NANOGRAF CORPORATION

PREPARED FOR SPACE POWER CONFERENCE 2023

4.27.23

COMPANY OVERVIEW



Advanced Silicon Anode Technology

Proprietary SiOx Blend Enables World-leading Energy Density

State-of-the-Art Performance | Scalable and Low-cost | Drop-in Manufacturing



Premium Market Design Win

Supplying & Enabling World's Most Energy Dense Cell

NanoGraf-Branded 18650 Cell | Mass Production in 2023 | Performance Validated by End Customers

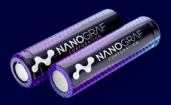


Raised $65M Series B to Scale Silicon Anode Material

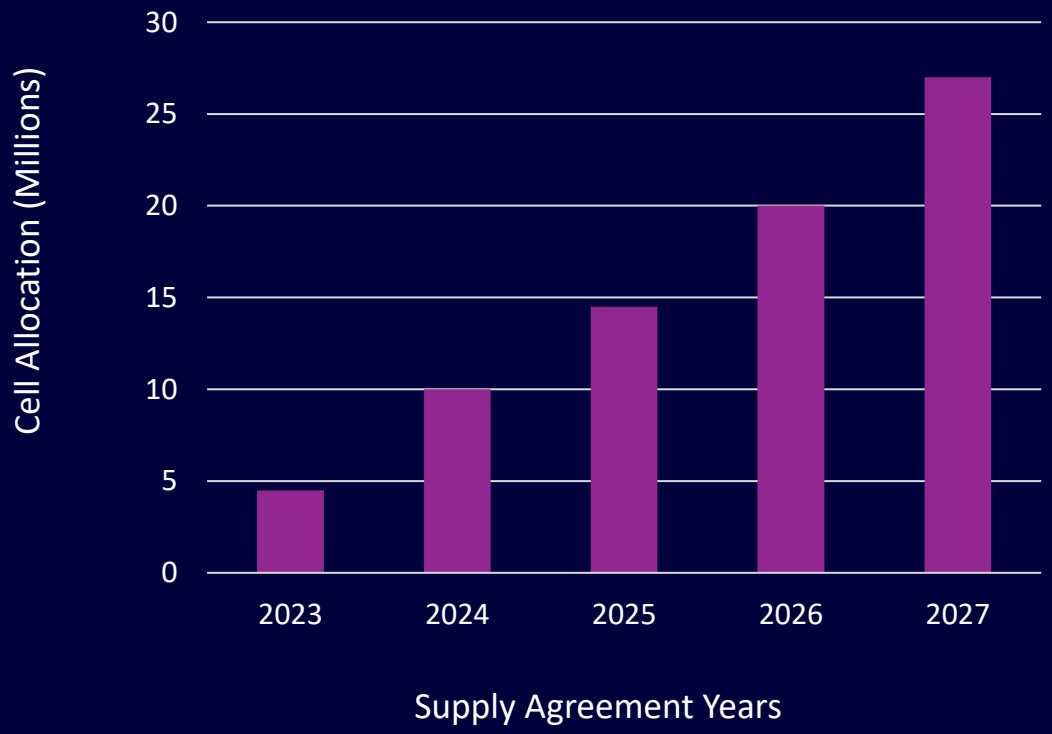
Agreement in Place with Top Cell Manufacturer to Supply High-Performance Cells

MOU Signed for North American Gigafactory | Bipartisan Momentum for North American Batteries

SECURED PRODUCTION & SUPPLY



CELL ALLOCATION ROADMAP



KEY TAKEAWAYS

- Formal Supply and Collaboration Agreement Signed
- Secured Ramped Cell Allocation (2023-2027)
- Solidified Cell Pricing for the 3.8Ah 18650 Cell
- Agreement to Partner on R&D (e.g., JDA)

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3.8 AH 18650 CELL CHARACTERISTICS

Enabled by NanoGraf G6 Si Anode Material

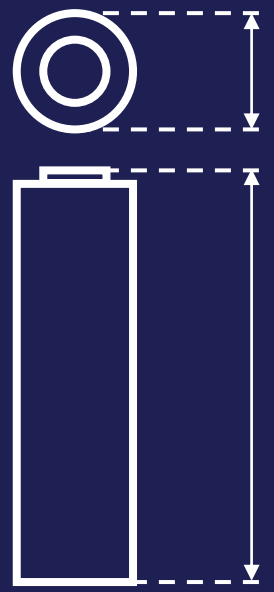
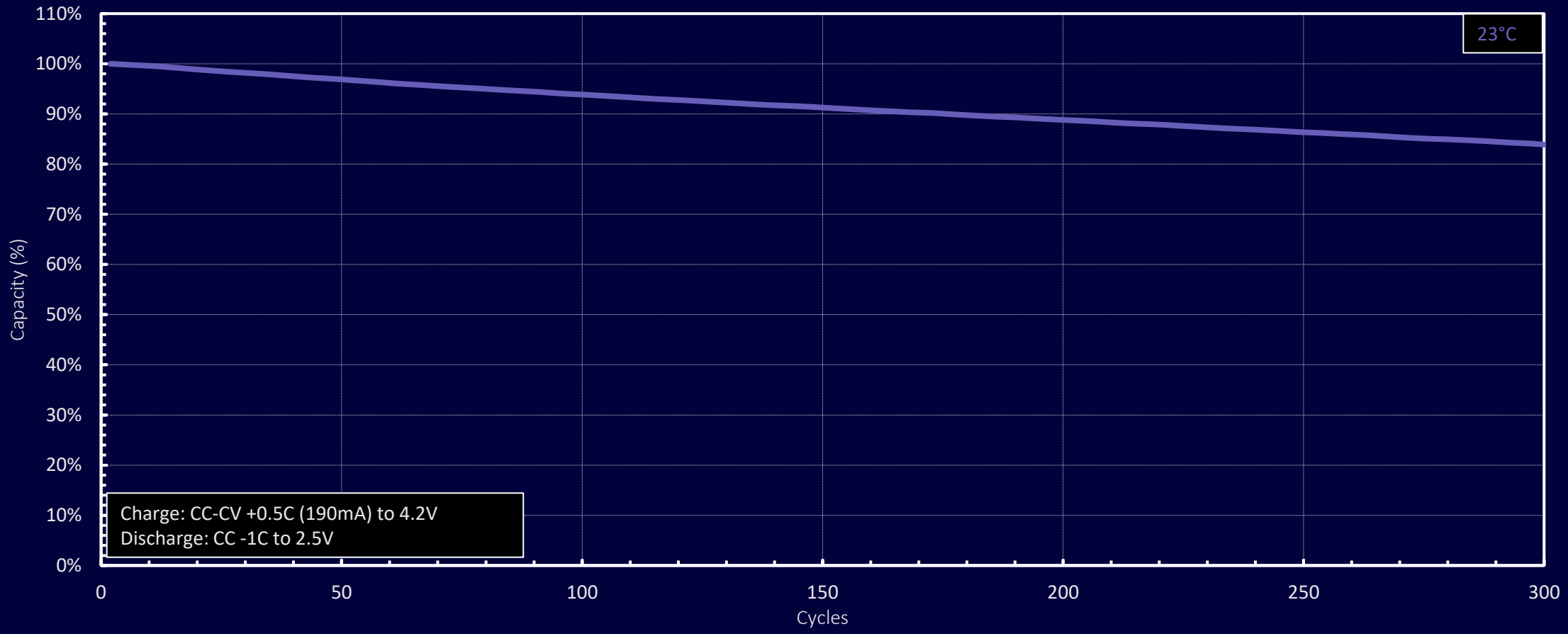


Figure NOT drawn to scale

Shape	Cylindrical
Weight	Maximum: 50 g

Capacity	Typical: 3800 mAh Minimum: 3750 mAh
Voltage	Nominal: 3.55 V Charge: 4.2 V Discharge: 2.5 V
Charge Current	Standard: 1.9 A
Discharge Current	Standard: 3.8 A Maximum: 10 A
Temperature	Discharge: -30ºC to 60ºC Charge: 0ºC to 60ºC Storage: -40ºC to 60ºC
Energy Density (C/5)	Minimum: 777 Wh/L
Specific Energy (C/5)	Minimum: 270 Wh/kg
Impedance (AC 1kHz)	Maximum: ≤30 mΩ Typical: 24 mΩ
Cycle Life (+1.9A/-3.8A, 80%)	Nominal: 300 cycles
Recovered Capacity (60ºC, 100% SoC)	56d: ≥95% 84d: ≥90%

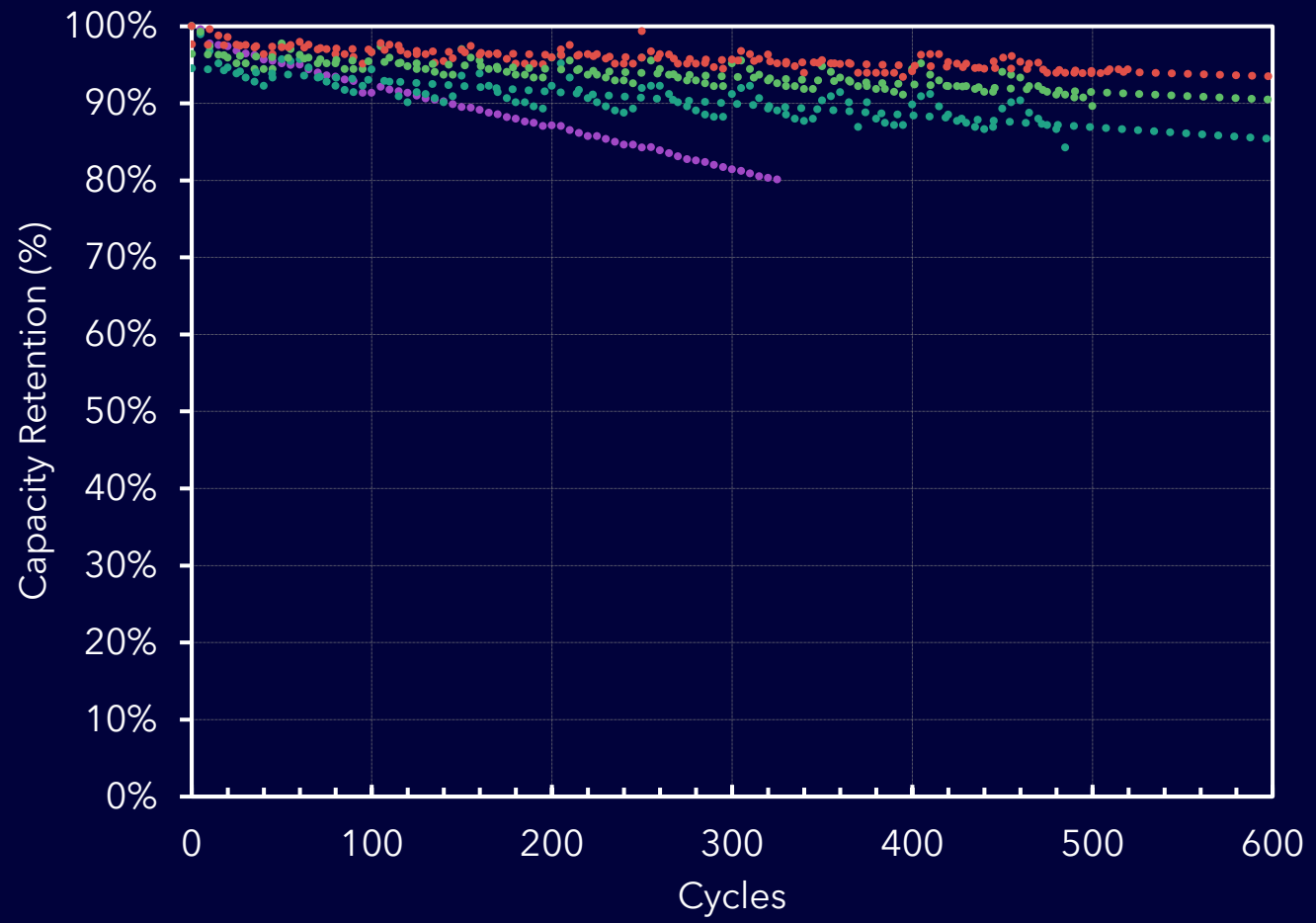
3.8AH CYCLING CHARACTERISTICS



1st Charge Capacity (mAh)	1st Discharge Capacity (mAh)	FCE (%)	3rd Discharge Capacity (mAh)
4481 ± 26	3882 ± 48	86.7 ± 0.1	3907 ±36

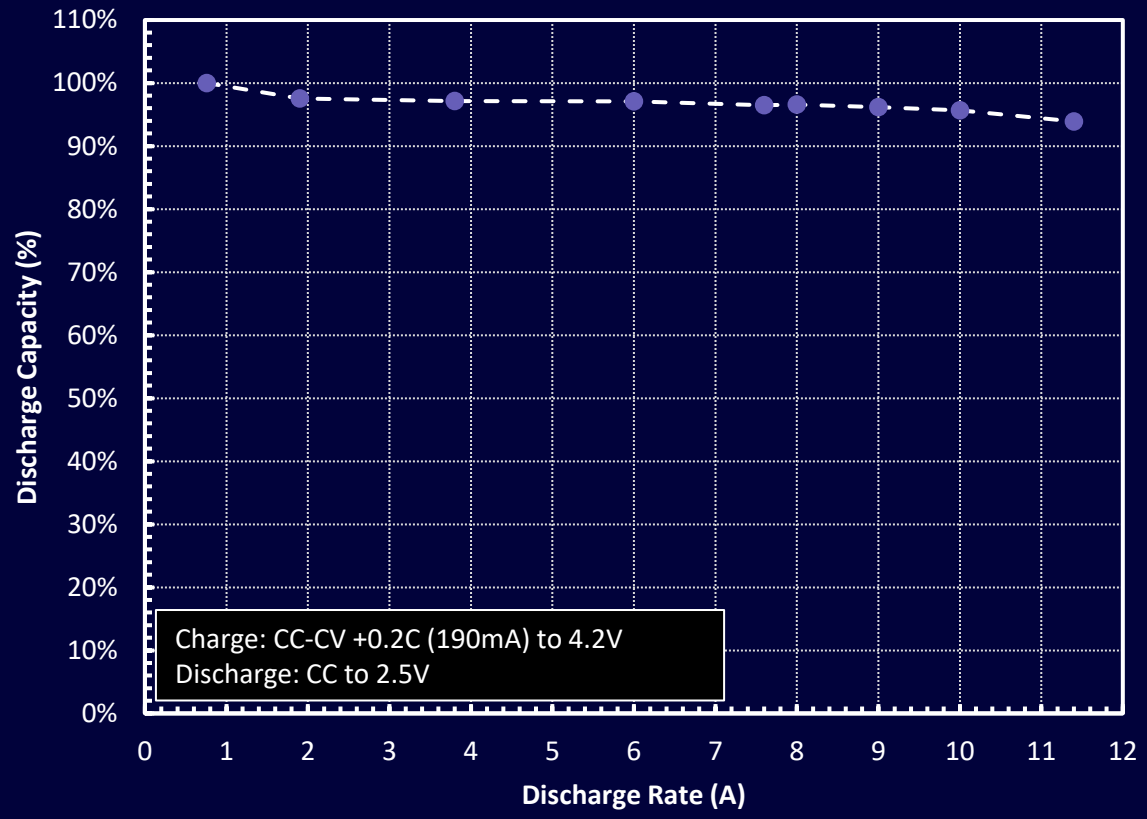
3.8AH CYCLE LIFE CHARACTERISTICS

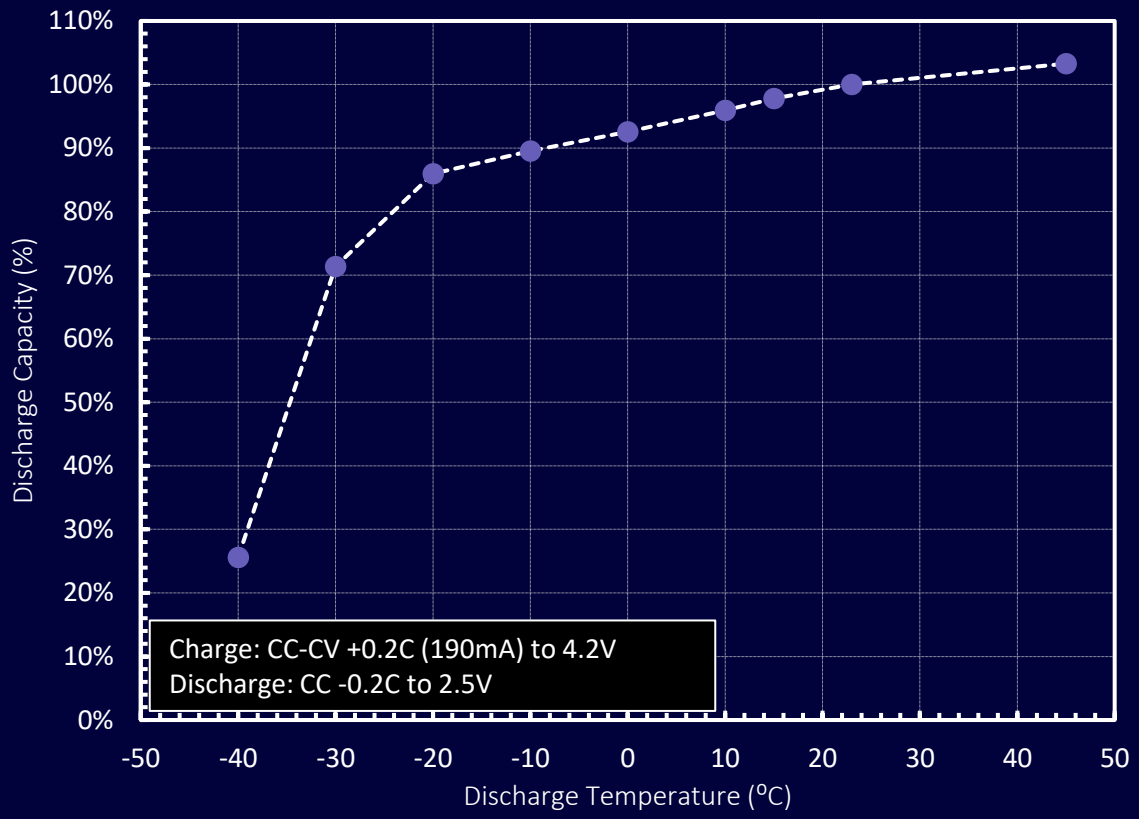
Shallow cycling significantly increases cycle life performance & matches real-world usage



4.2 – 3.61V	100 – 70% SOC
4.2 – 3.38V	100 – 50% SOC
4.2 – 3.15V	100 – 30% SOC
4.2 – 2.50V	100 – 0% SOC

DISCHARGE RATE & TEMPERATURE CHARACTERISTICS





3.8AH 18650 COMMERCIAL PLAN

Final Prototype Builds

JUL. – AUG. 2022

AUG. – FEB. 2023

Validate and Test Prototype Cells

Mass Production Validation Run (5000 Pcs)

APR. 2023

MAY. – AUG. 2023

UN-UL Certifications, Safety Testing and Final Specifications

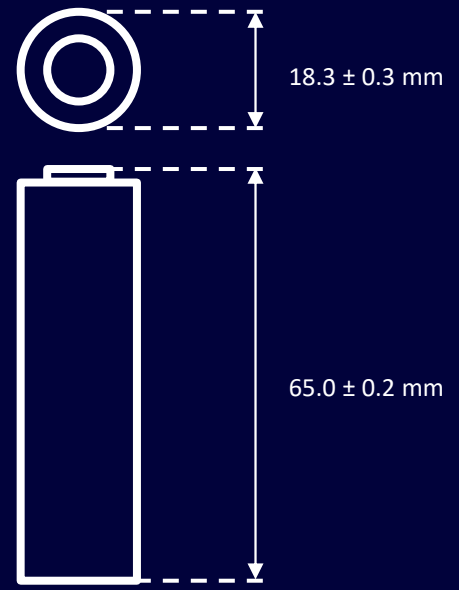
Start of Mass Production (4.5M cells in 2023)

Q4 2023

M4X 18650 CELL REQUIREMENTS

Metric	Threshold Target	Objective Target	Remarks
Discharge Capacity	Typical: 4100 mAh Minimum: 4000 mAh	Typical: 4300 mAh Minimum: 4150 mAh	At 23ºC CC-CV Charge +0.2C (0.05C) to 4.2V CC Discharge -0.2C to 2.5V
Voltage	Charge: 4.2 V Discharge: 2.5 V		–
Charge Current	Standard: 1.9 A		At 23ºC
Discharge Current	Standard: 4.0 A		At 23ºC, 80ºC cut-off temperature
	Maximum: 5.0 A	Maximum: 10.0 A	
Temperature	Discharge: -30ºC to 60ºC Charge: 0ºC to 60ºC Storage: -40ºC to 60ºC		–
Cycle Life (80%)	Minimum: 300 cycles		At 23ºC CC-CV Charge +0.2C (0.05C) to 4.2V CC Discharge -0.2C to 2.5V
Self-Discharge (23°C, 100% SoC, 28d)	Maximum: 5%		ΔOCV

Shape	Cylindrical
Weight	Maximum: 50 g



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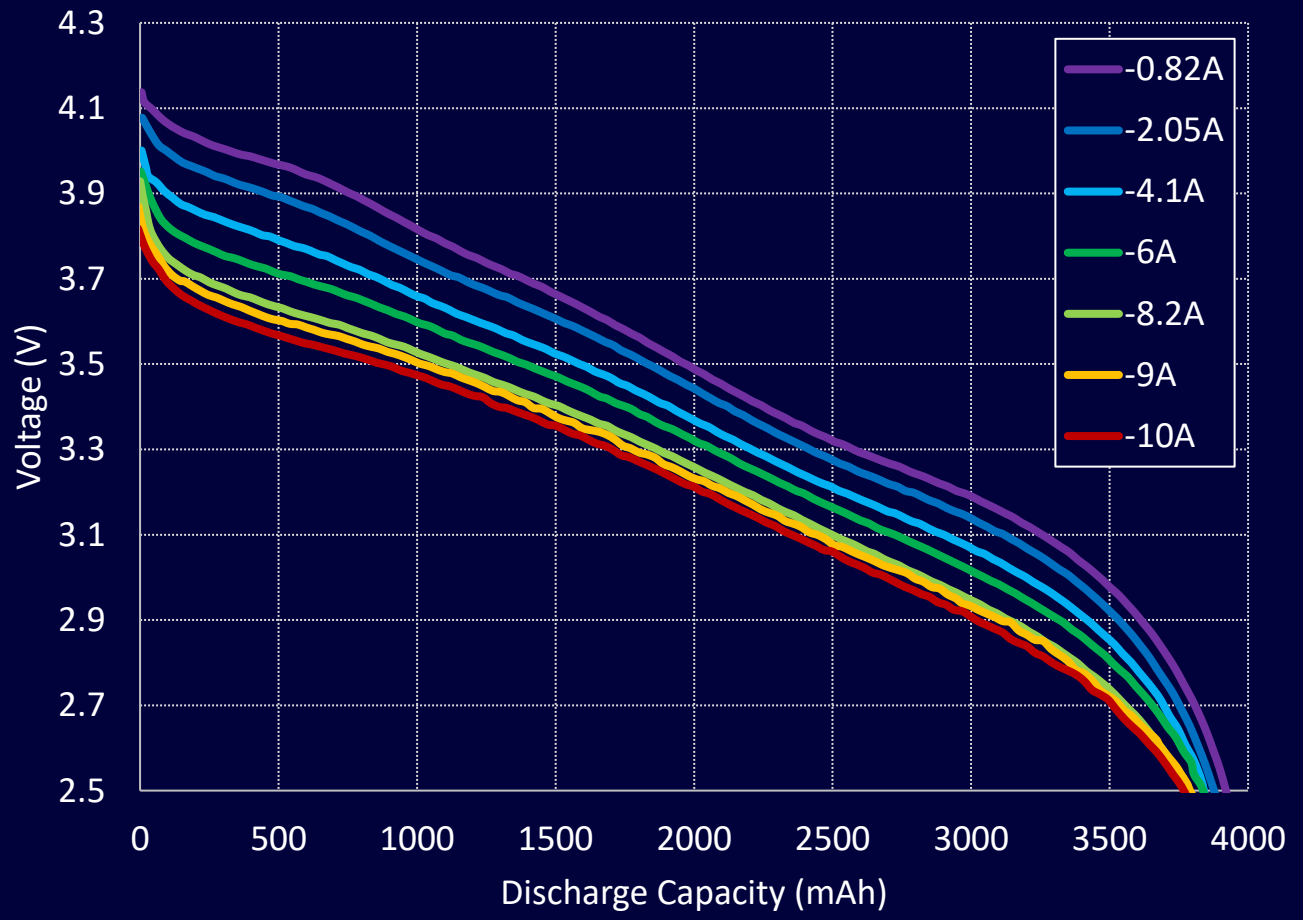
PHASE I 3RD DISCHARGE CAPACITY DATA

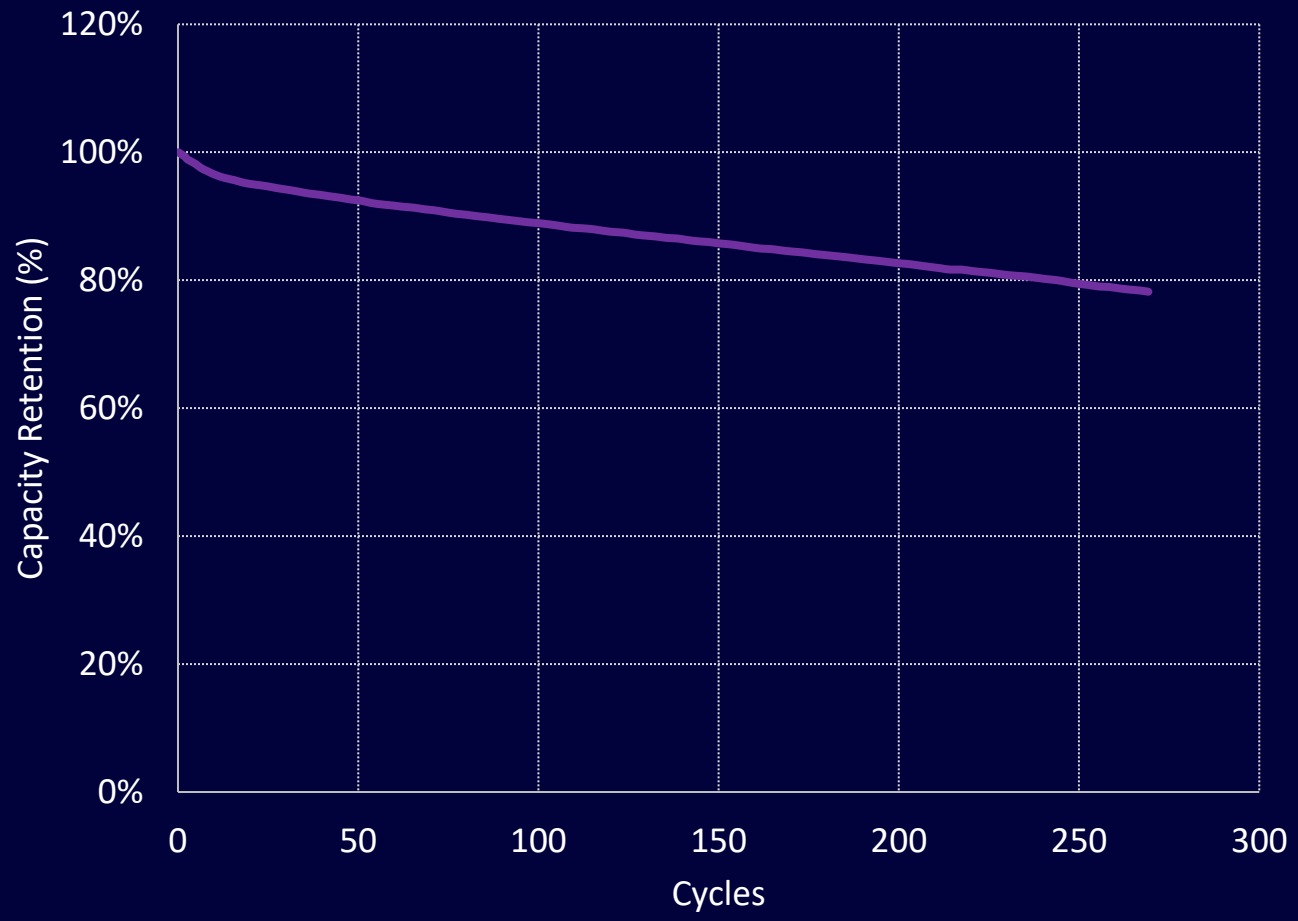
Results are in line with expectations; threshold req. were nearly met with 1st build

Electrolyte Vol.	Cell Qty	3D (Ah)	3D Energy (Wh)	3D En. Dens. (Wh/L)
Low (-5%)	6	3.942	13.56	787.1
Med (Centre)	29	3.999	13.75	798.6
High (+5%)	6	4.056	13.95	809.8
Threshold Req.		4.0 (min.)	14.4 (min.)	800 (min.)

PHASE I DISCHARGE RATE MAP



PHASE I CYCLE LIFE DATA



M4X PLAN AHEAD

- NanoGraf will perform two additional M4X design builds in 2023 – targeting 4.3Ah
- Introducing our next-generation G7 material, loadings up to 50% Si
- Targeting end of 2023 for 4.0 to 4.3Ah 18650 commercialization decision
- 3.8Ah 18650 cells available NOW for evaluation!



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