lumafield

Battery Quality Report

Using industrial X-ray CT to assess the hidden hazards in the lithium-ion battery supply chain

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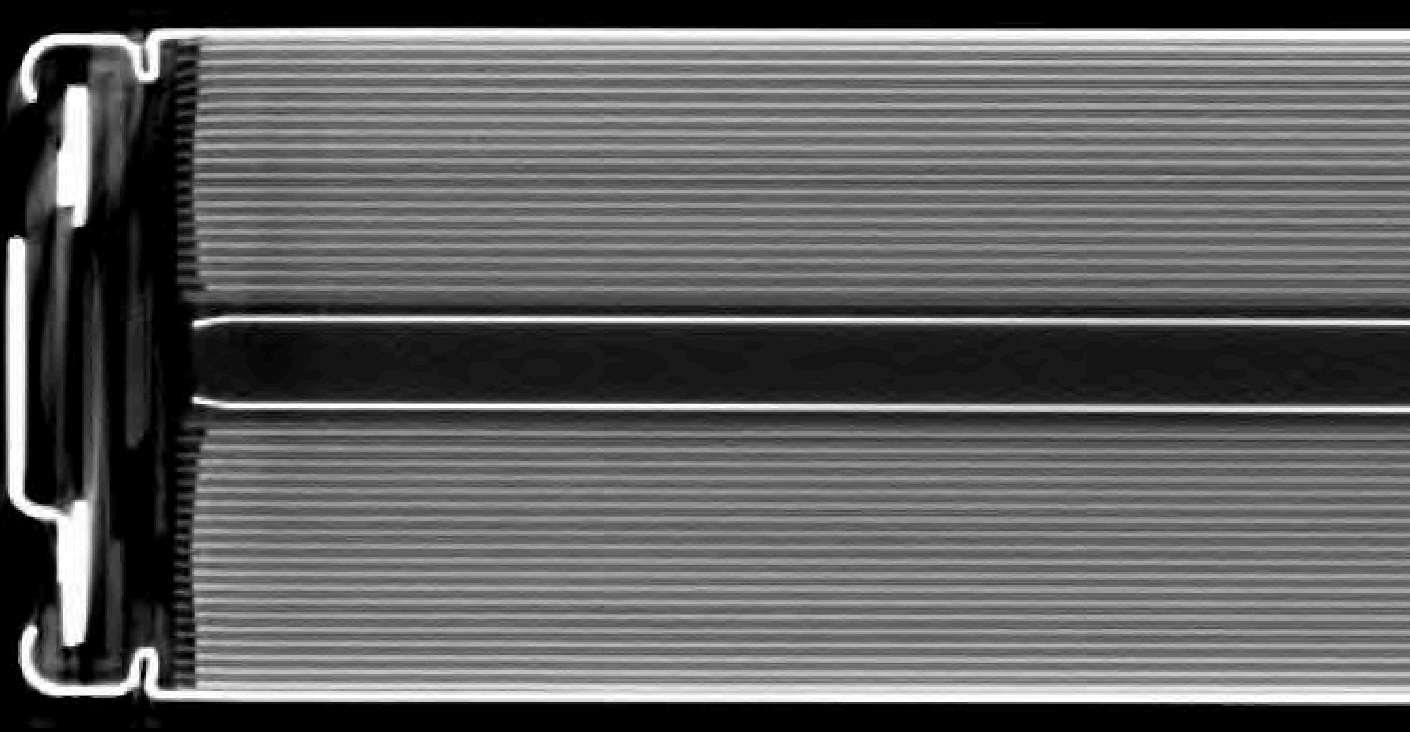


INTRODUCTION

The Lumafield Battery Quality Report

Batteries are the backbone of the modern world. Lithium-ion cells have enabled dense, portable, rechargeable power since the 1990s, driving an explosion in electronics from mobile phones to electric vehicles. But the quality of these cells is frequently still a black box, and they fail all too often. It's estimated that about one in a million batteries will fail,[1] with about 1 in 40 million causing a catastrophic fire.[2] However, given that more than 10 billion battery cells are produced each year,[3] that low per-cell failure rate stacks up.

In 2024, the Consumer Product Safety Commission (CPSC) issued 26 recalls and 9 product safety warnings related to fire and burn hazards posed by battery overheating. Through August 2025, 17 recalls and 6 product safety warnings have been issued.[4] These recalls span a wide range of product categories, from power banks and electric scooters to drones and the charging case for Humane's short-lived AI pin, but the risks go far beyond the products that make it onto a recall list.

Inside every rechargeable electronic device lives a small chance of danger, a risk that becomes compounded by the sheer quantity of gadgets around us and number of battery cells inside each one. Battery fires and explosions are extremely dangerous and have resulted in millions of dollars in damage, injuries, and deaths. Data from Erie Insurance reveals that lithium-ion battery fires are not only occurring more often than they have in the past, but they also result in more than 3 times the property damage of an average fire from other causes.[5]

Within the lithium-ion battery space, 18650 cells have come to dominate production. These cylindrical cells, 18 mm in diameter and 65 mm long, offer a convenient standardized form factor ideal for packaging individually in small devices or in large packs, powering everything from vapes to vehicles.

Over 5 billion 18650 cells are produced every year.[6] This multi-billion-dollar market hosts a mix of reputable brand-name OEMs, fraudulent counterfeiters that inject dangerous batteries into the supply chain, and a large middle ground of grey-market resellers.

In 2021, the CPSC issued a warning, cautioning consumers against loose 18650 cells for sale on popular e-commerce sites due to the high rate of counterfeits. They also announced the agency's plans to crack down on their sale.[7] But, as we found in our sourcing for this study, dangerous batteries are easier to buy than ever. On the outside, these cells look identical to high-quality cells, but their insides reveal highly variable quality that can make certain cells significantly more dangerous than others.

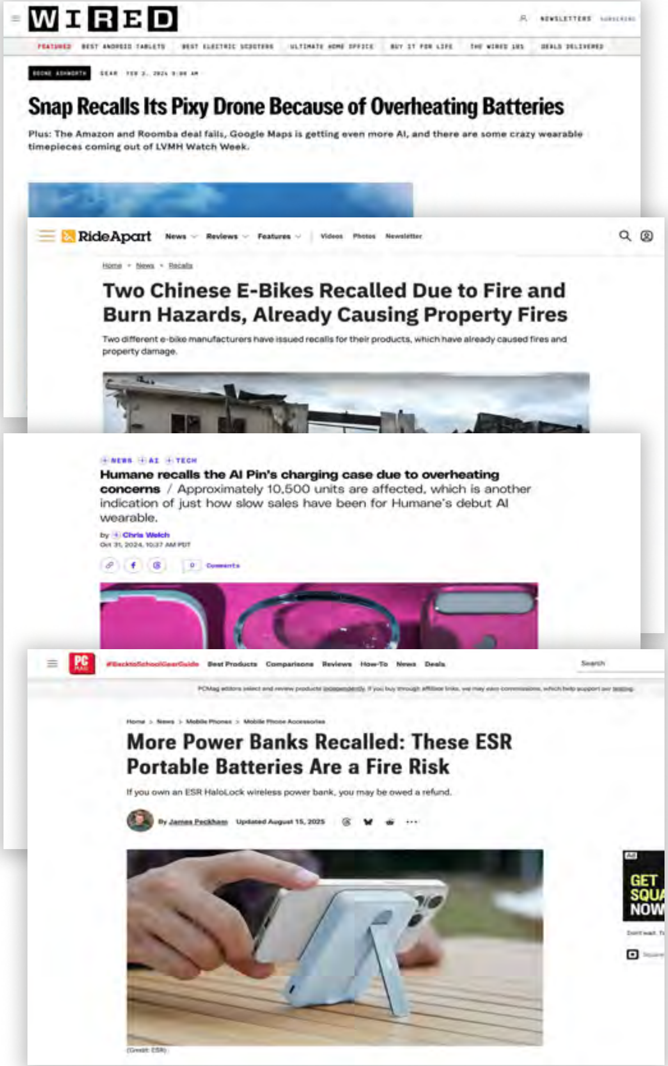
To develop this study, Lumafield CT scanned more than 1,000 batteries, sampling 100+ cells from 10 brands that ranged from OEM to counterfeit. After generating slices in seconds with Ultra-Fast CT, we ran automated analyses to evaluate cell quality. We focused on the two main indicators of cell safety and quality: anode overhang (AOH) and edge alignment, evaluating these metrics within and across brands. Electrode misalignment is a well-documented driver of lithium plating in lithium-ion cells with liquid electrolytes.[8] Lithium plating can lead to dendrite formation, and these dendrites may lead to degraded performance and short-circuits that cause thermal runaway.

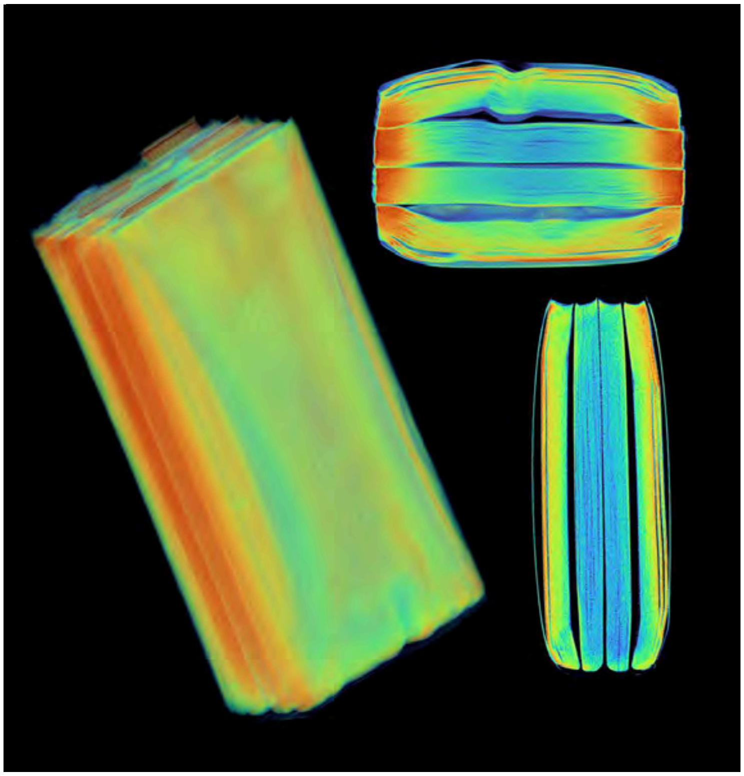
The variation we found between cell sources was staggering. Brand-name OEM cells that we sourced through legitimate channels showed strong quality indicators, and as was expected with sample sets of only 100 cells, we did not find any obvious defects. Among the low-cost/counterfeit batteries that we sourced from Temu, however, 8% of cells had a serious defect known as cathode overhang—a rate that reached 15% for one low-cost brand. While cathode overhang doesn't guarantee a battery will catch fire when put to use, it is a strong indicator that a cell has a significantly higher risk of experiencing a reliability and/or safety failure due to lithium plating. Other quality metrics also deteriorated significantly as our study moved from the higher to the lower end of the battery supply chain.

These findings highlight the danger of uncontrolled battery supply chains. In such a high-volume, globalized industry, dangerous counterfeit batteries can easily make their way into critical products. This problem will only grow worse in the near term as companies race to reorganize their supply chains as quickly as possible in response to fast-changing trade barriers.

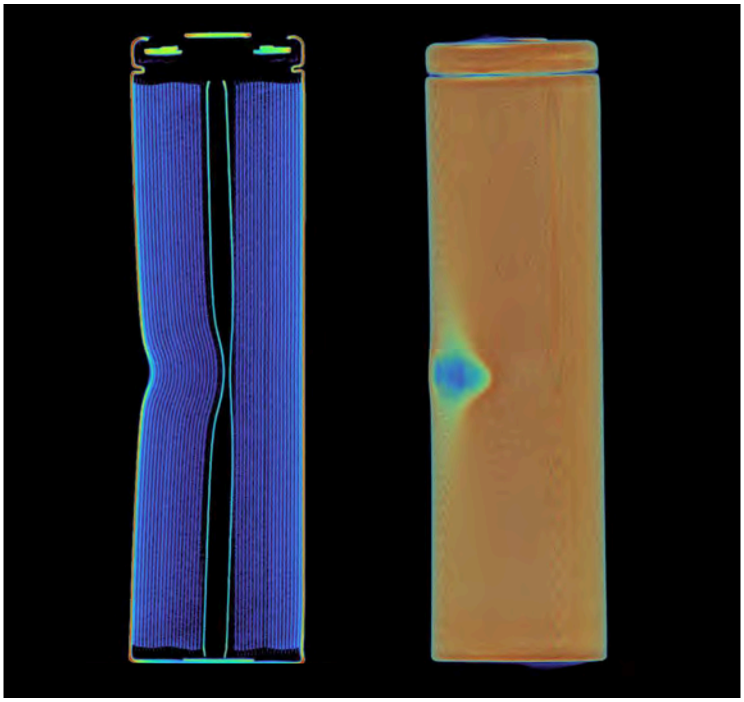
In order to avoid catastrophic battery fires and keep their customers safe, manufacturers must reassert control over their battery supply chains, demand traceability from their suppliers, and deploy new technologies that enable rapid battery inspection. Consumers should be wary of offers that seem too good to be true; low cost and counterfeit batteries can cost 3 to 4 times less than legitimate OEM batteries, and they often make their way into low-cost counterfeits of popular consumer electronics.

The Lumafield Battery Quality Report details our findings, shining a light on reliability and risk in the battery supply chain.





▲ A CT scan of a swollen lithium-ion pouch cell battery pack, with X and Y cross sections.



▲ A dented 18650 battery cell.

Key Findings

1054

total 18650 battery cells CT scanned and analyzed for this report.

Low cost/counterfeit cells exhibit

7x lower quality

on anode overhang, a key indicator of process control.

CT scans of these low quality cells also reveal

50% worse

edge alignment, which can accelerate performance degradation and lead to internal shorts.

Dangerous defects appear in the data

33 of 1054

cells scanned had cathode overhang, a potentially dangerous defect that significantly increases risk of short-circuiting and catastrophic failure.

100%

of the 33 defective cells came from low cost/counterfeit brands.

That means

1 in 13 (almost 8%)

low cost/counterfeit batteries could have a dangerous cathode overhang defect, based on this report's results.

0%

of the legitimate OEM cells exhibited cathode overhang.

18650 Quality Indicators: Anode Overhang and Edge Alignment

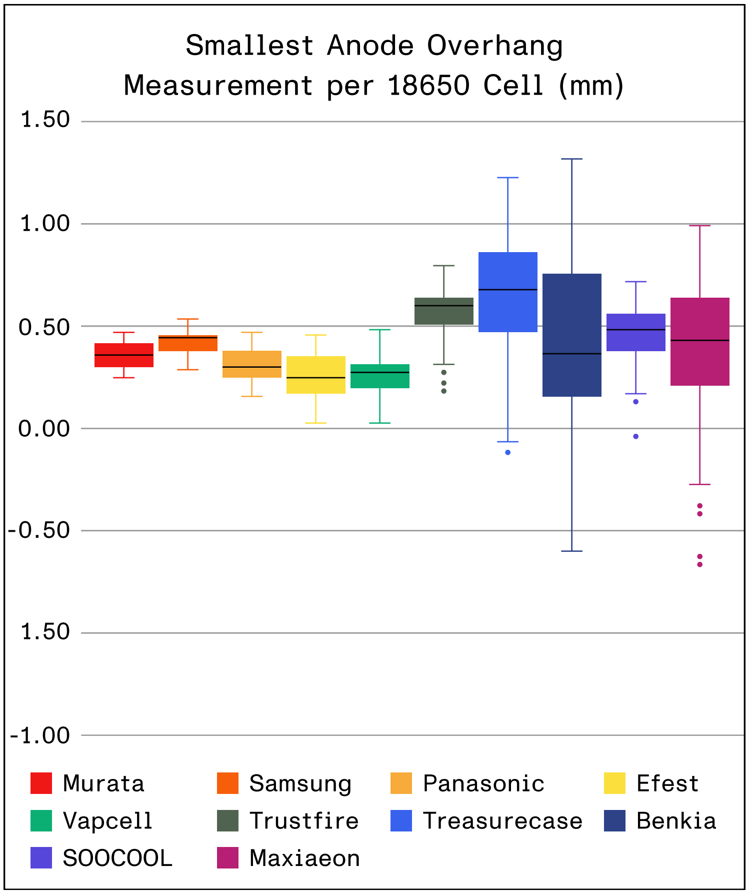
In our analysis, we focus on two indicators of battery quality: anode overhang (AOH) and edge alignment.

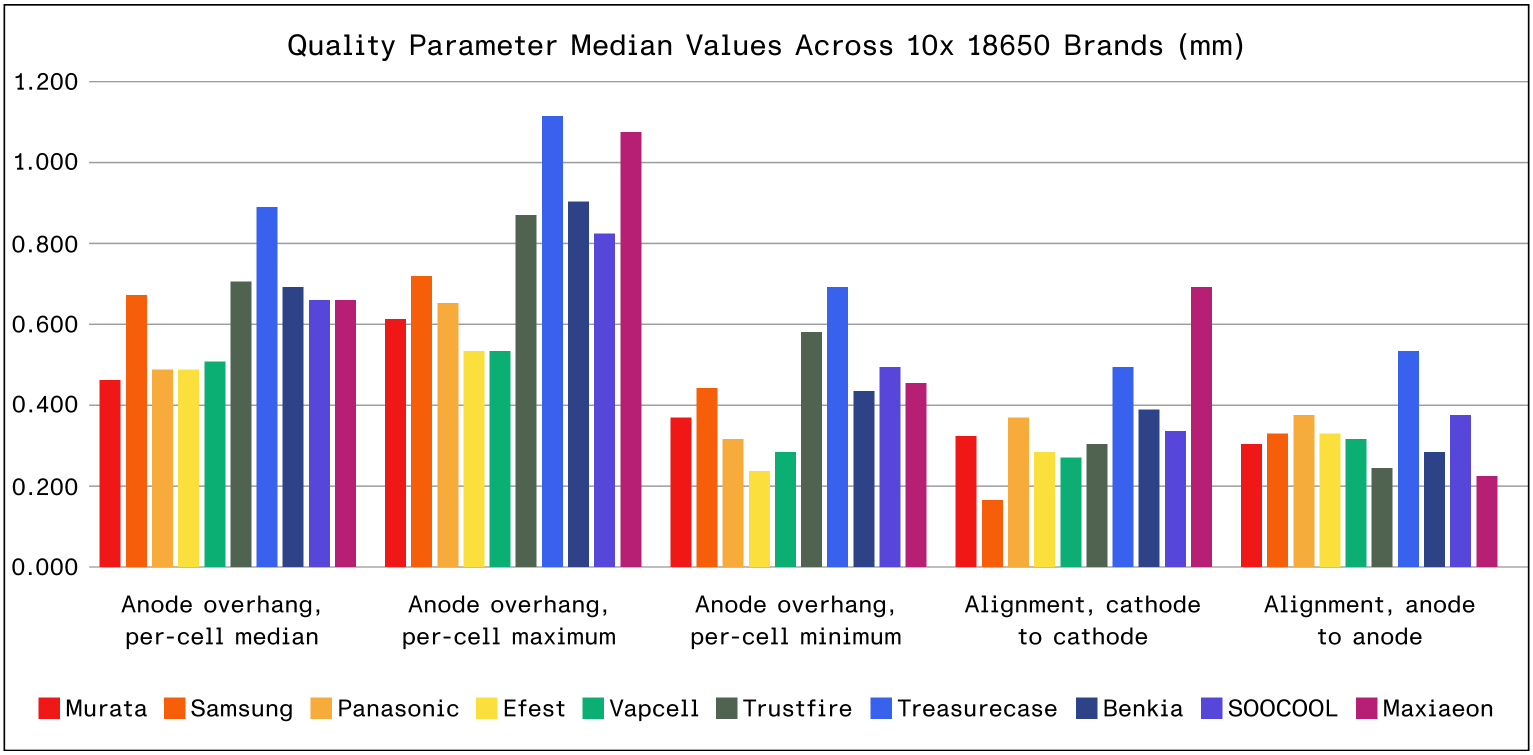
The typical target specification for anode overhang is 0.500 mm. Too little anode overhang promotes lithium plating, which can lead to degraded performance and potentially internal shorts. Excessive overhang increases the chance of contact with the can and introduces other failure modes. Thus an ideal battery would have a tight AOH distribution centered near 0.500 mm.

In the data, we see that the first five brands cluster close to 0.500 mm with comparatively narrow spreads. The last five trend longer and display wider distributions. Although the medians of these final five are higher, many cells within each of these brands fall well below 0.500 mm, which raises risk. The overly-long anodes are also indicators of poor quality.

When it comes to edge alignment, lower values are better. Small alignment error indicates controlled winding and typically correlates with tighter overhang control. Larger misalignment suggests uneven winding that can widen overhang variability and create further internal issues.

Only a few brands show clearly worse alignment in the initial charts. However, later charts in this report reveal broader, more variable alignment distributions among lower-cost brands.





Battery Study Summary					
Brand	**Murata**	**Samsung**	**Panasonic**	**Efest**	**Vapcell**
					
Category	OEM	OEM	OEM	Rewrap	Rewrap
Listed Capacity (mAh)	3000	3000	3450	4000	4000
Measured Capacity* (mAh)	2661 (89%)	2525 (84%)	2693 (78%)	3023 (76%)	3055 (76%)

Brand	**Trustfire**	**Treasurecase**	**Benkia**	**SOOCOOL**	**Maxiaeon**
					
Category	Rewrap	Low Cost / Counterfeit	Low Cost / Counterfeit	Counterfeit	Low Cost / Counterfeit
Listed Capacity (mAh)	3400	3000	9900	3000	9900
Measured Capacity* (mAh)	2906 (85%)	1180 (39%)	1259 (13%)	2595 (87%)	1214 (12%)

*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. This is a conservative real-world discharge that would not be expected to extract maximum capacity.

Occurrence of Cells with Negative Anode Overhang										
Category	OEM			Rewrap			Low Cost / Counterfeit			
Quantity	0	0	0	0	0	0	3	14	1	15
Percentage	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	12.5%	1.0%	15.0%
Category Percentage	0.0%			0.0%			7.8%			

Mean Quality Parameter Values by Cell Category			
Category	OEM	Rewrap	Low Cost / Counterfeit
Anode Overhang, Per-Cell Median	0.526 mm	0.551 mm	0.725 mm
Median AOH Standard Deviation	0.041 mm	0.048 mm	0.277 mm
Anode Overhang, Per-cell Max	0.658 mm	0.654 mm	0.953 mm
Anode Overhang, Per-cell Min	0.366 mm	0.355 mm	0.488 mm
Alignment, Cathode to Cathode	0.298 mm	0.286 mm	0.529 mm
Alignment, Anode to Anode	0.323 mm	0.294 mm	0.401 mm

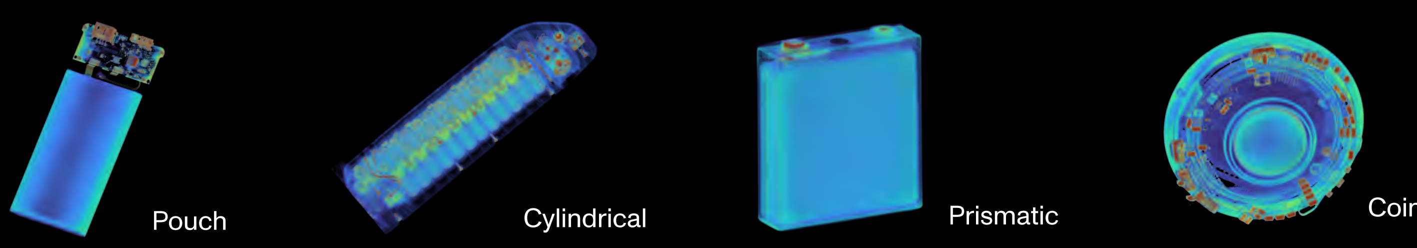
Lithium-Ion Battery Form Factors and Uses

From electric vehicles and personal devices to a wide-range of industrial applications, lithium-ion batteries are everywhere. The vast majority of rechargeable devices rely on lithium-ion chemistries. The primary formats for these lithium-ion cells are pouch, cylindrical, prismatic, and button, each with distinct mechanical and electrical tradeoffs summarized in the table below. Manufacturers must consider their concrete constraints such as energy and power density, package geometry, thermal behavior, cycle life, and cost, in making their selection.

According to Grand View Research, cylindrical cells made up 55% of lithium-ion battery revenue in 2024.[9] Their dominance reflects mature standards, efficient manufacturing, and broad compatibility, though prismatic cells are gaining share with EV adoption.[10] With billions of dollars at stake, cylindrical cells attract counterfeiters; standardized formats and opaque packaging make imitation easier, diverting revenue from OEMs and adding risk to global supply chains.

Lithium-ion Battery Types: Overview

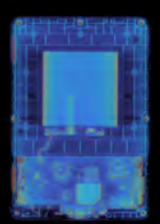
Form Factor	Typical Chemistries	Enclosure	Strengths	Trade-Offs	Common Uses
Pouch	LCO, NMC, NCA, LFP, LMO	Foil pouch (soft pack)	Highest packing efficiency; light; many sizes/shapes; high power versions available	Needs mechanical support/compression; can swell; more sensitive to puncture	Phones, laptops, drones, power banks, wearables
Cylindrical (e.g., 18650, 21700)	NMC, NCA, LFP	Steel/ aluminum can	Robust and safe; excellent cycle life; good thermal paths; mature supply chain	Lower volumetric efficiency vs pouch/ prismatic; fixed sizes	Tools, e-bikes, EV packs, flashlights
Prismatic (hard case)	NMC, NCA, LFP	Rigid rectangular can	Better space use than cylindrical; stable shape; common in large packs	More complex manufacturing; can be prone to swelling without proper compression	EV modules, power storage, medical devices, aerospace
Coin/Button (recharge-able Li-ion)	LCO, LMO	Metal coin cell	Very compact; easy to integrate for tiny loads	Low capacity & current; fewer charge cycles; narrow temperature range	Small wearables, sensors

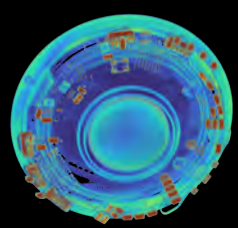


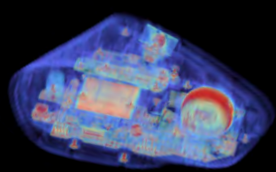
Lithium-Ion Battery Safety is Personal

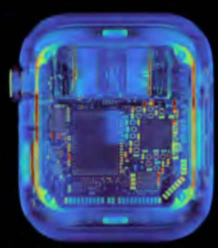
The average American owns nine devices powered by lithium-ion batteries.[11] Below are 21 examples of such personal and household gadgets. How many of these do you own? Are there others not listed that add to your individual lithium-ion battery exposure?

As these industrial CT scans illustrate, cylindrical cells are often assembled into packs. The cordless drill battery pack below combines five 18650 cells into a single battery pack, while the e-bike battery consolidates 39 cells. Though a single cylindrical cell has a low level of risk, a battery is ultimately only as safe as its most dangerous individual cell. That means risks compound as more cells are added to a battery pack; if a single cell has a defect rate of one in a million, or 0.0001%, the chance that a battery pack with 39 cells has at least one defective cell is 0.0039%, or nearly 1 in 25,000.

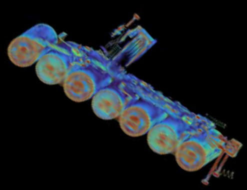

E-Reader

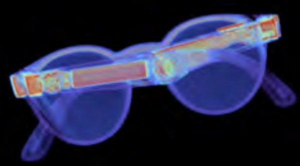

Bluetooth tag

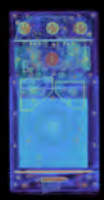

Rechargeable mouse

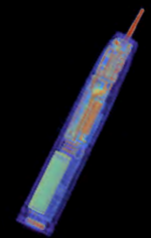

Smartwatch


Bluetooth Speaker
Contains 3x 18650 cells

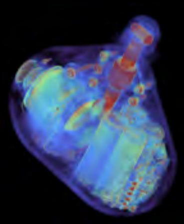

Cordless vacuum battery
Contains 7x 18650 cells

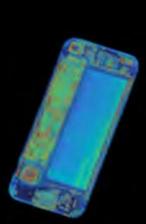

Smart glasses

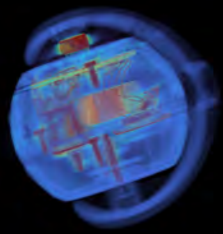

Security doorbell camera

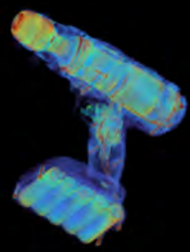

Electric toothbrush
Contains 1x 18650 cell

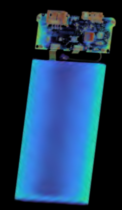

Game controller


Portable massager
Contains 4x 18650 cells

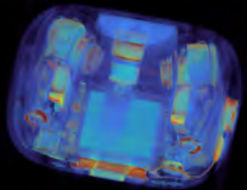

Phone

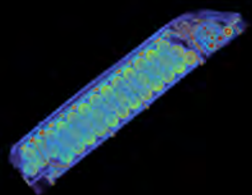

Cat toy

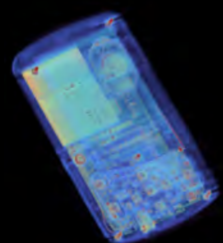

Cordless drill
Contains 5x 18650 Cells

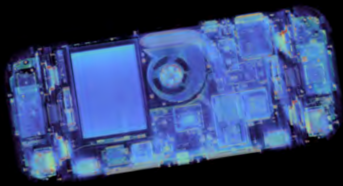

Power bank

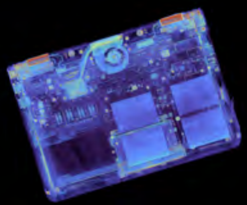

Electric shaver
Contains 1x 18500 cell


Bluetooth earbuds


E-bike battery
Contains 39x 18650 cells


Baby monitor


Handheld gaming device


Laptop

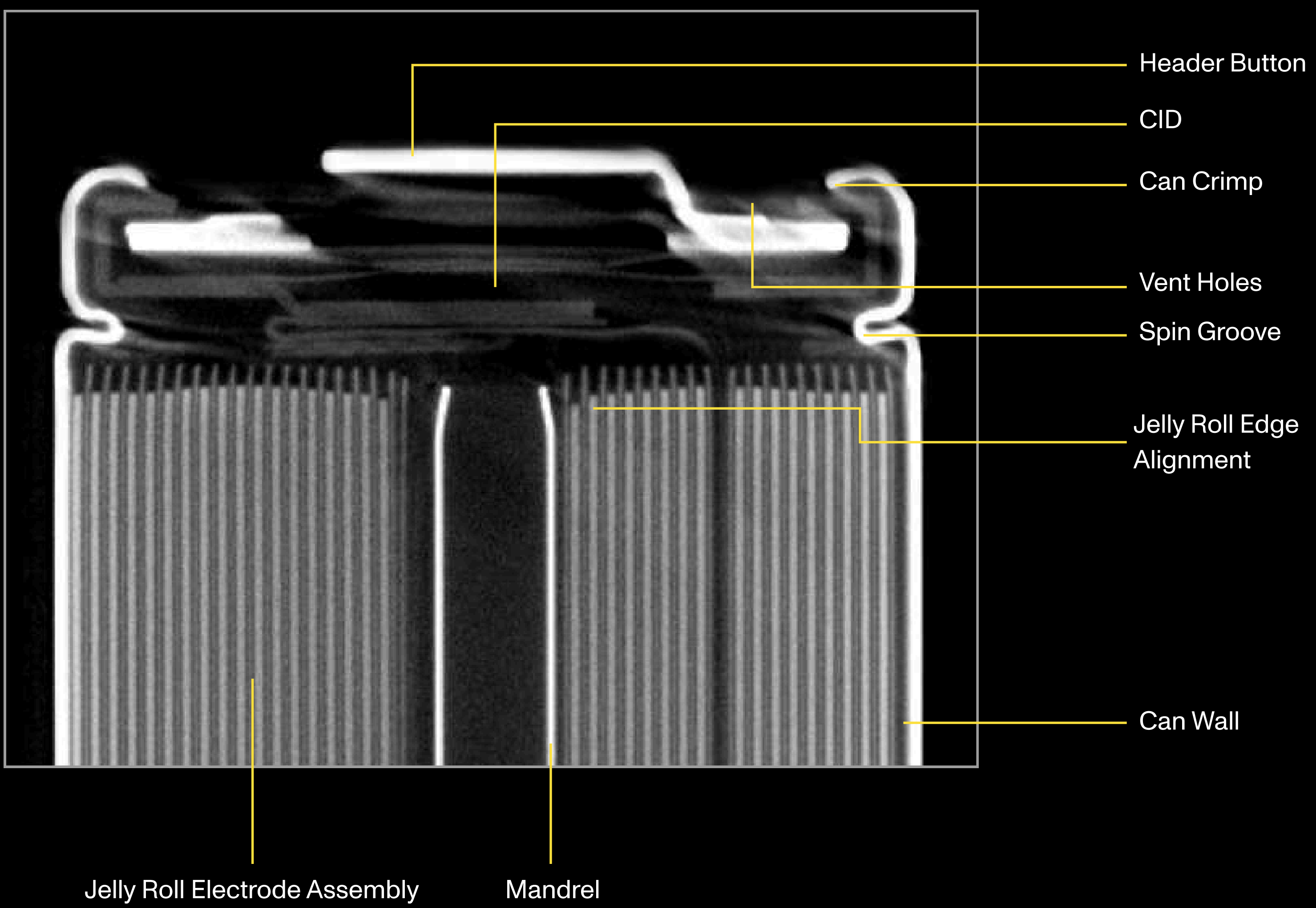
Battery Breakdown

On the outside, 18650 batteries all look the same. That standardization makes 18650s easy to assemble into packs and integrate with other electronics. Though their external wraps may vary in color and branding, and the positive terminal may be flat-top or button-top, fundamentally all 18650s have the same 18 mm by 65 mm cylindrical profile.

When we look inside these batteries with a CT scan, we can see the key components that define the quality of an 18650 battery. A lithium-ion cell contains two electrodes separated by a porous polymer separator and filled with electrolyte. The anode, usually graphite, stores lithium during charge by intercalation. The cathode, typically a layered metal oxide, accepts and releases lithium as the cell charges and discharges. The alignment and structure of these anode and cathode layers are fundamental to safety and reliability.

Industrial X-ray CT lets us nondestructively slice into this structure to evaluate key indicators of cell design and manufacturing quality without resorting to dangerous destructive inspection. Let's take a closer look inside.

Battery Cell Diagram



Anode Overhang

The anode should extend slightly beyond the cathode along the wound or stacked edges. That graphite "guard band" soaks up stray lithium during fast charge and helps prevent edge plating that can grow into a short. Too little overhang raises short-risk; too much wastes volume and raises impedance at the edges.

Edge Alignment

Every cathode edge must sit inside the anode margin with a separator between them. Layer misalignment concentrates current at exposed cathode edges and drives mechanical instability, encouraging lithium plating, heat, and premature aging. In stacked pouches it also raises the chance of foil-to-foil proximity after swelling.

Current Interrupt Device (CID) and Positive Temperature Coefficient Device (PTC)

In high-quality cylindrical cells, the CID sits under the cap and vents or opens the circuit when internal pressure spikes. A correctly seated CID prevents can rupture and thermal events by breaking the current path in time. PTCs are small discs usually found between the pressure seal and the top of the battery. They are made of materials that have low resistance under standard operating temperatures. However, when heated their resistance increases significantly, thereby reducing the battery's energy output capability. These features are often missing in lower-end, counterfeit batteries.

Spin Groove

The spin groove is the circumferential groove in the can just below the top cap. This feature helps retain the header and gasket. Under high internal pressure it can elongate to relieve pressure, and it often becomes the rupture line where the header releases.

Top Fold / Can Crimp

The top fold is the rolled lip at the very rim of the can that folds over the cap to complete the crimp seal. During severe over-pressurization it can straighten, opening the crimp and allowing the header to lift or eject.

Header Button

18650 cells are available with flat tops or button tops, for use in different types of applications. Both types were scanned for this study.

Vent Holes

Vent holes allow gasses to escape in case of overpressurization, helping to prevent catastrophic explosions.

Can Wall Thickness

Can thickness determines crush strength, dent resistance, and heat flow around the electrolyte jelly roll. Under-spec walls can deform under winding pressure or transport shocks, increasing separator damage and leak risk. Over-spec walls add weight and alter thermal gradients that can mask hot spots.

Layer Count

Layer count is a direct driver of capacity: more layers add coated area and active material within the same footprint, increasing capacity as long as porosity, loading, and wetting stay in spec. Batteries with fewer layers and more empty space have less total area and deliver less capacity, often with a measurable shift in internal resistance even when chemistry and coating settings are unchanged.

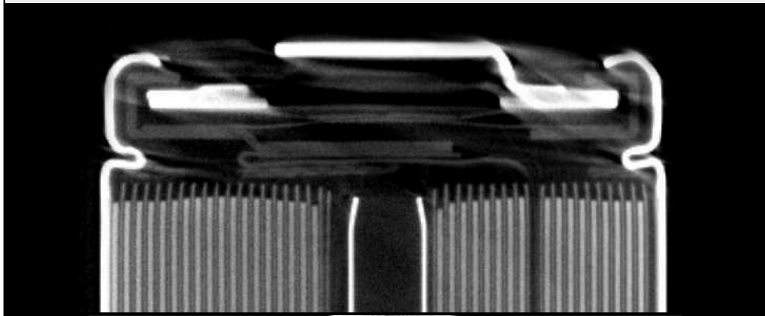
Mandrel Presence

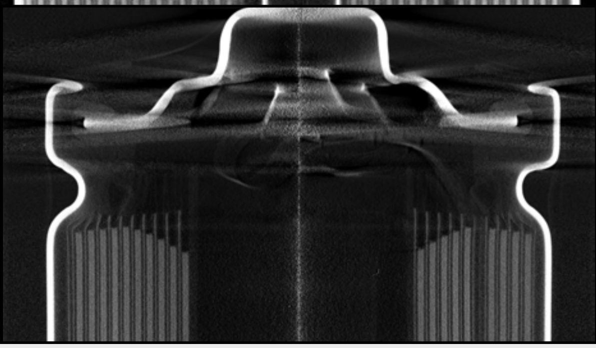
Cylindrical cells are wound around a central core. Some designs leave a hollow core, others include a mandrel or center pin to control winding tension, prevent core collapse, and provide a path for gasses to escape in case of overpressurization.

Other defects to look out for within cells include:

- **Separator integrity:** wrinkles, tears, or folds are direct precursors to internal shorts.
- **Foreign material:** metal particles or burrs seed micro-shorts and gas generation.
- **Electrolyte distribution:** pooling or dry zones drive imbalance and plating.
- **Internal shorts and thermal-runaway precursors:** CT scans can highlight contact points, crushed layers, and breach paths before they escalate.

Battery Observations





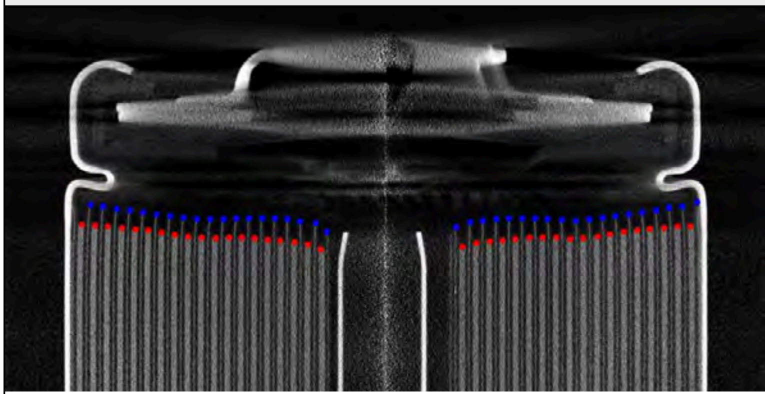
Panasonic Cell P100
High-quality OEM cell

- Capacity tested at 78% of label capacity under standard conservative charge cycle.
- No negative anode overhang.

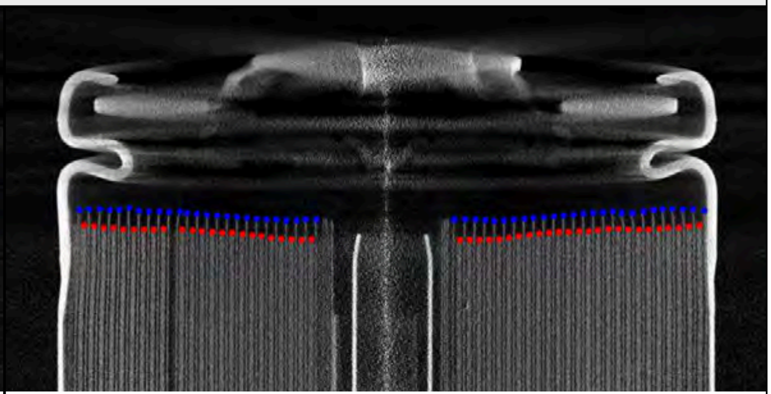
Maxiaeon Cell X100
Low-cost cell sourced from Temu

- Capacity tested at 12% of label capacity under standard conservative charge cycle.
- Dangerous negative anode overhang in 15% of specimens scanned.

Good Electrode Alignment Examples

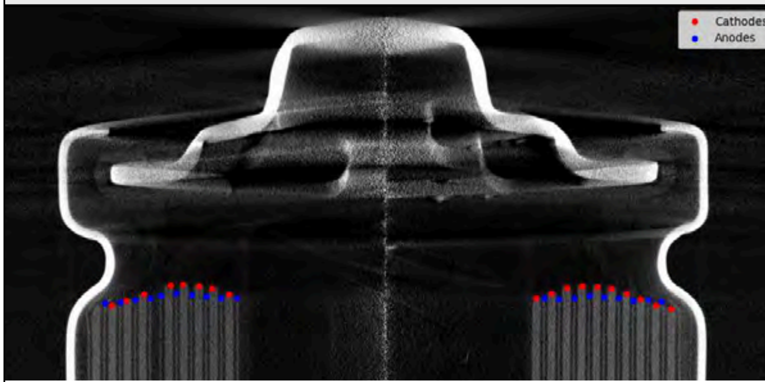


Panasonic Cell P096
The anode layers in this cell extend evenly and sufficiently above the cathode layers.

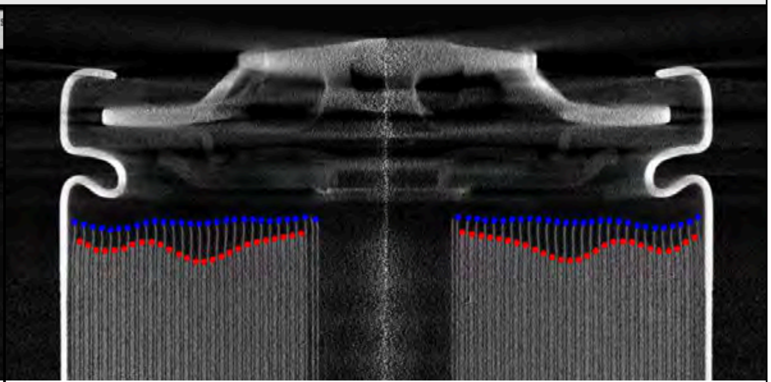


Murata Cell M038
The anode and cathode layers are very straight, indicating tight manufacturing process controls.

Poor Electrode Alignment Examples



Treasurecase Cell A003
Cathodes hang over anodes here, a dangerous defect that increases the chances of lithium plating and dendrite formation.



SOOCOOL Cell Q052
The wavy, uneven pattern of the cathodes indicates poor manufacturing process controls.

Lithium-Ion Battery Supply Chain

TIER 1 Upstream (Raw Materials Extraction)

Lithium: Australia, Chile, Argentina
Cobalt: Democratic Republic of Congo
Nickel: Indonesia, Russia, Canada
Graphite: China, Mozambique

TIER 2 Midstream (Processing and Refining)

Lithium refining: China
Cobalt refining: China, Finland
Nickel refining: Indonesia, Russia
Cathode/Anode precursors: China, South Korea, Japan

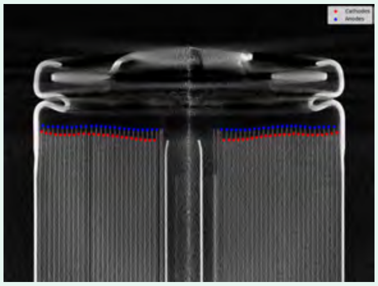
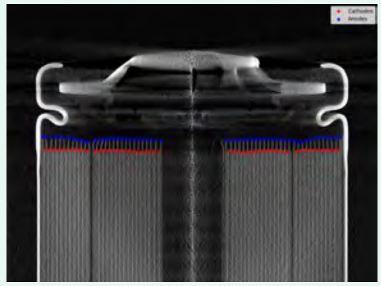
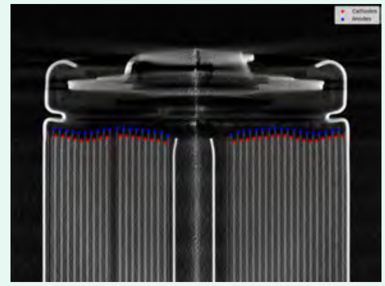
TIER 3 Downstream (Manufacturing)

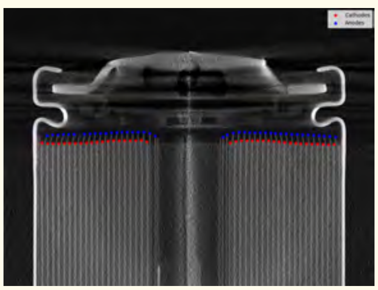
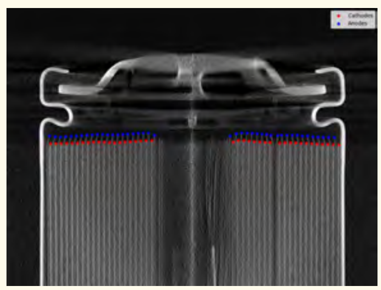
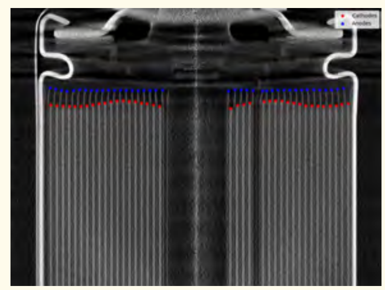
Cell assembly: China (CATL, BYD), Japan (Panasonic), South Korea (LG, Samsung, SK)
Module & pack integration: China, U.S., Europe (Tesla, VW, GM, Northvolt)
Cathode/Anode production: China, Japan, South Korea
Separator production: Japan, China, South Korea

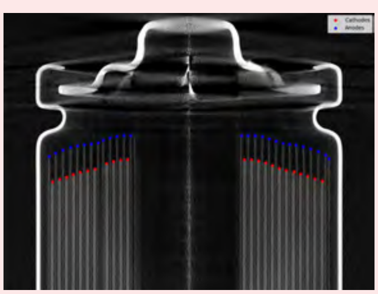
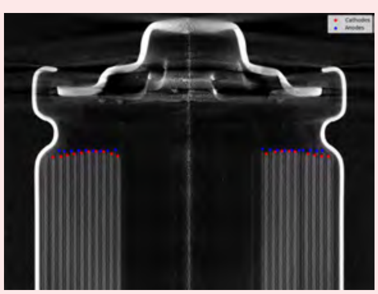
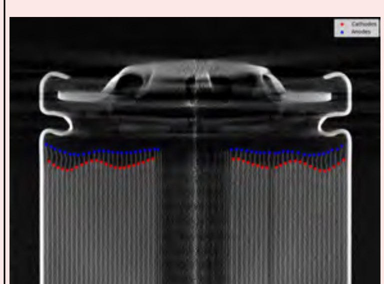
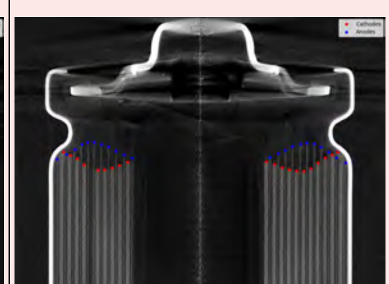
TIER 4 End of Life (Second Life & Recycling)

Second-life storage: China, Europe, U.S.
Recycling: China, Europe, U.S.
Recovered materials: Feed back into Midstream
Methods: Pyrometallurgy, Hydrometallurgy, Direct recycling

The Lumafield 18650 Investigation

Brand-Name OEM Cells		
		
Murata Cell M020	Samsung Cell S018	Panasonic Cell P046

Rewrap Cells		
		
Efest Cell E057	Vapcell Cell V047	Trustfire Cell T059

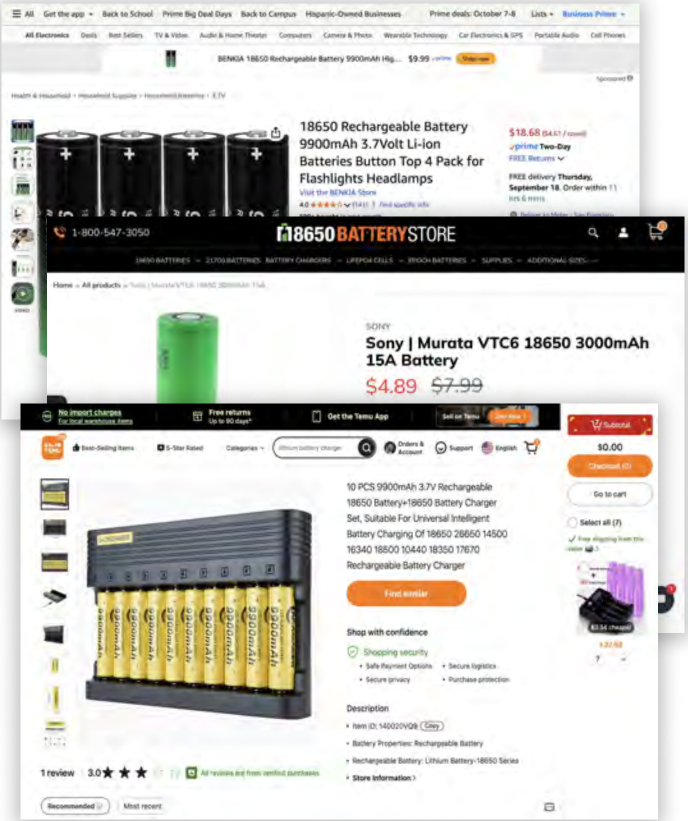
Low Cost / Counterfeit Cells			
			
Treasurecase Cell B004	Benkia Cell A001	SOOCOOL Cell Q037	Maxiaeon Cell X034

Investigation Methodology

Battery Selection

In sourcing the batteries for this study, we aimed to sample the spectrum of cell supplier types, from high-end OEMs to outright counterfeits. One would intuitively expect differences across the spread, but we wanted to quantify the quality deltas between sources.

OEM batteries from well-established manufacturers were sourced from highly reviewed, specialized suppliers. Re-wrap batteries, which are often OEM cells that have had their original plastic wrapper replaced and are sold with different, often inflated specs, were sourced from specialized battery sites or from their own dedicated brand web stores. Low cost/counterfeit cells were sourced from large, general online retailers such as Temu. Three OEMs (Murata, Samsung, and Panasonic), three rewrap vendors (Efest, Vapcell, and TrustFire), and four low cost/counterfeit brands (Treasurecase, Benkia, SOOCOOL, and Maxiaeon) were chosen for a total of ten brands.



The SOOCOOL batteries are the most direct example of counterfeit cells, with a product listing title of “Authentic 30QP Rechargeable 3.7V 18650 Battery Flat Top, Real 3000mAh(2PCS, with Free Plastic Case)” clearly referencing Samsung’s “30Q” product name. The pink wrap also mimics the physical appearance of a true Samsung 30Q 18650 cell. The Treasurecase, Benkia, and Maxiaeon cells focus on low-cost appeal, though they could also be considered counterfeit in that they dramatically misrepresent their performance specifications.

We set out to buy at least 100 cells from each brand. Some of the vendors shipped us extra batteries free of charge, while other vendors required purchases in increments of 8, resulting in over 100 cells for certain cell sets. We scanned every battery we received. We also manually labeled every cell for traceability, allowing us to revisit specific cells as needed. In total, we scanned 1,054 18650 batteries.

▲ Lumafield’s Neptune industrial X-ray CT scanner.

18650 Investigation Cells					
Brand	Experiment Label	Source Type	Purchase Site	List Price per Cell	Quantity
Murata	M	OEM	18650 Battery Store	$5.99	100
Samsung	S	OEM	18650 Battery Store	$6.99	100
Panasonic	P	OEM	IMR Batteries	$6.99	100
Efest	E	Rewrap	18650 Battery Store	$12.99	100
Vapcell	V	Rewrap	Liion Wholesale	$7.49	110
Trustfire	T	Rewrap	Trustfire site	$9.99	120
Treasurecase	B	Low Cost	Temu	$4.19	112
Benkia	A	Low Cost	Amazon	$2.31	112
SOOCOOL	Q	Low Cost	Amazon	$9.93	100
Maxiaeon	X	Low Cost	Temu	$2.06	100

Scanning Method

All cells were scanned on a Lumafield industrial X-ray CT system with a 130 kV microfocus source. Using Ultra-Fast CT (UFCT), we acquired a scan of each cell with sub-minute scan times. UFCT data was processed using Lumafield's Battery Analysis Module to automatically locate electrode positions and extract the study metrics for bulk analysis.

We prioritized rapid scan acquisition and automated analysis to reflect production-relevant workflows, given the extraordinary speeds battery production lines require. With annual 18650 output exceeding 5 billion units, pace determines practical value. Lumafield offers two industrial X-ray CT product lines: Neptune, a compact and easy-to-use scanner ideal for offices and R&D labs, and Triton, a scanner optimized for high-volume scanning. In production line settings, Triton paired with UFCT supports scans in under 5 seconds, enabling a throughput of over 720 cells per hour.

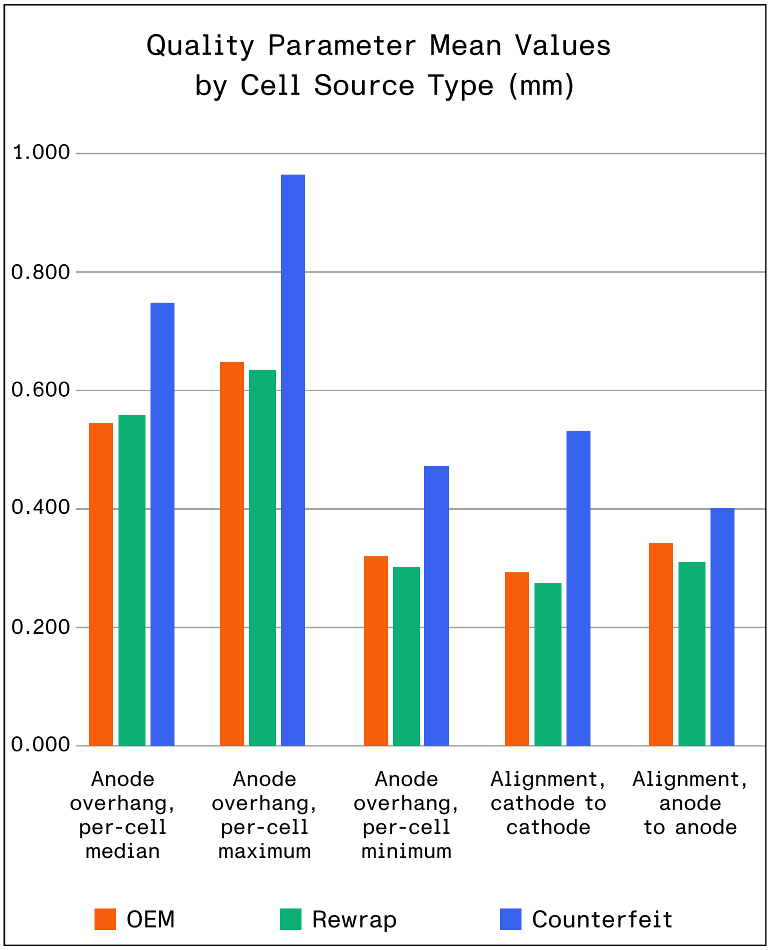
Cells were labeled on receipt with unique identifiers to ensure one-to-one traceability between physical samples and scan records. We scanned all cells in new, as-received condition to avoid artifacts introduced by prior use.

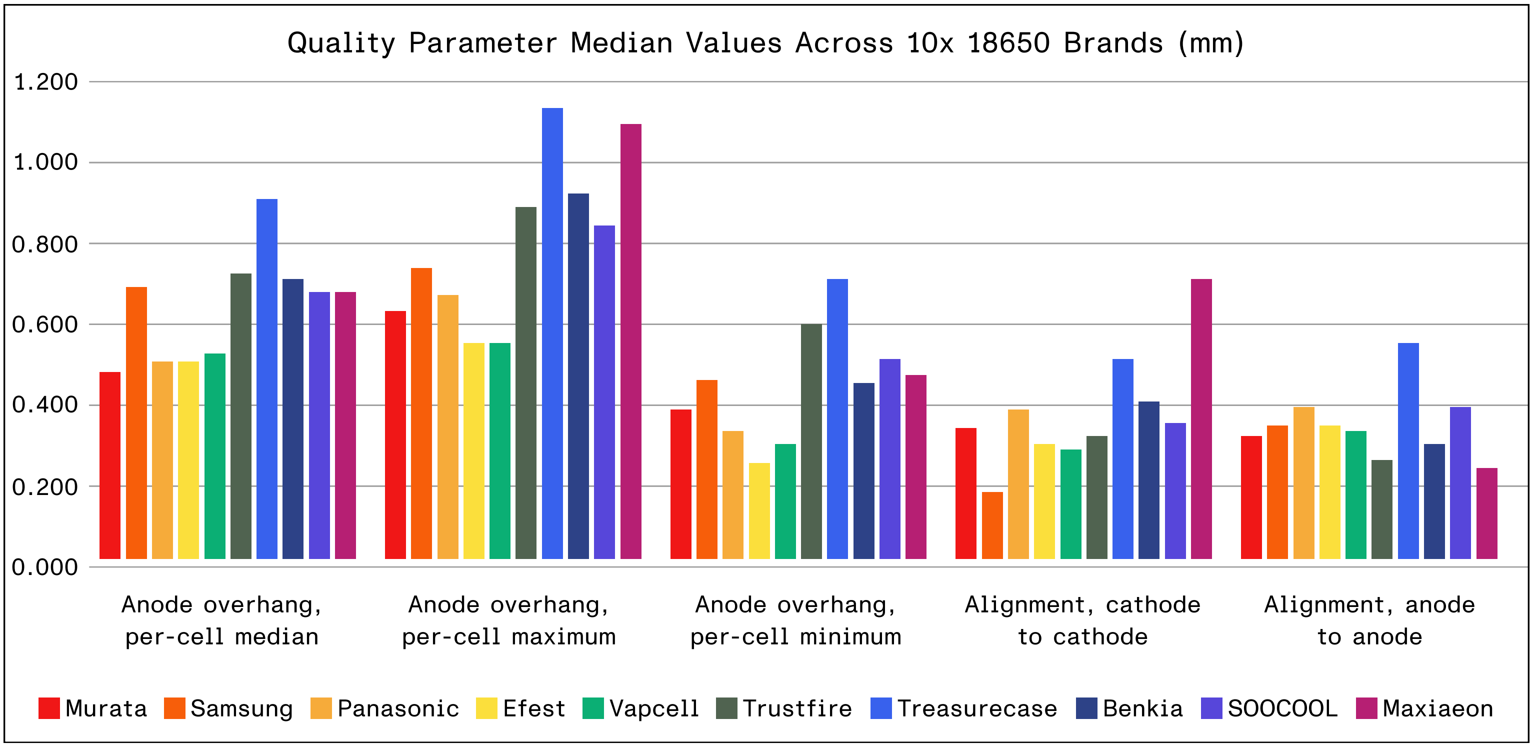
Some vendors in this study advertised capacities up to 9900 mAh—an extraordinary claim for a form factor that typically achieves capacities closer to 3000 mAh. To spot-check vendor claims, we measured real-world capacities by charging cells to 4.2 V at 0.2 C, resting for 60 minutes at room temperature, and discharging to 3.0 V at 0.2 C. We chose a conservative discharge profile to avoid overstress or damage so that anomalous cells identified in the UFCT scans could be preserved for deeper follow-up.

Dataset Overview

In analyzing the data from our 1,054 scanned cells, we prioritized three parameters for anode overhang (AOH) and two parameters for alignment. For anode overhang, we measured median AOH per cell to get a baseline sense of overhang quality. Median was chosen over mean due to the presence of extreme outliers among some of the cells. Additionally, we analyzed maximum and minimum AOH per cell. As described previously, insufficient overhang can lead to lithium plating and its subsequent risks. Anodes that are excessively long can also be problematic, potentially coming into contact with the metal cell can and creating another type of short circuit risk.

We also measured alignment, taking the delta between the highest and lowest cathode and highest and lowest anode in each cell. Cylindrical cells are produced with a winding operation, and telescoping introduced during that step can be another source of short-circuits developing within a cell.[12] Large deviations can indicate poor process control and a generally higher risk of other defects being introduced in that supplier's manufacturing process.



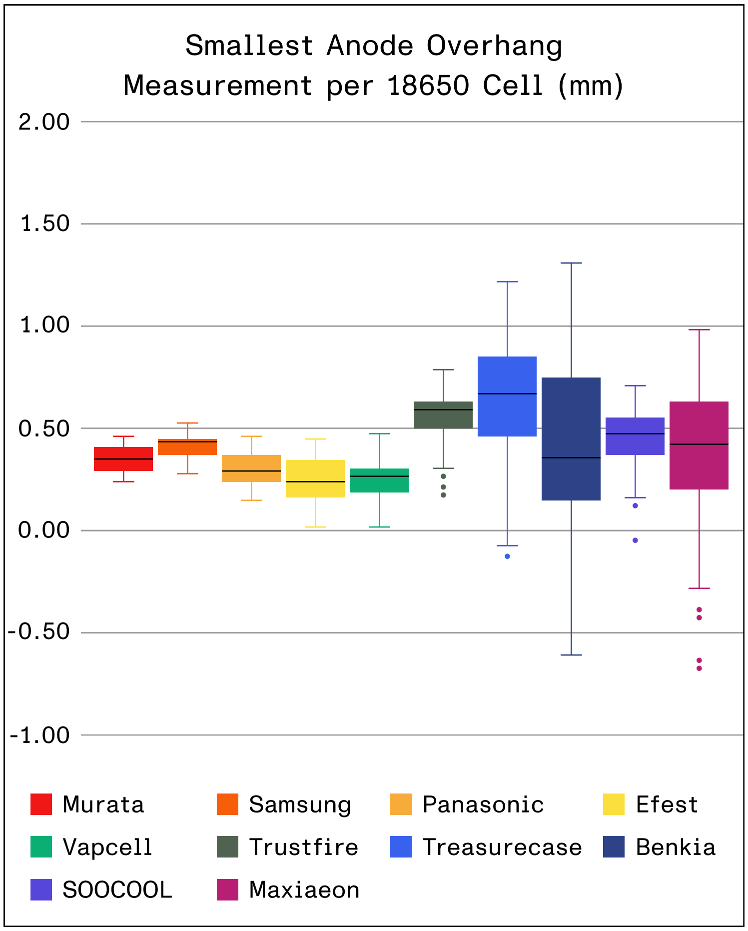


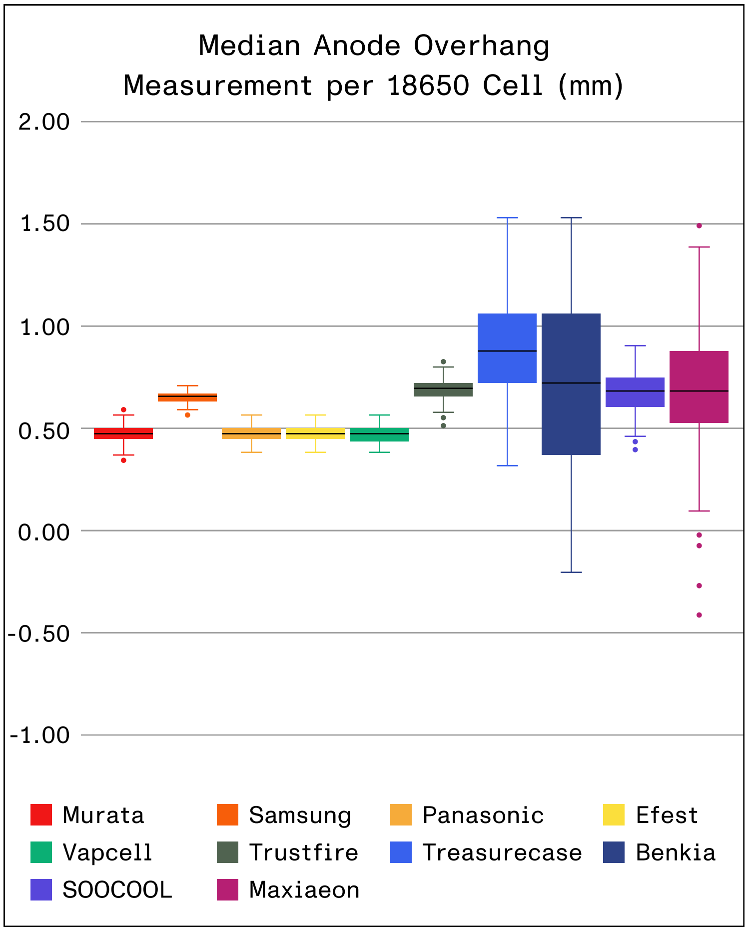
The data generally aligns with expectations. OEM cells show tight quality control, with anode overhang centered near the 0.50 mm industry standard specification and reasonably low figures for alignment. Rewrap cells track the OEMs surprisingly closely when comparing medians across brands. However, of the three rewrap brabds, Trustfire's metrics are significantly worse than Efest and Vapcell.

To use a rewrap battery is to roll the dice. Unless you are CT scanning your cells, you cannot be certain of cell quality when sourcing from a rewrap vendor. The cells may come from reputable OEMs and perform accordingly, or they could diverge drastically from the expected specifications. Lastly, the low cost and counterfeit cells diverge across every metric, clearly forming a distinct quality tier.

Plotting the per-brand distributions as box plots tells an additional quality story. The OEM batteries have narrow interquartile ranges of anode overhang. Though the rewrap cells generally share similar medians to the OEMs, they exhibit broader spread, and the distribution for the minimum AOH per cell is significantly wider. The interquartile ranges for the low cost/counterfeit cells are even larger, and each of those brands had at least one unit with negative AOH. The 18650 cells that we sourced from Temu and Amazon are the worst offenders, with 15 Maxiaeon and 14 Benkia batteries exhibiting cathode overhang.

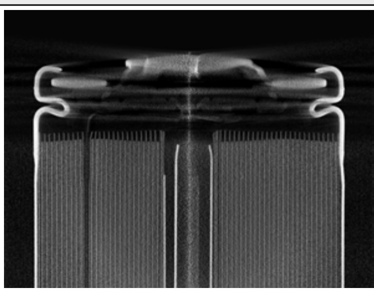
It's challenging to quantify exactly how much more dangerous a battery with cathode overhang is, given how many variables can go into a catastrophic failure. However, 33 of the 424 low cost/counterfeit cells exhibited cathode overhang. That suggests that as many as one in thirteen counterfeit batteries could contain this dangerous defect that significantly accelerates aging and drives a highly increased risk of internal short-circuiting. The standard deviations for the low cost/counterfeit cells are 7 times larger than those of the OEMs, suggesting much worse process controls and considerably lower quality.



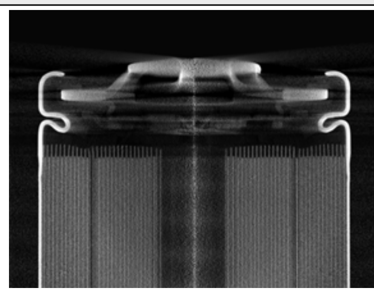


Occurrence of Cell with Negative Anode Overhang										
Category	OEM			Rewrap			Low Cost / Counterfeit			
Quantity	0	0	0	0	0	0	3	14	1	15
Percentage	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.7%	12.5%	1.0%	15.0%
Category Percentage	0.0%			0.0%			7.8%			

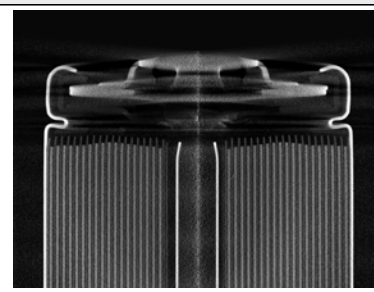
Median Anode Overhang Representative Cells



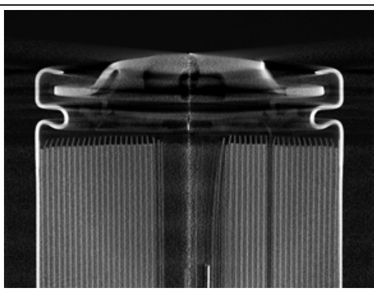
Murata Cell M093



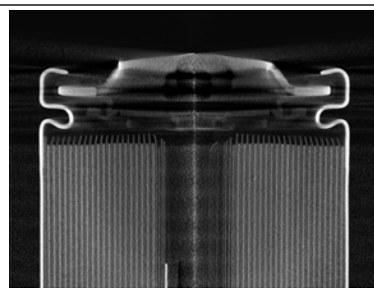
Samsung Cell S070



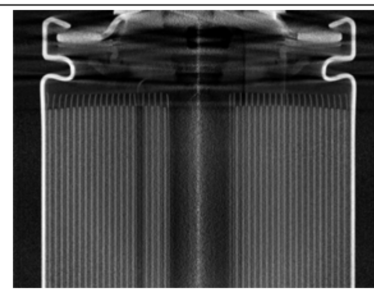
Panasonic Cell P010



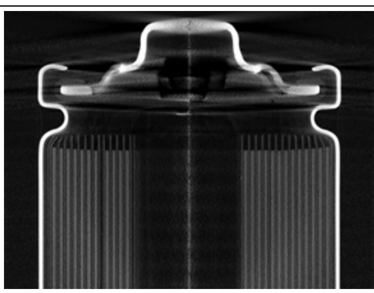
Efest Cell E091



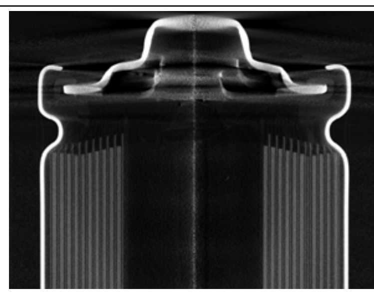
Vapcell Cell V006



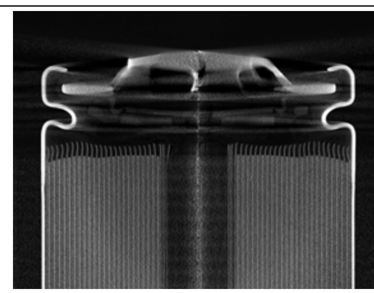
Trustfire Cell T037



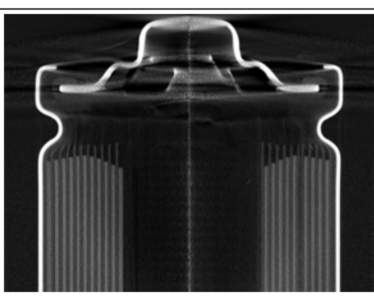
Treasurecase Cell B002



Benkia Cell A062



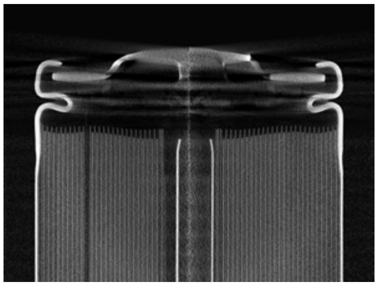
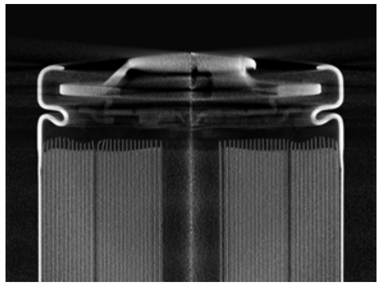
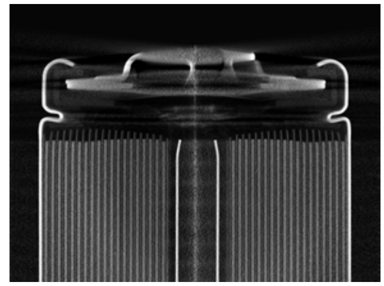
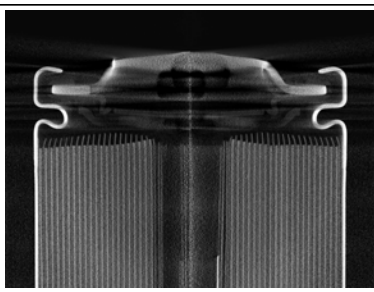
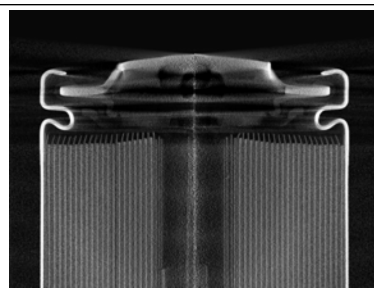
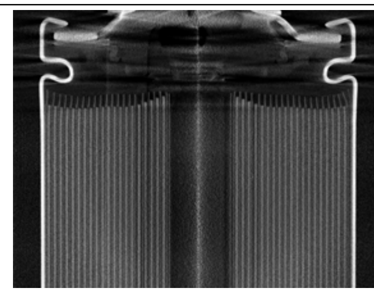
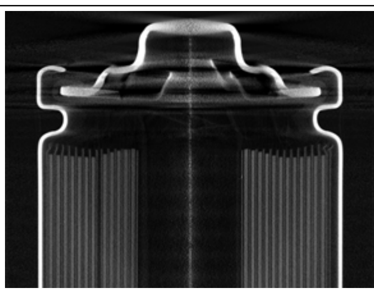
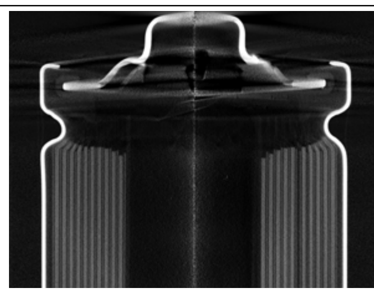
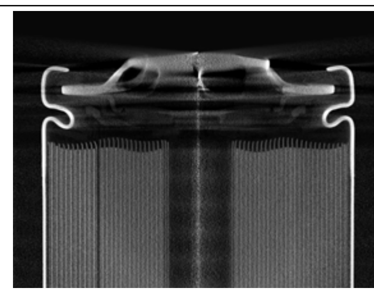
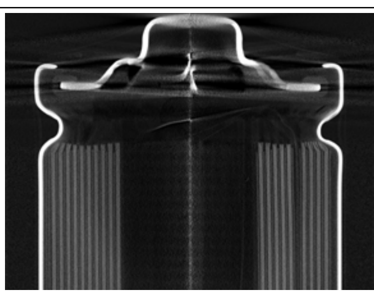
SOOCOOL Cell Q019



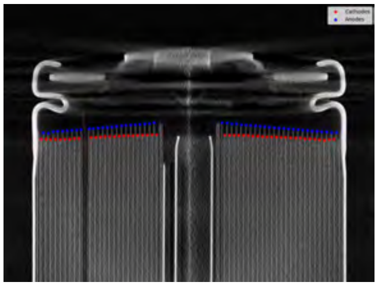
Maxiaeon Cell X083

Analyzing the alignment deviations of the cells, Samsung not only has the lowest median but also exhibits the tightest interquartile spread, indicating a highly controlled production process. As seen with the AOH plots, the OEM and rewrap brands have reasonable alignment figures. When we move to the counterfeit cells, those numbers worsen. The mean low cost/counterfeit cathode alignment of 0.529 mm is 78% larger than the 0.298 mm mean of the OEMs. Their larger alignment deviations further reinforce their risky nature.

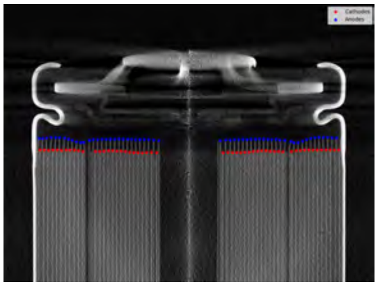
We are able to visualize the impact of poor alignment by pulling scans of the cells in the median and outlier positions. Manufacturers that use X-ray CT inspection at scale can use images like these to identify shifting in their production process.

Smallest Anode Overhang Representative Cells		
 Murata Cell M043	 Samsung Cell S073	 Panasonic Cell P002
 Efest Cell E090	 Vapcell Cell V026	 Trustfire Cell T094
 Treasurecase Cell B069	 Benkia Cell A083	 SOOCOOL Cell Q028
 Maxiaeon Cell 042		

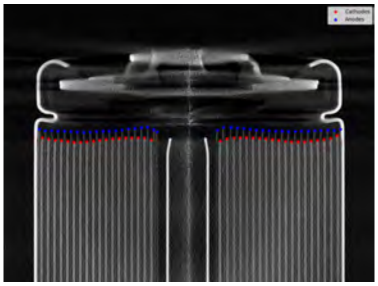
Median Edge Alignment Representative Cells



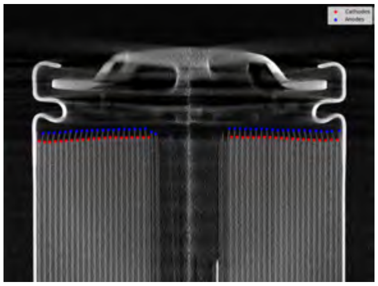
Murata Cell M009



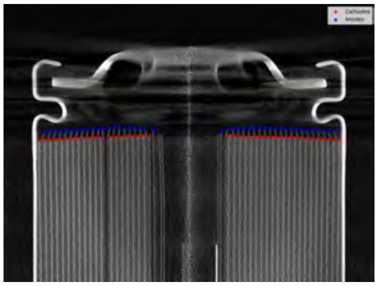
Samsung Cell S091



Panasonic Cell P027



Efest Cell E049



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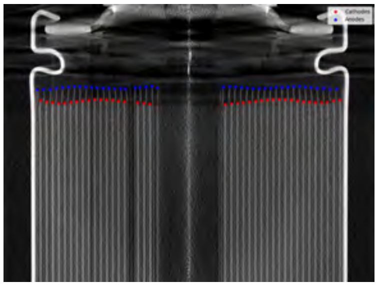
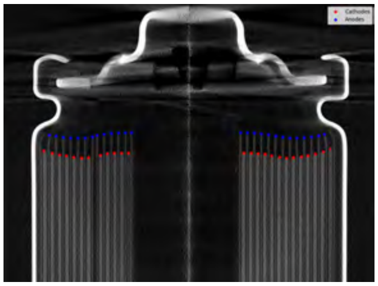
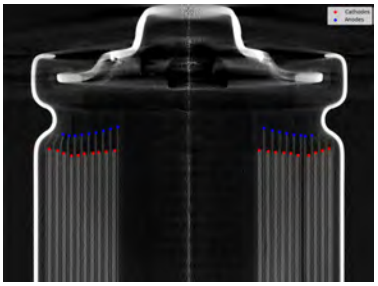


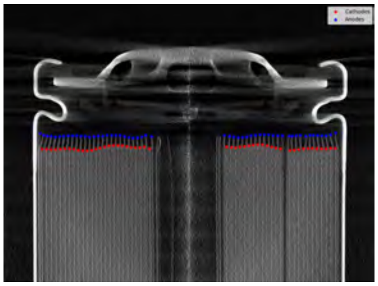
Trustfire Cell T021



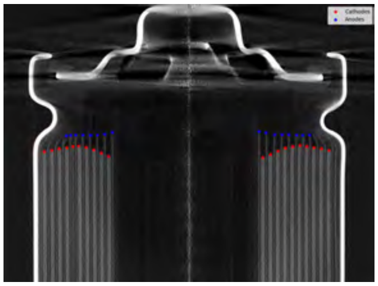
Treasurecase Cell B024



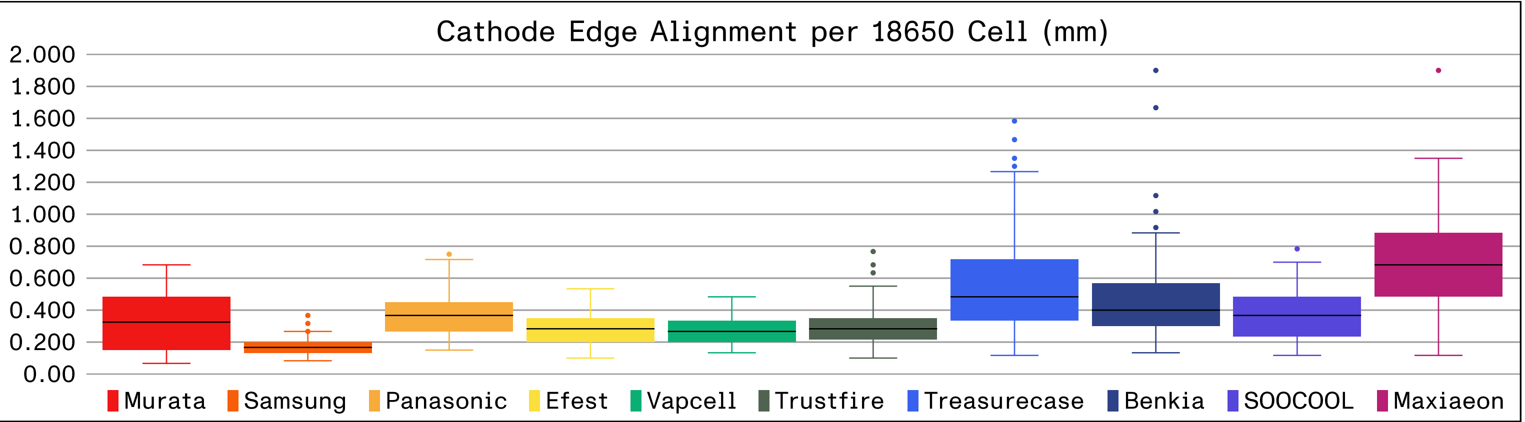
Benkia Cell A014

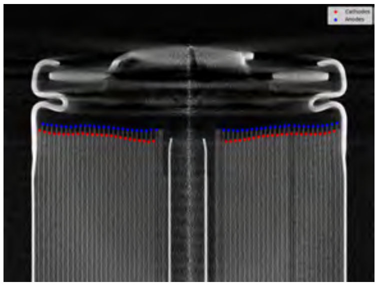
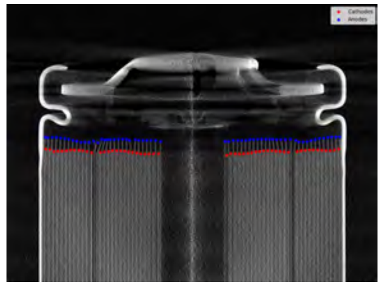
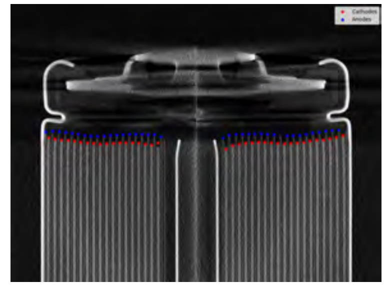
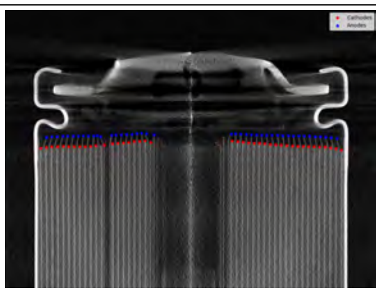
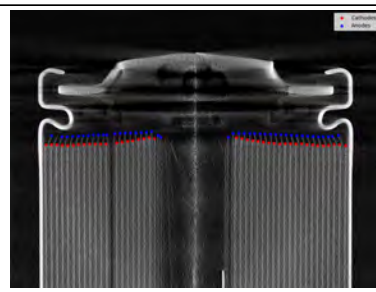
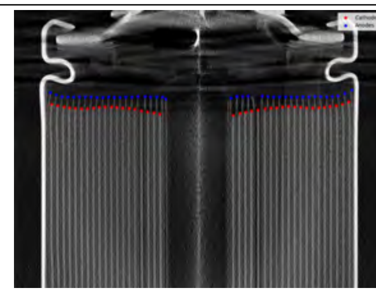
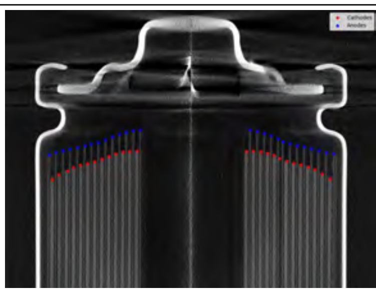
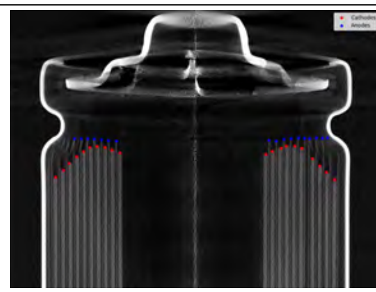
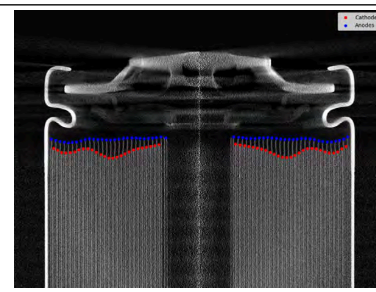
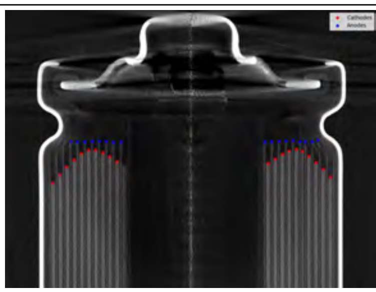


SOOCOOL Cell Q048



Maxiaeon Cell X083



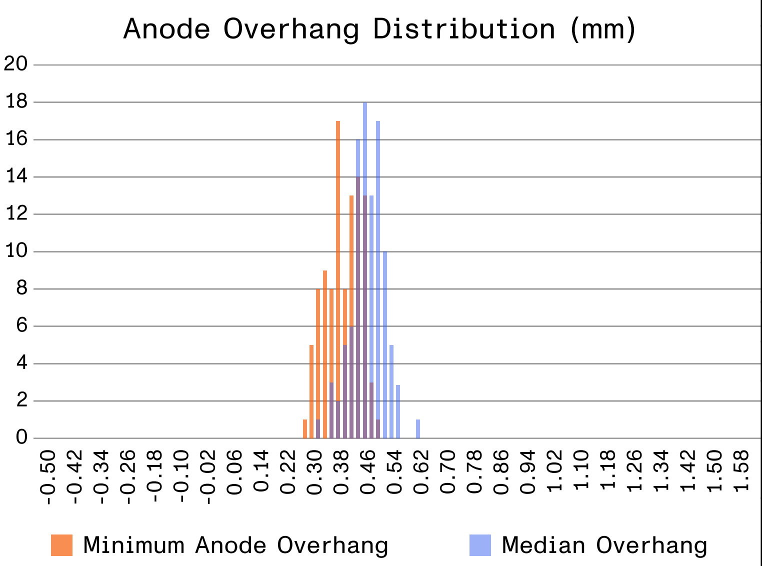
Largest Edge Alignment Deviation Representative Cells		
 Murata Cell M024	 Samsung Cell S054	 Panasonic Cell P030
 Efest Cell E027	 Vapcell Cell V026	 Trustfire Cell T071
 Treasurecase Cell B111	 Benkia Cell A028	 SOOCOOL Cell Q052
 Maxiaeon Cell X086		

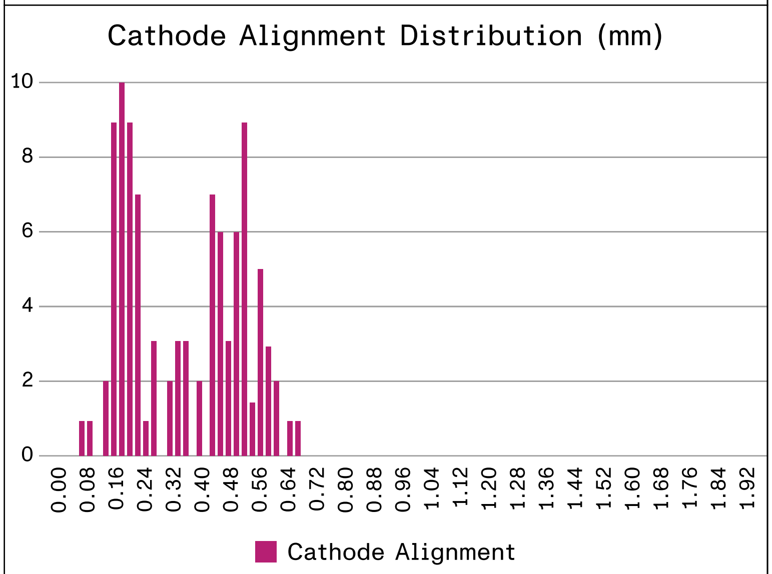
Experiment Results by Brand

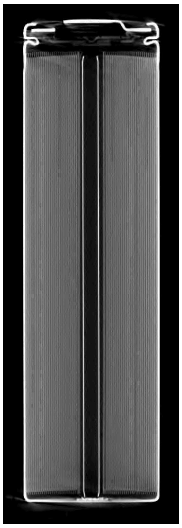
Murata 18650 Cell Quality Overview

Brand Name	Murata
Label Letter	**M**
Listed Capacity (mAh)	3000
Measured Capacity (mAh)*	2661
Cell measured	M99
Median # of cathodes in cross-section	49
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.460
Anode Overhang, Per-cell Maximum	0.600
Anode Overhang, Per-cell Minimum	0.368
Alignment, Cathode to Cathode	0.316
Alignment, Anode to Anode	0.286
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.460
Anode Overhang, Per-cell Maximum	0.607
Anode Overhang, Per-cell Minimum	0.366
Alignment, Cathode to Cathode	0.322
Alignment, Anode to Anode	0.289

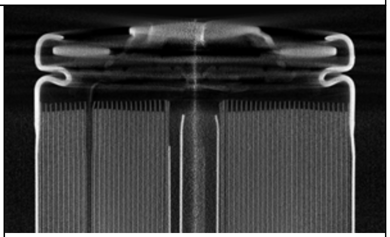
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.



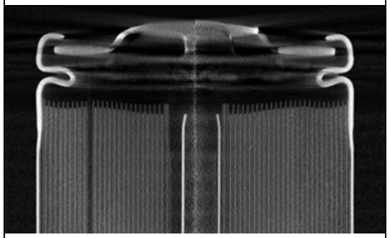




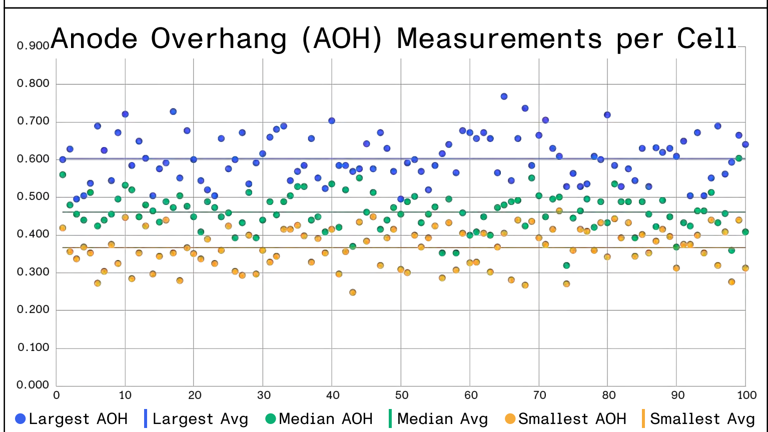
Murata Cell M099
60 minute scan

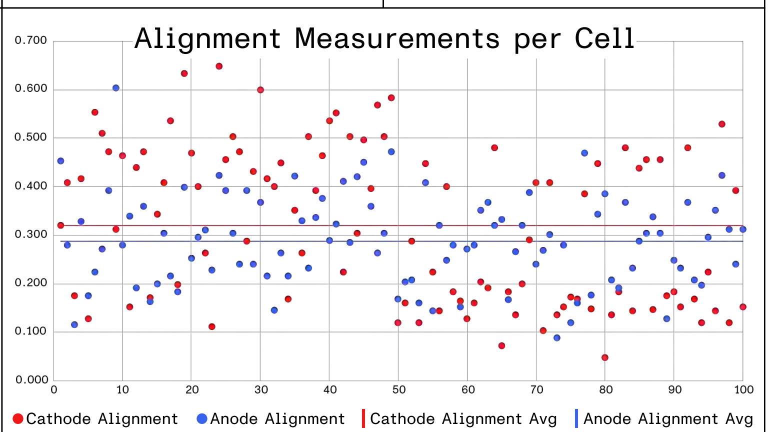


Cell M093
Median AOH representative



Cell M043
Minimum AOH representative

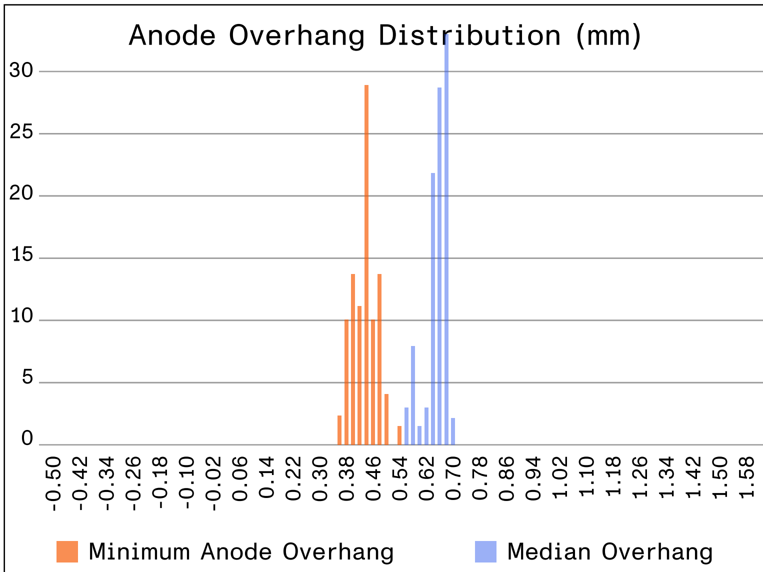


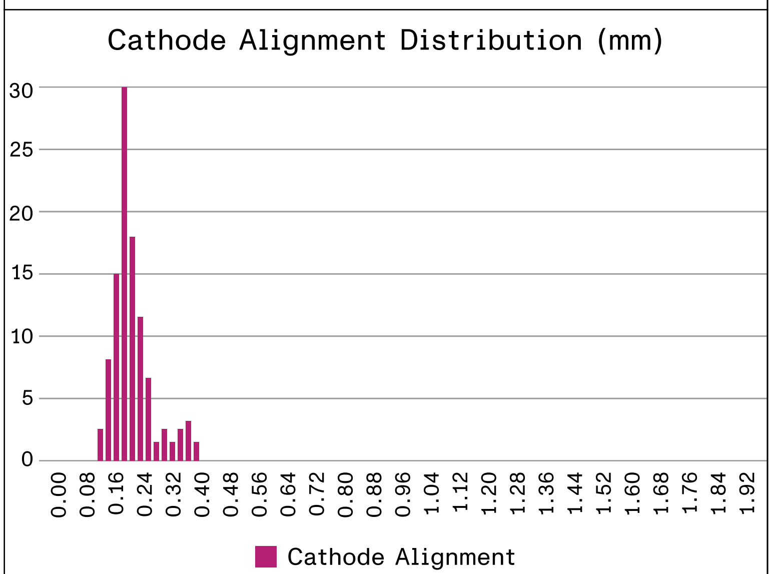


Samsung 18650 Cell Quality Overview

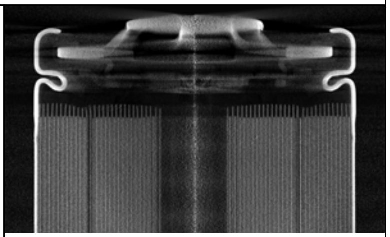
Brand Name	Samsung
Label Letter	**S**
Listed Capacity (mAh)	3000
Measured Capacity (mAh)*	2525
Cell measured	S55
Median # of cathodes in cross-section	53
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.650
Anode Overhang, Per-cell Maximum	0.720
Anode Overhang, Per-cell Minimum	0.432
Alignment, Cathode to Cathode	0.176
Alignment, Anode to Anode	0.308
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.643
Anode Overhang, Per-cell Maximum	0.736
Anode Overhang, Per-cell Minimum	0.422
Alignment, Cathode to Cathode	0.185
Alignment, Anode to Anode	0.311

*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.

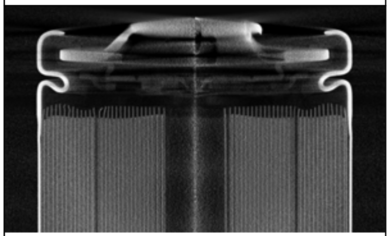




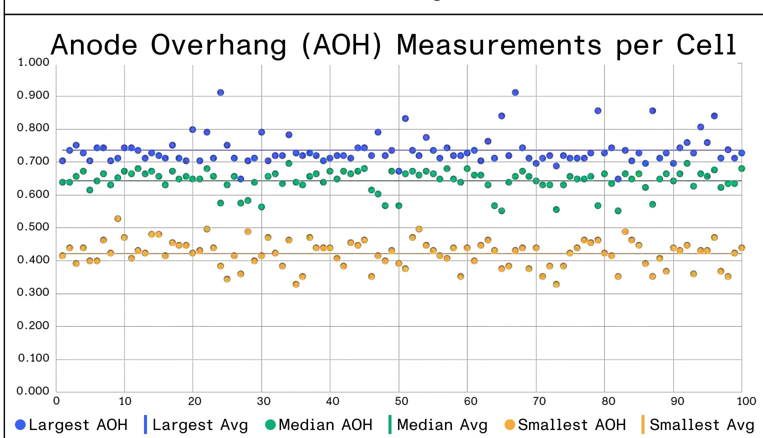
Samsung Cell S055
60 minute scan

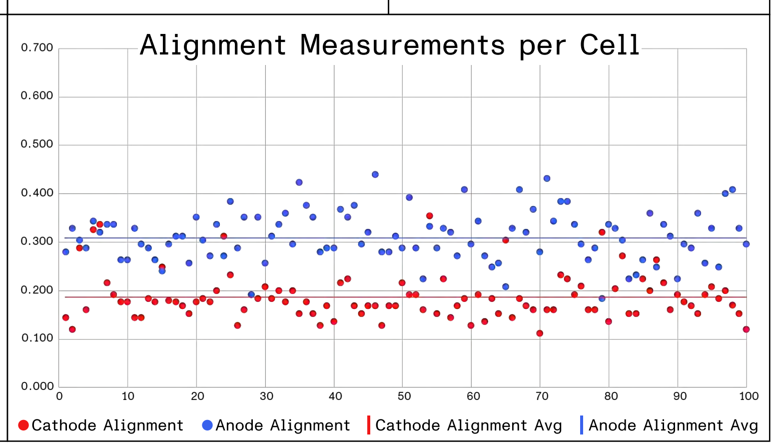


Cell S070
Median AOH representative



Cell S073
Minimum AOH representative

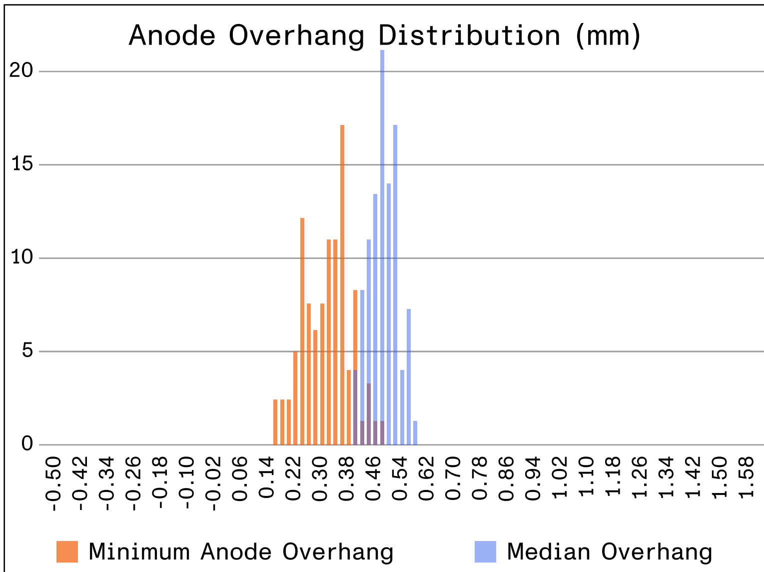


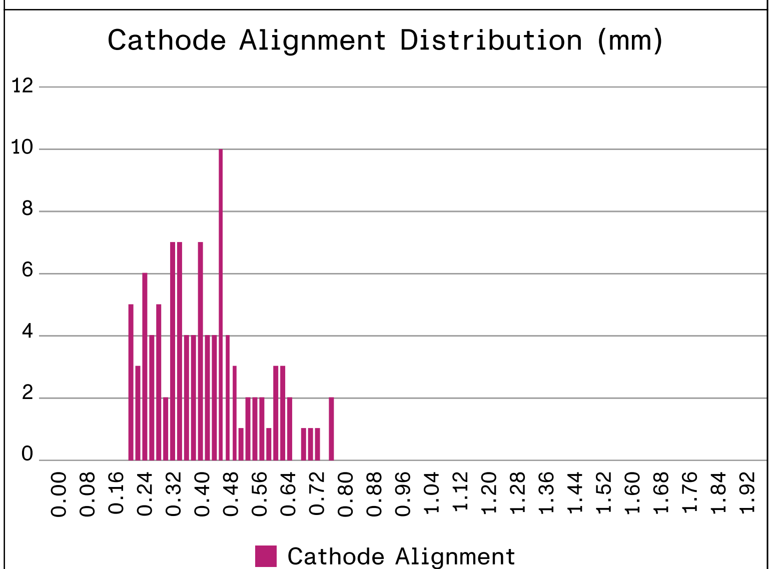


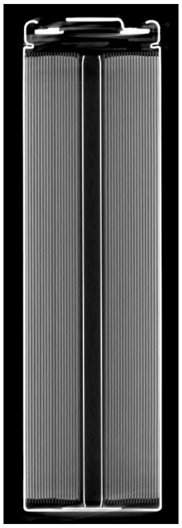
Panasonic 18650 Cell Quality Overview

Brand Name	Panasonic
Label Letter	**P**
Listed Capacity (mAh)	3450
Measured Capacity (mAh)*	2693
Cell measured	P100
Median # of cathodes in cross-section	37
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.472
Anode Overhang, Per-cell Maximum	0.640
Anode Overhang, Per-cell Minimum	0.314
Alignment, Cathode to Cathode	0.368
Alignment, Anode to Anode	0.372
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.475
Anode Overhang, Per-cell Maximum	0.631
Anode Overhang, Per-cell Minimum	0.308
Alignment, Cathode to Cathode	0.386
Alignment, Anode to Anode	0.368

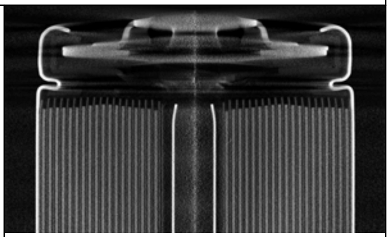
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.



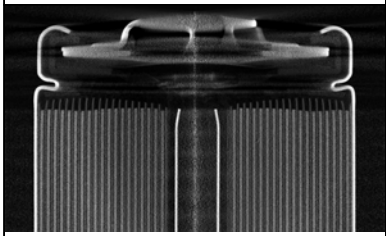




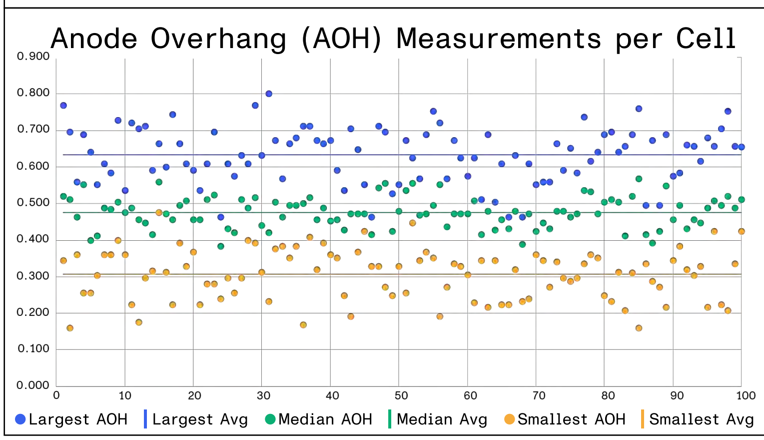
Panasonic Cell P100
60 minute scan

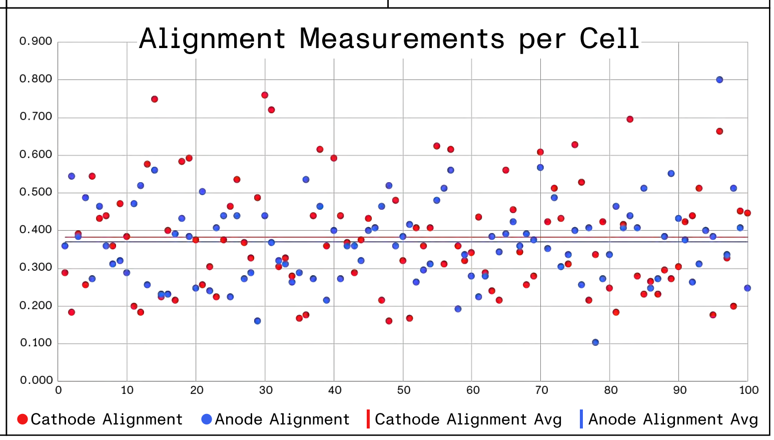


Cell P101
Median AOH representative



Cell P002
Minimum AOH representative

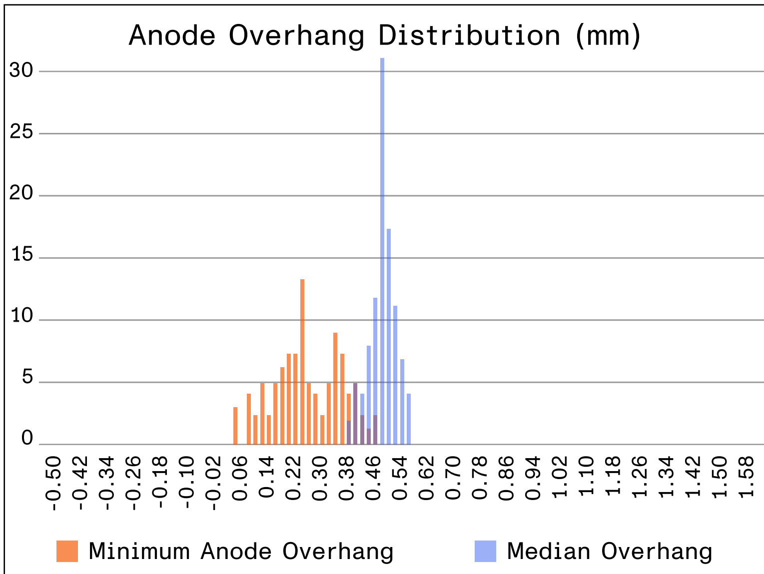


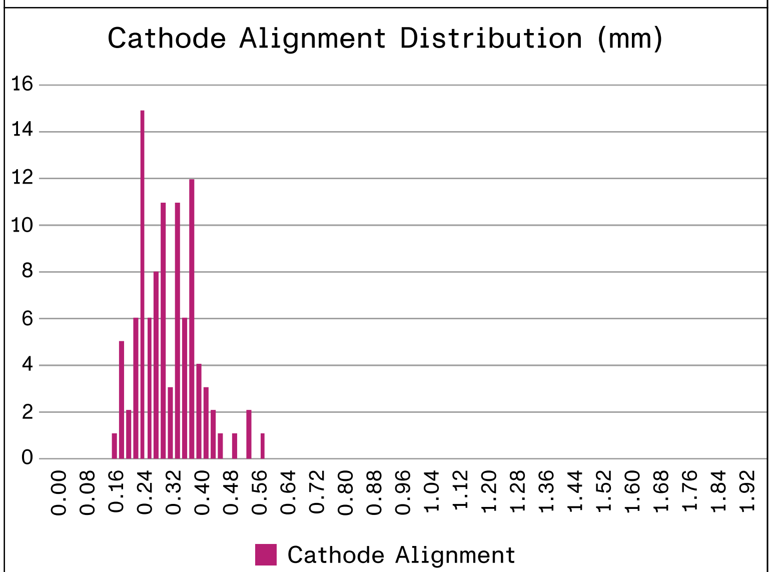


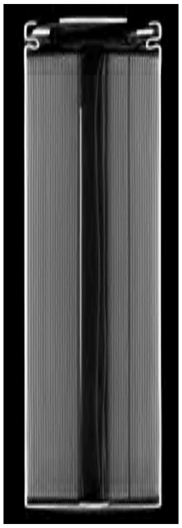
Efest 18650 Cell Quality Overview

Brand Name	Efest
Label Letter	**E**
Listed Capacity (mAh)	4000
Measured Capacity (mAh)*	3023
Cell measured	E100
Median # of cathodes in cross-section	41
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.472
Anode Overhang, Per-cell Maximum	0.536
Anode Overhang, Per-cell Minimum	0.232
Alignment, Cathode to Cathode	0.272
Alignment, Anode to Anode	0.312
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.473
Anode Overhang, Per-cell Maximum	0.545
Anode Overhang, Per-cell Minimum	0.249
Alignment, Cathode to Cathode	0.286
Alignment, Anode to Anode	0.319

*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.

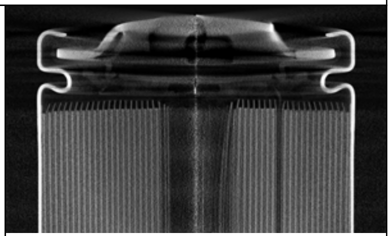






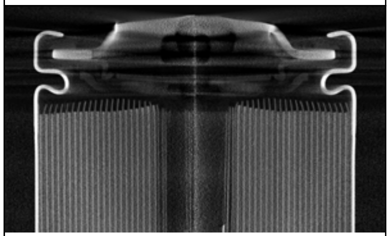
Efest Cell E110

60 minute scan



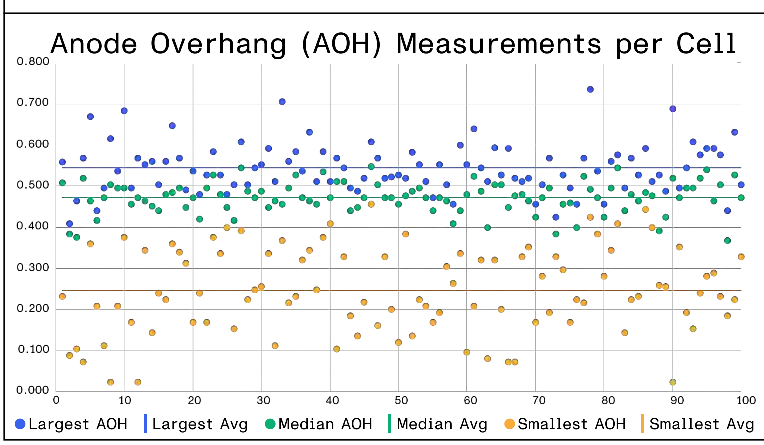
Cell E091

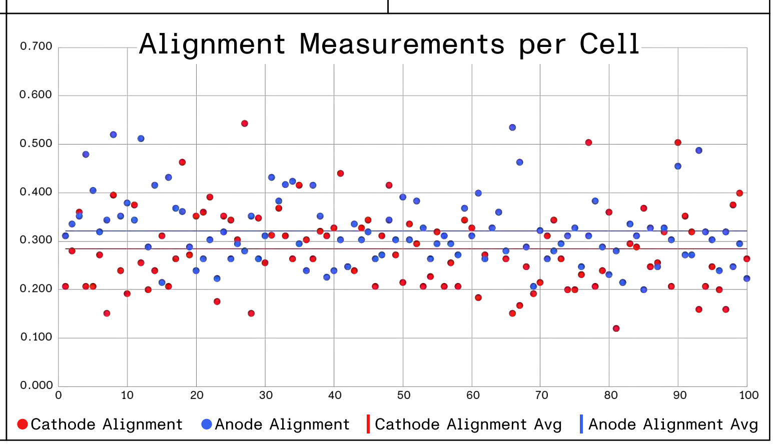
Median AOH representative



Cell E090

Minimum AOH representative

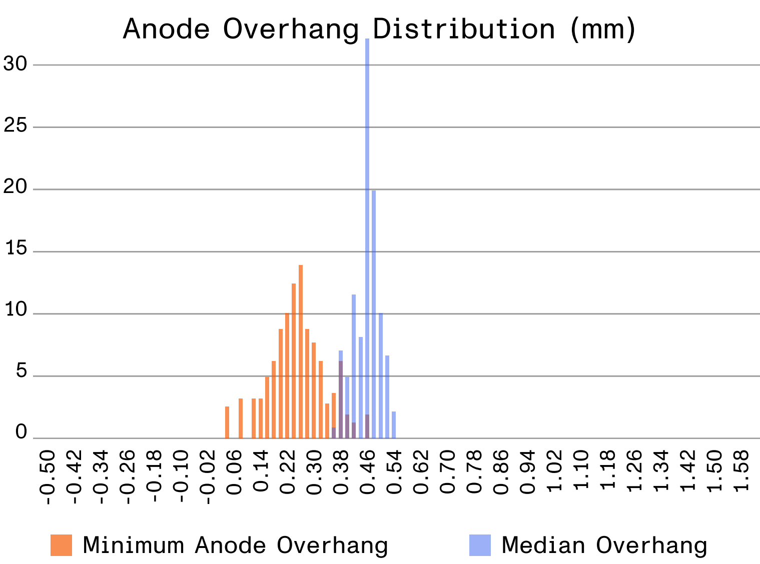


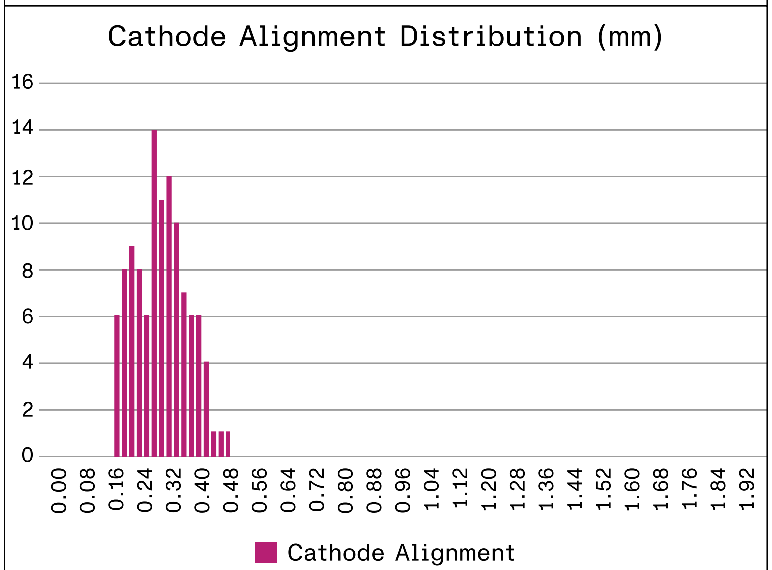


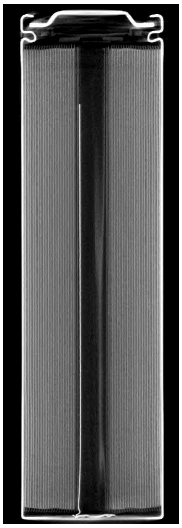
Vapcell 18650 Cell Quality Overview

Brand Name	Vapcell
Label Letter	**V**
Listed Capacity (mAh)	4000
Measured Capacity (mAh)*	3055
Cell measured	V010
Median # of cathodes in cross-section	41
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.480
Anode Overhang, Per-cell Maximum	0.536
Anode Overhang, Per-cell Minimum	0.260
Alignment, Cathode to Cathode	0.264
Alignment, Anode to Anode	0.293
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.476
Anode Overhang, Per-cell Maximum	0.542
Anode Overhang, Per-cell Minimum	0.258
Alignment, Cathode to Cathode	0.271
Alignment, Anode to Anode	0.309

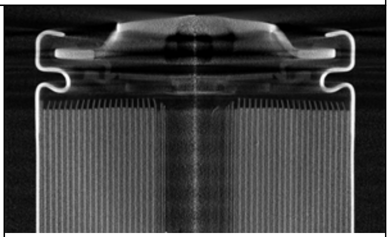
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.



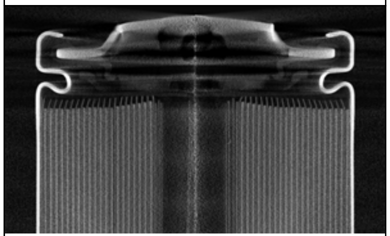




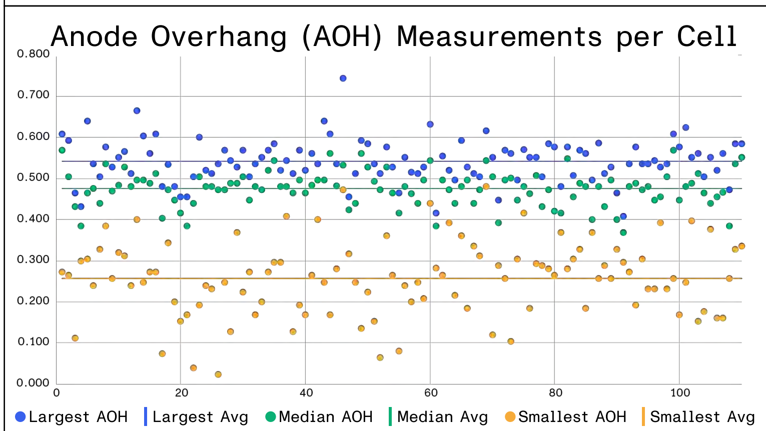
Vapcell Cell V010
60 minute scan

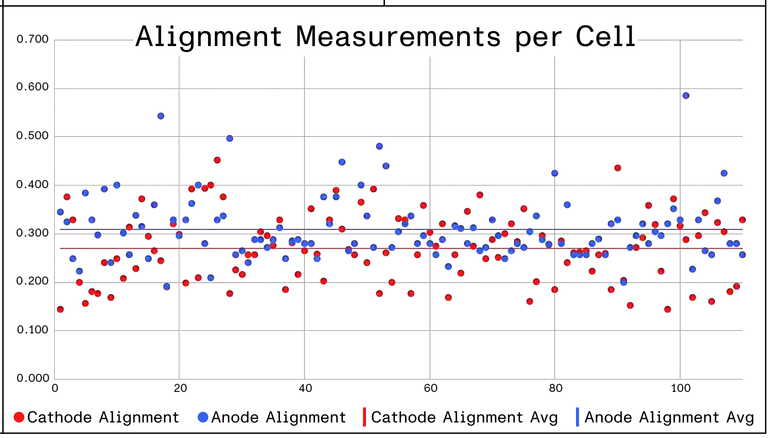


Cell V006
Median AOH representative



Cell V026
Minimum AOH representative

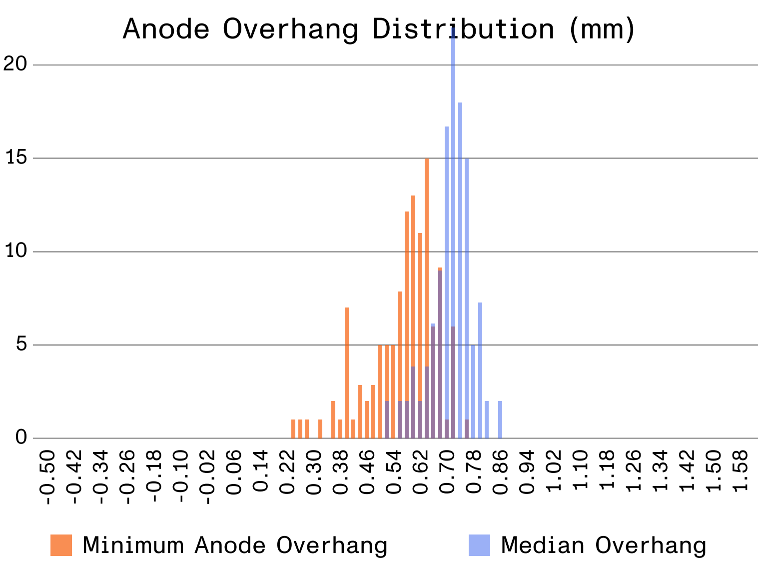


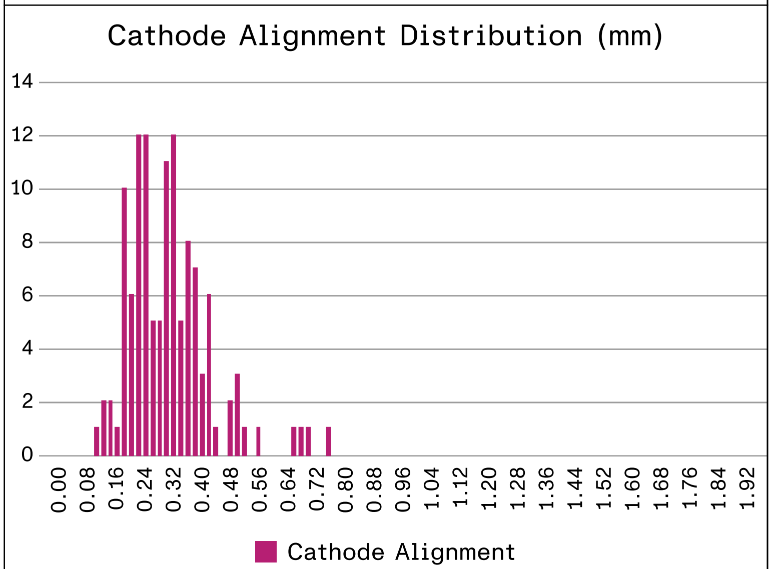


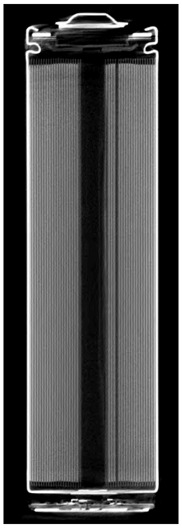
Trustfire 18650 Cell Quality Overview

Brand Name	Trustfire
Label Letter	**T**
Listed Capacity (mAh)	3400
Measured Capacity (mAh)*	2906
Cell measured	T103
Median # of cathodes in cross-section	38
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.714
Anode Overhang, Per-cell Maximum	0.872
Anode Overhang, Per-cell Minimum	0.584
Alignment, Cathode to Cathode	0.290
Alignment, Anode to Anode	0.224
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.704
Anode Overhang, Per-cell Maximum	0.874
Anode Overhang, Per-cell Minimum	0.559
Alignment, Cathode to Cathode	0.300
Alignment, Anode to Anode	0.253

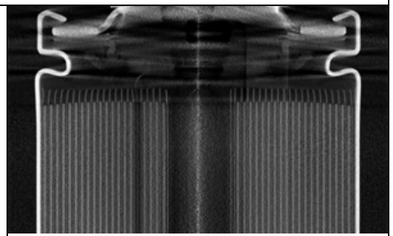
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.



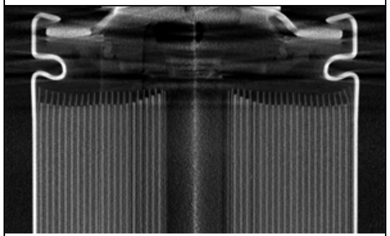




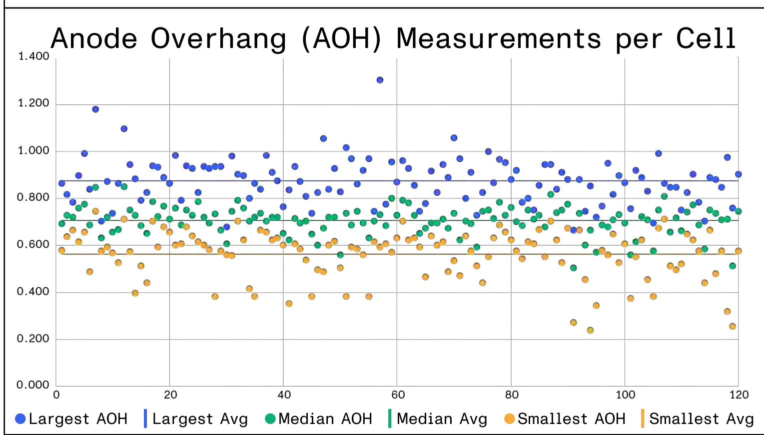
Trustfire Cell T103
60 minute scan

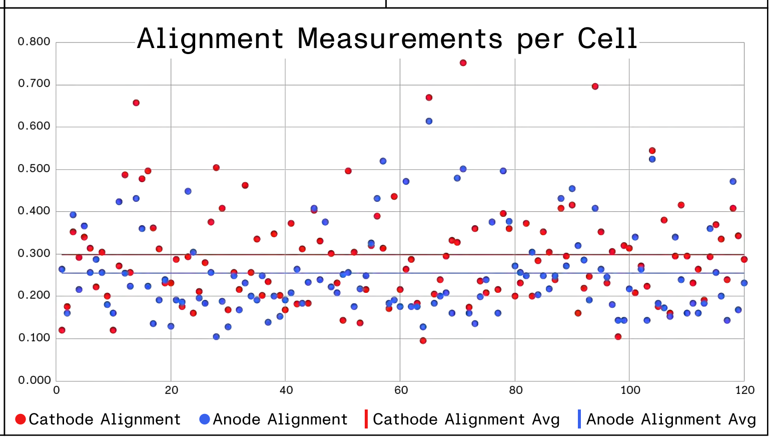


Cell T037
Median AOH representative



Cell T094
Minimum AOH representative

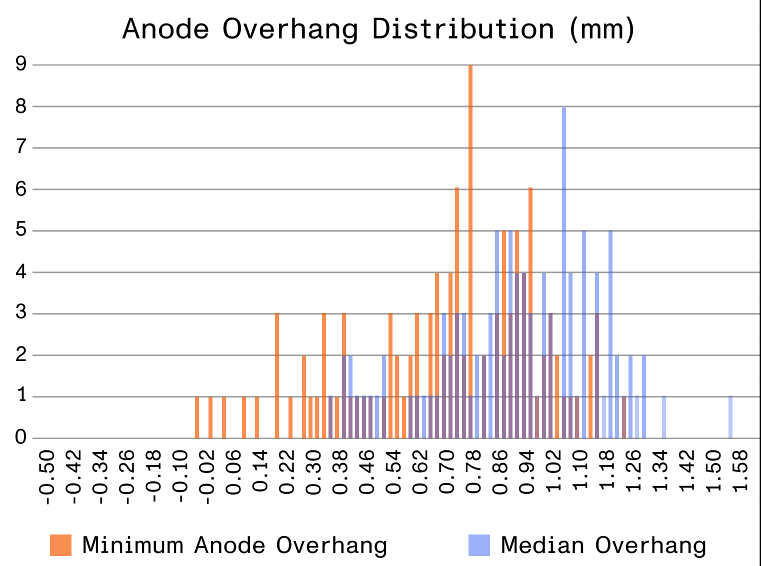


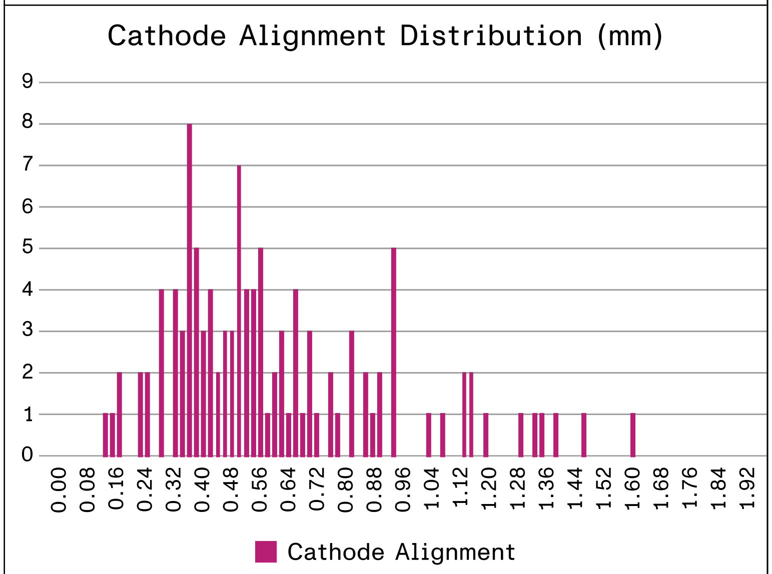


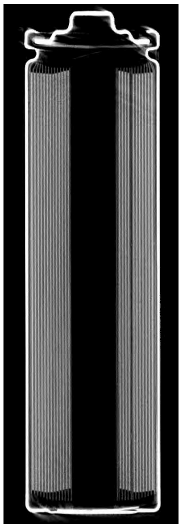
Treasurecase 18650 Cell Quality Overview

Brand Name	Treasurecase
Label Letter	**B**
Listed Capacity (mAh)	3000
Measured Capacity (mAh)*	1180
Cell measured	B112
Median # of cathodes in cross-section	24
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.888
Anode Overhang, Per-cell Maximum	1.112
Anode Overhang, Per-cell Minimum	0.668
Alignment, Cathode to Cathode	0.493
Alignment, Anode to Anode	0.540
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.872
Anode Overhang, Per-cell Maximum	1.082
Anode Overhang, Per-cell Minimum	0.637
Alignment, Cathode to Cathode	0.575
Alignment, Anode to Anode	0.601

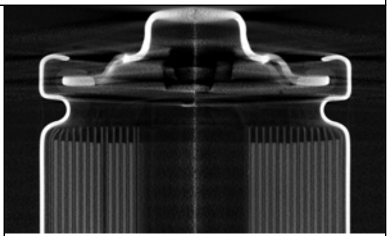
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.



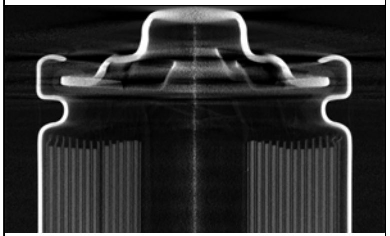




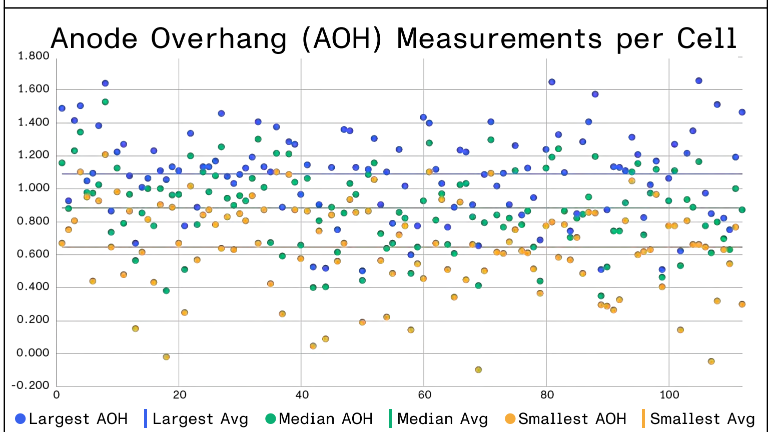
Treasurecase Cell B112
60 minute scan

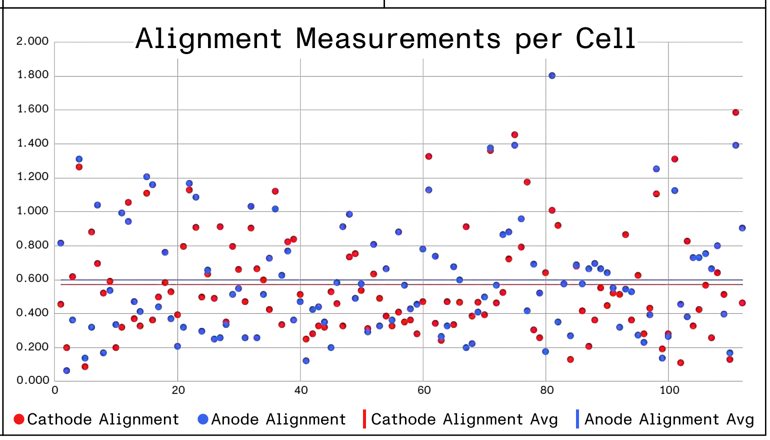


Cell B002
Median AOH representative

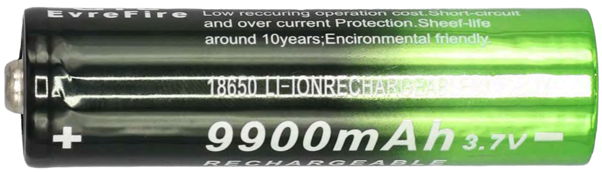


Cell B069
Minimum AOH representative



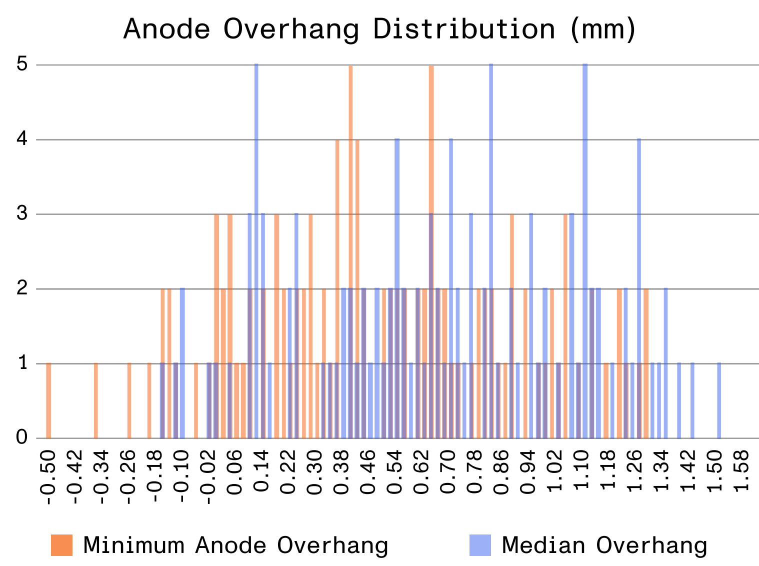


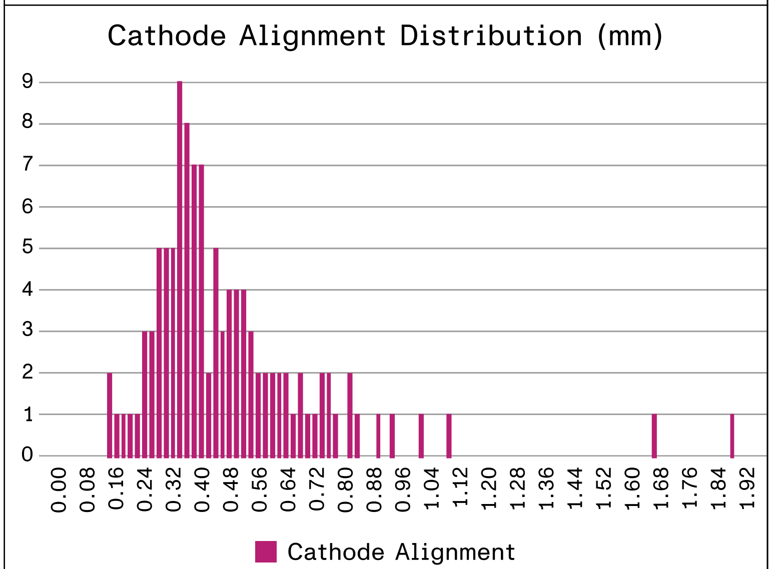
Benkia 18650 Cell Quality Overview

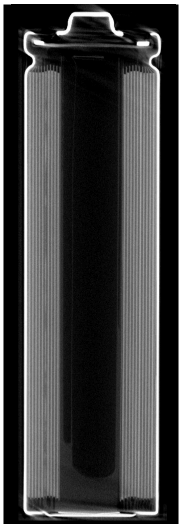


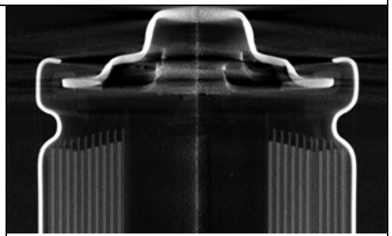
Brand Name	Benkia
Label Letter	**A**
Listed Capacity (mAh)	9900
Measured Capacity (mAh)*	1259
Cell measured	A112
Median # of cathodes in cross-section	20
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.704
Anode Overhang, Per-cell Maximum	0.892
Anode Overhang, Per-cell Minimum	0.424
Alignment, Cathode to Cathode	0.392
Alignment, Anode to Anode	0.269
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.690
Anode Overhang, Per-cell Maximum	0.893
Anode Overhang, Per-cell Minimum	0.479
Alignment, Cathode to Cathode	0.472
Alignment, Anode to Anode	0.321

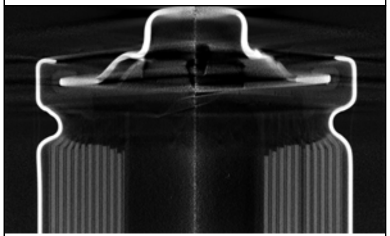
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.

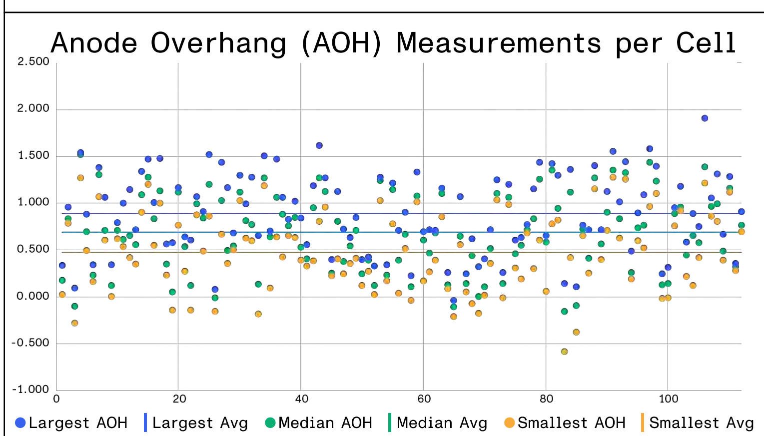


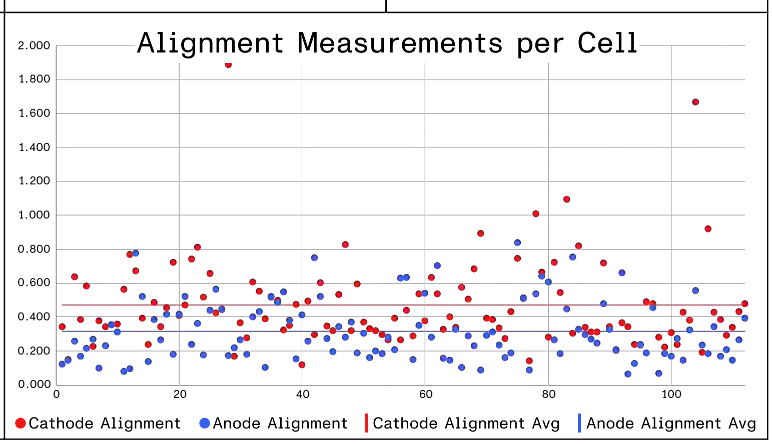



Benkia Cell A112
60 minute scan


Cell A062
Median AOH representative


Cell A083
Minimum AOH representative

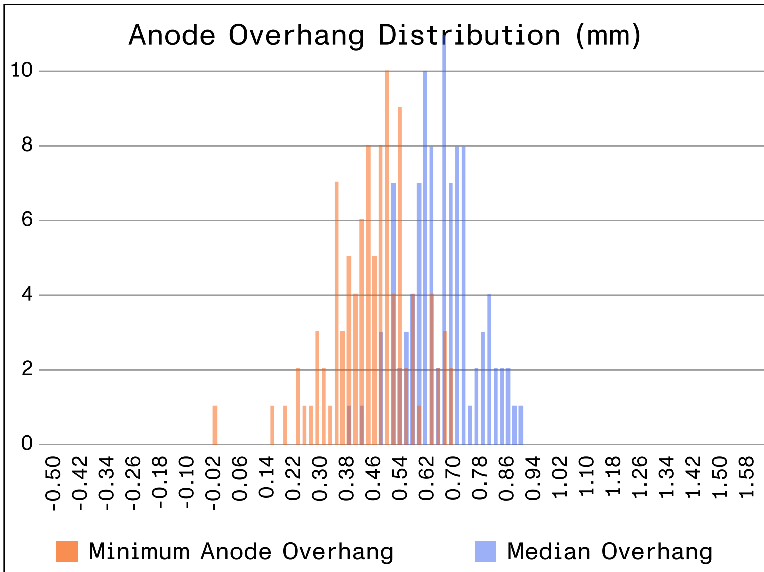


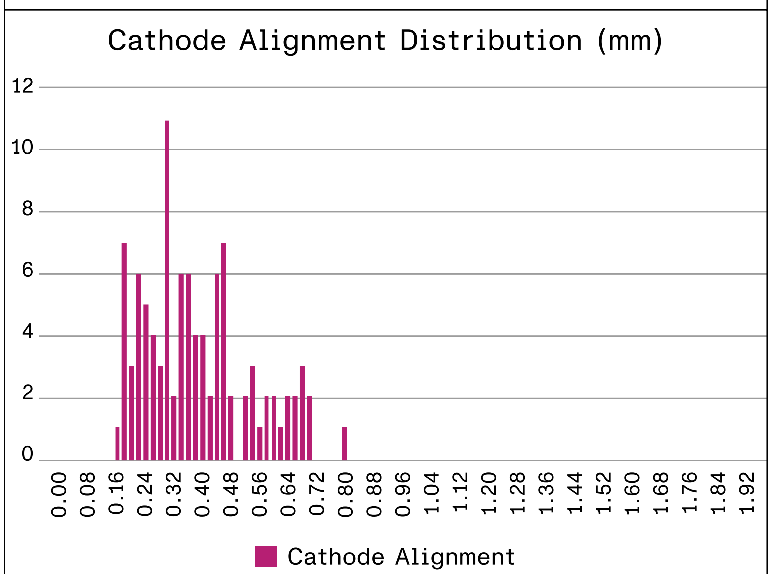


SOOCOOL 18650 Cell Quality Overview

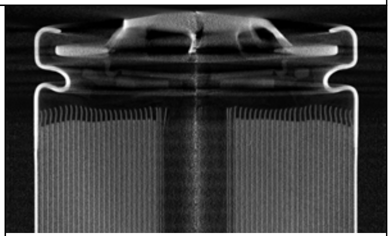
Brand Name	SOOCOOL
Label Letter	**Q**
Listed Capacity (mAh)	3000
Measured Capacity (mAh)*	2595
Cell measured	Q100
Median # of cathodes in cross-section	51
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.664
Anode Overhang, Per-cell Maximum	0.820
Anode Overhang, Per-cell Minimum	0.480
Alignment, Cathode to Cathode	0.350
Alignment, Anode to Anode	0.372
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.657
Anode Overhang, Per-cell Maximum	0.826
Anode Overhang, Per-cell Minimum	0.461
Alignment, Cathode to Cathode	0.379
Alignment, Anode to Anode	0.393

*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.

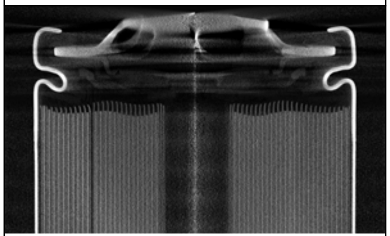




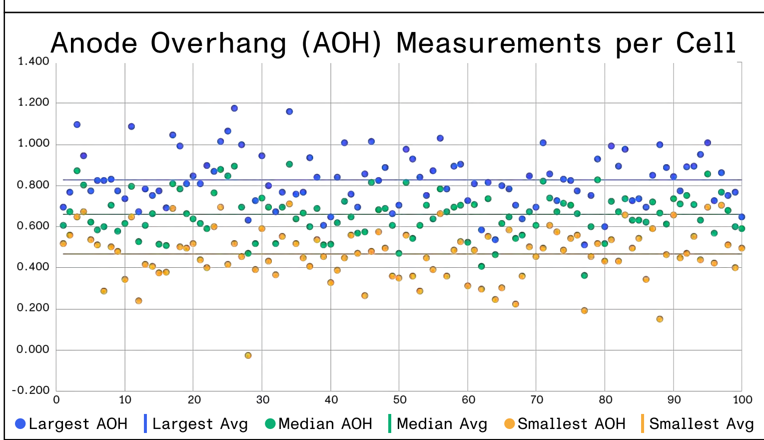
SOOCOOL Cell Q100
60 minute scan

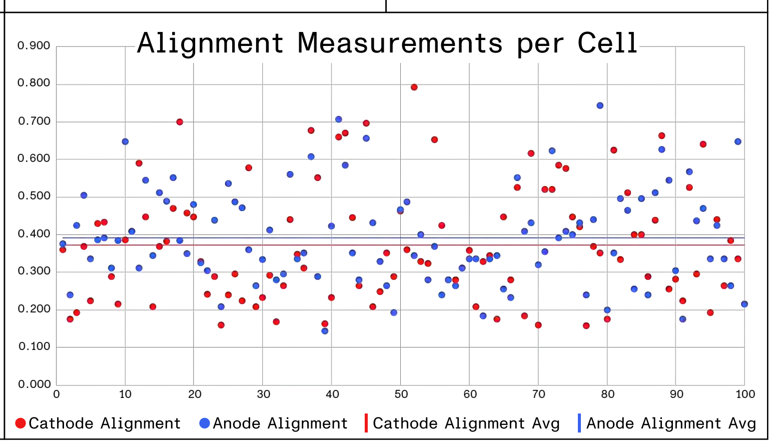


Cell Q019
Median AOH representative



Cell Q028
Minimum AOH representative

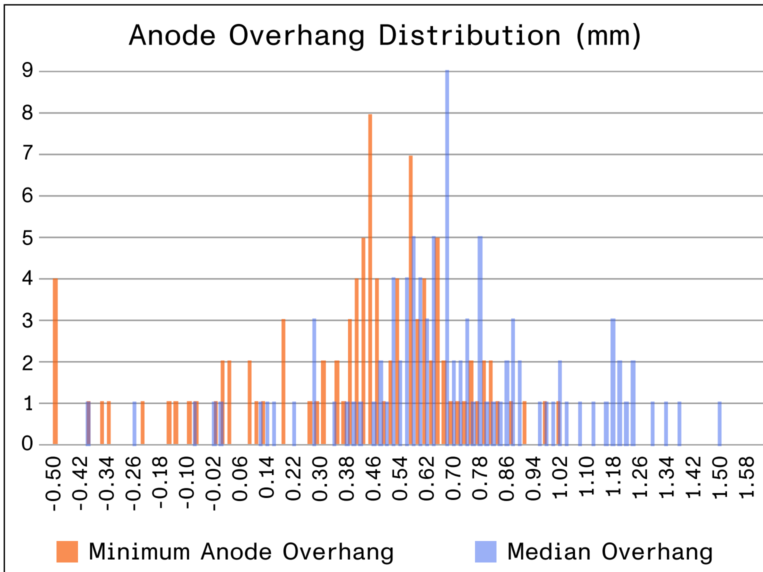


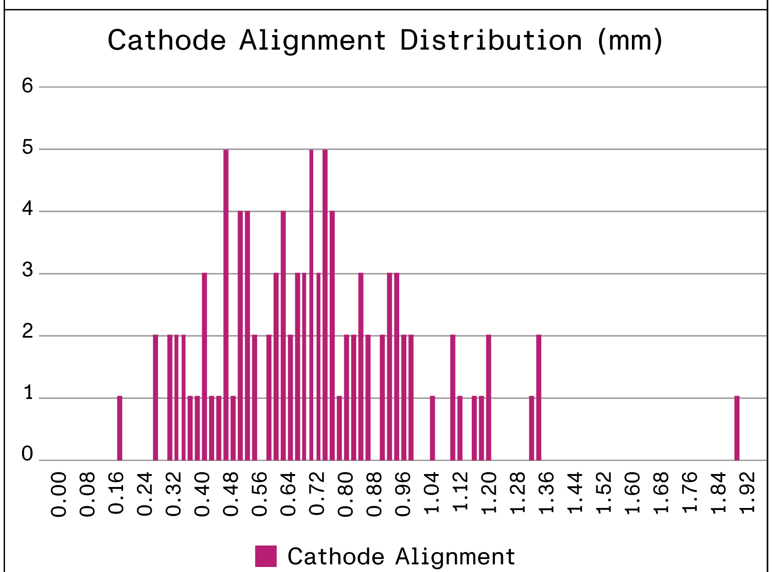


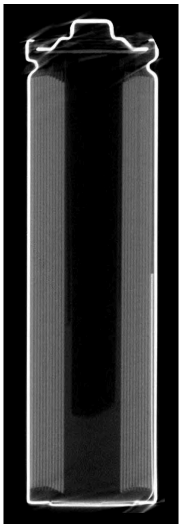
Maxiaeon 18650 Cell Quality Overview

Brand Name	Maxiaeon
Label Letter	**X**
Listed Capacity (mAh)	9900
Measured Capacity (mAh)*	1214
Cell measured	X099
Median # of cathodes in cross-section	20
Median Values for Dataset (mm)	
Anode Overhang, Per-Cell Median	0.664
Anode Overhang, Per-cell Maximum	1.072
Anode Overhang, Per-cell Minimum	0.440
Alignment, Cathode to Cathode	0.688
Alignment, Anode to Anode	0.209
Mean Values per Dataset (mm)	
Anode Overhang, Per-Cell Median	0.683
Anode Overhang, Per-cell Maximum	1.012
Anode Overhang, Per-cell Minimum	0.374
Alignment, Cathode to Cathode	0.693
Alignment, Anode to Anode	0.289

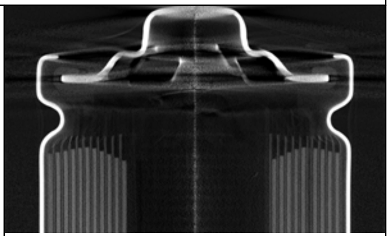
*Single cell charged to 4.2V at 0.2C, rested for 60 min, and discharged to 3.0V at 0.2C. Conservative discharge that would not extract maximum performance.



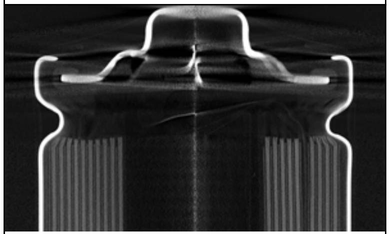




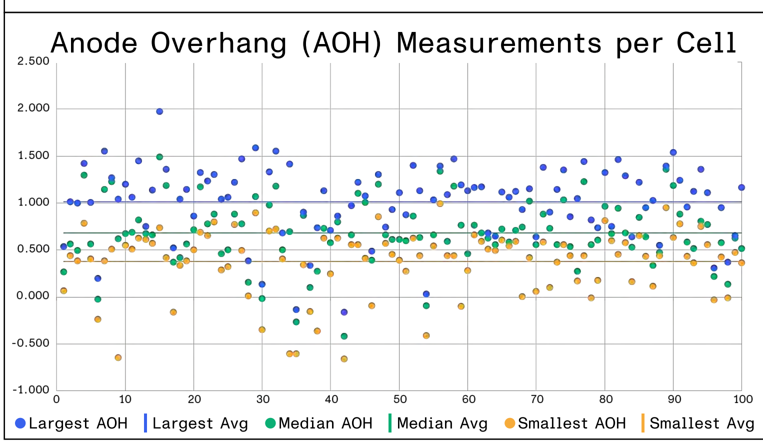
Maxiaeon Cell X100
60 minute scan

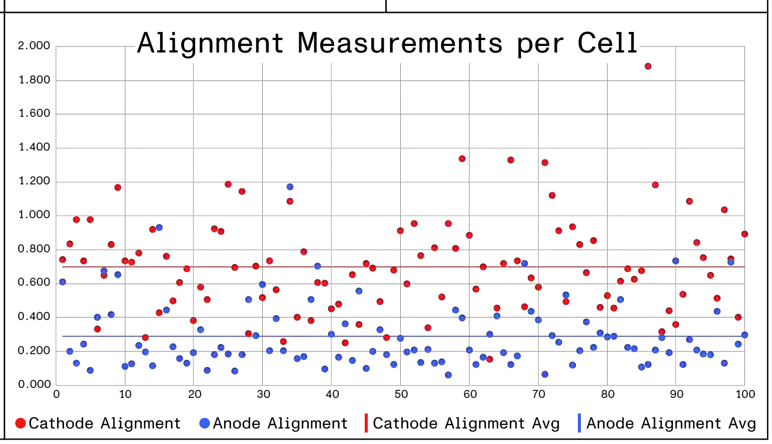


Cell X083
Median AOH representative



Cell X042
Minimum AOH representative





Implications and Recommendations

Our study identifies clear, measurable indicators of risk in non-OEM battery cells. Using industrial X-ray CT inspection allows us to visualize and measure anode overhang and electrode alignment issues that elevate the probability of poor performance and safety failures. However, what we present here only scratches the surface of the suspicious, risky nature of non-OEM batteries.

In a 2023 paper, authors Linxi Kong and Michael G. Pecht dove into the background of MXJO, a company that provides rewrapped 18650 cells strikingly similar to those we scanned. MXJO cells can still be purchased today, from several of the same sites where we bought the 18650 cells for our scan study. However, the authors discovered that the company was deregistered in 2019, and found no physical or financial evidence that MXJO ever had the capabilities to design, manufacture, or test batteries.[13] Despite being linked directly to several severe safety incidents, the mysterious cells from this shell company are still easily available to U.S. consumers.

Kong et al.'s investigation into a single shadow brand that still circulates in U.S. channels–and reputable channels, not inherently suspicious ones like Ali Express and Temu–points to a broader problem with supply chain management. We bought cells from seven non-OEM labels and could easily have added dozens more. Who makes these cells, where, and under what process controls? There is no accountability for these batteries of unknown provenance.

Battery manufacturers, device integrators, and consumers should keep in mind the dangers lurking in the battery market, taking steps wherever possible to protect themselves and their stakeholders.

Original Battery Manufacturers

Battery OEMs are already familiar with the importance of tight specifications and strong quality control. We see this reflected in the quality of the OEM 18650 cells we scanned. However, these manufacturers face risks downstream as they work to protect their brands and consumers.

Scrap is a critical starting point. Battery OEMs should quarantine scrap and make destruction irreversible, so that defective parts from the production line don't find their way into the rewrap market. Tracking scrap and verifying proper disposal is critical; if rejects can be rewrapped and resold, they will be.

Effective channel management is also essential. Manufacturers can audit authorized distribution partners for lot segregation, storage conditions, and documentation, set contracts that bar commingling or substitutions without written approval, and reserve inspection and stop-ship rights when handling or paperwork drifts. Periodic blind market buys can add an additional external check. If manufacturers are selling to rewrap brands, set clear standards for traceability of their supply chain, and set hard consequences for violations.

Another path for unsafe cells into the channel is through end-of-life devices. Good OEM cells may go into safe pack assemblies initially, but when the device gets scrapped, the pack can be separated and the loose cells resold as "new." Though battery manufacturers are not directly involved in that process, considering this grey market possibility in designing for traceability can help preserve brand separation and defensibility when issues with the cells arise in the future.

Device Integrators

Risk reduction for device manufacturers starts with validating supply. Carefully audit your suppliers, especially if sourcing from a manufacturer that may be less well-known or established or if buying cells through a distributor. Inspecting samples from each lot can also enable integrators to verify the quality reports provided by their suppliers. Though a failure or fire in a device may be caused by the battery, the device manufacturer's name will carry the headline, and verification is essential to reduce that exposure. Practical technologies are now available that empower device integrators to hold their supply chains accountable and audit quality immediately at the point of receipt. Rapid industrial X-ray CT inspection, the technology we leveraged to collect the data for this report, can be used to inspect incoming cells non-destructively and at scale, to ensure their contents match what the manufacturer expects. Considering the high costs that battery defects can incur, and the increasing accessibility of industrial CT, using CT has moved from a nice-to-have to a necessity for manufacturers.

Pack design is another important defense that can prevent a single fault from becoming a system event. Manufacturers should design in features and tolerances that add layers of safety and limit propagation, such as protective electronics and sufficient spacing between cells. Validation should show that a single-cell failure remains local and does not compromise enclosure integrity. Additionally, ensuring that cell and pack identity are still traceable after integration into a full assembly can help minimize the impact of potential incidents, helping companies localize and respond to issues in a fast and targeted fashion.

Designs that allow user-replaceable batteries have real sustainability benefits, yet the supply path needs guardrails. Use clear access to authorized cells, visible labeling, and straightforward guidance to steer customers toward known-good parts. Basic compatibility checks in the device can discourage unsafe substitutes without adding friction for legitimate service.

In many modern end-user devices, lithium-ion batteries are not user-replaceable, given how tightly the batteries may be integrated into the rest of the device. Making those batteries easier to swap is an essential way to extend product life and improve the sustainability of electronic devices. However, it does introduce a pathway for users to replace the battery with a cheap, unreliable source. Device integrators should provide customers with clear, convenient channels to purchase authorized cells, and reinforce in manuals and on-device prompts that replacements should come from official, qualified sources.

Consumers

All batteries carry some inherent level of danger. Unfortunately, supply chains and regulations are not optimally configured to minimize that risk. As a result, consumers must be vigilant to protect themselves. Warnings about the dangers of lithium-ion batteries are so pervasive that we can easily become desensitized to them, but there is no room for complacency with these materials.

Consumers should be mindful of basic battery best practices. It's critical not to mix cells of different brands, capacities, or ages, and to protect batteries from any kind of physical damage or extreme environmental exposure. Though disposing of batteries properly can be troublesome, it's ultimately less of an inconvenience than a battery fire could be.

It's also critical to be mindful of where you buy lithium-ion batteries. An OEM solution might seem overpriced and unnecessary when an alternative brand sells compatible cells with the same listed specs for less. However, the CT scans in this report have highlighted just how wide the discrepancy can be between OEMs and other sources, and a few dollars in savings isn't worth the likely performance impact and the safety risk.

Lastly, consumers should be alert to some of the common telltale signs of a battery undergoing a safety failure. Watch for unusual heat during or after charging, swelling or a soft "pillow" feel, hissing or popping sounds, a sharp chemical odor, discoloration, or any liquid residue. Sudden drops in capacity, repeated shutdowns, or a charger that refuses to start can also indicate internal damage. It's essential to properly dispose of these questionable batteries as quickly as possible.

CONCLUSION

Supply Chain Unknowns Create Real Risk

Though our 1,054 battery cells are barely a drop in the ocean of annual 18650 production, this unprecedented research dataset puts numbers to what most engineers already suspect about non-OEM 18650s. Defects like negative anode overhang and alignment misregistration meaningfully increase the risk of serious failures, and these scans clearly show that the probability of lithium-ion battery thermal events is not evenly distributed across suppliers and individual cells.

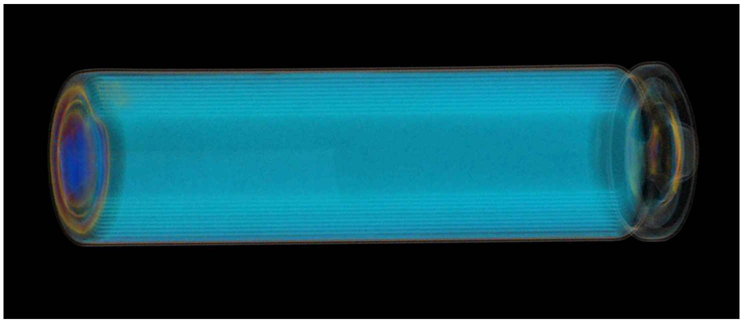
Most failures will not cause fires. They manifest as lost capacity, higher direct current internal resistance (DCIR), and early pack imbalance as weak cells drag down parallel mates. These failures have a real impact, kneecapping the performance of the devices they're powering. The small fraction that do result in ignition events are absolutely catastrophic. It's critical to strive to avoid both the common reliability failures and the rare disasters.

The great unknown here is provenance. In today's landscape of changing tariffs and trade disruptions, grey market workarounds are becoming increasingly appealing and sources are becoming more difficult to fully verify. In a high-volume, global market, unaccountable cells can slip into critical products, and rapid supply-chain reconfiguration in response to shifting trade barriers will magnify that risk in the near term.

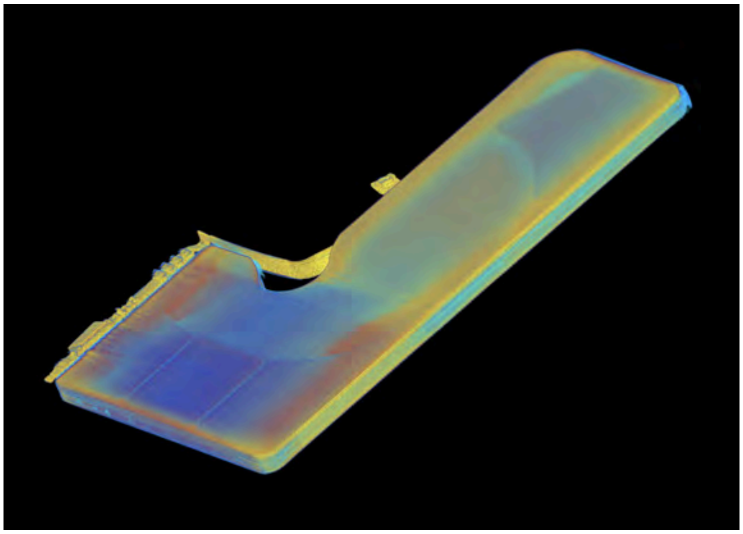
Each one of the 754 non-OEM 18650s we procured was a blind box until CT scanned, where we could identify some cells that matched closely with OEM performance, and reveal others that were wildly out of spec.

In the murkiness of the battery supply chain, X-ray CT technology is a powerful tool to verify that you're receiving what you've been sold. Industrial CT inspection can expose rewraps for what they really are, catch mixed lots, and reveal quality drift. And with faster-than-ever solutions like Lumafield's Triton, which can automatically scan cylindrical cells in under five seconds, manufacturers can inspect a higher percentage of their battery cells than ever before.

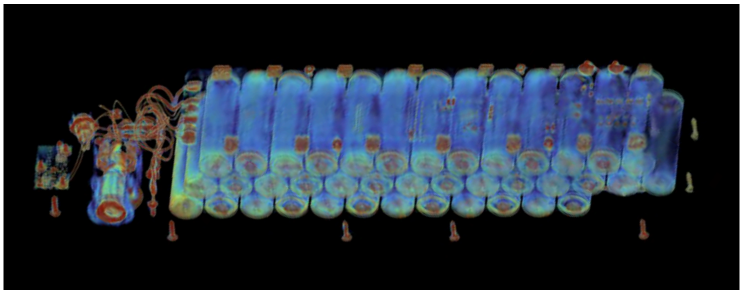
The results of the Lumafield Battery Quality Report expose the hazards of an uncontrolled battery supply chain. Ultimately everyone who interacts with batteries, from cell manufacturers and device integrators, to the consumers who rely on this technology every day, must take concrete steps to minimize these risks.



▲ A dented 18650 battery cell.



▲ A stacked lithium-ion battery for the iPhone XS.



▲ An e-bike battery composed of 39 18650 lithium-ion cells.

100 Batteries 10 from each brand

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