AnteoTech

Maximising high silicon anode performance

AABC US – Las Vegas

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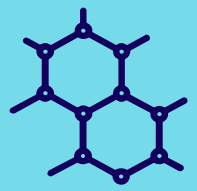
Product portfolio in silicon enabling technologies

Established and growing business

Publicly listed company (ASX:ADO)
- Chemical and materials business, manufacturing and scaling binding/cross-linking reagents into Life Science (Diagnostics) and Batteries
- Headquartered in Brisbane, Australia

Proprietary technology



Portfolio of Lithium-ion battery (LIB) technologies
- **Anteo X** – Cross-linker for high % silicon anodes
- **Anteo S** – Cross-linker for ceramic coated separators
- **Ultranode** – Ultra-high silicon content anode technology (70% - 95% silicon)

Innovating for the next generation of batteries

Deep expertise in battery formulations and formulation development
- Silicon anode designs of >20wt% silicon active material
- Performance optimisation of silicon anode designs
- Teaming up with novel cathode material suppliers
- Anteo X and Anteo S production facility with scale-up capacity

https://anteotech.com/

AnteoTech (ASX: ADO) Cutting Edge Technology in Batteries, Life Sciences and Beyond - YouTube

Leading in High Silicon Anode Technology

ANTEOX™

ADDITIVE "CROSS LINKER" – DROP IN CHEMICAL

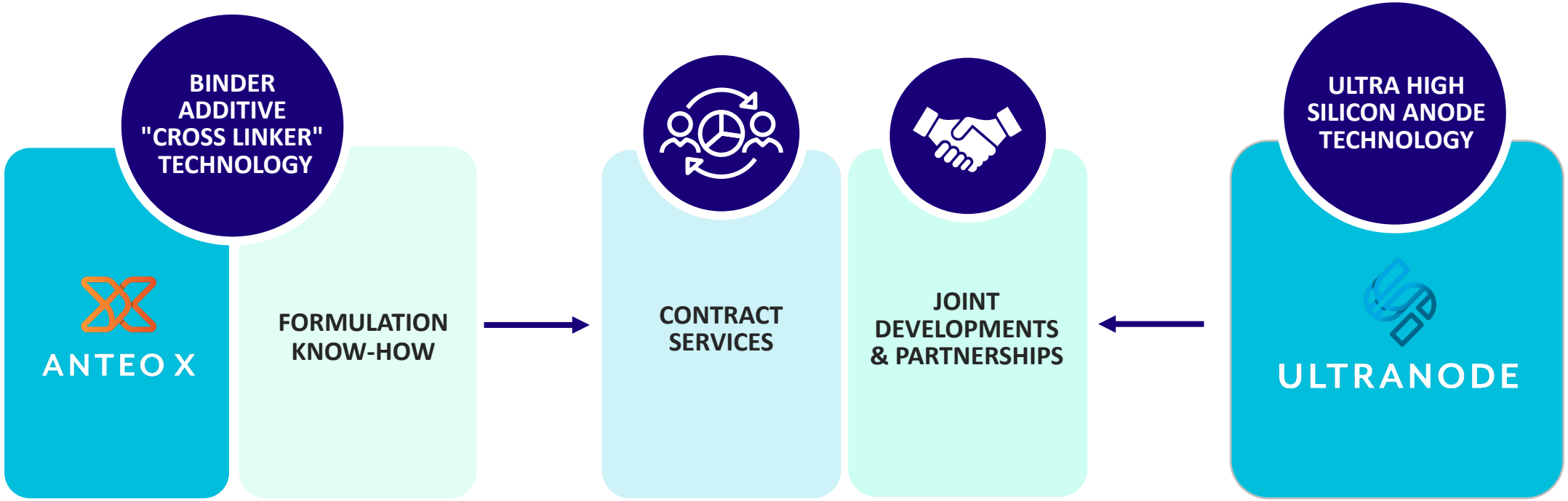
ULTRANODE™

ULTRA HIGH SILICON ANODE TECHNOLOGY FORMULATION

Technology Platforms & Commercial Engagement Frameworks

AnteoTech

Combining AnteoTech's silicon-enabling products and anode design know-how we create pathways to smaller, lighter and cheaper LiBs for our customers



Unique "cross-linker" product for high silicon anodes

Flexible commercial approach to partnering. Supporting the advancement of 'next generation' high silicon anode battery solutions

Tailored to meet a variety of anode design criteria. Available under development partnerships and licensing arrangements

Partnerships and Customer Relationships currently in progress

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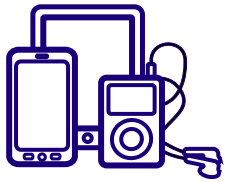
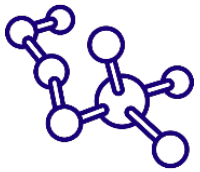
Our partnerships span the value chain from advanced materials to application OEMs

3C Battery Manufacturer



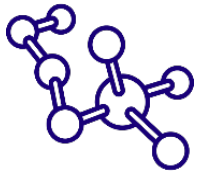
Automotive OEM

Global Speciality Chemical Company



WYON
SWISS BATTERIES

BLACK DIAMOND STRUCTURES™



Separator Coatings

Defence battery manufacturer

Anteo X™ – A "Cross-Linking" Chemical Additive

Supports sustained anode performance by providing structural integrity

Sustainable and Versatile

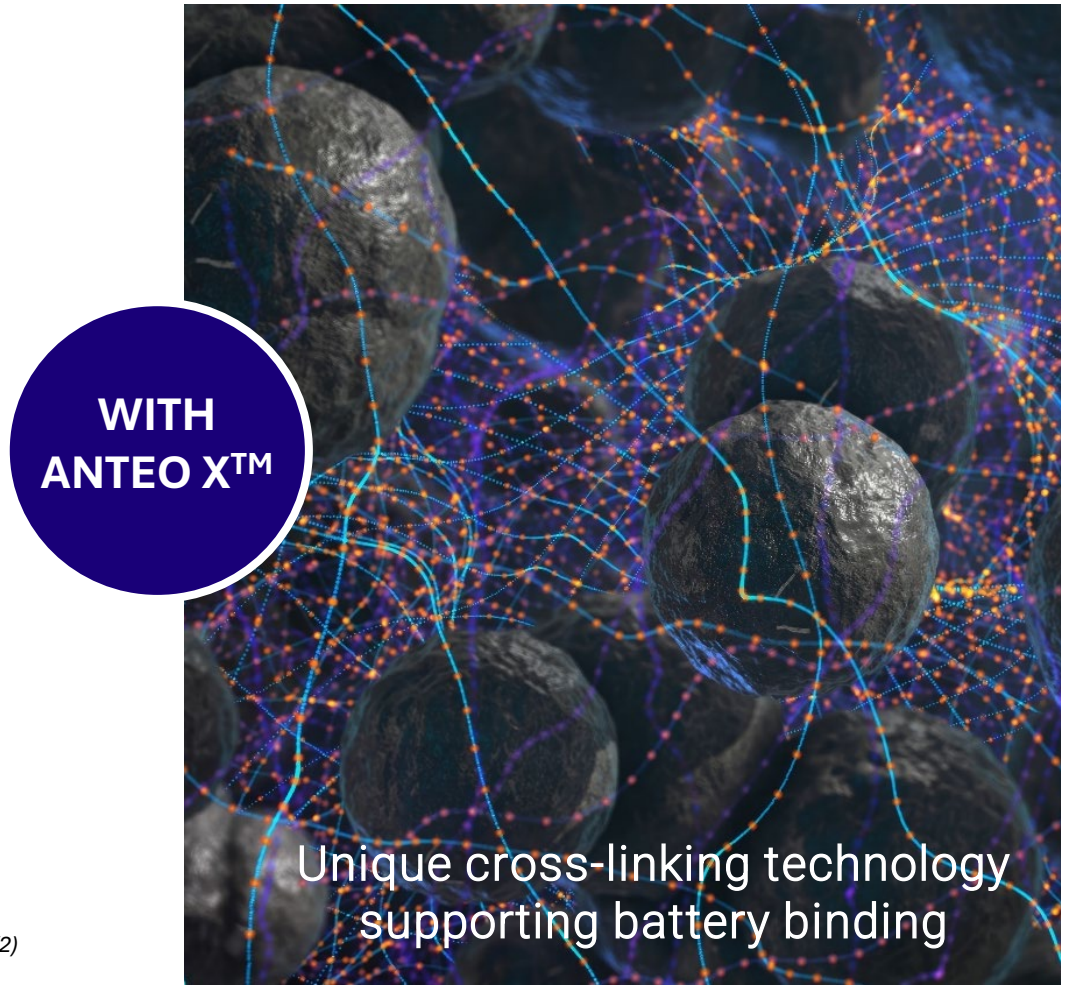
- Water-based and PFAS-free
- Compatible with a wide range of binders
- Easily integrated into existing manufacturing processes

Delivering Improved Performance

- Improved cycle life by more than 35% [1]
- Reduced expansion by up to 40% [2]
- Increased capacity retention by up to 5% [3]

Improving Cost Efficiency

- Reduction in CNT content by 50% [1]
- Reduction in binder content by more than 2wt% [3]



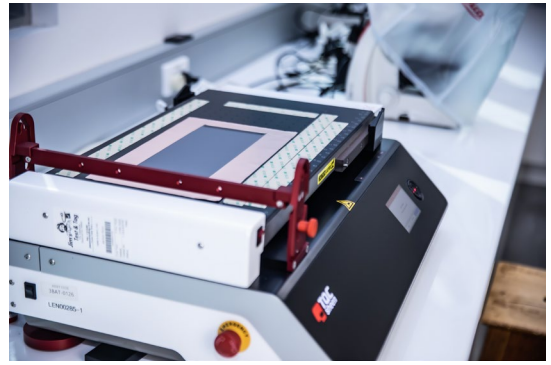
[1] Demonstrated in AnteoTech's proprietary Ultranode™ design at cycle 100 at cycling capacity of 1,300mAh/g (C/2)
[2] Demonstrated by external party in 80% SiO_x anode for eVTOL applications
[3] Demonstrated in full coin cells with a 20% Si/C containing anode at 80% of original anode coating capacity

Supporting Services in silicon anode formulation development

Deep experience and capabilities in silicon anode development and designs

Optimising the inactive material fraction matters

- Performance improvements and cost advantages
- Ever-growing number of design and material choices
- Optimising can be time consuming and expensive

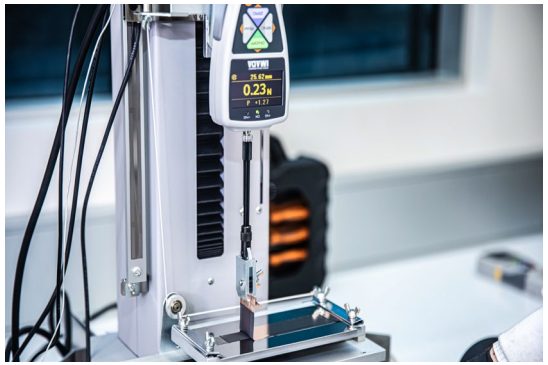


Partnering to accelerate development timeframes

- Established team and expertise to immediately tap into
- Extensive testing data sets and experience base across materials
- Accelerated screening of formulations
- Independent assessments

In-house capabilities

- ~250m^2 R&D laboratory space
- Powder processing and slurry fabrication
- Electrode coating and cell assembly
- Full cell, half cell, CV, EIS and DCIR
- Capacity for 1,000 test channels



Step 1 - Formulation Screening – 600mAh/g with Si/C and Gr

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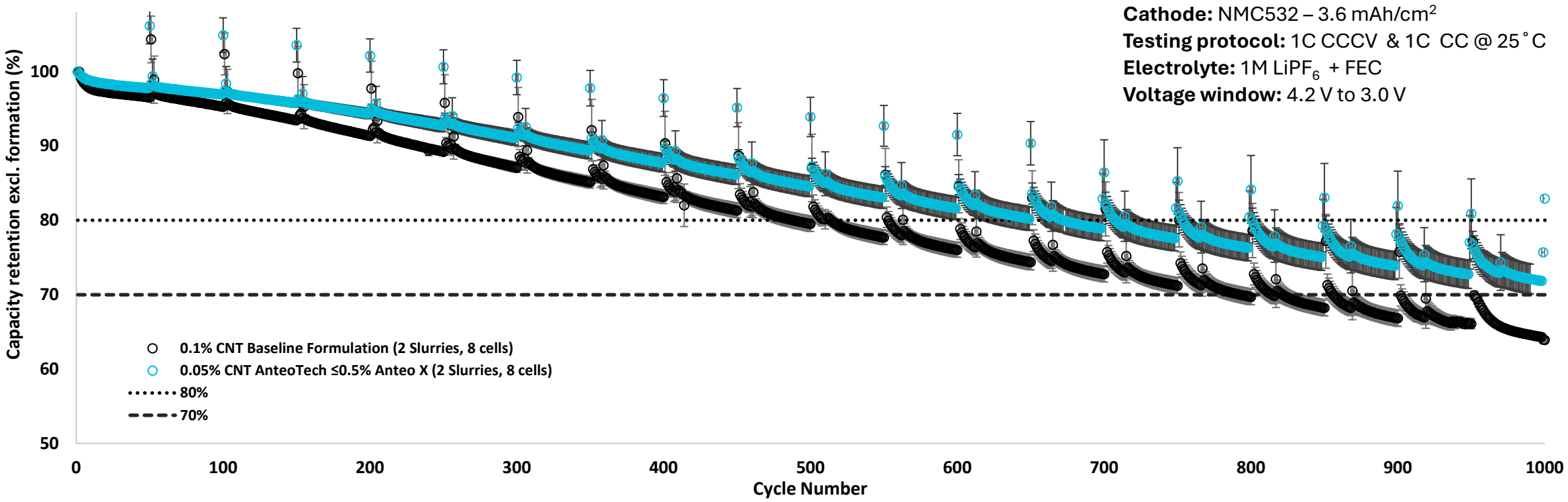
Potential cost savings by optimising the inactive material fraction of the anode



	Formation cycle discharge capacity @C/20 (mAh/g)	1st cycle discharge capacity @1C (mAh/g)	Initial coulombic efficiency (%)	Cycle number at 80% capacity retention (excl. formation)	Cycle number at 70% capacity retention (excl. formation)	Final capacity at cycle 1,000 (mAh/g)
Baseline Formulation	603	467	84.68	489	793	287
0.05wt.% CNT ≤0.5wt.% Anteo X	603	474	86.00	**674**	**>1000 (@71.85%)**	340
Improvement	-	8	1.32	**185 (38% increase)**	**>207 (>26% increase)**	53

Step 2 – Single-layer or Multi-layer Pouch Cells

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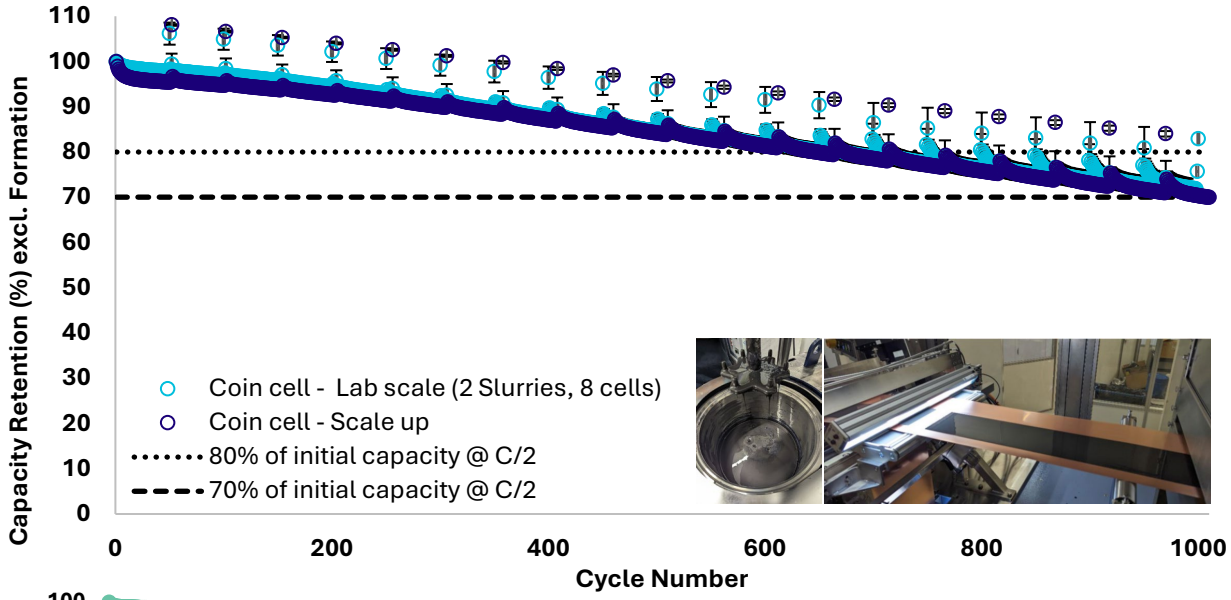
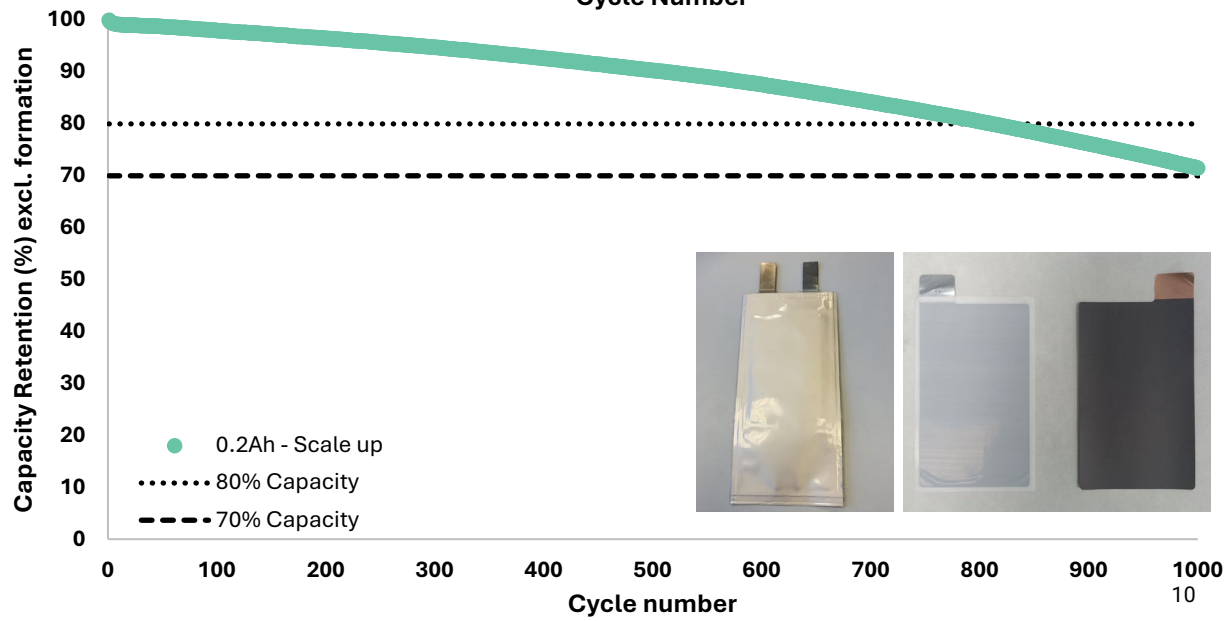
Lab-scale produced electrodes vs. R2R coated electrodes

- Full coin cells produced from A4 hand sheet coatings almost perfectly match results produced from R2R coated anode formulation
- **Coin cell (A4 hand sheets):** 673 cycles @ 80%
- **Coin cells (R2R coated):** 653 cycles @ 80%



Full coin cells vs. Single Layer Pouch Cells

- The R2R coated anode formulation tested in 0.2Ah SLP cells showed a 17% improvement in capacity retention when compared against coin cell data
- Results from full coin cell to SLP cells showed excellent scalability
- **0.2Ah SLPs (R2R coated):** 820 cycles @ 80%



Anteo S cross links binder polymers used in ceramic coated separator (CCS) coatings

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Improves ceramic coated separator stability by keeping dimensional stability of separator for longer and/or at higher temperatures

Forms a **cross-linked particle-polymer** network by artificially increasing the molecular weight of the binder resulting in a more robust and stable ceramic coating

Potential to reduce ceramic coating thickness while maintaining adequate **stability of the ceramic coating layer** allowing for **increased Wh** of the cell

Potential for cost savings by minimising coating thickness and inactive materials (Al_2O_3, Boehmite, Binders) required for thermal stability

Anteo S performance has been verified by a third-party ceramic coating material manufacturer

Impact on slurry rheology

No significant change on slurry rheology observed upon integration of Anteo S in standard slurry compositions[1]

Gurley value test

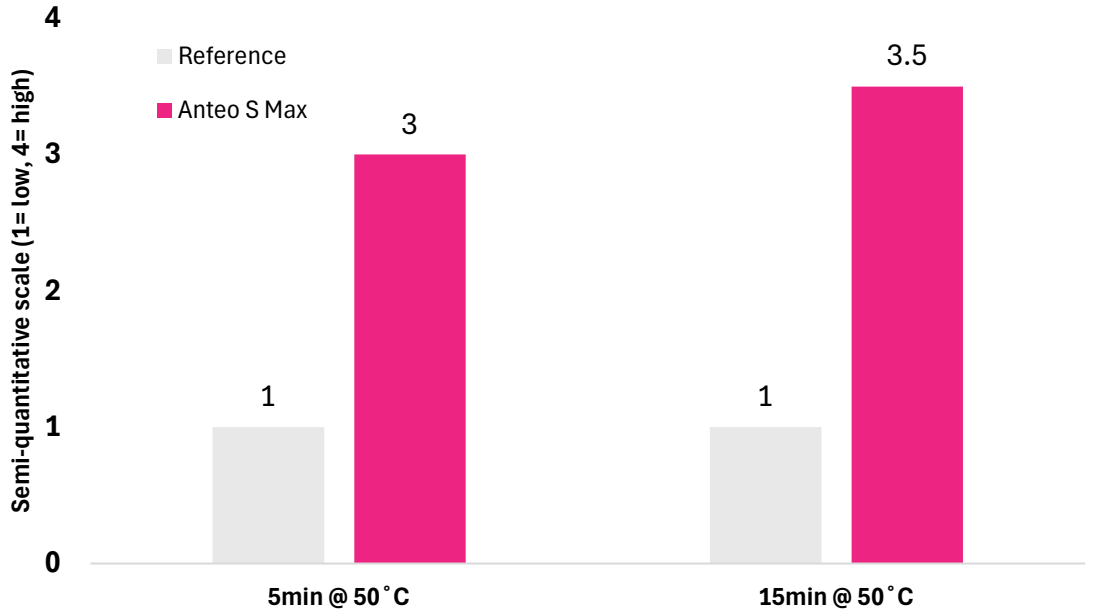
Gurley value not impacted by Anteo S integration into ceramic coating layer

Thermal stress test

- **Separator type:** PE
- **Maxium drying temperature tested:** 50 ˚C
- **Drying condition:** RT vs. 5min@50˚C vs. 15min@50˚C
- **Ceramic coating layer thickness:** ~2 µm
- **Measurement:** Dimensional stability (% shrinkage)
- **Acceptance criteria:** 2 out 3 samples <5% shrinkage

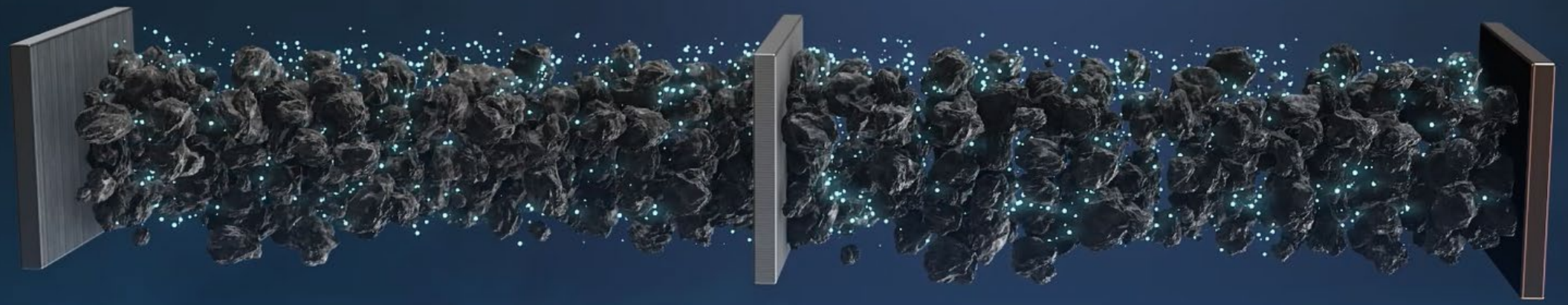
Thermal stability test

Anteo S : Improved thermal stability of separator after drying of coating film at 5min@50˚C and further improves upon drying for 15min @50˚C



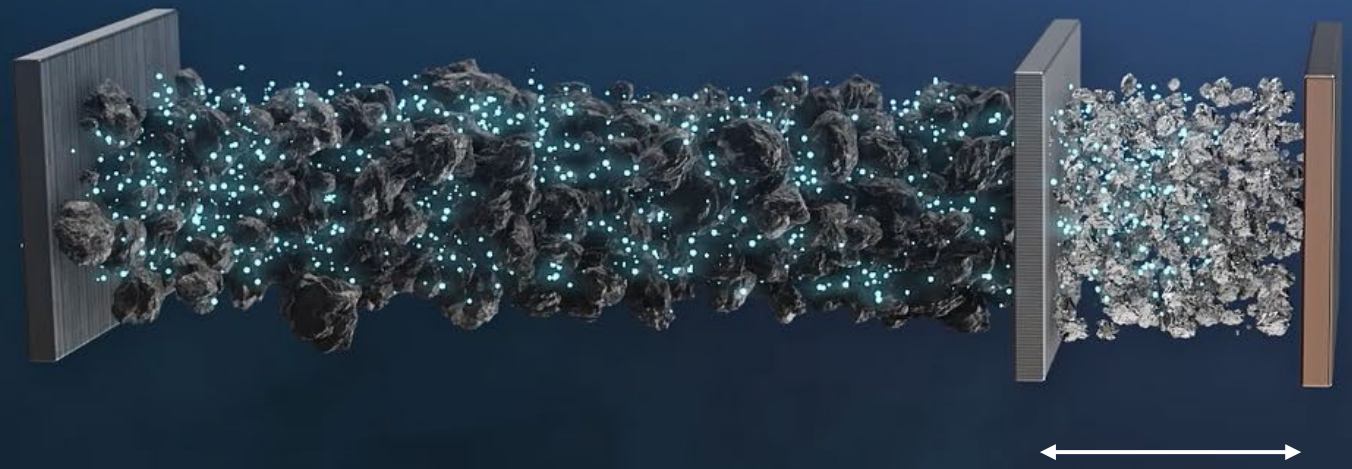
Note: (1) Measured after slurry fabrication; Reference: No. samples tested 14, avg. dry-film thickness (µm) 1.893; Anteo S: No. samples tested 26, avg. dry-film thickness (µm) 2.019

Ultranode™ – Concept



CONVENTIONAL GRAPHITE ANODE

ANODE THICKNESS – GRAPHITE ANODE



ANTEOTECH ANODE TECHNOLOGY

ULTRANODE™

ULTRANODE ™

- 70-95% silicon active material
- Crude micron-sized elemental silicon particles
- Available up to tonne-scale in every geography

Our Competitive Advantage in Silicon Anode Technology

Up to 95% silicon delivers high energy and high performance

Specific anode coating capacities that deliver **up to 2,400 mAh/g**

Highly customizable

Ultranode™ design can be heavily customized without redesigning the active material properties

Cost effective (up to 80% cheaper active material powder compared to adv. Si/C)

Ultranode™ 95 - up to 50% cheaper ($/m^2) compared to same anode specification made from adv. Si/C *1

Sustainability

Up to 80% reduction in kg CO_2e/m^2 of anode compared to artificial graphite*2

Supply chain security

AnteoTech's anode material is sourced from suppliers at tonne-scale in US, EU, KR, AU and others

Uses conventional manufacturing processes

Ultranode™uses conventional slurry-based anode manufacturing process -> no new CAPEX required

*1 Up to 5x cheaper Si active material powder compared to adv. Si/C materials
*1 Based on electrodes with equivalent area capacities, Si active material content and anode formulation
*2 CO_2e/m^2 values vary with source of active materials and electricity grid mix but can be as low as 3.1 kg CO_2e/kg mSi

Ultranode™ is Highly Customisable by Application

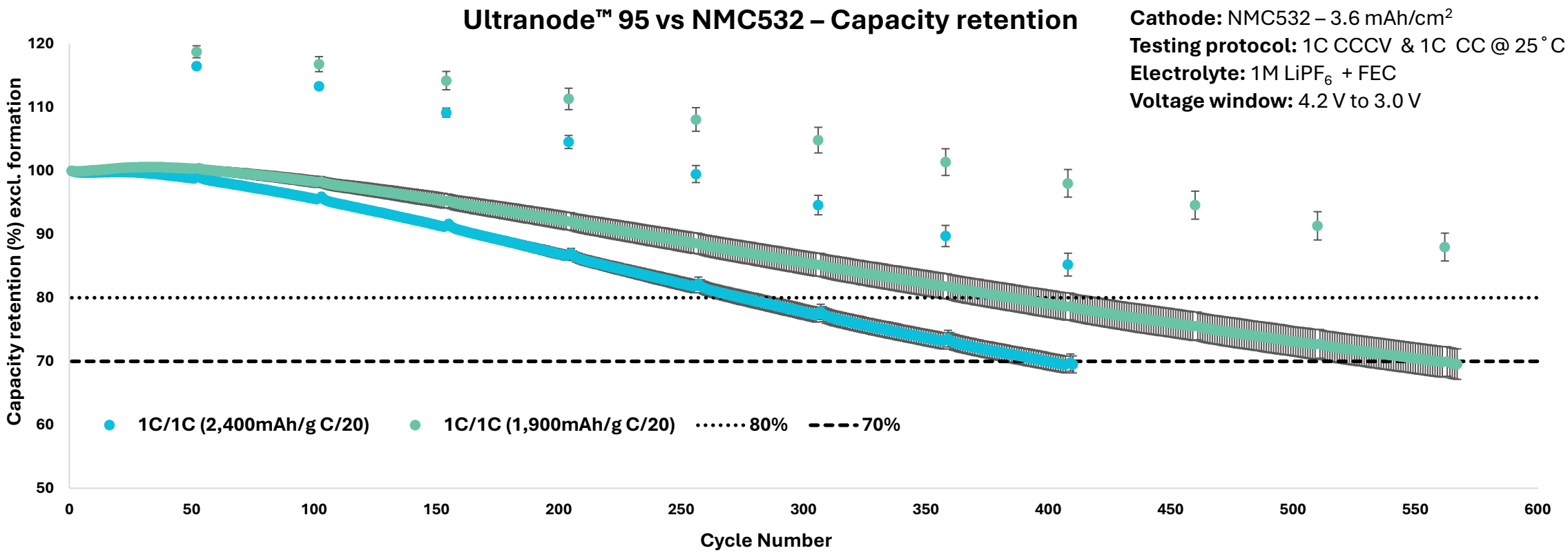
	Ultranode™ 95	Ultranode™ 70	Ultranode™ X

Target Applications	• **Highest energy with lower cycle-life requirements targeting**
	  • Unmanned Aerial Systems
	  • Drones
		• **Balanced energy density with cycle life targeting**
		  • 3C markets and Wearables
		  • 2-3 Wheelers & Micro-mobility
			• Maximised cycle life for **high-energy, high-cycle life** applications targeting
			  • Electric Vehicles
			  • eVTOLs

Engagement pathway	• Ultranode™ + Cathode sample packs • JDA's for cell development	• Ultranode™ + Cathode sample packs • R2R coated Ultranode 70 orders	• Technology partnerships • JDAs for customization, technology transfer and licensing
Performance Characteristics	• High-capacity anode coatings of **1,800 - 2,400 mAh/g** @C/20 • Cycle life of up **to 380 cycles at 80% capacity retention** (subject to cathode chemistry employed)	• Medium-capacity anode coatings of **600 - 1,200 mAh/g** • Intermediate cycle life of **up to 670 cycles at 80% capacity retention**	• **>1,000 cycles at 80%** capacity retention • Coating capacities of **850 - 1,100 mAh/g at C/20** • High **first-cycle efficiencies of >90%** • Customisation is driven by customer and partner specifications.

Ultranode™ 95 vs NMC532

Delivers specific coating capacities of in between 1,800 to 2,400 mAh/g



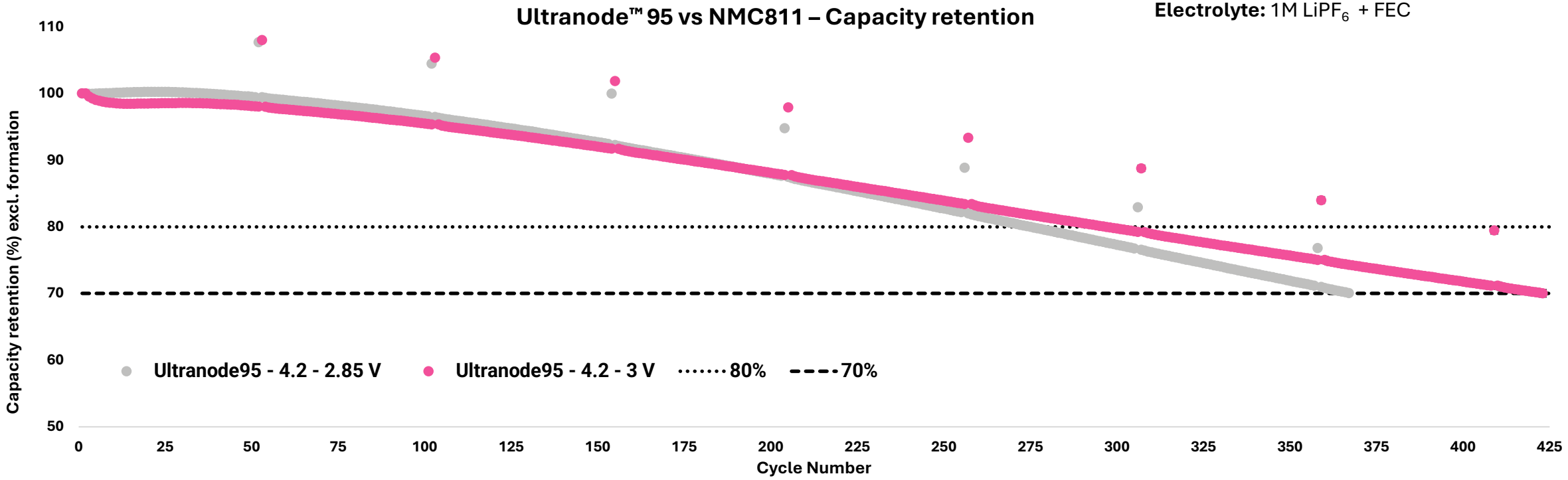
Cathode: NMC532 – 3.6 mAh/cm^2
Testing protocol: 1C CCCV & 1C CC @ 25˚C
Electrolyte: 1M $LiPF_6$ + FEC
Voltage window: 4.2 V to 3.0 V

Ultranode™ 95	Formation cycle discharge capacity @C/20 (mAh/g)	1st cycle discharge capacity @C/5 (mAh/g)	1st cycle discharge capacity @1C (mAh/g)	Initial coulombic efficiency (%)	Cycle number at 80% capacity retention (excl. formation)	Cycle number at 70% capacity retention (excl. formation)
Ultranode 95	2,391	2,087	1,791	90.2	**280**	**411**
Ultranode 95	1,900	1,573	1,344	89.9	**393**	**568**

Ultranode™ 95 vs NMC811

Delivers specific coating capacities of >1,700 mAh/g @ 1C

Cathode: NMC811 – 3.7 mAh/cm^2
Testing protocol: 1C CCCV & 1C CC @ 25˚C
Electrolyte: 1M $LiPF_6$ + FEC



Ultranode™ 95	Formation cycle discharge capacity @C/20 (mAh/g)	1st cycle discharge capacity @C/5 (mAh/g)	1st cycle discharge capacity @1C (mAh/g)	Initial coulombic efficiency (%)	Cycle number at 80% capacity retention (excl. formation)	Cycle number at 70% capacity retention (excl. formation)
Ultranode 95 (4.2 V – 2.85 V)	2,028	1,874	1,733	88.8	**275**	**367**
Ultranode 95 (4.2 V – 3 V)	2,063	N/A	1,637	88.9	**296**	**423**

Ultranode™ 95 - Potential for superior Wh/kg

Unit stack level analysis based on tested cells

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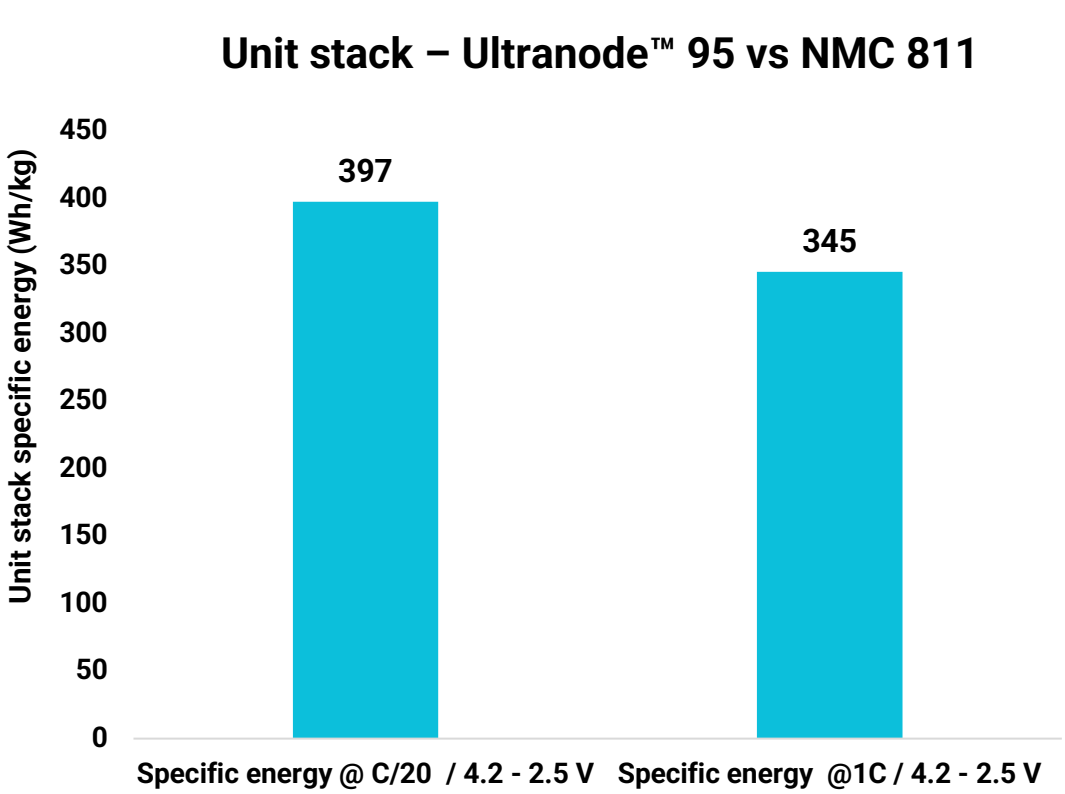
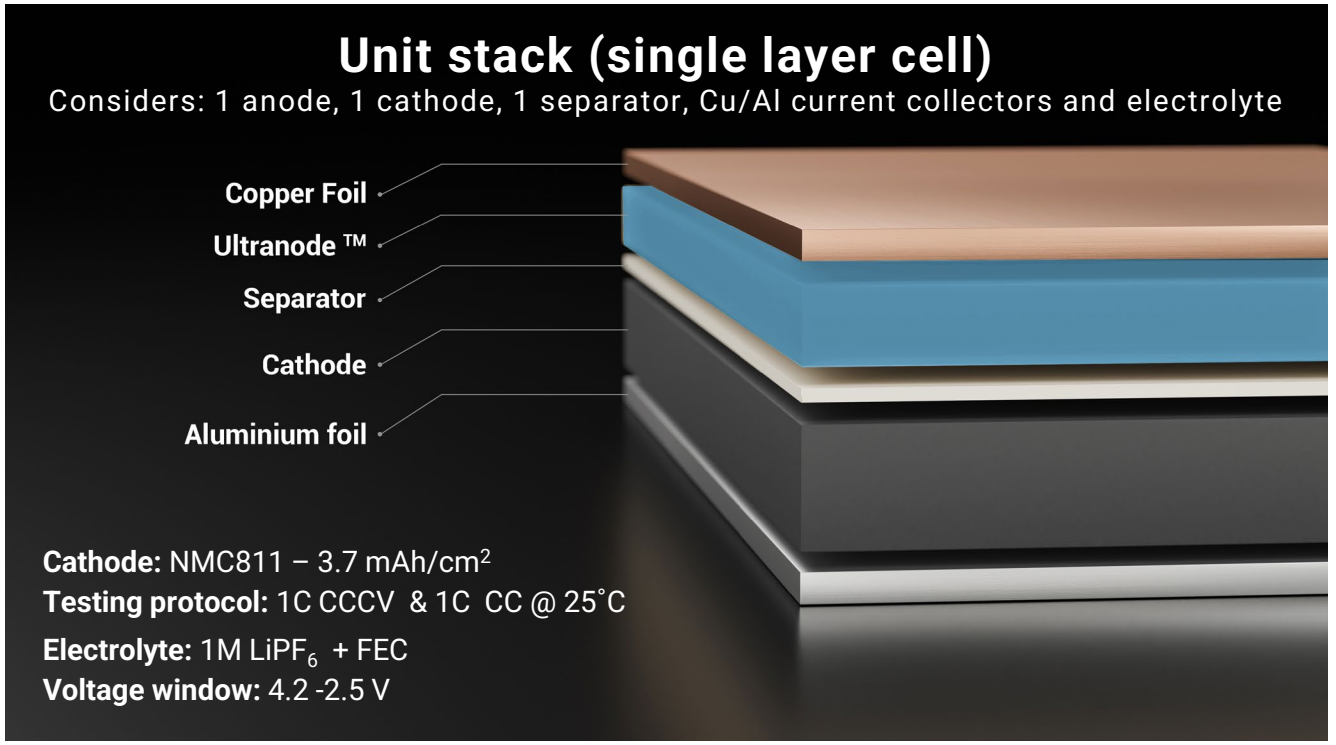




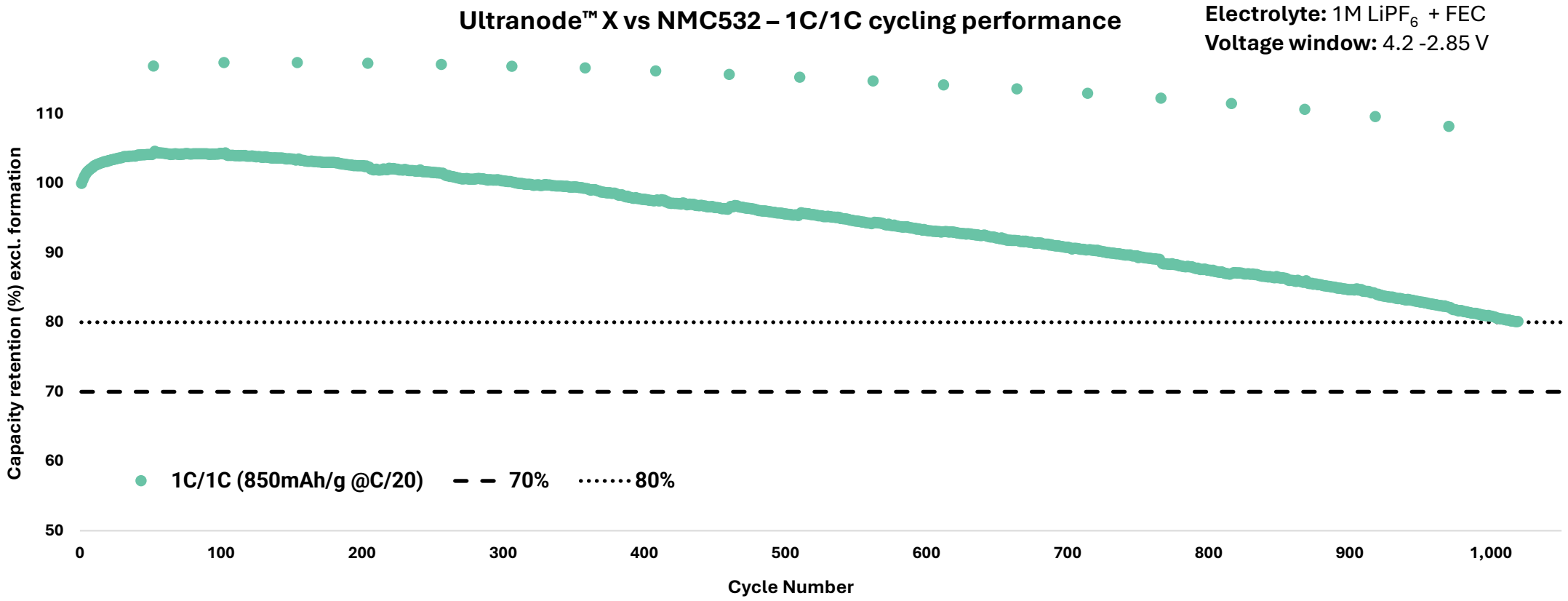
Note: Specific energy does not consider packaging, tabbing etc.

Ultranode™ 95	Formation cycle discharge capacity @C/20 (mAh/g)	1st cycle discharge capacity @1C (mAh/g)	Initial coulombic efficiency (%)	Specific energy of chemical stack @/20 (Wh/kg)	Specific energy of chemical stack @/1C (Wh/kg)
Ultranode 95 - 2,000mAh/g	2,025	1,841	89.1	397	345

Ultranode™ X achieves >1,000 cycles at 80% capacity retention

Further improvements target 1,500 cycles at 80%

Cathode: NMC532 – 3.6 mAh/cm^2
Testing protocol: 1C CCCV & 1C CC at 25˚C
Electrolyte: 1M $LiPF_6$ + FEC
Voltage window: 4.2 -2.85 V



Ultranode™ X with 70% silicon	Formation cycle discharge capacity at C/20 (mAh/g)	1st cycle discharge capacity at 1C (mAh/g)	Initial coulombic efficiency (%)	Cycle number at 80% capacity retention (excl. formation)
Ultranode X (4.2 – 2.85V)	856	601	89.69	**1,020**

Ultranode Technology Roadmap

Different pathways for different applications to meet customer requirements

	1. Customer evaluations	2. Formulation scale-up	3. Cell prototyping (internal)	4. Progressing commercial engagement
Ultranode™ 95	**In progress** Multi evaluations	**In progress**	**In progress** SLP -> MLP -> 18650	**Planned for 2026** Ultranode/Cathode sample packs with matched electrode pairs
Ultranode™ 70	**In progress** Multi evaluations	✓	**Planned for 2026** SLP -> MLP	**Planned for 2026** Ultranode/Cathode sample packs with matched electrode pairs
Ultranode™ X	✓ Achieved first prototype sales	✓	**Planned for 2026** Continuous optimisation with new milestones targeting 1,500 cycles at 80%	**Partnerships/JDAs** Bespoke cell developments under partnership arrangement

Our Products, Technologies and What we can Deliver

Leading in silicon anode technology

ANTEO X™ | **ANTEO S**

- **Anteo X** cross-linking additive that can improve silicon anode performance
- **Anteo S** additive for ceramic coated separators improving cost and safety
- "Jump start" Implementation support - Sample plus service package
- +20,000L existing production capacity

ULTRANODE™

- **Ultranode** is an integrated silicon anode technology
- Highly customisable for Maximum Capacity or Maximum Cycle Life
- Cost effective silicon material sourced from established supply chains
- Range of commercial partnering opportunities

FORMULATION SERVICES

- Can rapidly deliver into customer's formulation design
- Independent advice on silicon active materials
- Flexible service packages with clear pricing structures

AnteoTech

THANK YOU

Contact us for samples or partnership opportunities!

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