

DEDICATED TO LITHIUM-ION BATTERY TESTING AND DEVELOPMENT



Coin-cell Automatic Assembly System

CAAS



» Introduction

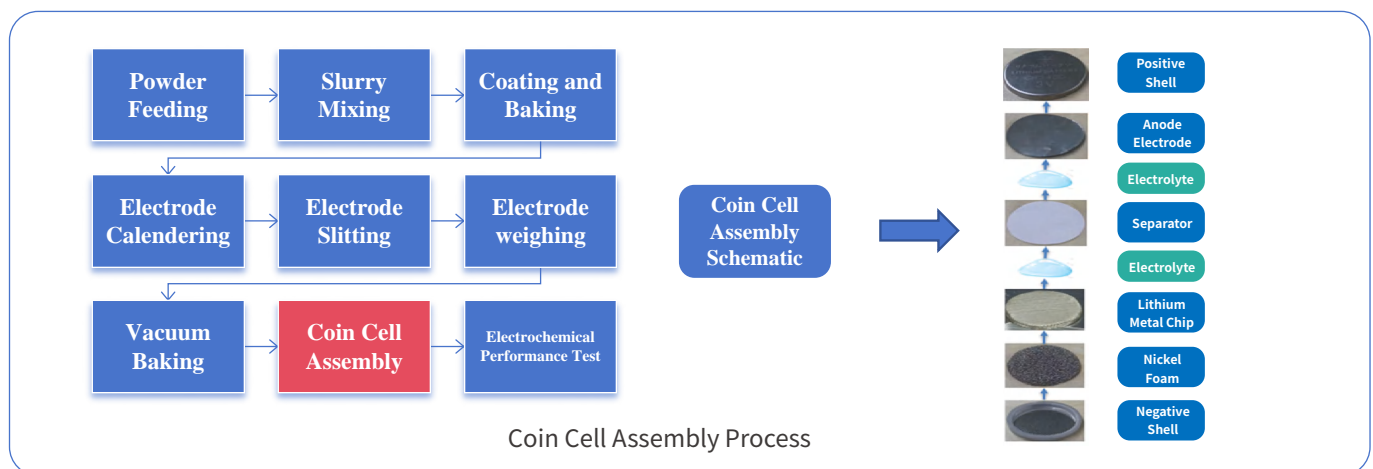
The Significance of Coin Cells : In the early stages of the research and development of new materials and new processes, coin cells are often used for electrochemical performance testing to help determine the actual application value and commercial development potential of the material.

Type of Coin Cell: CR/BR : Common models are: CR2032/2430/2025/2016, etc. The first 2 digits are diameter (in mm) and the last 2 digits are thickness (in 0.1 mm) .

The Structure of Coin Cell :



Coin Cell Assembly Process : Although the structure of coin cell is relatively simple compared to full cells, the preparation process is the same, which requires slurry coating at the powder end, rolling, punching and weighing of the electrode, cell assembly, and finally electrical performance testing.



» Product Introduction

Background: Assessing the stability of electrode intercalation in material batches is a necessary procedure for both material manufacturers and battery cell factories. The consistency of personnel in assembling electrode intercalation significantly affects the judgment of material performance.

Features: Utilizing high-precision robotic arms, visual inspection systems, and automatic sealing devices to achieve automated and precise assembly of button-type batteries. The sealing pressure is stable.

Applications: Automated assembly of electrode intercalations - Systematic evaluation of the electrochemical performance of lithium (sodium) battery positive and negative electrode materials.

Product Features

Glove box integration

Anhydrous & oxygen-free atmosphere.



High-speed robot assembly

Around 1 min / cell.



High-precision assembly

Assembly concentric $\pm 0.2\text{mm}$.



Assembly process traceability

High-definition camera to record the state of the material surface.



Laser marking

Laser marking/ink-jet for sourcing.



Auto Electrolyte injection

multiple electrolyte supported.



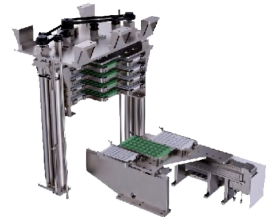
Online voltage test

Online testing integrated.



High-throughput assembly

Up to 200 cells for single assembly.



Particle Control

Separate dust removal; 4-axis manipulator; Non-metallic cell tray.



Automatic lithium metal chip brushing module

Reducing oxidation; Improving assembly consistency.



Monitoring Sentinel

High-definition camera; Monitor the equipment operation status; Online monitoring management.



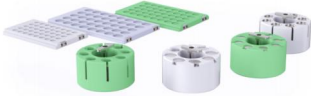
Functional Modularity

Module configuration can be customized based on customer demands.



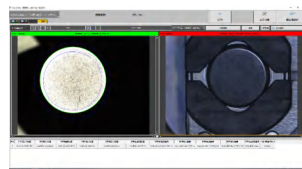
Material tray

Centralized feeding.



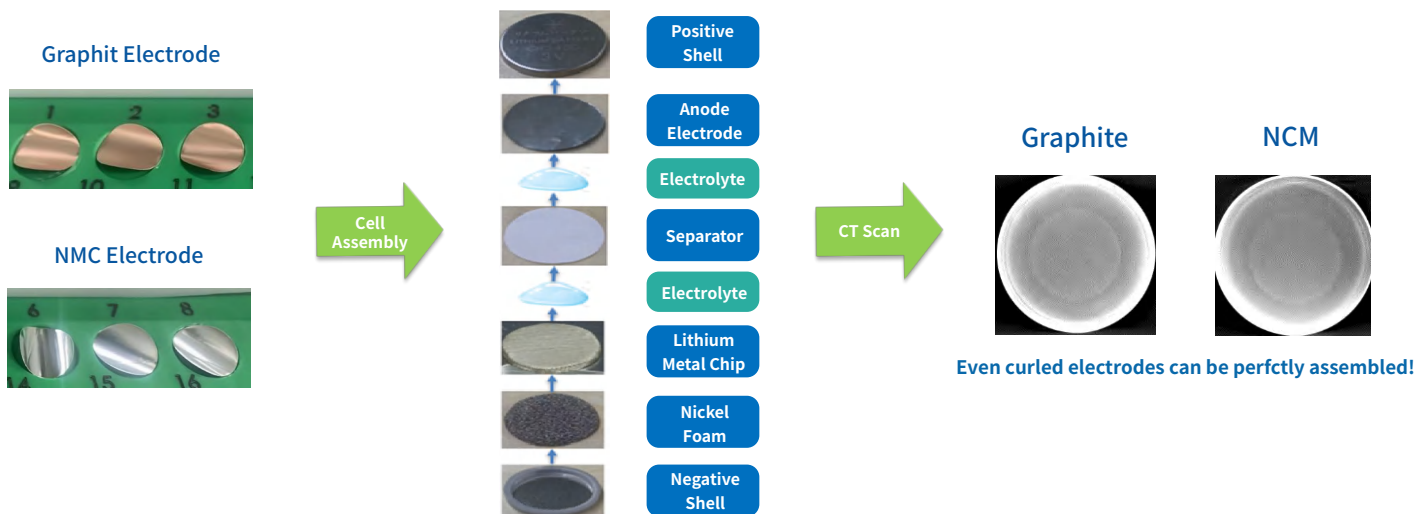
Data Processing

Automatic data collection.



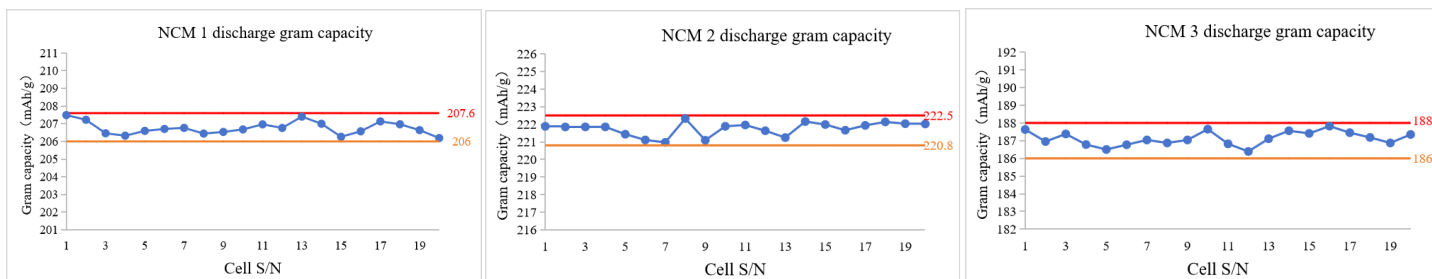
» Applications

Case 1: Application on Curled Electrodes



- ① Our special suction cup can ensure that the curled electrode is sucked evenly and flatly.
- ② Our visual positioning system can avoid the placement position deviation caused by the curling of the electrodes.
- ③ The positive electrode shell is pressed down horizontally to flatten the curled electrode that contacts the electrolyte.

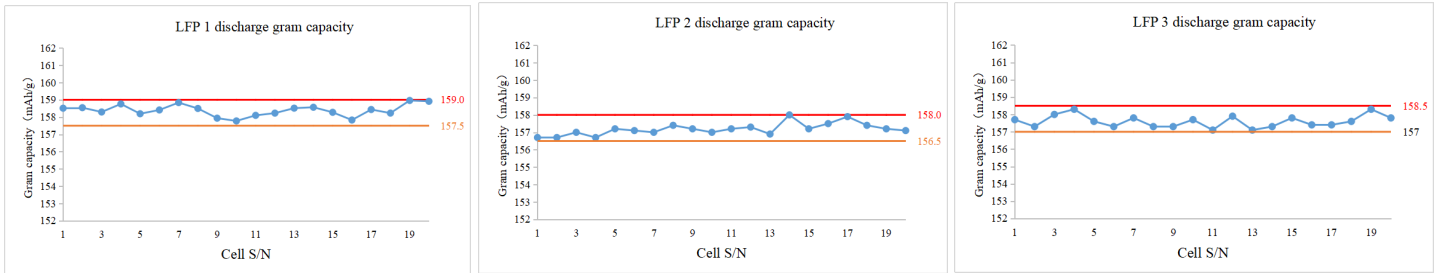
Case 2: Application on the NCM Half Cells



Experimental Conditions		NCM Half Cells					
Material		NCM 1		NCM 2		NCM 3	
Item		Discharge gram capacity (mAh/g)	ICE	Discharge gram capacity (mAh/g)	ICE	Discharge gram capacity (mAh/g)	ICE
Assembly environment	Glove box, H ₂ O and O ₂ ≤ 0.01ppm						
Equipment	Automatic assembly equipment						
Half Cells	NCM 1, NCM 2, NCM 3 Bake at 105 ° C for 6 hours						
Electrolyte	Positive electrolyte						
Shell, nickel foam	All are ultrasonic cleaned and dried						
Separator	One-sided ceramic separator						
Lithium metal chip	No brushing						
Range		1.299	0.5%	1.354	0.4%	1.430	0.7%
Mean Value		206.756	91.1%	221.750	91.4%	187.129	87.6%
σ		0.37	0.00	0.39	0.00	0.39	0.00
COV		0.18%	0.19%	0.17%	0.11%	0.21%	0.23%

Conclusion: The range of discharge gram capacity can be controlled within 1.5 mAh/g.

Case 3: Application on the LFP Half Cells

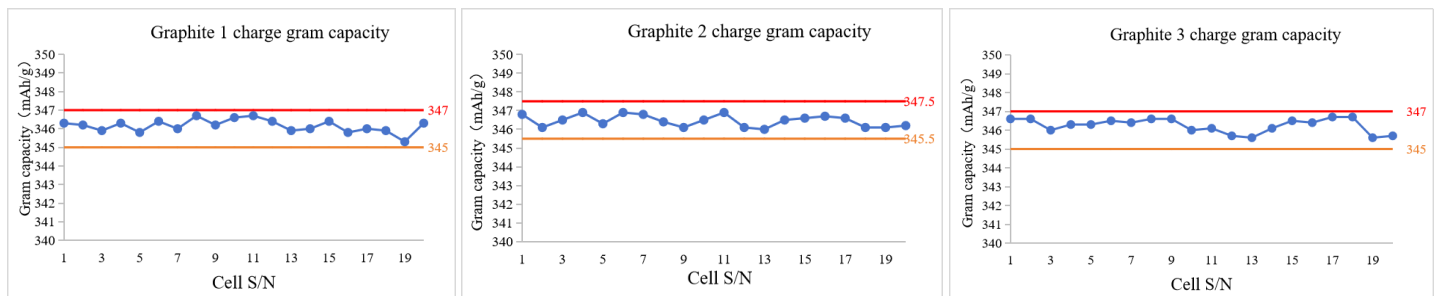


Experimental Conditions	
Assembly environment	Glove box, H ₂ O and O ₂ ≤ 0.01ppm
Equipment	Automatic assembly equipment
Half Cells	LFP 1, LFP 2, LFP 3 Bake at 105 ° C for 6 hours
Electrolyte	Positive electrolyte
Shell, nickel foam	All are ultrasonic cleaned and dried
Separator	One-sided ceramic separator
Lithium metal chip	No lithium brushing

LFP Half Cells						
Material	LFP1		LFP2		LFP3	
Item	Discharge gram capacity (mAh/g)	ICE	Discharge gram capacity (mAh/g)	ICE	Discharge gram capacity (mAh/g)	ICE
Range	1.185	0.8%	1.310	0.8%	1.190	0.6%
Mean Value	158.391	97.7%	157.185	97.3%	157.600	97.2%
σ	0.34	0.00	0.35	0.00	0.36	0.00
COV	0.21%	0.23%	0.22%	0.17%	0.23%	0.17%

Conclusion: The range of discharge gram capacity can be controlled within 1.5 mAh/g.

Case 4: Application on the Graphite Half Cells

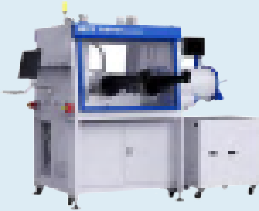




Experimental Conditions	
Assembly environment	Glove box, H ₂ O and O ₂ ≤ 0.01ppm
Equipment	Automatic assembly equipment
Half Cells	Graphite 1, Graphite 2, graphite 3 Bake at 105 ° C for 6 hours
Electrolyte	Negative electrolyte
Shell, nickel foam	All are ultrasonic cleaned and dried
Separator	One-sided ceramic separator
Lithium metal chip	Brush the chip

Graphite Half Cells						
Material	Graphite 1		Graphite 2		Graphite 3	
Item	Charge gram capacity (mAh/g)	ICE	Charge gram capacity (mAh/g)	ICE	Charge gram capacity (mAh/g)	ICE
Range	1.4	0.7%	0.9	0.6%	1.1	0.8%
Mean Value	346.155	94.4%	346.455	94.3%	346.250	94.3%
σ	0.35	0.00	0.31	0.00	0.38	0.00
COV	0.10%	0.22%	0.09%	0.17%	0.11%	0.28%

Conclusion: The range of charge gram capacity can be controlled within 2 mAh/g.

» Model Table

Models	CAAS1000G/M	CAAS1100G/M	CAAS1200G/M
Pictures			
Assembly Feature	1 Cell Each Time	40 Cells Each Time	200 Cells Each Time
Assembly accuracy	±0.2mm		
Assembly efficiency	1 ~ 1.5 min/Cell		
Function	<ol style="list-style-type: none"> 1.Single Position Automatic Assembly System. 2.High-precision Assembly. 3.Rapid Assembly. 4.Assembly Process Traceability. 5.Integration into the standard single-station glove box. 	<ol style="list-style-type: none"> 1.Multi-station Automatic Assembly System 2.High Precision Assembly 3.Rapid Assembly 4.High-throughput assembly 5.Assembly process traceability 6.Automatic lithium chip brushing module; 	

Note: IEST is committed to continuous product improvement. Any changes to technical specifications will be made without prior notice.



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