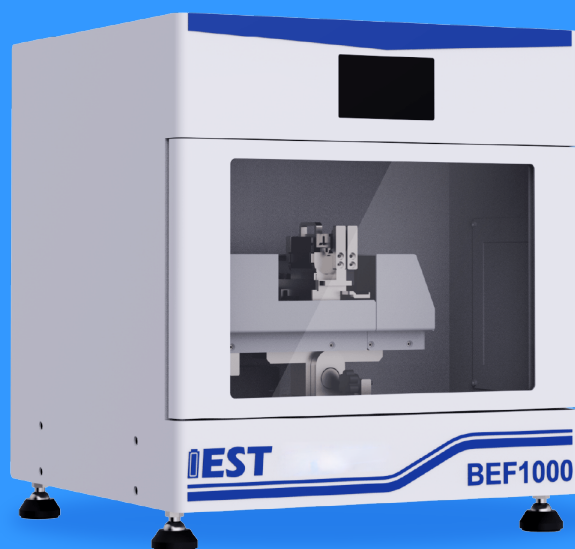


Battery Electrode Flexibility Testing System

▶ BEF Series



Flexibility Testing of Electrode Sheets

- Enhance battery performance and consistency
- Optimize manufacturing processes, improving production efficiency and first-pass yield
- Ensure battery safety and reliability
- Support the R&D of new materials and processes
- Meet industry standards and market demands

Systematic flexibility testing enables comprehensive optimization of electrode sheet performance, driving advancements in battery technology and providing crucial support for the growth of the new energy industry.

Evaluation of material formulations

Optimisation of production process

Product quality control

Adapting to new battery designs

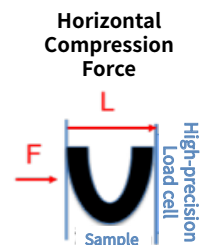
Innovative Solution

The BEF1000 Electrode Flexibility Testing Equipment adopts the fundamental testing method for electrode stress-strain curves: after bending the electrode at a specific angle and mounting it on the testing device, displacement is applied to induce deformation, and the stress and strain (stress-displacement relationship) of the electrode under different deformation degrees are measured to evaluate its flexibility.



Equipment Functions

- Cyclic Testing: Enables single-pressure application or multiple reciprocating tests.
- Inspection: Equipped with third-party calibrated standard thickness blocks and weights for regular equipment spot checks.



Displacement Force Precision Testing

Precise displacement control, combined with high-precision pressure sensors, Real-time recording of displacement pressure curves

Flip mechanism Bi-directional testing

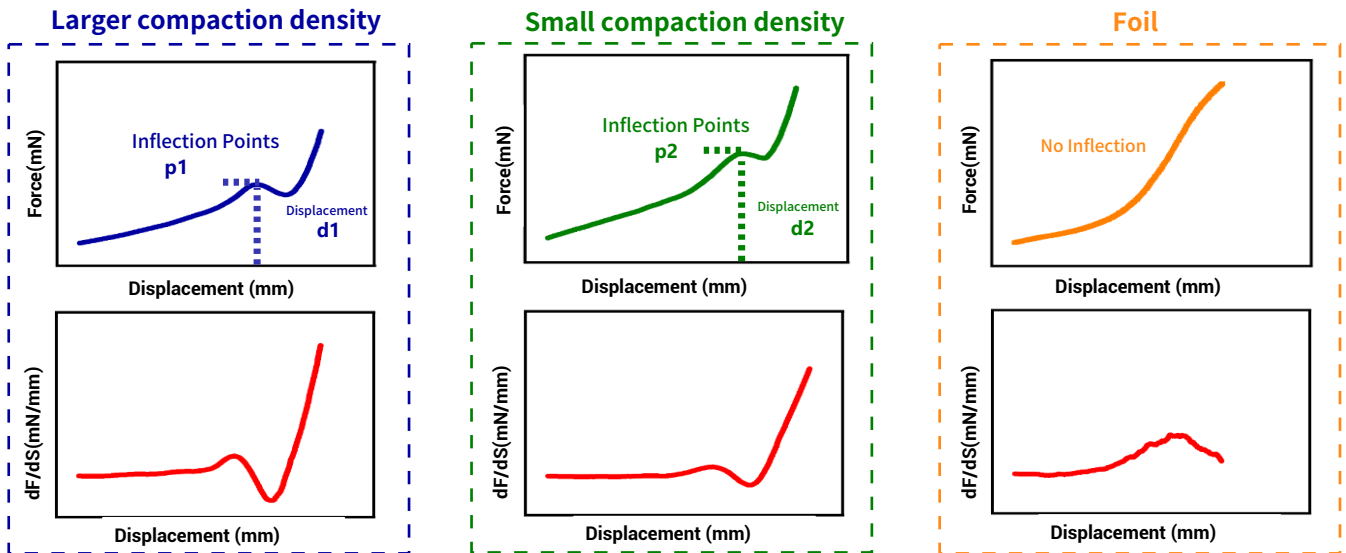
The test mechanism is capable of rotated 90°, supporting horizontal pressing and vertical pressing. testing scenarios.

Detachable Electrode fixture

Ensures consistent clamping of the electrodes, prevents twisting damage to the electrodes, Facilitates operation for testing personnel.

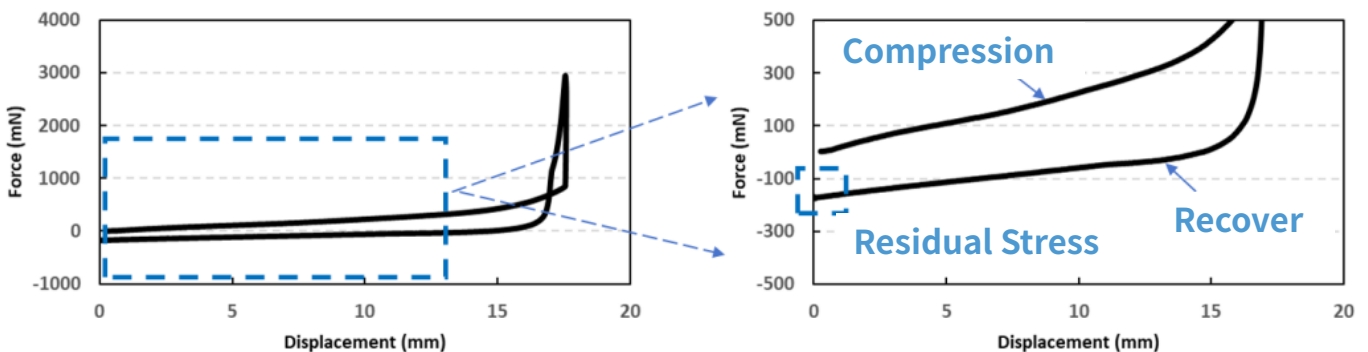
Methods of Analysis

Bendability



- **Analyze fracture point:** Electrode with larger compressive displacement corresponding to the better flexibility.
- **Curve Shape:** Higher flexibility may have smoother curves.
- **The first derivative:** Electrode sheets with poorer flexibility may show larger peaks or sharp changes.

Recoverability

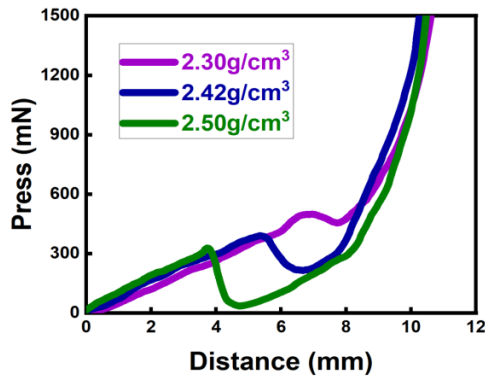


- **Curve Shape:** The stress- strain curve has no obvious inflection points, and for electrode sheets with higher flexibility, the absolute value of their residual stress is smaller.
- **Fatigue Test:** Evaluate the recovery ability and long-term stability after deformation during multiple bending processes by analyzing residual stress.

Application Cases

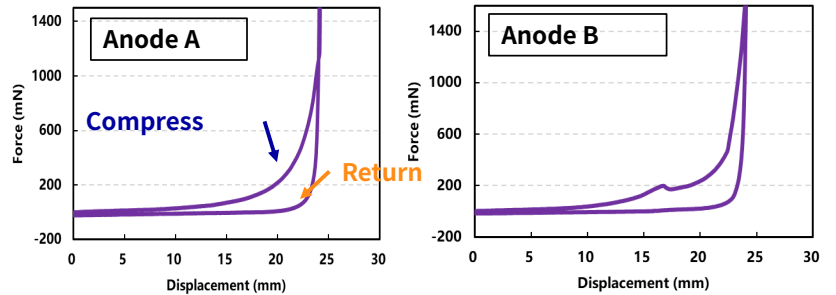
Anode & Cathode Electrode

2 LFP electrode sheets with different compaction densities



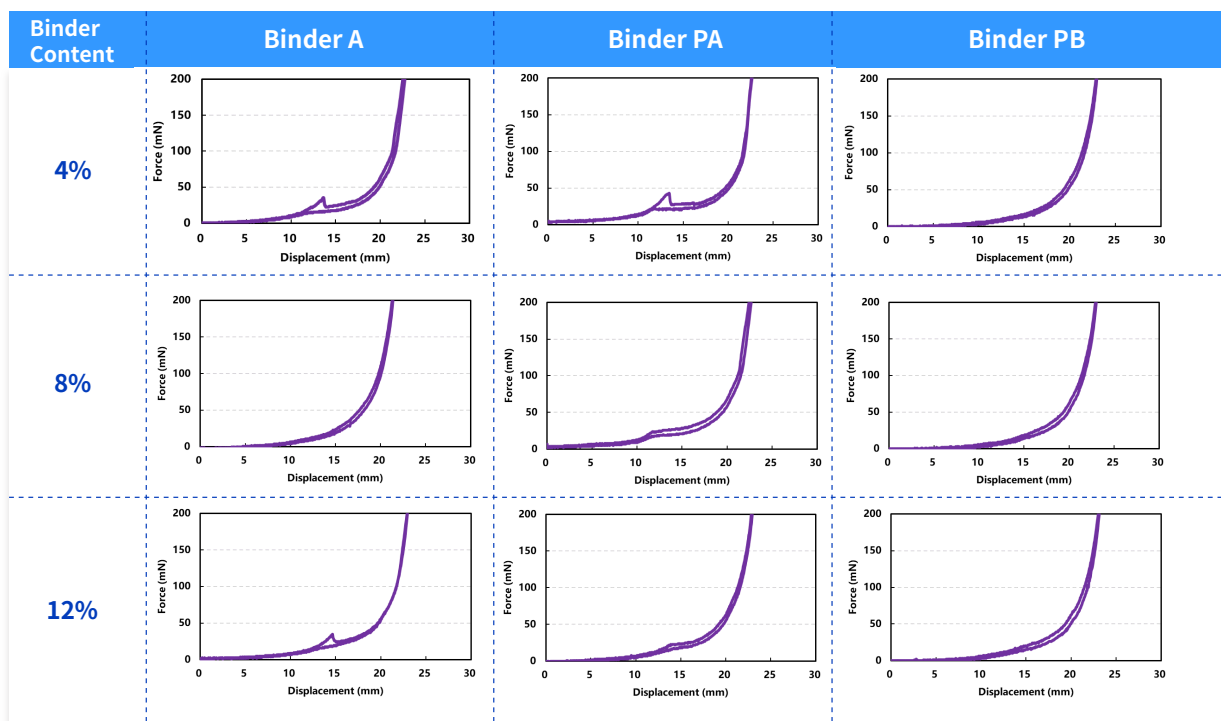
- Three groups of electrode sheets with different compacted densities underwent compression testing.
- As the compacted density increased, the compressive fracture stress and corresponding displacement both decreased, indicating progressive deterioration of flexibility.

Different Hard Carbon Anode Electrode Sheets A/B

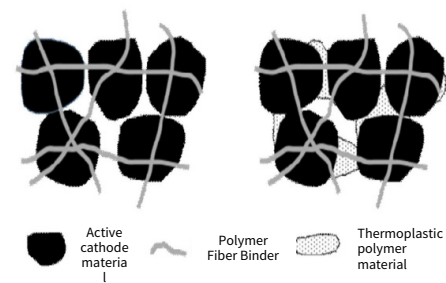


- Compression and decompression cyclic experiments were conducted on two sets of electrode sheets to compare their flexibility.
- An inflection point appeared in the curve for Electrode B, indicating a clear stress decay process, suggesting that B has slightly poorer flexibility than A.

Fibrous Binder



- Evaluating the impact of varying binder types in the electrode sheets to evaluate their flexibility during compression.
- At the same content, the flexibility of binders A and PA is inferior to that of PB; and an 8% content might be a relatively suitable proportion for all three types of binders.



Equipment Parameters

Model	BEF1000	
Equipment Parameters	Pressure Test Range	0~10000mN
	Pressure Resolution	±0.01mN
	Pressure Accuracy	±10mN
	Displacement Travel Range	0~18mm
	Displacement Accuracy	±10μm
	Displacement Resolution	0.1μm
	Sampling Frequency	10Hz

INNOVATIVE BATTERY TESTING SOLUTION PROVIDER

Initial Energy Science&Technology(Xiamen) Co., Ltd

Tel: (86)592-5367060

Fax: (86)592-5367062

Mail: info@iesttech.com

Web: www.iestbattery.com

Add: 4F No.2 BLDG, Xinfeng 2nd Road, Huli District, Xiamen, China

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