

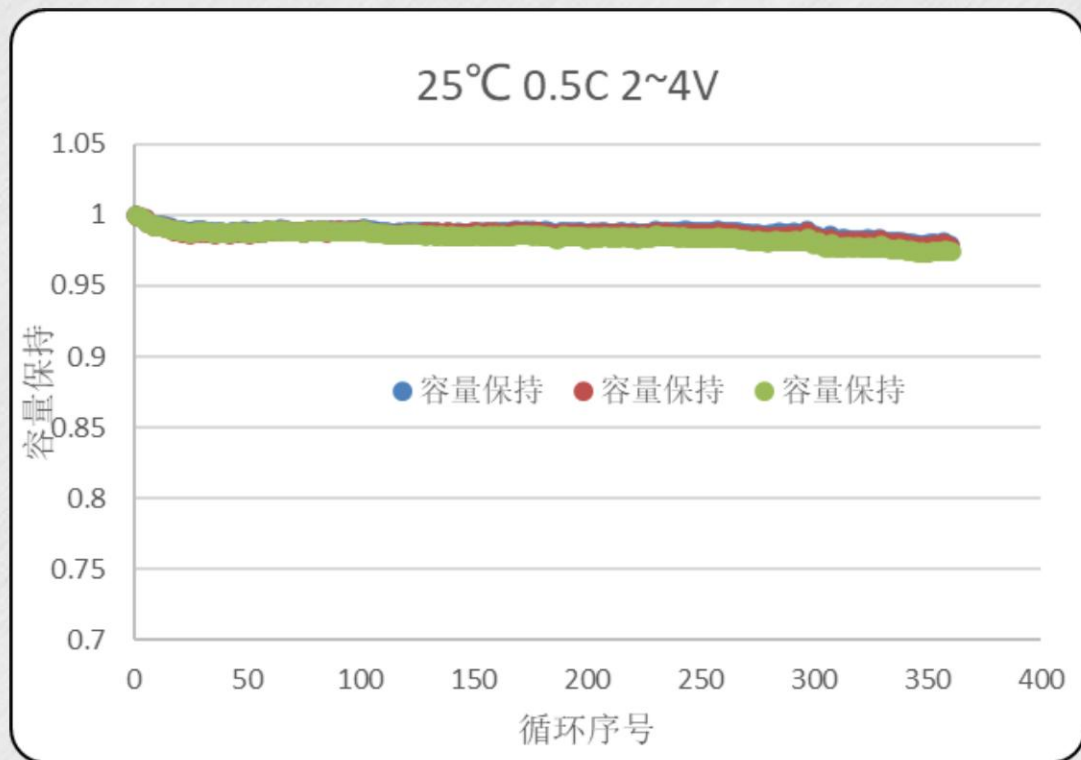
## Sodium ion battery product introduction



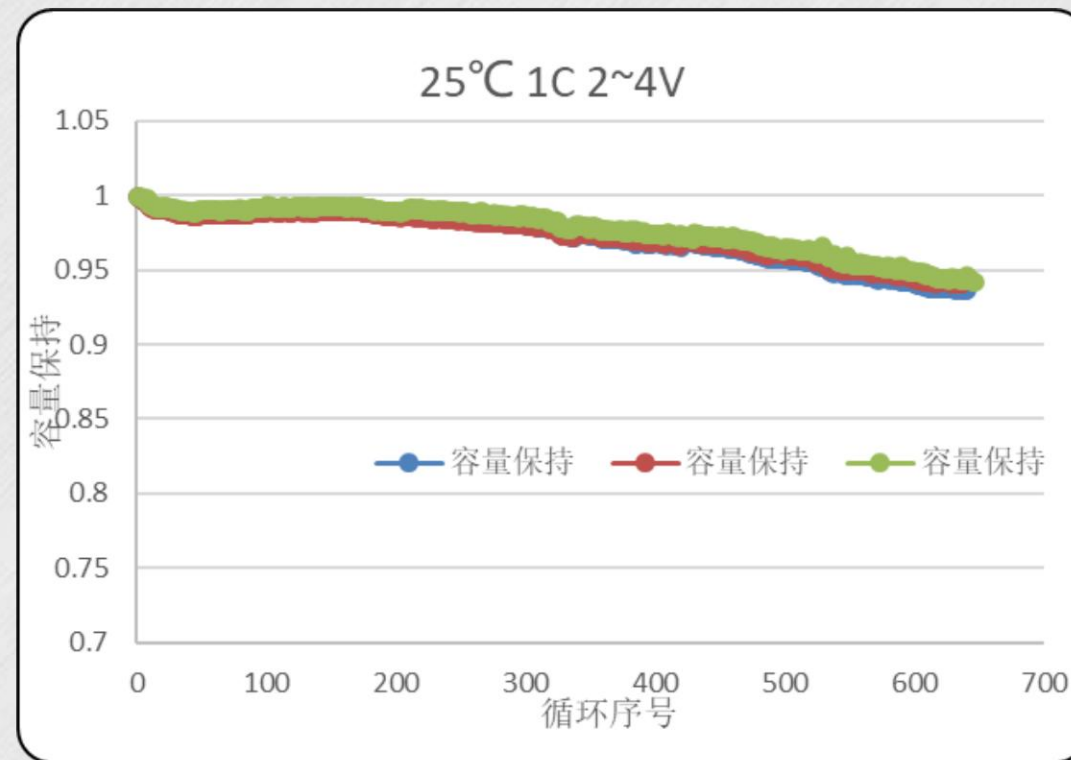
# Cylindrical battery-NaCR32140-ME10

No.	Project		Technical Indicators
1	Dimensions	Diameter	<b>33.2±0.2mm</b>
2		High	<b>140±0.3mm</b>
3	Battery Weight		269±5.0g
4	Nominal Capacity		10.0Ah
5	Nominal Energy		31 Wh
6	Rated Voltage		3.1V
7	Operating Voltage		2.0-4.0V
8	Standard Charging Mode		0.2C constant current and constant voltage charging to 4.0V/0.05C cut-off
9	Standard Discharge Mode		0.2C constant current discharge to 2.0V cut-off
10	BOL_ACR		ACR≤3mΩ
11	Energy Density		≥120Wh/kg
12	Charging working temperature		-10~55℃
13	Discharge working temperature		-30~55℃
14	cycle life	25℃ 1.0C/1.0C cycle life	≥3000cycles
15		25℃ 2.0C/2.0C cycle life	≥1500cycles
16		45℃ 1.0C/1.0C cycle life	≥800cycles





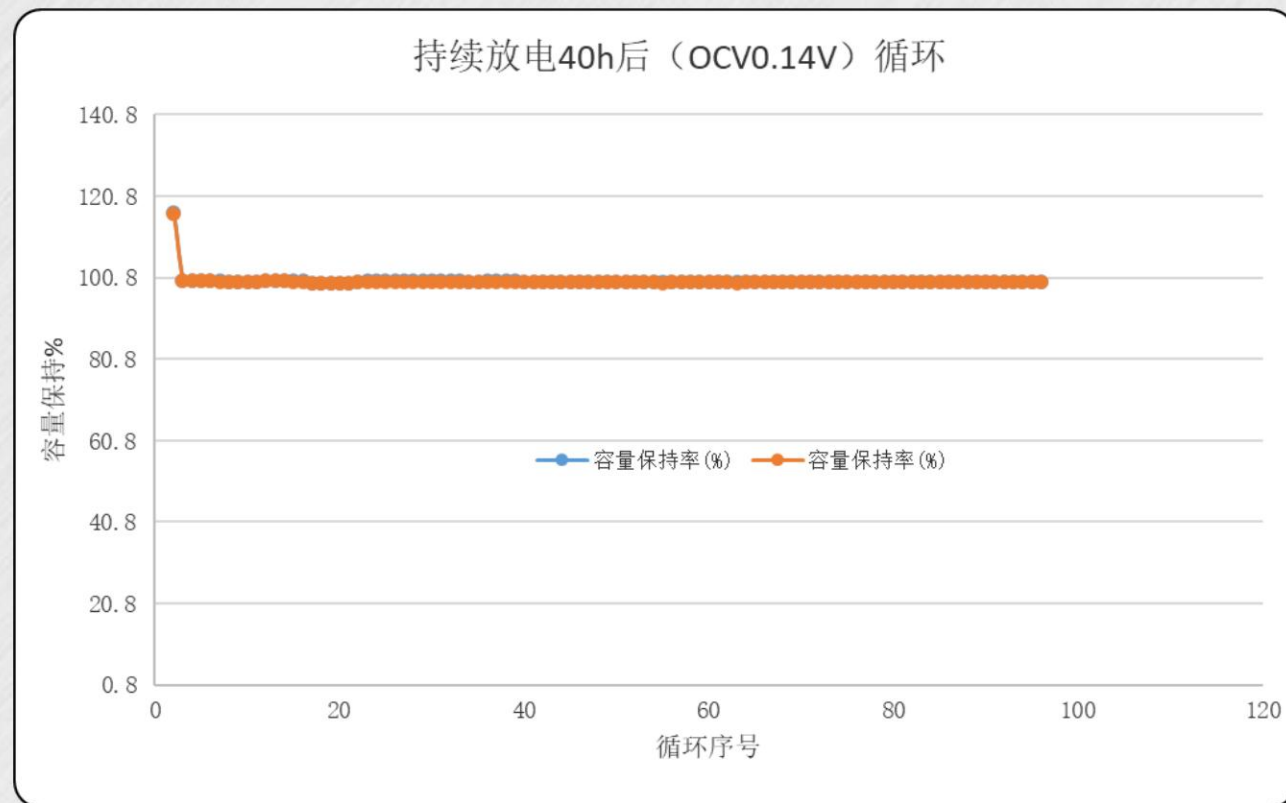
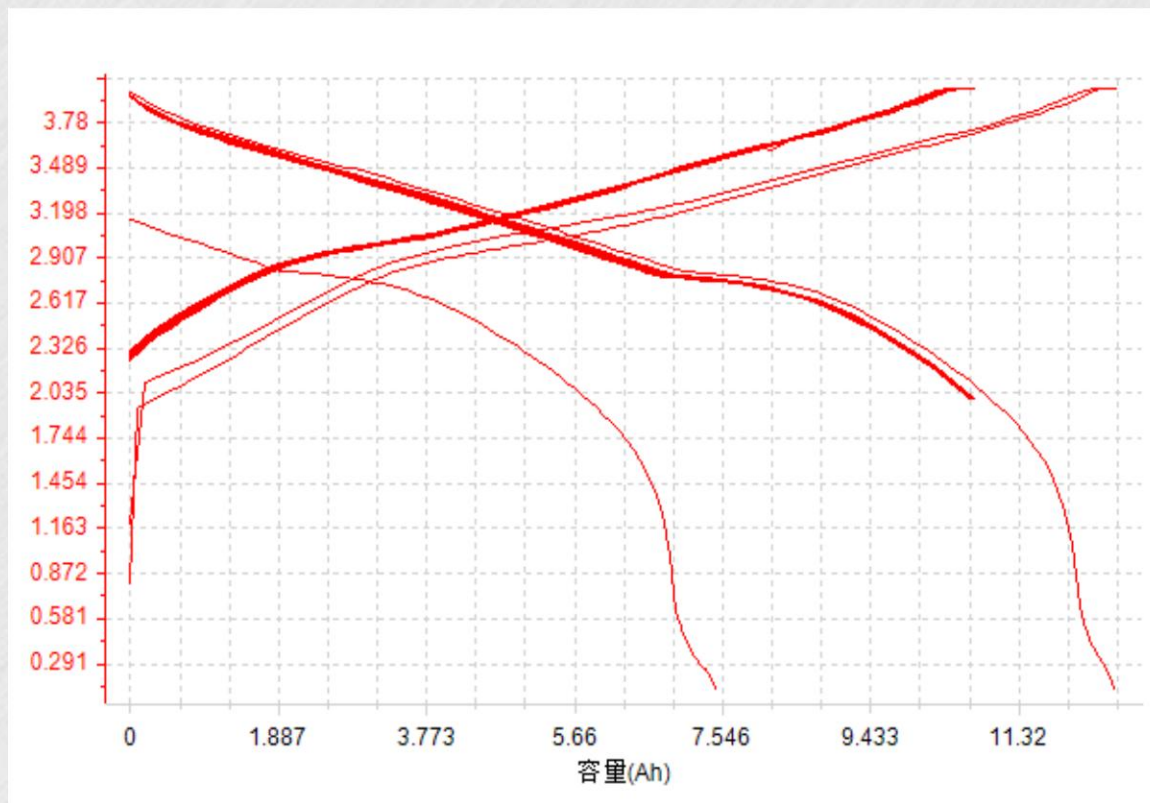
0.5C charge-discharge cycle 350 cycles, 97%



1C charge and discharge cycle 600 cycles, 95%



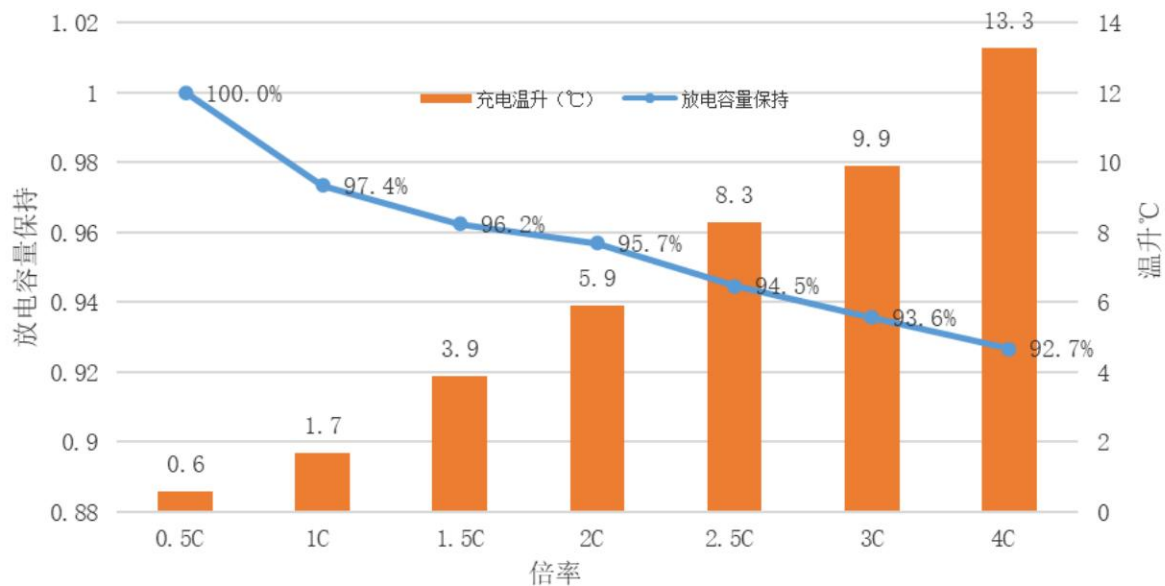
## Over discharge cycle



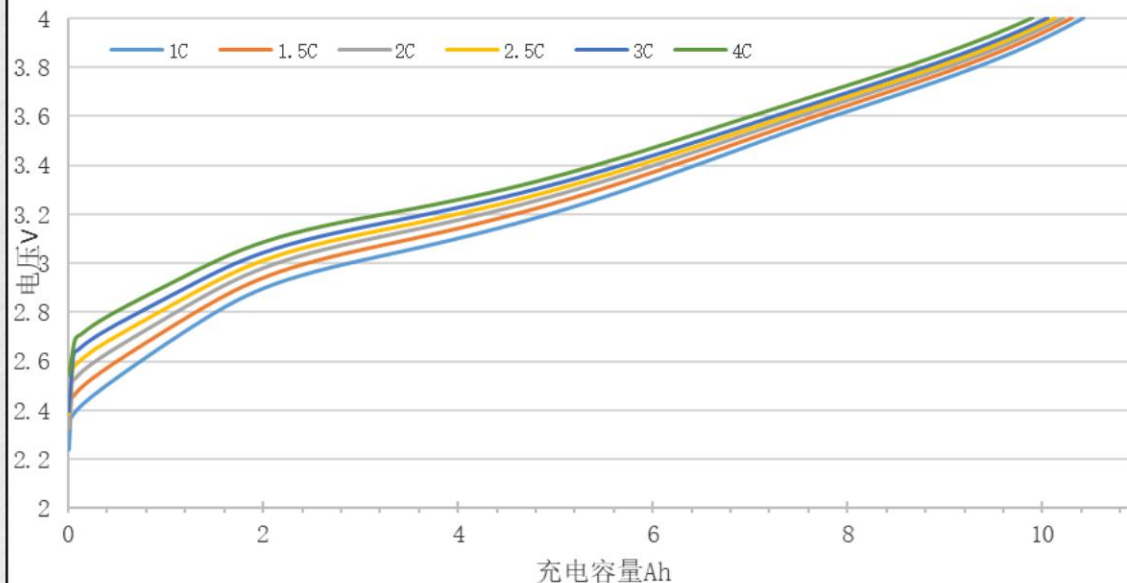
After continuous over-discharge, there is almost no capacity decay at 1C cycle for 100 cycles

# Rate charging

### 倍率充电



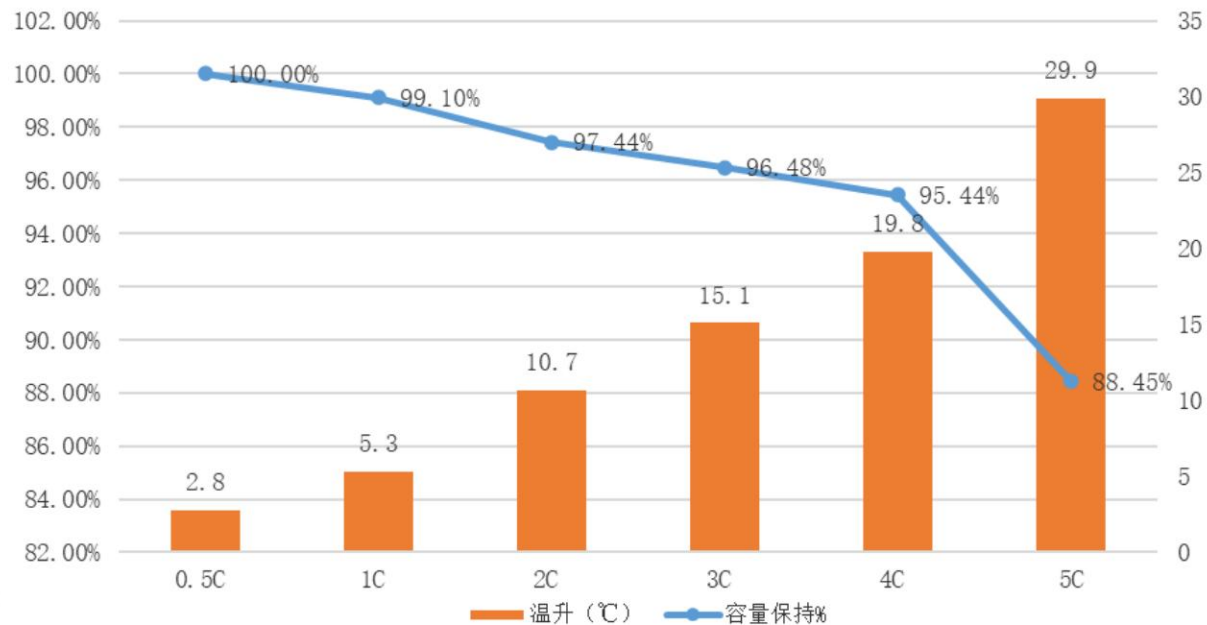
### 倍率充电



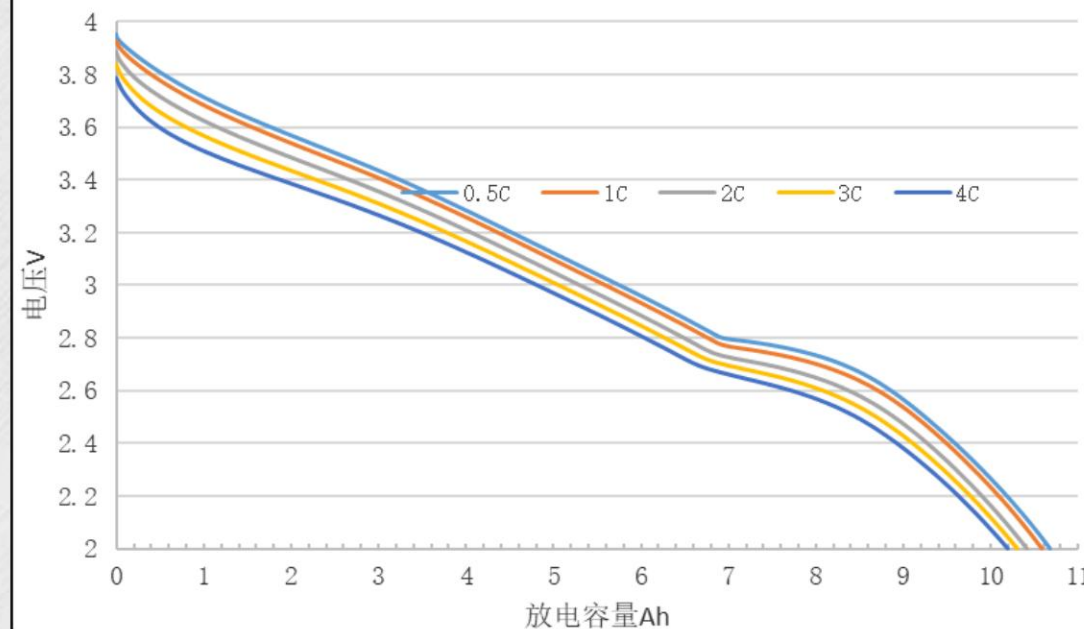
The 4C charge capacity retention rate is 93%, and the temperature rise is less than 15°C

# rate discharge

### 倍率放电



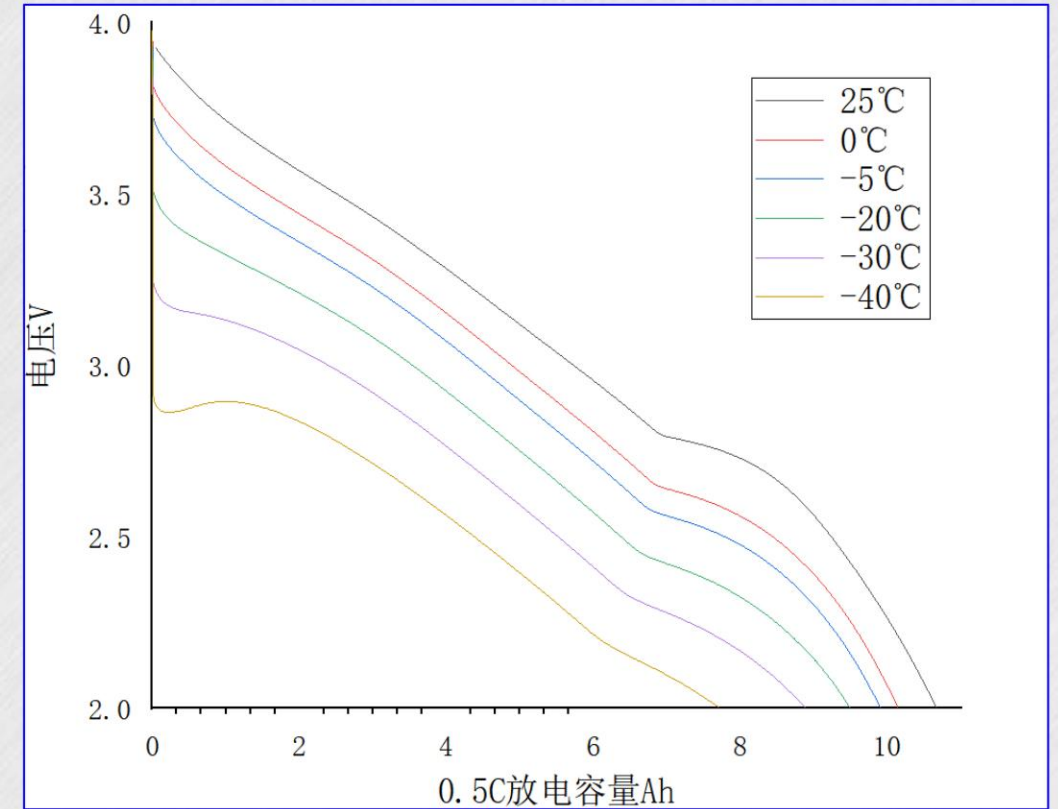
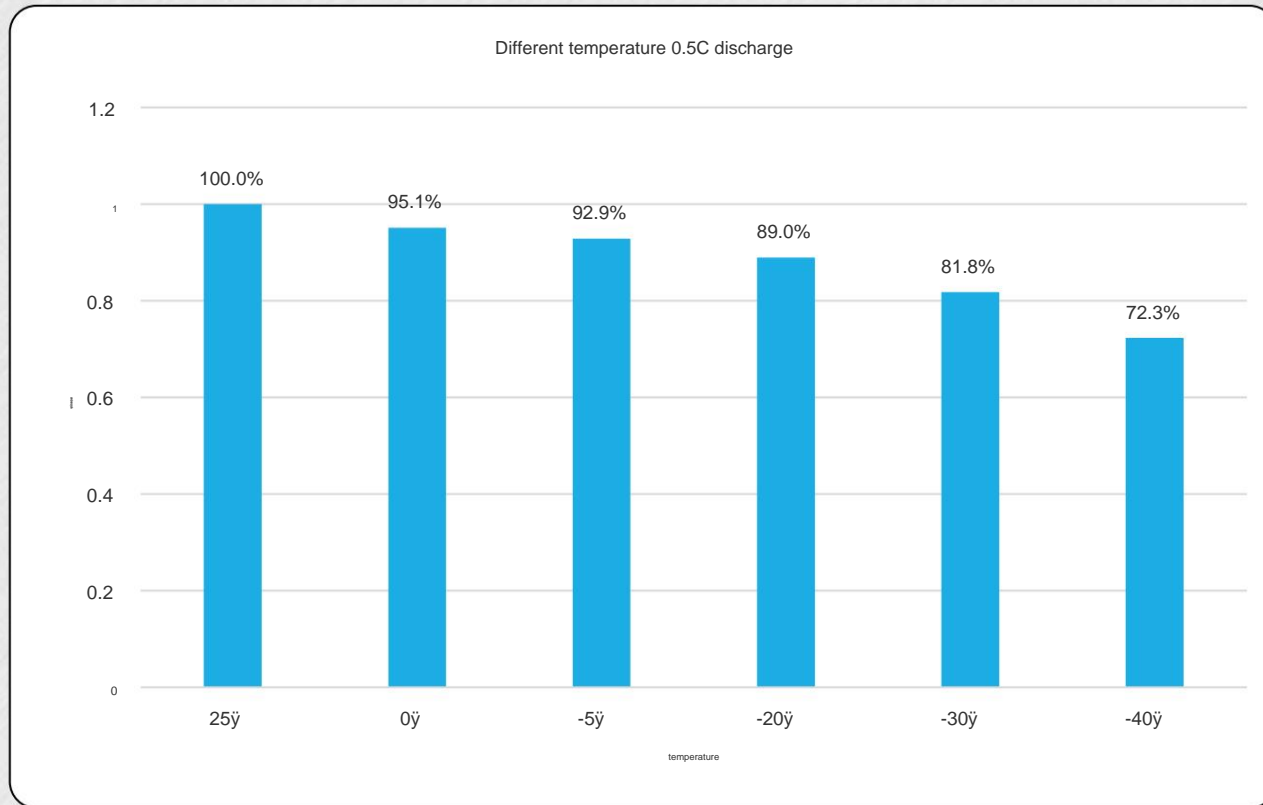
### 倍率放电



4C discharge capacity retention rate of 95%, temperature rise less than 20 °C



## Low temperature 0.5C discharge



**-30°C 0.5C discharge capacity retention rate 81%**

charging window

	SOC	温度梯度						
		-20℃~-10℃	-10℃~0℃	0℃~10℃	10℃~20℃	20℃~45℃	45℃~55℃	55℃~70℃
最大充电倍率	100%	/	/	0.05	0.05	0.05	0.05	/
	90%	/	0.05	0.20	0.75	0.50	0.50	0.50
	80%	0.05	0.20	0.50	0.75	3.00	1.00	0.50
	70%	0.10	0.20	0.50	0.75	3.00	1.00	0.50
	60%	0.10	0.20	0.50	0.75	3.00	1.00	0.50
	50%	0.10	0.20	0.50	0.75	3.00	1.00	0.50
	40%	0.10	0.20	0.50	0.75	3.00	1.00	0.50
	30%	0.10	0.20	0.50	0.75	3.00	1.00	0.50
	20%	0.10	0.20	0.50	0.75	3.00	1.00	0.50
	10%	0.10	0.20	0.50	0.75	0.75	0.50	0.50
	0%	0.10	0.20	0.50	0.50	0.50	0.50	0.50



## Safety Performance

Test	Standard Test	Judgement Standard	Test Results
Overcharge	Fully charged 1C to 6V	no fire, no explosion	pass
Overdischarge	0.2C constant current discharge for 90min at 0V	No fire, no explosion, no leakage, capacity recovery $\geq 95\%$	pass
Short Circuit	Short the positive and negative poles with an external line resistance of $\leq 5m\Omega$	no fire, no explosion	pass
Heavy Impact	A rod with a diameter of $15.8\pm 0.2mm$ and a minimum length of 60mm is placed in the middle of the cell, and a 9.1kg weight is placed from the drop impact bar at 610mm	no fire, no explosion	pass
Hot Abuse	Heating to $130^{\circ}C$ with full power and maintaining for 30 minutes	no fire, no explosion	pass
Extrusion	Put the fully charged battery on the extrusion workbench, start the extrusion device, release the pressure at $13\pm 0.78KN$ , extrusion experiments can be stopped once the pressure reaches the maximum	no fire, no explosion	pass
Fall	The positive or negative terminal of the fully charged battery can be freely dropped from a height of 1.5m onto the concrete floor	no fire, no explosion, no leakage	pass