

## Over-discharge test of 4S2P 1.7AH (polyanion cell) battery pack

I. Test parameters: 12V 1.7AH 60C discharge temperature rise test

II Test results:

Fully charge the battery and conduct a discharge cycle test at a high current of 60C (100A) with an interval of 45 seconds, until the voltage drops below 7V. Connect the temperature sensing wire to the main positive output nickel plate. The 2.4S2P battery pack underwent 14 high-current discharge tests at 60C (100A),

During the testing process, the battery did not leak, catch fire, or explode, with a maximum temperature of 68.2°C.

5. Battery voltage after test: 9.529V, internal resistance: 37.72mΩ

### Process diagram

Temperature sensor is pasted on the position of the main positive output nickel plate

### Battery placement



### Temperature, time, and corresponding battery voltage and charging current

The temperature before the test was 25.6°C

Voltage: 13.813V, Current: 0A, Discharge Time: 0



The temperature is 33.2°C

Voltage: 12.7892V, current 100A, discharge for 3S



2025-12-1	9.1009	-59.3848	0.0082	0.0751	恒流放电
2025-12-1	7.3819	-100.003	0.0912	0.6941	恒流放电
2025-12-1	7.3749	-100.003	0.1051	0.7966	恒流放电
2025-12-1	12.5181	0	0.1051	0.7966	静置
2025-12-1	12.7228	0	0.1051	0.7966	静置
2025-12-1	12.763	0	0.1051	0.7966	静置
2025-12-1	12.7651	0	0.1051	0.7966	静置
2025-12-1	12.7892	0	0.1051	0.7966	静置

The temperature is 36.1°C

Voltage: 12.6139V, current 100A, discharge for 3S










7.7938	-95.7028	0.1184	0.9002	恒流放电
7.53	-100.003	0.2017	1.5355	恒流放电
7.5199	-100.004	0.2156	1.6401	恒流放电
12.4131	0	0.2156	1.6401	静置
12.6138	0	0.2156	1.6401	静置
12.6139	0	0.2156	1.6401	静置

The temperature is 39.1°C

Voltage: 12.5962V, current: 100A, discharge duration: 3S



2025-12-1	9.3359	-59.4478	0.2239	1.7171	↑
2025-12-1	7.6879	-100.004	0.3068	2.366	↑
2025-12-1	7.6719	-100.003	0.3207	2.4726	↑
2025-12-1	12.3651	0	0.3207	2.4726	清
2025-12-1	12.5811	0	0.3207	2.4726	清
2025-12-1	12.5882	0	0.3207	2.4726	清
2025-12-1	12.5961	0	0.3207	2.4726	清
2025-12-1	12.5962	0	0.3207	2.4726	清

The temperature is 40.4°C	Voltage: 12.5508V, current 100A, discharge for 3S																																								
	<table border="1"> <tbody> <tr><td>2025-12-1</td><td>9.4578</td><td>-59.4429</td><td>0.329</td><td>2.5507</td></tr> <tr><td>2025-12-1</td><td>8.1379</td><td>-95.6519</td><td>0.3412</td><td>2.6526</td></tr> <tr><td>2025-12-1</td><td>7.7199</td><td>-100.003</td><td>0.4245</td><td>3.3092</td></tr> <tr><td>2025-12-1</td><td>12.2721</td><td>0</td><td>0.4245</td><td>3.3092</td></tr> <tr><td>2025-12-1</td><td>12.5351</td><td>0</td><td>0.4245</td><td>3.3092</td></tr> <tr><td>2025-12-1</td><td>12.5351</td><td>0</td><td>0.4245</td><td>3.3092</td></tr> <tr><td>2025-12-1</td><td>12.5508</td><td>0</td><td>0.4245</td><td>3.3092</td></tr> </tbody> </table>	2025-12-1	9.4578	-59.4429	0.329	2.5507	2025-12-1	8.1379	-95.6519	0.3412	2.6526	2025-12-1	7.7199	-100.003	0.4245	3.3092	2025-12-1	12.2721	0	0.4245	3.3092	2025-12-1	12.5351	0	0.4245	3.3092	2025-12-1	12.5351	0	0.4245	3.3092	2025-12-1	12.5508	0	0.4245	3.3092					
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The temperature is 40.5°C	Voltage: 12.4721V, current 100A, discharge for 3S																																								
	<table border="1"> <tbody> <tr><td>2025-12-1</td><td>9.5549</td><td>-59.4519</td><td>0.4328</td><td>3.3881</td></tr> <tr><td>2025-12-1</td><td>7.8129</td><td>-100.003</td><td>0.5144</td><td>4.0448</td></tr> <tr><td>2025-12-1</td><td>12.2251</td><td>0</td><td>0.5144</td><td>4.0448</td></tr> <tr><td>2025-12-1</td><td>12.4561</td><td>0</td><td>0.5144</td><td>4.0448</td></tr> <tr><td>2025-12-1</td><td>12.4601</td><td>0</td><td>0.5144</td><td>4.0448</td></tr> <tr><td>2025-12-1</td><td>12.4608</td><td>0</td><td>0.5144</td><td>4.0448</td></tr> <tr><td>2025-12-1</td><td>12.4721</td><td>0</td><td>0.5144</td><td>4.0448</td></tr> </tbody> </table>	2025-12-1	9.5549	-59.4519	0.4328	3.3881	2025-12-1	7.8129	-100.003	0.5144	4.0448	2025-12-1	12.2251	0	0.5144	4.0448	2025-12-1	12.4561	0	0.5144	4.0448	2025-12-1	12.4601	0	0.5144	4.0448	2025-12-1	12.4608	0	0.5144	4.0448	2025-12-1	12.4721	0	0.5144	4.0448					
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The temperature is 41.5°C	Voltage: 12.3341V, current: 100A, discharge duration: 3S																																								
	<table border="1"> <tbody> <tr><td>2025-12-1</td><td>8.7209</td><td>-79.9658</td><td>0.5255</td><td>4.1417</td></tr> <tr><td>2025-12-1</td><td>7.7659</td><td>-100.003</td><td>0.6088</td><td>4.806</td></tr> <tr><td>2025-12-1</td><td>7.7468</td><td>-100.003</td><td>0.6227</td><td>4.9137</td></tr> <tr><td>2025-12-1</td><td>12.0681</td><td>0</td><td>0.6227</td><td>4.9137</td></tr> <tr><td>2025-12-1</td><td>12.3341</td><td>0</td><td>0.6227</td><td>4.9137</td></tr> </tbody> </table>	2025-12-1	8.7209	-79.9658	0.5255	4.1417	2025-12-1	7.7659	-100.003	0.6088	4.806	2025-12-1	7.7468	-100.003	0.6227	4.9137	2025-12-1	12.0681	0	0.6227	4.9137	2025-12-1	12.3341	0	0.6227	4.9137															
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Temperature: 43°C	Voltage: 12.1931V, current 100A, discharge duration 3S																																								
	<table border="1"> <tbody> <tr><td>2025-12-1</td><td>8.2559</td><td>-95.7408</td><td>0.636</td><td>5.0235</td></tr> <tr><td>2025-12-1</td><td>7.6879</td><td>-100.003</td><td>0.7194</td><td>5.6818</td></tr> <tr><td>2025-12-1</td><td>7.6529</td><td>-100.004</td><td>0.7332</td><td>5.7882</td></tr> <tr><td>2025-12-1</td><td>11.9151</td><td>0</td><td>0.7332</td><td>5.7882</td></tr> <tr><td>2025-12-1</td><td>12.1781</td><td>0</td><td>0.7332</td><td>5.7882</td></tr> <tr><td>2025-12-1</td><td>12.1829</td><td>0</td><td>0.7332</td><td>5.7882</td></tr> <tr><td>2025-12-1</td><td>12.183</td><td>0</td><td>0.7332</td><td>5.7882</td></tr> <tr><td>2025-12-1</td><td>12.1931</td><td>0</td><td>0.7332</td><td>5.7882</td></tr> </tbody> </table>	2025-12-1	8.2559	-95.7408	0.636	5.0235	2025-12-1	7.6879	-100.003	0.7194	5.6818	2025-12-1	7.6529	-100.004	0.7332	5.7882	2025-12-1	11.9151	0	0.7332	5.7882	2025-12-1	12.1781	0	0.7332	5.7882	2025-12-1	12.1829	0	0.7332	5.7882	2025-12-1	12.183	0	0.7332	5.7882	2025-12-1	12.1931	0	0.7332	5.7882
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The temperature is 43.7°C	Voltage: 12.0291V, current 100A, discharge for 3S																																								
	<table border="1"> <tbody> <tr><td>8.6239</td><td>-80.0049</td><td>0.7444</td><td>5.8841</td></tr> <tr><td>7.5479</td><td>-100.003</td><td>0.8277</td><td>6.5346</td></tr> <tr><td>11.7701</td><td>0</td><td>0.8277</td><td>6.5346</td></tr> <tr><td>12.0291</td><td>0</td><td>0.8277</td><td>6.5346</td></tr> </tbody> </table>	8.6239	-80.0049	0.7444	5.8841	7.5479	-100.003	0.8277	6.5346	11.7701	0	0.8277	6.5346	12.0291	0	0.8277	6.5346																								
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The temperature is 45.7°C	Voltage: 11.8731V, current: 100A, discharge duration: 3S																																								
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The temperature is 46.5°C	Voltage: 11.5911V, current: 100A, discharge duration: 3S																																								
	<table border="1"> <tbody> <tr><td>2025-12-1</td><td>7.8918</td><td>-99.1039</td><td>0.9552</td><td>7.5413</td></tr> <tr><td>2025-12-1</td><td>7.1001</td><td>-100.003</td><td>1.0385</td><td>8.1594</td></tr> <tr><td>2025-12-1</td><td>11.2701</td><td>0</td><td>1.0385</td><td>8.1594</td></tr> <tr><td>2025-12-1</td><td>11.5671</td><td>0</td><td>1.0385</td><td>8.1594</td></tr> <tr><td>2025-12-1</td><td>11.5751</td><td>0</td><td>1.0385</td><td>8.1594</td></tr> <tr><td>2025-12-1</td><td>11.5792</td><td>0</td><td>1.0385</td><td>8.1594</td></tr> <tr><td>2025-12-1</td><td>11.5911</td><td>0</td><td>1.0385</td><td>8.1594</td></tr> </tbody> </table>	2025-12-1	7.8918	-99.1039	0.9552	7.5413	2025-12-1	7.1001	-100.003	1.0385	8.1594	2025-12-1	11.2701	0	1.0385	8.1594	2025-12-1	11.5671	0	1.0385	8.1594	2025-12-1	11.5751	0	1.0385	8.1594	2025-12-1	11.5792	0	1.0385	8.1594	2025-12-1	11.5911	0	1.0385	8.1594					
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The temperature is 45.5°C	Voltage: 11.1921V, Current: 100A, Discharge duration: 3S																																								

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The temperature is 49.3°C	Voltage: 10.628V, Current: 100A, Discharge: 3S																																			
	<table border="1"> <tr><td>2025-12-1</td><td>8.5099</td><td>-59.5328</td><td>1.1367</td><td>8.8947</td></tr> <tr><td>2025-12-1</td><td>7.2259</td><td>-95.7548</td><td>1.1489</td><td>8.9856</td></tr> <tr><td>2025-12-1</td><td>6.2949</td><td>-100.003</td><td>1.2322</td><td>9.54</td></tr> <tr><td>2025-12-1</td><td>6.2232</td><td>-100.004</td><td>1.2461</td><td>9.6268</td></tr> <tr><td>2025-12-1</td><td>10.4361</td><td>0</td><td>1.2461</td><td>9.6268</td></tr> <tr><td>2025-12-1</td><td>10.628</td><td>0</td><td>1.2461</td><td>9.6268</td></tr> </table>	2025-12-1	8.5099	-59.5328	1.1367	8.8947	2025-12-1	7.2259	-95.7548	1.1489	8.9856	2025-12-1	6.2949	-100.003	1.2322	9.54	2025-12-1	6.2232	-100.004	1.2461	9.6268	2025-12-1	10.4361	0	1.2461	9.6268	2025-12-1	10.628	0	1.2461	9.6268					
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The temperature is 49.1°C	Voltage: 10.0911V, current 100A, discharge for 3S																																			
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2025-12-1	10.0911	0	1.3459	10.263																																
The temperature is 48.4°C	Voltage: 9.4772V, current: 100A, discharge duration: 3S																																			
	<table border="1"> <tr><td>2025-12-1</td><td>7.3119</td><td>-59.5288</td><td>1.3541</td><td>10.3234</td></tr> <tr><td>2025-12-1</td><td>6.435</td><td>-79.9938</td><td>1.3638</td><td>10.39</td></tr> <tr><td>2025-12-1</td><td>4.6039</td><td>-100.004</td><td>1.4471</td><td>10.8251</td></tr> <tr><td>2025-12-1</td><td>4.5409</td><td>-100.004</td><td>1.461</td><td>10.8886</td></tr> <tr><td>2025-12-1</td><td>9.2191</td><td>0</td><td>1.461</td><td>10.8886</td></tr> <tr><td>2025-12-1</td><td>9.4611</td><td>0</td><td>1.461</td><td>10.8886</td></tr> <tr><td>2025-12-1</td><td>9.4772</td><td>0</td><td>1.461</td><td>10.8886</td></tr> </table>	2025-12-1	7.3119	-59.5288	1.3541	10.3234	2025-12-1	6.435	-79.9938	1.3638	10.39	2025-12-1	4.6039	-100.004	1.4471	10.8251	2025-12-1	4.5409	-100.004	1.461	10.8886	2025-12-1	9.2191	0	1.461	10.8886	2025-12-1	9.4611	0	1.461	10.8886	2025-12-1	9.4772	0	1.461	10.8886
2025-12-1	7.3119	-59.5288	1.3541	10.3234																																
2025-12-1	6.435	-79.9938	1.3638	10.39																																
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2025-12-1	9.2191	0	1.461	10.8886																																
2025-12-1	9.4611	0	1.461	10.8886																																
2025-12-1	9.4772	0	1.461	10.8886																																
Measure the surface temperature of the battery cell after the test	Voltage: 9.529V, Current: 0A, Discharge: 0S																																			
																																				
The surface temperature of the battery cell after ten minutes																																				
																																				

working mode	Main parameter 1 Current (A) / Power (W) / Voltage (V)	Main parameter 2 / Constant voltage (V) / number of cycles	Cut off voltage (v)	Cut off current (A)	Jump	Deadline (h: mm: ss)	Jump	Cut off temperature (°C)	Jump	Cut off capacity (Ah)	Cut off energy (wh)	AV (mv)
standing						00:35.0				0		0
constant current discharge		100	2			00:03.0				0		0
standing						01:05.0				0		0
Process ended										0		0