minimum capacity(Ah)	≥29
rated energy(Wh)	360
Maximum discharge power@3秒(W)	4800
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	30
Recommended charging current(A)	≤30
Maximum charging current(A)	90
Standard discharge current(A)	30
maximum discharge current(A)	≤90
CCA (CCA)	750
internal resistance(mΩ)	≤6
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S3P
Protection grade	IP65
Weight(kg)	约: 5.5
Diemension(长*宽*高,mm)	230*175*220
适用车型	东风本田CR-V和思铂睿/广汽本田 / 一汽丰田/长安马自达马自达昂克赛拉 /



H9/PN6-30Ah



## Sodium ion battery product series

电池规格参数:	
型号	YTX17/PN10-10Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	10
Minimum capacity(Ah)	≥9
rated energy(Wh)	120
Maximum discharge power@3秒(W)	1200
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	10
Recommended charging current(A)	≤10
Maximum charging current(A)	30
Standard discharge current(A)	10
maximum discharge current(A)	≤30
CCA (CCA)	250
internal resistance(mΩ)	≤18
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S1P
Protection grade	IP65
Weight(kg)	约: 2.5
Diemension(长*宽*高,mm)	176*87*155



YTX17/PN10-10Ah



## Sodium ion battery product series

电池规格参数:	
型号	YTX30L/PN20-20Ah
Working voltage range(V)	8.0~16.0
nominal voltage(V)	12
Nominal Capacity(Ah)	20
Minimum capacity(Ah)	≥19
rated energy(Wh)	240
Maximum discharge power@3秒(W)	1200
Fast charging voltage(V)	14.6
Standby charging voltage/float charging voltage(V)	14.2
Standard charge current(A)	20
Recommended charging current(A)	≤20
Maximum charging current(A)	60
Standard discharge current(A)	20
maximum discharge current(A)	≤60
CCA (CCA)	360
internal resistance(mΩ)	≤10
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-4S3P
Protection grade	IP65
Weight(kg)	约: 5.5
Diemension(长*宽*高,mm)	165*126*175



YTX30L/PN20-20Ah



## Sodium ion battery product series

电池规格参数:	
型号	PN30-20Ah
Working voltage range(V)	16.0~31.6
nominal voltage(V)	24
Nominal Capacity(Ah)	20
Minimum capacity(Ah)	≥19
rated energy(Wh)	480
Maximum discharge power@3秒(W)	4800
Fast charging voltage(V)	31.6
Standby charging voltage/float charging voltage(V)	30.4
Standard charge current(A)	20
Recommended charging current(A)	≤20
Maximum charging current(A)	60
Standard discharge current(A)	20
maximum discharge current(A)	≤60
CCA (CCA)	450
internal resistance(mΩ)	≤18
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-8S2P
Protection grade	IP65
Weight(kg)	约: 6.0
Diemension(长*宽*高,mm)	242x175x189

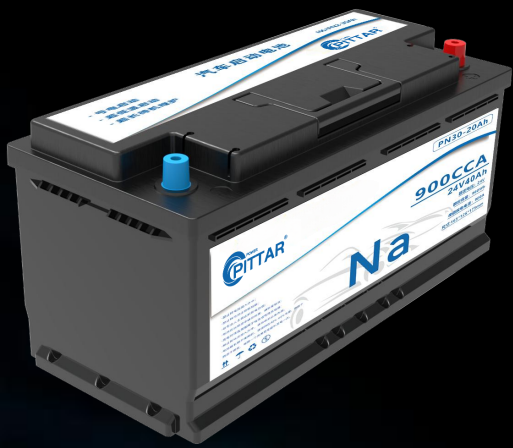


PN30-20Ah



## Sodium ion battery product series

电池规格参数:	
型号	PN31-40Ah
Working voltage range(V)	16.0~31.6
nominal voltage(V)	24
Nominal Capacity(Ah)	40
Minimum capacity(Ah)	≥39
rated energy(Wh)	960
Maximum discharge power@3秒(W)	9600
Fast charging voltage(V)	31.6
Standby charging voltage/float charging voltage(V)	30.4
Standard charge current(A)	40
Recommended charging current(A)	≤40
Maximum charging current(A)	120
Standard discharge current(A)	40
maximum discharge current(A)	≤120
CCA (CCA)	900
internal resistance(mΩ)	≤10
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	32140-8S4P
Protection grade	IP65
Weight(kg)	约: 10
Diemension(长*宽*高,mm)	398*175*188



PN31-40Ah



## Sodium ion battery product series

电池规格参数:	
型号	PN31-200Ah
Working voltage range(V)	16.0~31.6
nominal voltage(V)	24
Nominal Capacity(Ah)	200
Minimum capacity(Ah)	≥195
rated energy(Wh)	4800
Maximum discharge power@3秒(W)	9600
Fast charging voltage(V)	31.6
Standby charging voltage/float charging voltage(V)	30.4
Standard charge current(A)	100
Recommended charging current(A)	≤100
Maximum charging current(A)	200
Standard discharge current(A)	100
maximum discharge current(A)	≤200
CCA (CCA)	1500
internal resistance(mΩ)	≤20
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	73174207-8S1P
Protection grade	IP65
Weight(kg)	约: 50
Diemension(长*宽*高,mm)	460x386x240



PN40-200Ah



## Sodium ion battery product series

电池规格参数:	
型号	PN40-400Ah
Working voltage range(V)	16.0~31.6
nominal voltage(V)	24
Nominal Capacity(Ah)	400
Minimum capacity(Ah)	≥195
rated energy(Wh)	9600
Maximum discharge power@3秒(W)	9600
Fast charging voltage(V)	31.6
Standby charging voltage/float charging voltage(V)	30.4
Standard charge current(A)	100
Recommended charging current(A)	≤100
Maximum charging current(A)	200
Standard discharge current(A)	100
maximum discharge current(A)	≤200
CCA (CCA)	1500
internal resistance(mΩ)	≤20
Charge Temperature(°C)	-20~50
discharge temperature(°C)	-40~80
cycle life(25°C,0.5C,70%DOD)	>3000
Combination method of battery cells	73174207-8S2P
Protection grade	IP65
Weight(kg)	约: 100
Diemension(长*宽*高,mm)	800x386x240

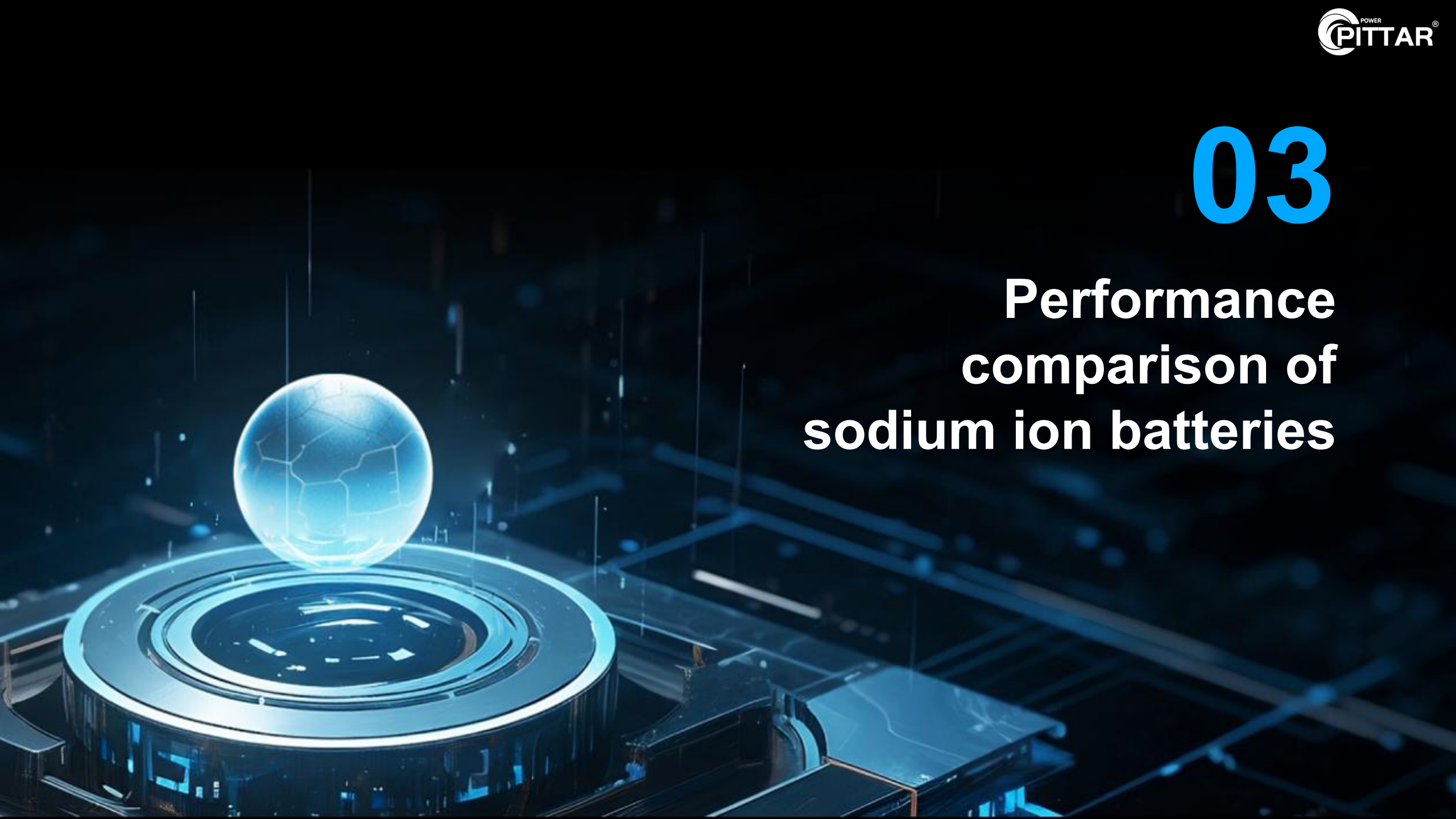


PN40-400Ah



# 03

## Performance comparison of sodium ion batteries



## Performance Comparison

	sodium-ion batteries	Lead acid battery	lithium iron phosphate battery
specifications	12V30Ah	12V30Ah	12V30Ah
Weight	5.5kg	12.5kg	4.5kg
Charging performance	Accept 3C high current fast charging, fully charged in about 20 minutes	Only low current slow charging, 10A charging takes more than 5.5 hours	Maximum charging capacity of 1C-2C, fully charged in about 40 minutes
discharge performance	Continuous discharge rate above 10C	Discharge rate 3-5C	Discharge rate 3-5C
	Instantaneous discharge:400A@3S (-40°C)	It can only be used when the power demand is greater than 50%, and the performance degradation is significant,	The discharge performance decreases significantly at low temperatures, and the ambient temperature cannot be lower than -20 °C for high current discharge;
intelligent management	The battery has safety protection functions such as overcharging, overdischarging, overcurrent, overtemperature protection, and short-circuit protection	no	The battery has various protection functions such as overcharging, overdischarging, short circuit, and overheating.
Cycle life	Over 3000	500	Over 2000
Dimension	约244*176*190mm	约260*180*200mm	约260*165*210mm
environment protection	Does not contain any heavy metals	Containing heavy metal lead and acid	Does not contain any heavy metals
temperature	-40°C~80°C	0°C-65°C (Low temperature attenuation is significant)	-20°C~65°C

# 04

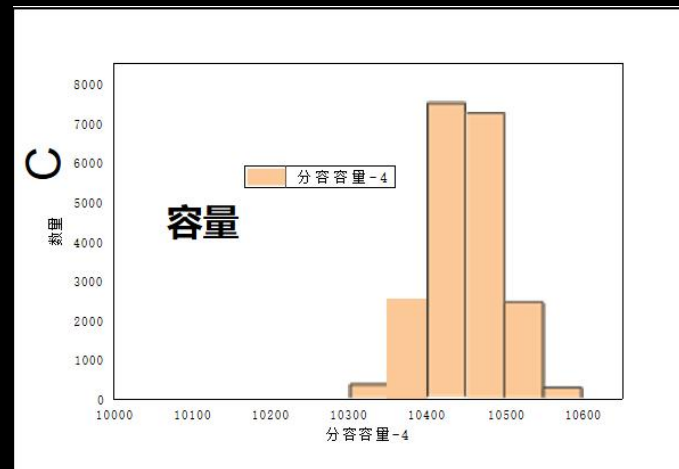
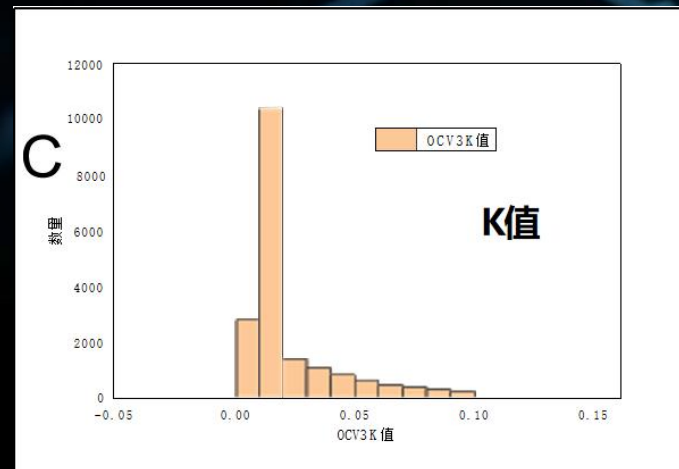
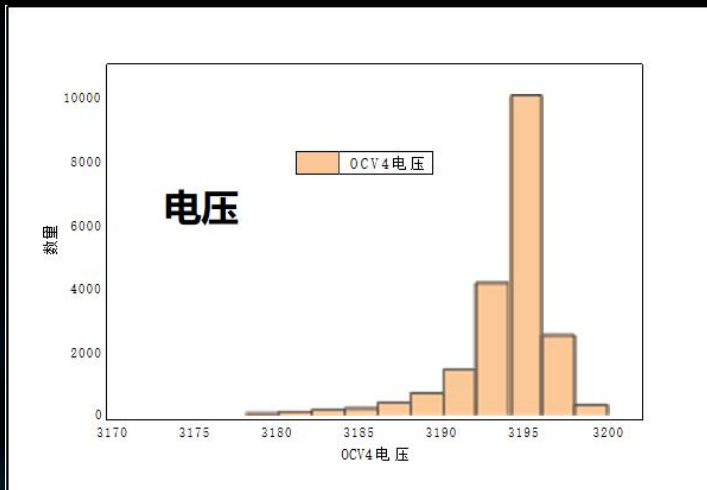
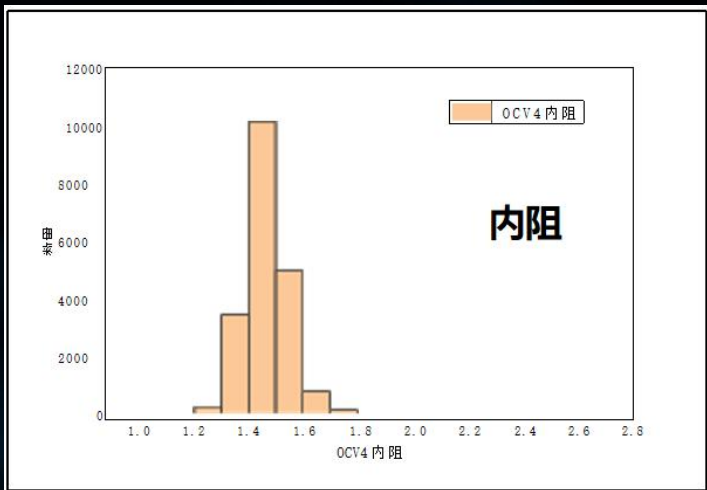
## Performance data of sodium ion batteries



# Performance data of sodium ion batteries

consistency:

- ◆ Main range of internal resistance: 1.4~1.6mΩ
- ◆ Main voltage range: 3.180~3.200V (48h)
- ◆ Main Capacity Range: 10300~10600mAh (极差3%)
- ◆ Main range of K value: 0~0.05mV/h



● Summary: Batch offline consistency has surpassed that of iron lithium offline consistency

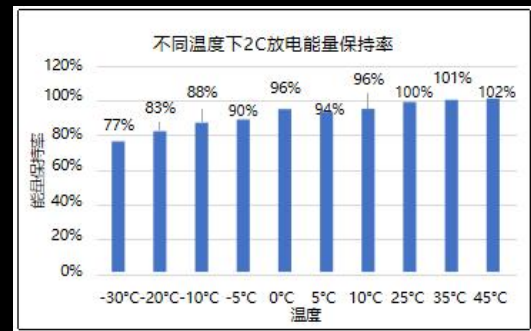
# Performance data of sodium ion batteries

## Discharge performance at different temperature rates

◆ Test conditions: Discharge at different temperatures and rates

放电倍率	-30° C			-20° C			-10° C			-5° C			0° C			5° C								
	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升						
0.33C	8599	22.71	7.3	9185.8	25.18	5.8	9876.5	28.73	0	10067.3	29.45	7.4	10.26	32.12	3.1	10313.1	31.05	0						
0.5C	8728	23.12	10.8	9369.1	25.92	9	9763.2	27.83	7.1	9909	28.77	6.1	10150	30.12	5.5	10215.5	30.25	4.7						
1C	8742	22.53	19.1	9262.8	24.76	16.2	9572.7	26.33	13.9	9716.9	27.19	12.4	9985.3	28.98	11.4	9986.5	28.62	10.3						
2C	8830.4	21.98	31.9	9187.4	23.72	28.2	9425.1	25.16	24.5	9520.3	25.7	22.9	9767.1	27.44	21.8	9737	26.96	20.3						
4C							9484.8	25.21	33.6	9535.5	25.61	31.6	9436.6	25.31	35.9	9645	26.47	29.1						
放电倍率	10° C			25° C			35° C			45° C														
	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升	容量mAh	能量Wh	温升												
0.33C	10396.1	31.5	0.1	10.46	31.46	2	10642.1	32.52	0	10675.5	32.49	0.1												
0.5C	10259.1	30.55	9.1	10.43	31.12	3	10572.3	31.99	2.7	10670.2	32.24	2.8												
1C	10037.7	29.05	9.7	10.23	29.73	7.2	10298.5	30.38	6.5	10487.6	31.03	8.1												
2C	9818.6	27.47	18.7	10.06	28.63	15.1	10075	28.99	13.8	10127.9	31.62	13.2												
4C	9657.6	26.66	27.4	10.05	25.22	19.8	9849.4	27.97	23.1	9689.1	27.02	21.6												

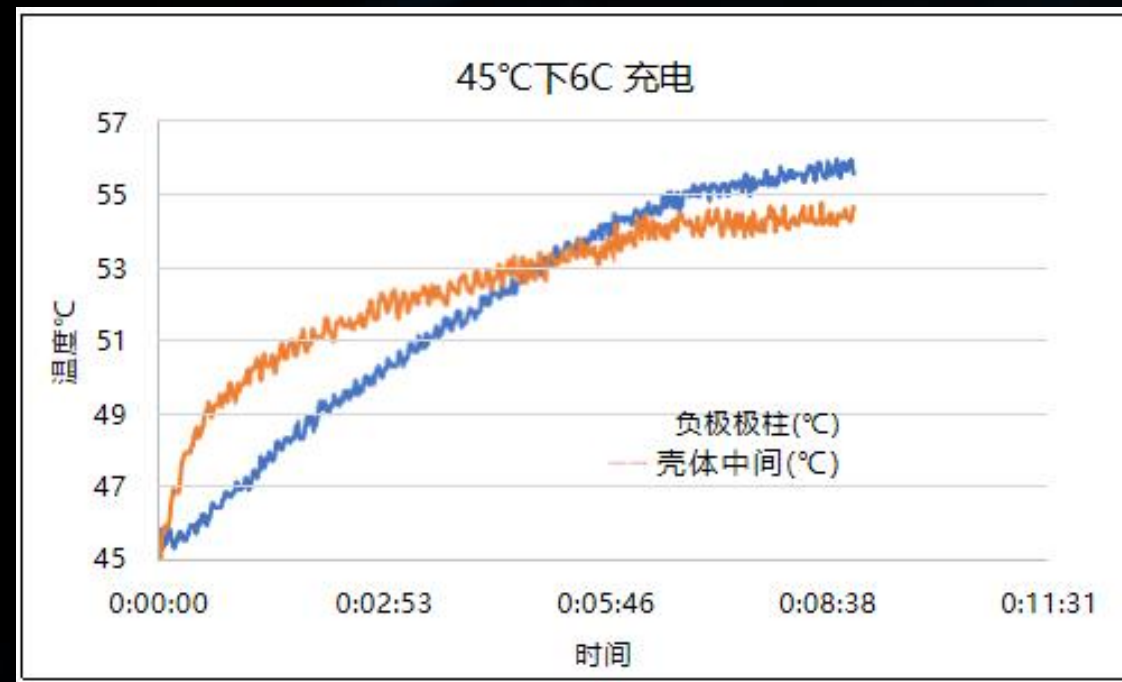
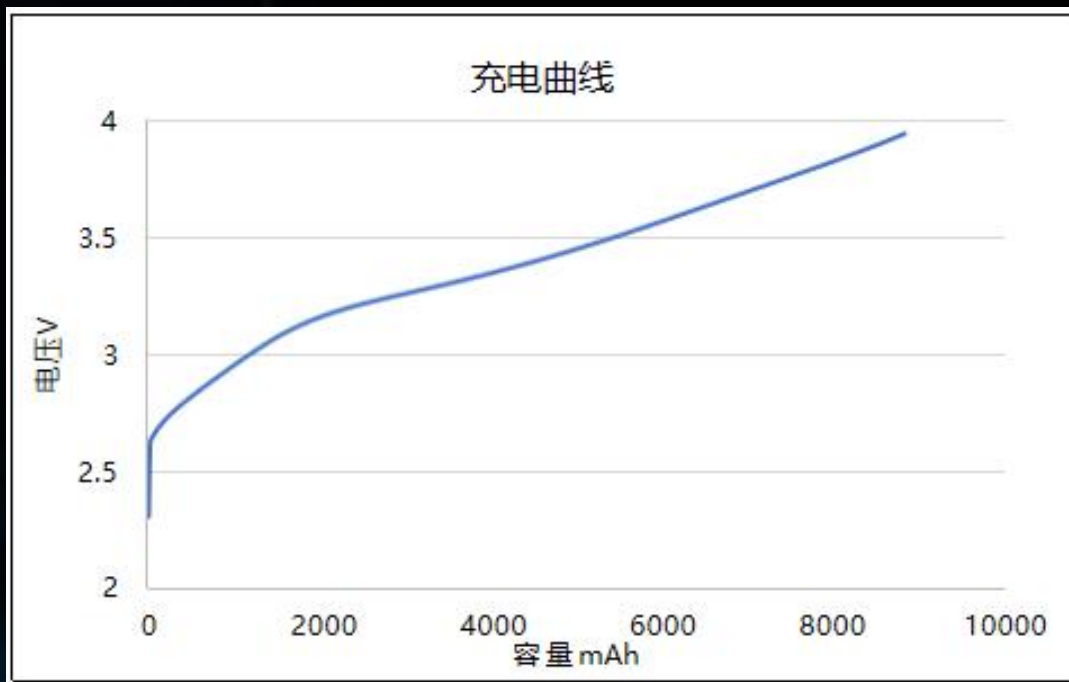
- Summary: Has excellent wide temperature range and high rate discharge performance



# Performance data of sodium ion batteries

High temperature rate charging performance

◆ Test conditions: Charge at a constant current of 6C at 45 °C to 3.95

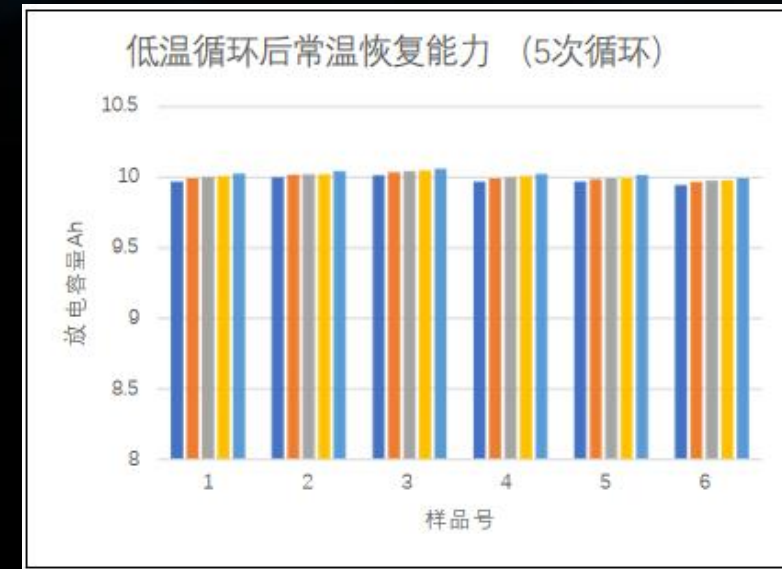
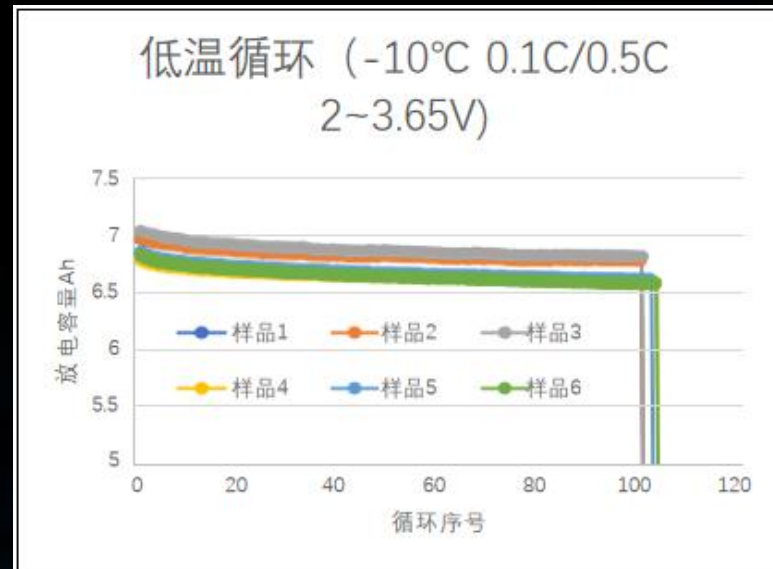
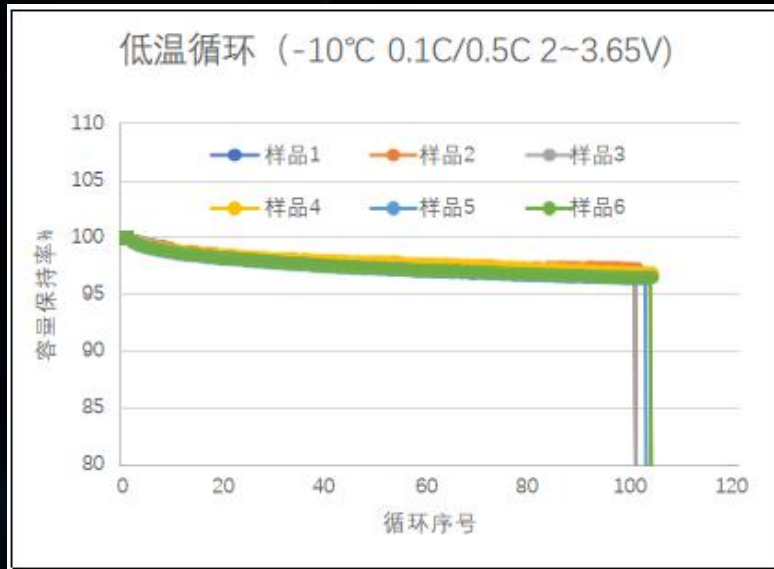


● Summary: Charge continuously at 6C at 45 °C until 100% SOC, maintain 90% capacity, and temperature rise < 11 °C

# Performance data of sodium ion batteries

## Low temperature charging performance

- ◆ 10Ah cylindrical battery cell is charged at a constant current of 0.1C to 3.65V at  $-10\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$  and left for 30 minutes, then discharged at 0.5C to 2.0V and left for 30 minutes, continuously cycling



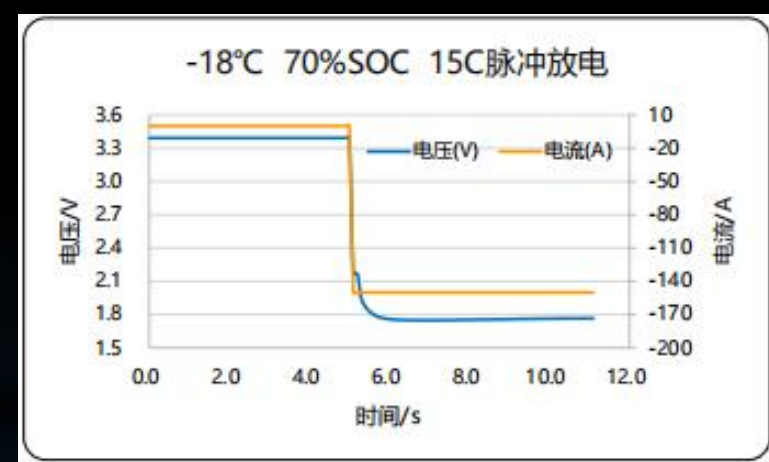
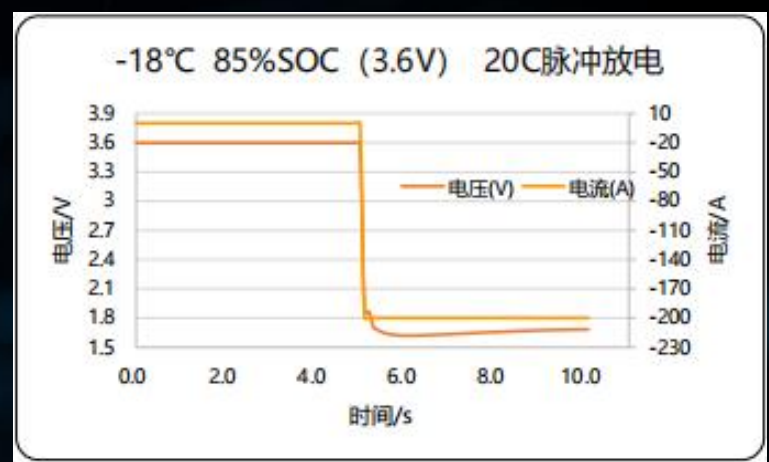
- **Summary: Sodium ion batteries can be charged 70% at 0.1C at  $-10\text{ }^{\circ}\text{C}$ , achieving long-term cycling and no capacity degradation after returning to room temperature.**

# Performance data of sodium ion batteries

Low temperature discharge performance under working conditions

- ◆ 10Ah cylindrical battery cells are discharged at different rates for a certain period of time after being placed at -18 °C for 6H

SOC \ 倍率	100%	85% (3.6V)	70%	50%
	放电时间			
10C	√	√	√	5s
15C	√	√	5s	x
20C	5s	5s	x	x



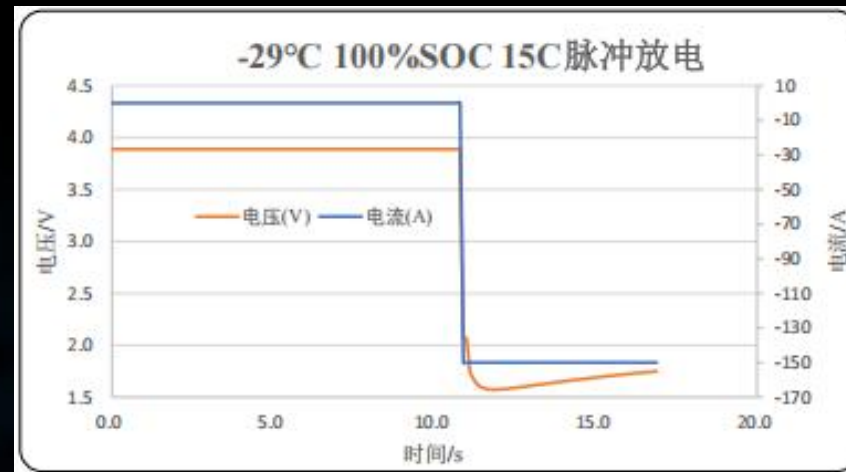
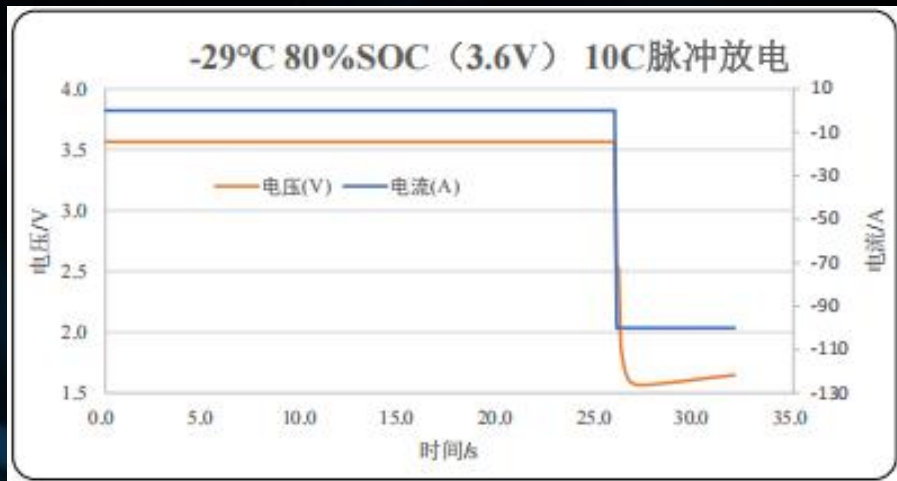
- Summary: Sodium ion batteries have a SOC of 50% at -18 °C and can achieve 10C pulse discharge for 5 seconds.

# Performance data of sodium ion batteries

Low temperature discharge performance under working conditions

- ◆ 10Ah cylindrical battery cells are discharged at different rates for a certain period of time after being left at -29 °C for 6H

SOC \ 倍率	100%	80% (3.6V)	70%
	放电时间		
10C	√	5S	×
15C	5S	×	×
20C	×	×	×



- **Summary: Sodium ion batteries have an SOC of 80% at -29 °C and can achieve 10C pulse discharge for 5 seconds**

# 05

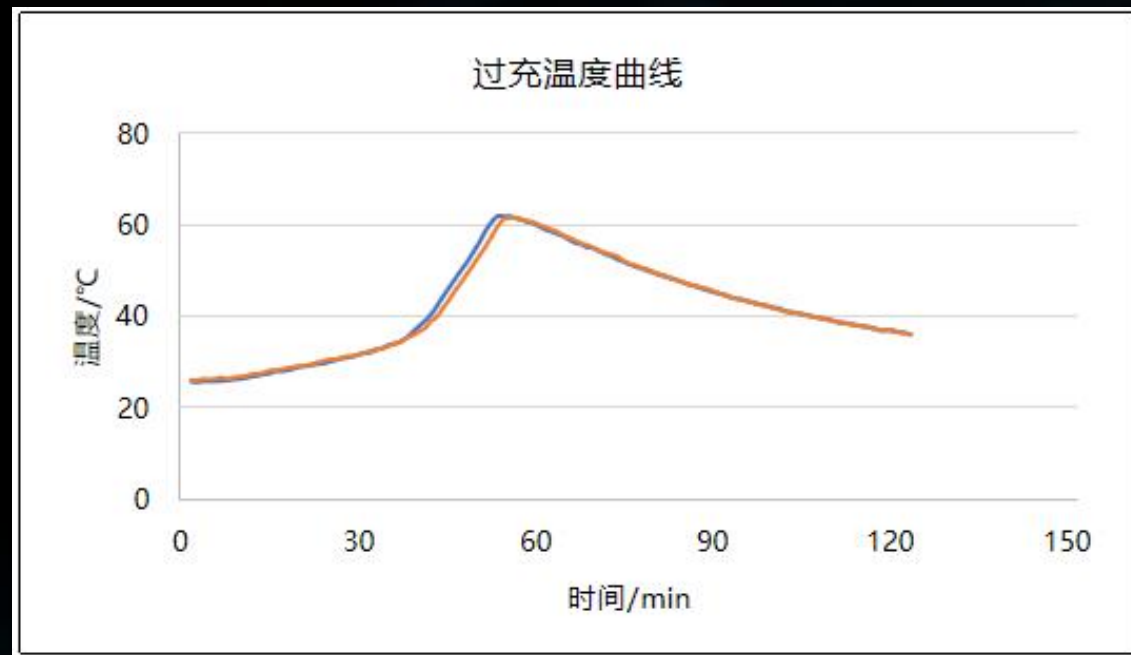
## Safety testing data for sodium ion batteries



# Safety performance data of sodium ion batteries

## Safety Tested\_Overcharging

- ◆ Test conditions: After the battery is fully charged, it is charged to 6.0V at a constant current of 1C at 25 °C± 5 °C

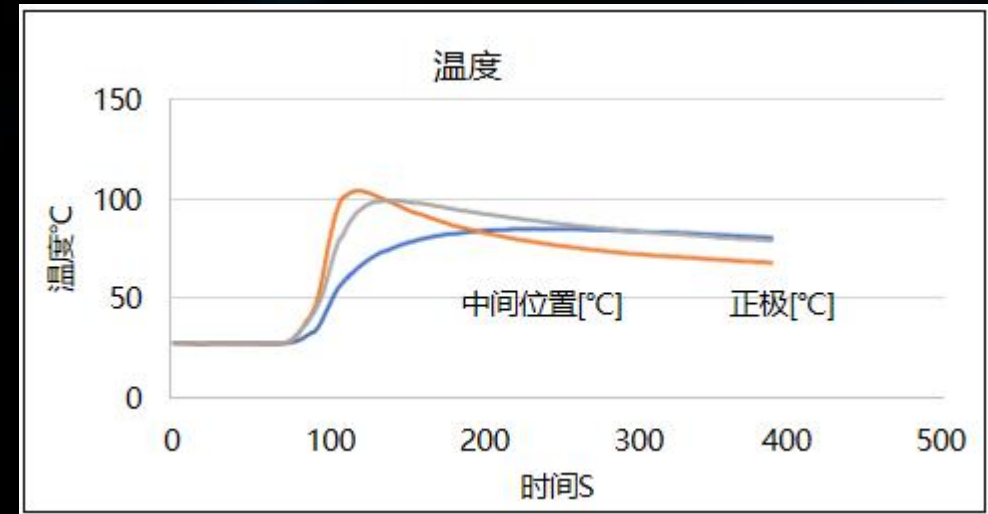


● Summary: Tested successfully

# Safety performance data of sodium ion batteries

## Safety Test - External Short Circuit

Test conditions: Charge at a constant current and voltage of 0.5C to 3.95V at  $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ , and short-circuit for 10 minutes with an external line resistance of  $<5\text{m } \Omega$ .

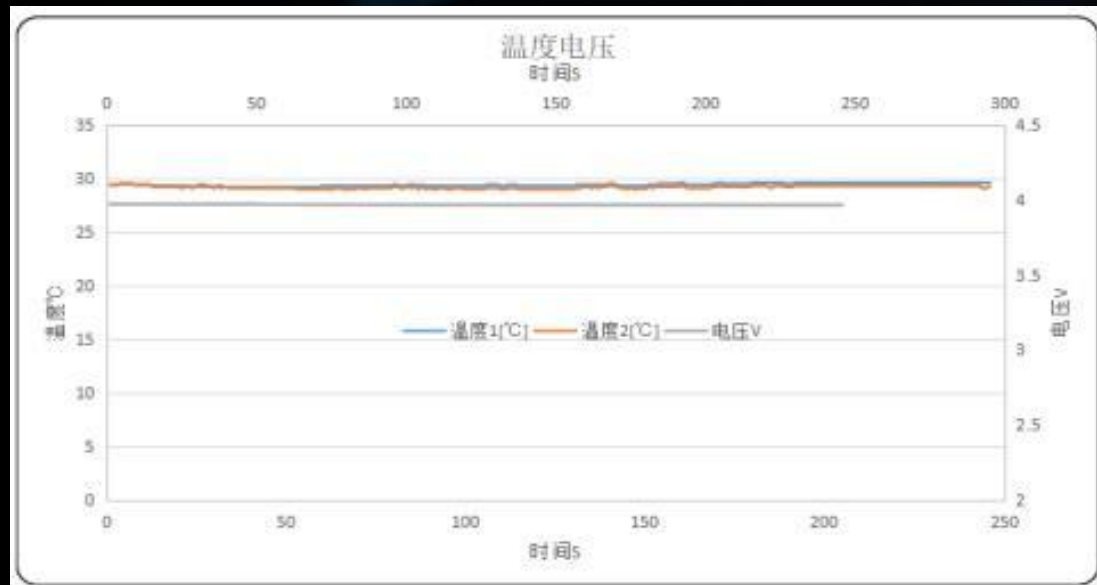
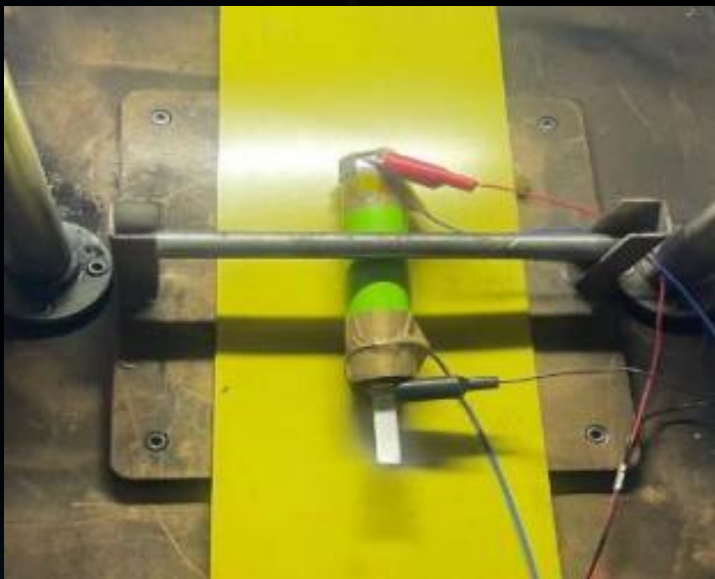


- Summary: Test passed; The battery did not catch fire or explode

# Safety performance data of sodium ion batteries

## Safety testing - Heavy object impact

- ◆ Test conditions: Charge at 0.5C constant current and constant voltage to 3.95V at 25 °C± 5 °C, with a hammer height of 610mm and a weight of 9.1kg, 15.8mm steel rod.

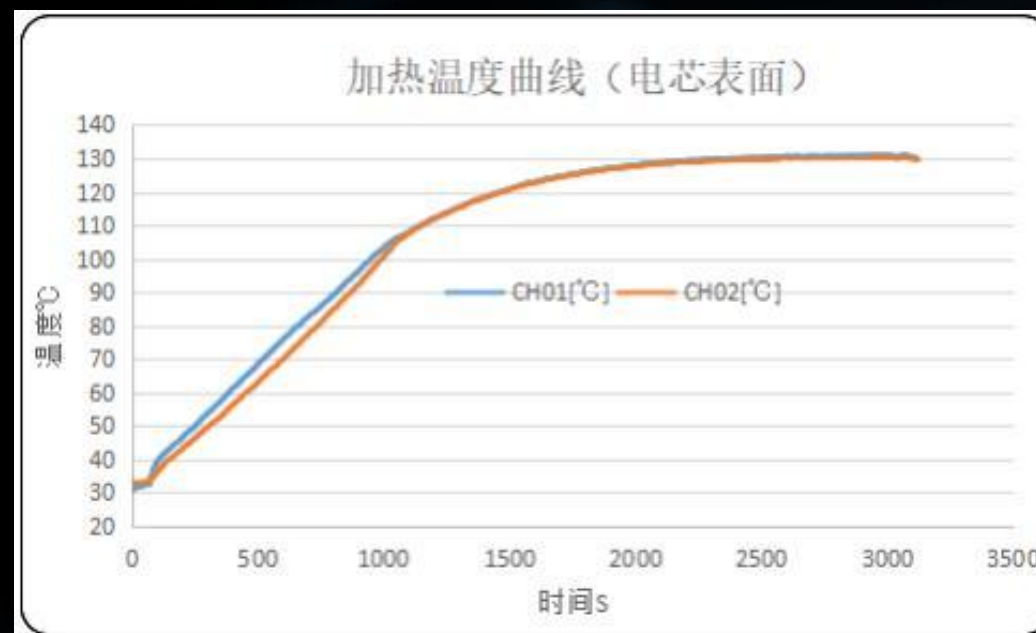


- Summary: Test passed; The battery has not caught fire, exploded, or leaked

# Safety performance data of sodium ion batteries

## Safety Tested\_Heating

- ◆ Test conditions: Charge the battery at a constant current and voltage of 0.5C to 3.95V at  $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ . After the battery is fully charged, place it in a heating test chamber and heat it at  $5\text{ }^{\circ}\text{C}/\text{min}$  to  $130\text{ }^{\circ}\text{C}$  for 30 minutes.



- Summary: Test passed; The battery did not catch fire or explode

**06**

# **Sodium ion battery certification**



# Certification report for sodium ion batteries



- ◆ Strong inspection report for power batteries

检测报告 Test Report			
产品名称 Product Name	钠离子电芯	规格型号 Model	NaCR32140-MP10
		样品编号 Sample No.	20230724WD206-25-26 20230724WD206-48
委托单位及地址 Applicant & Add.	濮阳中科海纳科技有限责任公司 濮阳市昆仑街道创智路 35 号		
生产单位及地址 Manufacturer & Add.	濮阳中科海纳科技有限责任公司 濮阳市昆仑街道创智路 35 号		
送样者 Sender	—	送样日期 Delivery date	2023.04.26
收样日期 Date of Sample	2023.04.26	检测日期 Test Time	2023.04.26-2023.09.03
样品数量 Specimen Quantity	3 个	样品状态 Sample Status	符合检验要求
检测环境 Environment	温度 (°C): 25.5-29.7 相对湿度 (%RH): 64.4-82.1		
检测地点 Check address	张家港市杨舍镇福新路 1215 号		
检测依据 Test Standard	GB/T 31484-2015 《电动汽车用动力电池循环寿命要求及试验方法》		
检测项目 Test Items	单体蓄电池: 室温容量、标准循环寿命、室温功率 蓄电池模块: 室温容量、室温功率		
检测结论 Test Conclusion	经检验, 该样品所检验项目的检验结果符合 GB/T 31484-2015 《电动汽车用动力电池循环寿命要求及试验方法》的要求, 检验结果参考第三页~第十一页。 签发日期: 2023年07月10日 Report Date		
备注 Remark	20230724WD206-25-26 样品为蓄电池单体 20230724WD206-48 样品为蓄电池模块		
主检: Tester	审核: Checked	批准: Approved	

张家港清研检测技术有限公司 Zhangjiagang Tsingyan Testing Technology Co.,Ltd.			
检测报告 Test Report			
产品名称 Product Name	钠离子电芯	规格型号 Model	NaCR32140-MP10
		样品编号 Sample No.	20230724WD206-27-38
委托单位及地址 Applicant & Add.	濮阳中科海纳科技有限责任公司 濮阳市昆仑街道创智路 35 号		
生产单位及地址 Manufacturer & Add.	濮阳中科海纳科技有限责任公司 濮阳市昆仑街道创智路 35 号		
送样者 Sender	—	送样日期 Delivery date	2023.07.24
收样日期 Date of Sample	2023.07.24	检测日期 Test Time	2023.08.01-2023.09.04
样品数量 Specimen Quantity	12 个	样品状态 Sample Status	符合检测要求
检测环境 Environment	温度 (°C): 20.3-26.2 相对湿度 (%RH): 33-62		
检测地点 Check address	张家港市杨舍镇福新路 1202 号 A02、1215 号		
检测依据 Test Standard	GB 38031-2020 《电动汽车用动力电池安全要求》		
检测项目 Test Items	预处理、过充电、过放电、外部短路、加热、温度循环、挤压		
检测结论 Test Conclusion	经检测, 该样品所检测项目的检测结果符合 GB 38031-2020 《电动汽车用动力电池安全要求》的要求, 检验结果参考第三页~第十页。 签发日期: 2023年07月18日 Report Date		
备注 Remark	—		
主检: Tester	审核: Checked	批准: Approved	

张家港清研检测技术有限公司 Zhangjiagang Tsingyan Testing Technology Co.,Ltd.			
检测报告 Test Report			
产品名称 Product Name	钠离子电芯	规格型号 Model	NaCR32140-MP10
		样品编号 Sample No.	20230724WD206-27-36 20230724WD206-39-48
委托单位及地址 Applicant & Add.	濮阳中科海纳科技有限责任公司 濮阳市昆仑街道创智路 35 号		
生产单位及地址 Manufacturer & Add.	濮阳中科海纳科技有限责任公司 濮阳市昆仑街道创智路 35 号		
送样者 Sender	—	送样日期 Delivery date	2023.07.26
收样日期 Date of Sample	2023.07.26	检测日期 Test Time	2023.07.26-2023.08.24
样品数量 Specimen Quantity	20 个	样品状态 Sample Status	符合检验要求
检测环境 Environment	温度 (°C): 25.5-29.7 相对湿度 (%RH): 64.4-82.1		
检测地点 Check address	张家港市杨舍镇福新路 1202 号 A02、1215 号		
检测依据 Test Standard	GB/T 31486-2015 《电动汽车用动力电池电性能要求及试验方法》		
检测项目 Test Items	单体蓄电池: 外观、极性、外形尺寸和质量、室温放电容量; 蓄电池模块: 外观、极性、外形尺寸和质量、室温放电容量、室温倍率放电容量、室温倍率充电性能、低温放电容量、高温放电容量、荷电保持与容量恢复能力、耐震动、储存。		
检测结论 Test Conclusion	经检验, 该样品所检验项目的检验结果符合 GB/T 31486-2015 《电动汽车用动力电池电性能要求及试验方法》的要求, 检验结果参考第三页~第十六页。 签发日期: 2023年07月18日 Report Date		
备注 Remark	20230724WD206-27-36 样品为蓄电池单体 20230724WD206-39-48 样品为蓄电池模块		
主检: Tester	审核: Checked	批准: Approved	

● Summary: The power battery has passed the mandatory inspection and certification of GB/T31484, GB38031, and GB/T31486

# Certification report for sodium ion batteries

**STE** Report No.: STE23092201S

### UL TEST REPORT UL 1642 Standard for Safety of Lithium Batteries

Report Number.....	STE23092201S
Tested by (name + signature).....	Ada Lin / Test engineer
Approved by (name + signature).....	Navy Jiang / Project manager
Date of issue.....	September 25, 2023
Total number of pages.....	31
<b>Testing Laboratory</b> .....	<b>Shenzhen STE Testing Laboratory Co., Ltd.</b>
Address.....	3/F, Building 9, Dehong Factory Building, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China
<b>Applicant's name</b> .....	<b>HINa Battery Technology Co., Ltd</b>
Address.....	Building 28, Chuangzhi Park, Zhongguancun, Liyang City, Jiangsu Province, China
<b>Manufacturer's name</b> .....	<b>HINa Battery Technology Co., Ltd</b>
Address.....	Building 28, Chuangzhi Park, Zhongguancun, Liyang City, Jiangsu Province, China
<b>Test specification:</b>	
Standard.....	UL1642: 2020 (6 <sup>th</sup> edition)
Test procedure.....	Type test
Non-standard test method.....	N/A
Test Report Form No.....	UL1642A
Test Report Form(s) Originator.....	STE
Master TRF.....	Dated 2020-08
<b>Shenzhen STE Testing Laboratory Co., Ltd All rights reserved.</b>	
<b>Test item description</b> .....	Sodium ion cell
Trade Mark.....	N/A
Model/Type reference.....	NaCR32140-MP10
Ratings.....	3.05V, 10Ah, 30.5Wh

**STE** STE Testing Laboratory Co., Ltd. Report No.: STE23092202S

### TEST REPORT IEC 62133-2 Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems

Report Number.....	STE23092202S
Tested by (name + signature).....	Ada Lin / Test engineer
Approved by (name + signature).....	Navy Jiang / Project manager
Date of issue.....	September 25, 2023
Total number of pages.....	27
<b>Testing Laboratory</b> .....	<b>Shenzhen STE Testing Laboratory Co., Ltd.</b>
Address.....	3/F, Building 9, Dehong Factory Building, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China
<b>Applicant's name</b> .....	<b>HINa Battery Technology Co., Ltd</b>
Address.....	Building 28, Chuangzhi Park, Zhongguancun, Liyang City, Jiangsu Province, China
<b>Manufacturer's name</b> .....	<b>HINa Battery Technology Co., Ltd</b>
Address.....	Building 28, Chuangzhi Park, Zhongguancun, Liyang City, Jiangsu Province, China
<b>Test specification:</b>	
Standard.....	IEC 62133-2: 2017
Test procedure.....	Type test
Non-standard test method.....	N/A
Test Report Form No.....	IEC 62133-2_A
Test Report Form(s) Originator.....	STE
Master TRF.....	Dated 2022-03
<b>Shenzhen STE Testing Laboratory Co., Ltd All rights reserved.</b>	
<b>Test item description</b> .....	Sodium ion cell
Model/Type reference.....	NaCR32140-MP10
Trade Mark.....	N/A
Ratings.....	3.05V, 10Ah, 30.5Wh

**STE** 第 2 页 共 11 页  
报告编号: STE23092202S

### 检验报告 Test Report

报告编号.....	STE23092202S
总页数.....	11页
发行日期.....	2023年09月25日
申请人名称.....	深圳中科海纳科技有限责任公司
申请人地址.....	江苏省溧阳市创智园 28 号楼
制造商名称.....	深圳中科海纳科技有限责任公司
制造商地址.....	江苏省溧阳市创智园 28 号楼
测试实验室名称.....	深圳市方略检测有限公司
测试实验室地址.....	深圳市龙华区观澜街道牛湖社区福昌路 63 号德宏厂房 9 栋 3 楼
检测依据标准.....	GB 31241-2022 《便携式电子产品用锂离子电池和电池组安全要求》 第 4.1.3、6.1、6.2、6.3、6.4、7.1、7.2、7.3、7.4、7.5、7.6、7.7、7.8、7.9 章节要求
检测结果.....	合格 (PASS)，请参考以下页面。
产品名称.....	钠离子电芯
商标.....	N/A (不适用)
产品型号.....	NaCR32140-MP10
参数.....	3.05V, 10Ah, 30.5Wh
签名:	
检验人:	黄家增
日期:	2023年09月25日
	2023年09月25日
STE Testing Laboratory Co., Ltd.	

- Summary: GB31241 has been approved UL1642, IEC62133-2 testing

# Certification report for sodium ion batteries



## ◆ UN38.3 Transportation

天溯 Tian Su Report No.: TSZ23090186-P01-R01  
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中国认可  
国际互认  
检测  
TESTING  
CNAS L5138

**UN38.3 检测报告**  
**UN38.3 Test Report**

样品名称: 钠离子电芯  
Sample name: Sodium ion Cell

样品型号: 32140NS-30.0Wh-3.0V  
Sample model:

委托单位: 深圳比瓦特科技有限公司  
Applicant: Shenzhen Biwatt Technology Co., Ltd.

深圳天溯计量检测股份有限公司  
Shenzhen Tiansu Calibration and Testing Co., Ltd.

Address: No.2, Jintong Avenue, Longgang District, Shenzhen, Guangdong, China  
Web: www.tiansu.org E-mail: tsj@tiansu.org Tel: 0755-89457984  
J3-2022-A01-0046

天溯 Tian Su Report No.: TSZ23090186-P01-R01  
Page 2 / 15 Pages

通用信息 General information

委托单位 Applicant	名称 Name	深圳比瓦特科技有限公司 Shenzhen Biwatt Technology Co., Ltd.		
	地址 Address	深圳市南山区西丽街道松坪山社区朗山路13号南园西丽湾华庭信息港科研楼107 Room 107, Scientific Research Building, Tsinghua Information Port, No. 13, Langshan Road, West Side of South Gate, Songpingshan Community, Xili Street, Nanshan District, Shenzhen		
生产单位 Manufacturer	名称 Name	溧阳中科海纳科技有限责任公司 Liyang HiNa Battery Technology Co., Ltd.		
	地址 Address	江苏省溧阳市中关村科技园28幢 Building 28, Chuangdi Park, Liyang City, Jiangsu Province, China		
	电话 Phone number	18922833470	邮箱 Email address	liangun@biwattpower.com
	网址 Website	www.biwattpower.com		
测试实验室 Testing laboratory	名称 Name	深圳天溯计量检测股份有限公司 Shenzhen Tiansu Calibration and Testing Co., Ltd.		
	地址 Address	广东省深圳市龙岗区横龙大道2号 No.2, Jintong Avenue, Longgang District, Shenzhen, Guangdong, China		
样品名称 Sample name	钠离子电芯 Sodium ion Cell	样品型号 Sample model	32140NS-30.0Wh-3.0V	
类别 Classification	钠离子电芯 Sodium ion Cell	商标 Trade mark	/	
额定值 Ratings	3.0V/10Ah/30.0Wh	样品形状 Shape of sample	近似柱体 Approximate Cylinder	
测试标准 Test standard	联合国《试验和标准手册》(第7版修订1) 38.3节 UN "Manual of Tests and Criteria" ST/S.G./AC.10/11/Rev.7/Amend1/Subsection 38.3			
签发日期 Date of issue	2023.09.26	测试日期 Test date	2023.09.14 to 2023.09.25	

主检  
Tested by 叶林芬

审核  
Reviewed by 张楠

批准  
Approved by 张楠

Address: No.2, Jintong Avenue, Longgang District, Shenzhen, Guangdong, China

● Summary: It has passed the UN38.3 lithium battery transportation standard testing

# Thank you for watching

Company Address	3rd Floor, Building 1, Guoning Kehui Cheng, Nancheng Sub-district, Dongguan City, Guangdong Province, China
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