ECELLIX

BATTERY INNOVATIONS

Reimagining The Future of Batteries

2020 Update No 1

ECELLIX

BATTERY INNOVATIONS

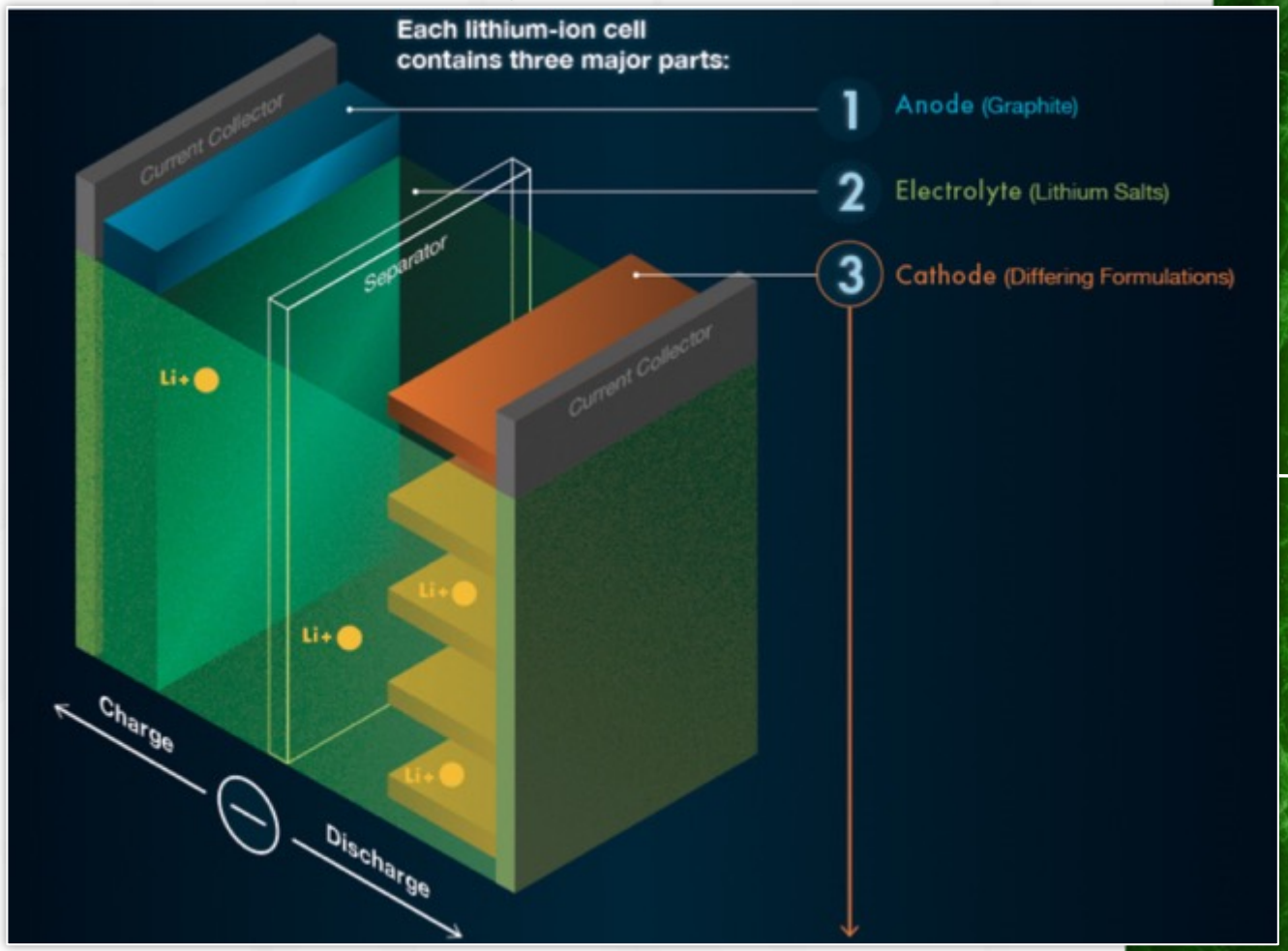
Batteries Reimagined

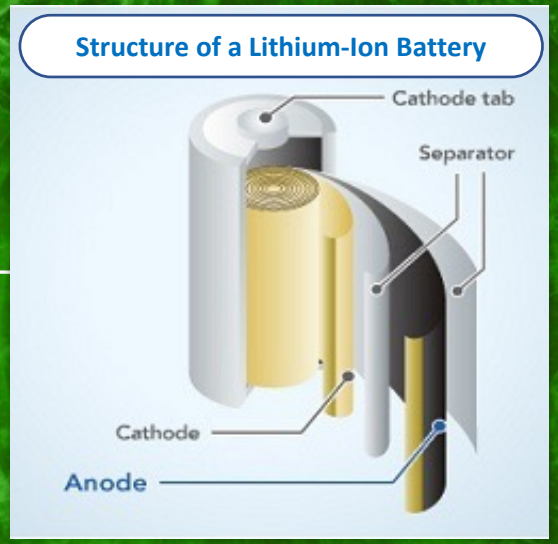
Ecellix is Reimagining the Future of Batteries.

Founded in Seattle in 2018, Ecellix is commercializing eCell™, a revolutionary battery anode material invented at Washington State University. eCell has 300-500% more energy capacity than graphite. In the near term, new batteries can be developed with 30-50% more energy capacity. Long term, battery energy can move closer to eCell's 300-500% capacity.


The worldwide lithium ion battery market will exceed
$100Billion
by
2024

Lithium-ion Battery Architecture





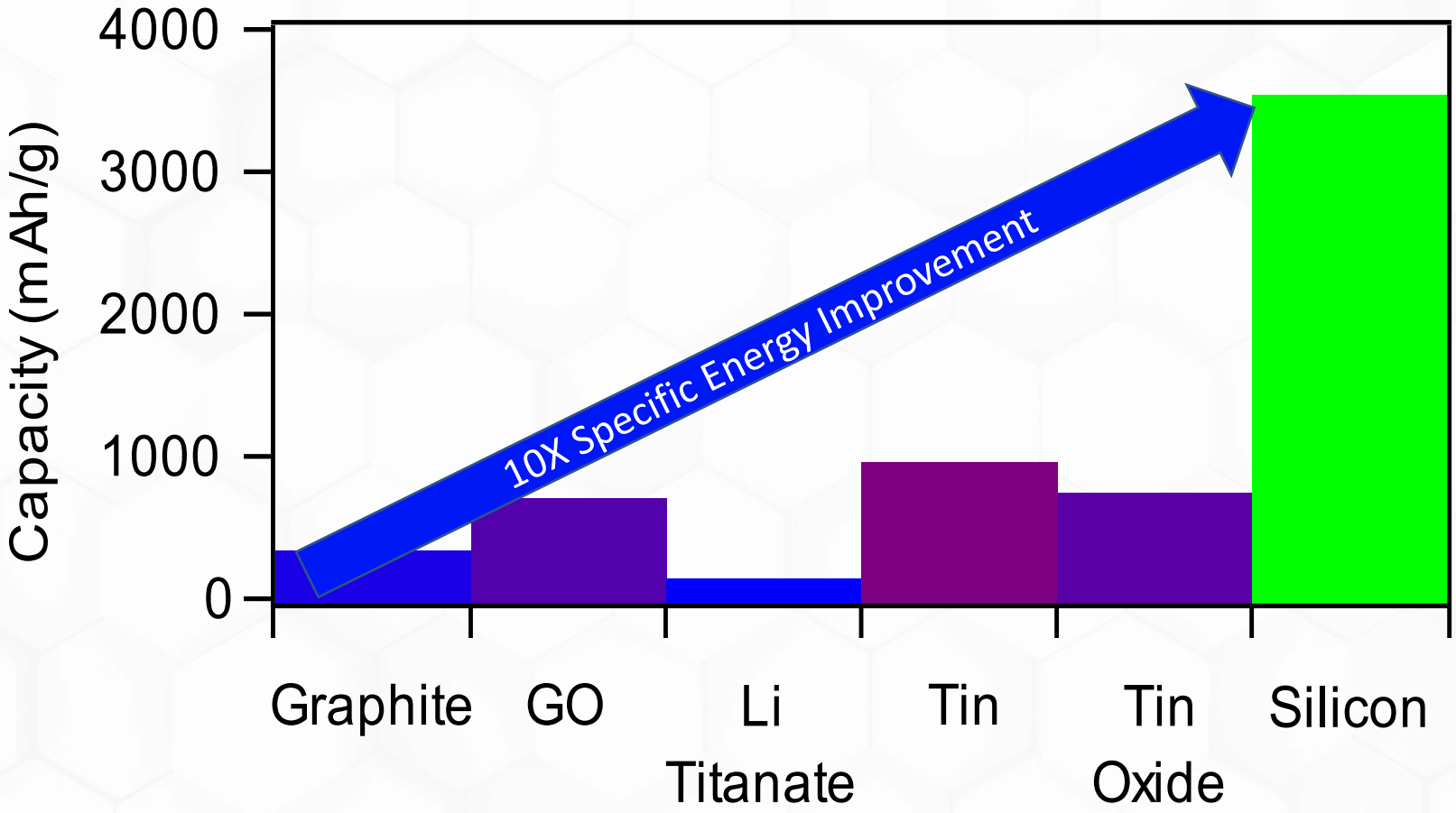
Standard Graphite Anode is

25% of Battery Cost

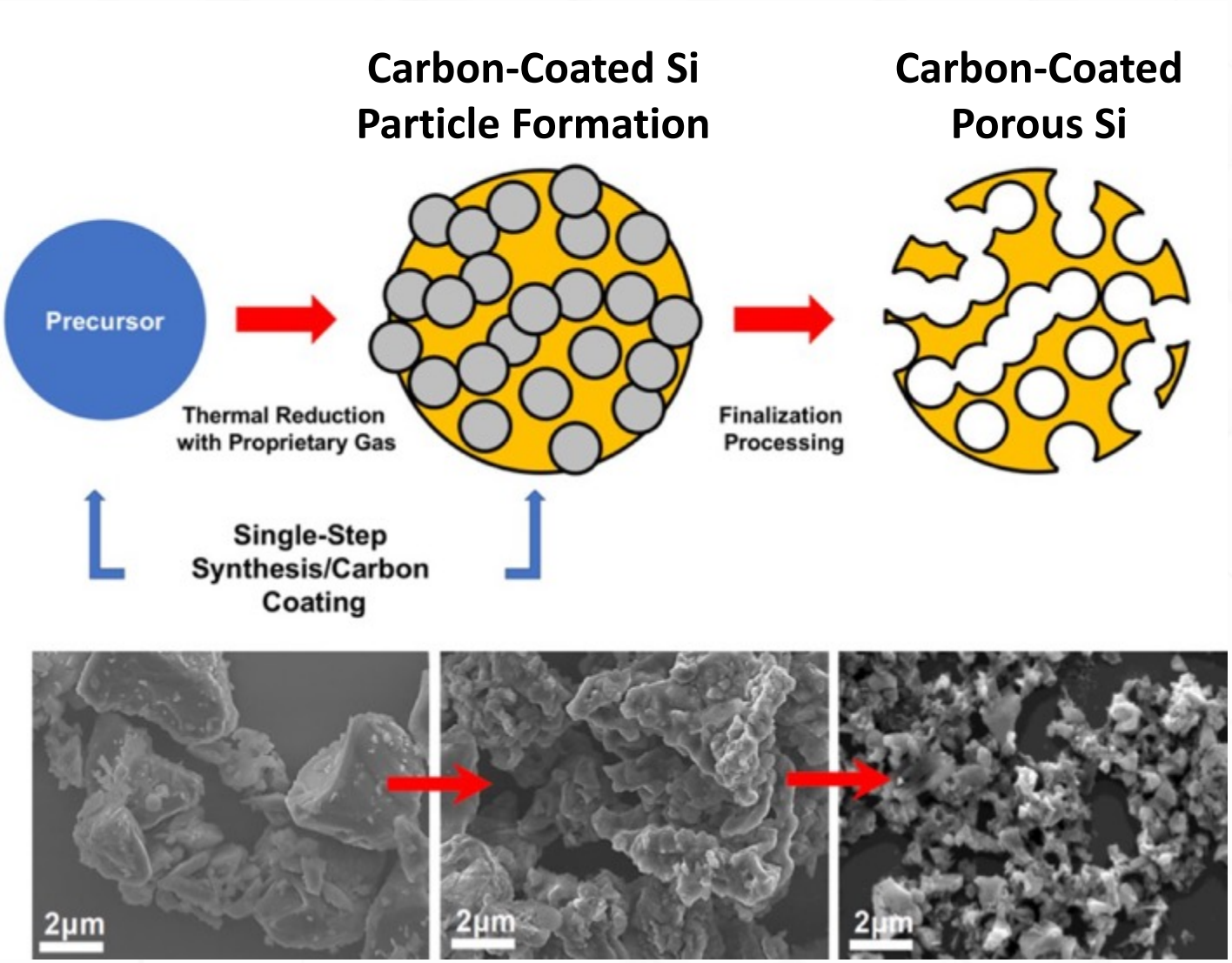
Since 1992, Li-ion battery development has relied on graphite anodes. Graphite is reliable, safe, low cost, stable, and long-lasting.

But Graphite lacks the specific energy capacity needed for future Li-ion battery development.

Silicon's **10x greater energy capacity** vs graphite makes it the replacement material of choice.



The eCell – A porous Silicon/Carbon composite material with ultra high capacity!



Our patent-pending top-down synthesis approach uses low-cost, common materials. It avoids use / handling of nanomaterials, ultra-high purity or exotic ingredients.

Carbon-coated pores are created *subtractively* within the material, allowing it to expand without cracking when exchanging energy with lithium.

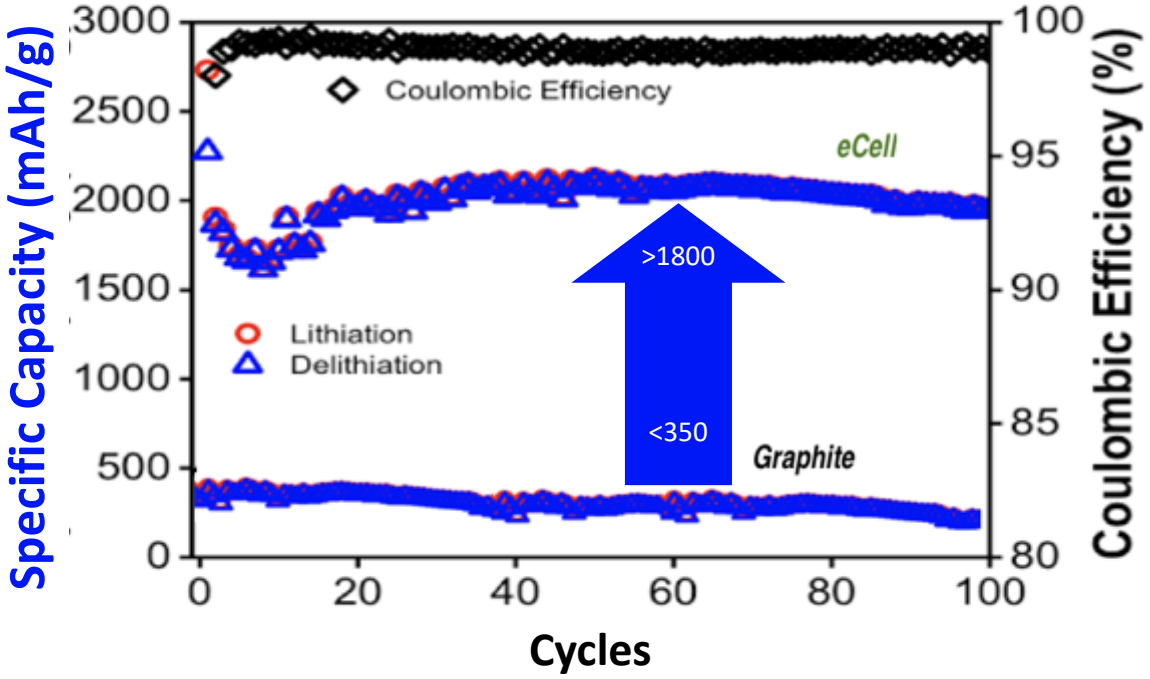
This also has advantages in conductivity, cycle life and other technical features.

The manufacturing process lends itself readily to scalable flow-based manufacturing approaches.

Performance over many cycles proves that eCell has **a high capacity** and lithiation expansion **does not destroy** eCell

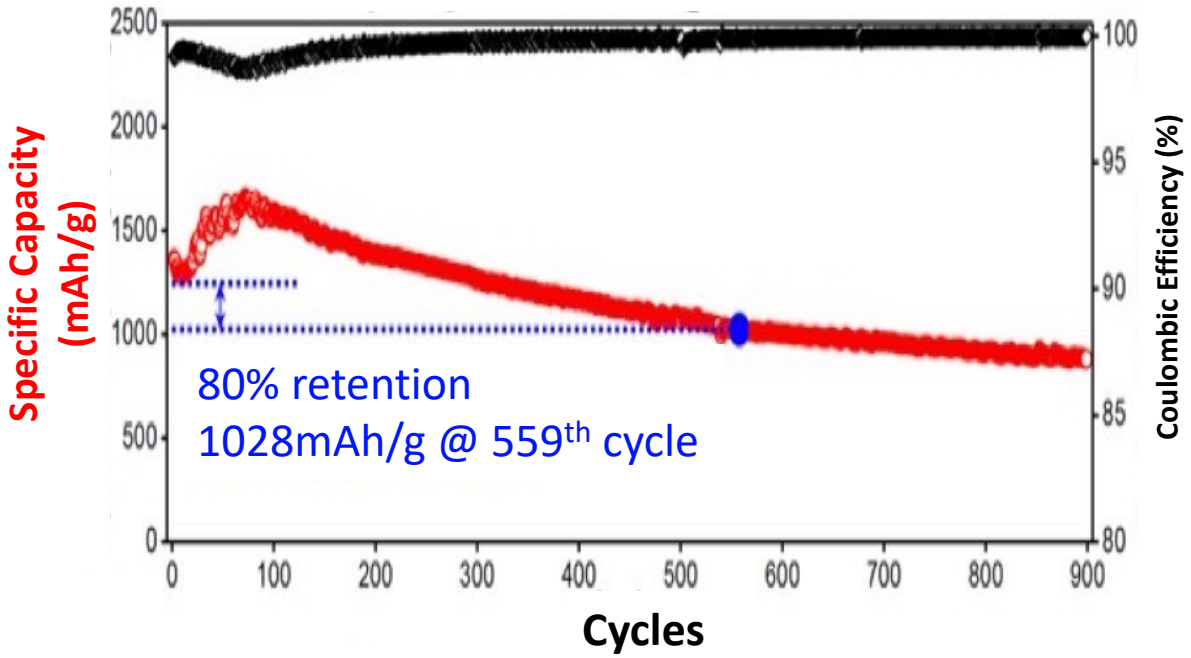
O.2 C-Rate

(5 hr charge & 5 hr discharge)



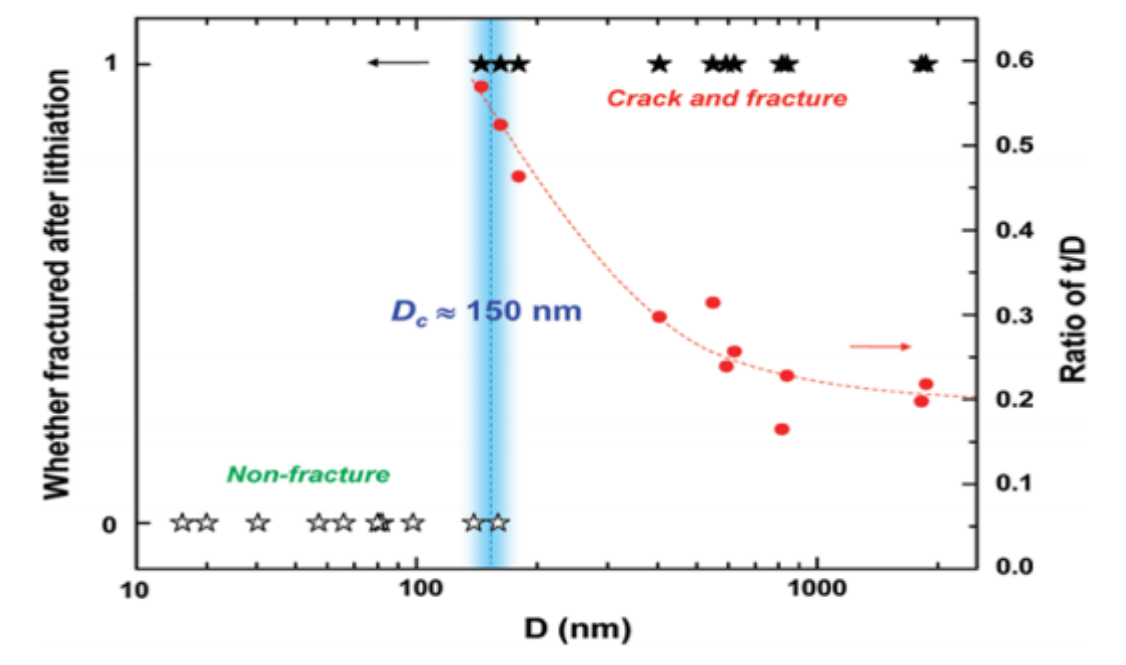
0.5 C-rate

(2 hrs charge & 2 hrs discharge)



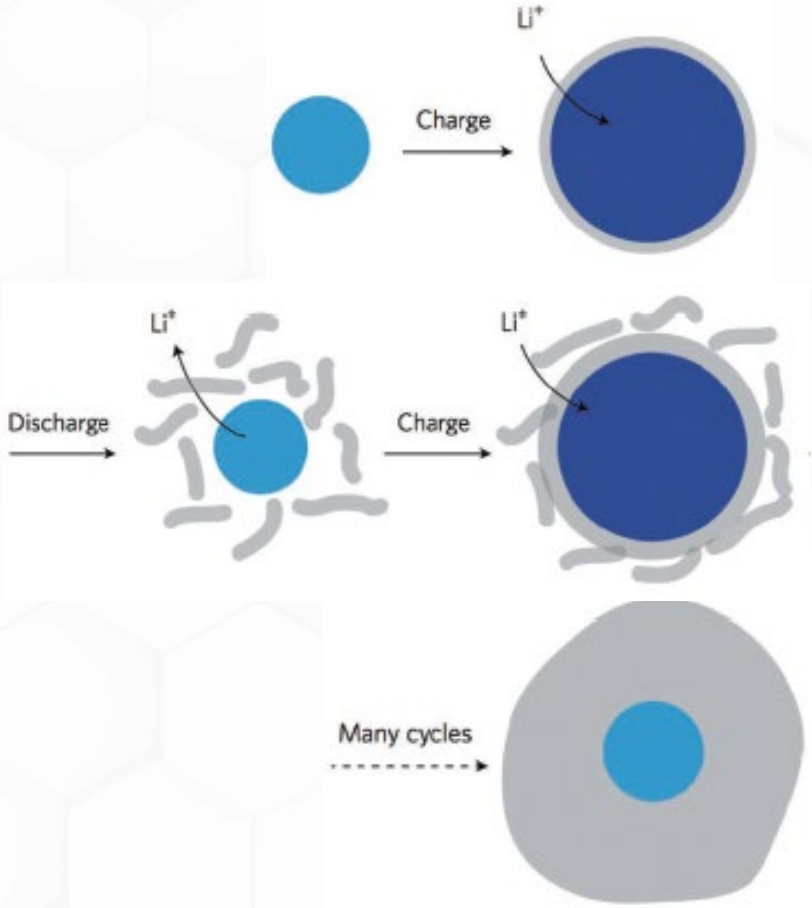
Silicon Anodes: Particle Size Matters

Silicon structures must be smaller than 150nm to avoid cracking



Source: Liu et al, ACS Nano 2012, 6, 1522.

But nano-sized particles have a much high surface area, which can lead to SEI layer challenges



Solid Electrolyte Interphase layer consumes lithium and electrolyte

Source: Jin et al., Adv. Energy Mater. 2017. 7, 1700715.

Silicon NanoMaterial Anodes:
Structural challenges continue to delay the promises of nanomaterials.

SILA NANOTECHNOLOGIES
amprius
ENEVATE Innovating Energy Storage
nexeon
NANOGRAF TECHNOLOGIES
Nanotek Instruments
OneD material
CALIFORNIA LITHIUM BATTERY
Group14 TECHNOLOGIES
SiNode SYSTEMS
envia

	Nanomaterials
lithium capacity	+
cracking	+
surface area / SEI	
diffusion path length	
conductivity	
tap density	
cost	

Numerous efforts have raised hundreds of $M to build silicon anodes.

To solve cracking, nano has been the only way.

To our knowledge, existing companies start with nano-scale components and build structures from the bottom up to try to overcome the physical challenges of nanomaterials.

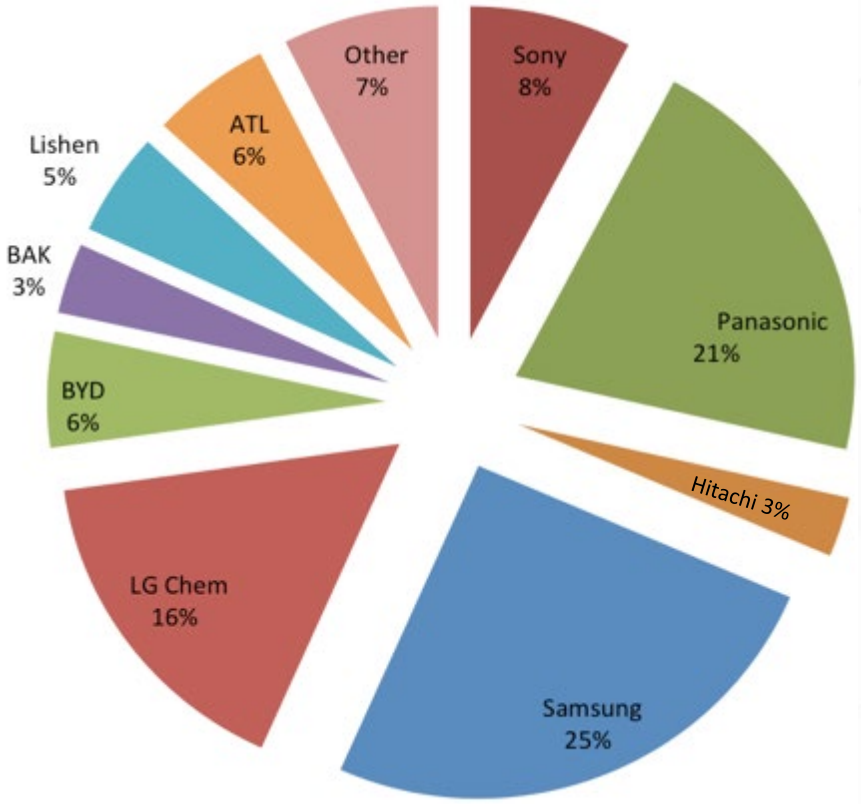
Contrasting Approaches to Making Silicon Anodes: Nano "Top-Down (subtractive)" vs Micro-porous "Bottoms-up (additive)"

eCell™: micro-porous Si/C Composite		Nanomaterials	
+	lithium capacity	+	*"Although nanosized materials can achieve stable long cycling electrochemical performance by addressing materials pulverization and unstable SEI problems*
+	cracking	+	
+	surface area / SEI	-	through elegant structure designs,
+	diffusion path length	-	there are also challenges *related to nanosized materials, including*
+	conductivity	-	*low initial Coulombic efficiency, low tap density leading to*
+	tap density	-	*low electrode mass loading and low areal capacity,*
+	cost	-	*and high cost."*

Jin et al, Challenges and Recent Progress in the Development of Si Anodes for Lithium-Ion Battery, Adv. Energy Mater. 2017, 7, 1700715.

Global Li-ion Battery Market

Who buys anode materials?



2024 Global Market:
$25B+ of Anodes
$10B of Active Anode Material

Dominated by:

- Panasonic **NDA**
- LG Chem **NDA**
- Samsung **NDA**

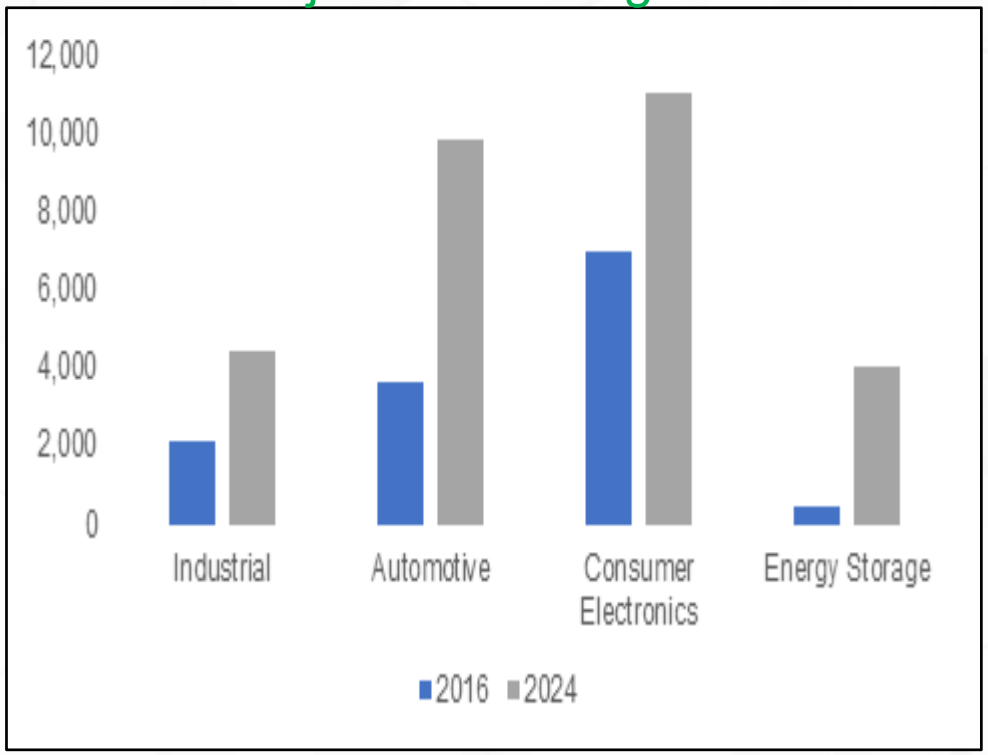
Partnered with:

- Hitachi Chem **NDA**

Supplying:

- BMW **NDA**
- PACCAR **NDA**
- Lockheed-Martin **NDA**
- Honeywell **NDA**

4 Major Market Segments



Strategic Collaboration*: R&D + Manufacturing Scale Up

Research & IP Partnerships	Testing & Full Cell Development Partners	Commercial Development Partners	Expressed Commercial Interest / Conversations
Agreements Established	*MOU's in place* *Work targeted to begin in September 2019*	*Working towards relationships to develop & test eCell-containing batteries when ready*	*Numerous*
Washington State University Applied Sciences Laboratory CleanTech Alliance Washington	Pacific Northwest National Laboratory Pyrotek	PACCAR Inc Kraus Aerospace	

**Relationships do not imply product endorsement*

ECELLIX
BATTERY INNOVATIONS

Proven Team / Industry Recognition

Proven Executive Team

CEO – Jerry Schwartz JD LLM

CTO – Geoff Deane PhD

CFO – Ken Poppe

CSO – Jason Schwartz

SVP Products – John Anderson

VP Strategic Dev – William Wiles JD

VP Manufacturing – Chris Venti

VP Investor Affairs – Brad Kayton

VP Corp Dev – David Liddle

Founded 2018 Seattle WA

U.S. Veteran-Owned Business

Seasoned Board & Advisors

Jerry Schwartz JD LLM

Bartosz Wojszczyk PhD

Brian Turner

Jason Schwartz

John Anderson

Brad Kayton (observer)

Brian Holloway PhD (advisor)

Lonnie Rosenwald JD (advisor)

Jennifer Houston (advisor)

Jay Kidd (advisor)

John Waters (advisor)

ECELLIX

BATTERY INNOVATIONS

Awards and Recognition

FiRe FUTURE IN REVIEW

KEIRETSU FORUM

NORTHWEST REGION

Great Association with Quality Deal Flow

Award Winning eCell™ Technology

TechConnect INNOVATION AWARD 2018

Ecellix Inc., United States

Increased Capacity Retention of Silicon Anodes for Lithium Batteries

TechConnect WORLD INNOVATION CONFERENCE & EXPO 20th ANNIVERSARY MAY 13-16, 2018 ANAHEIM, CA

Since its launch in 2002, Strategic News Service's annual *Future in Review (FiRe) Conference* has consistently been cited as the most credible source of predictions for both vital technologies and geopolitical trends.

Each year, the FiRe staff reviews and selects a small number of emerging companies that they predict will shape the future. These companies are named ***FiRe Starters***.

On October 8, 2019 at Lodge at Torrey Pines Golf Course, Ecellix was presented to the conference attendees as a FiRe Starter.

In announcing 2019's Fire Starters to the audience, SNS founder Mark Anderson noted that "…over 90% of *FiRe Starters* have gone on to commercial success!"

Ecellix is quite proud to be included in this august list!

In March 2019, Ecellix presented to about 600 investors at the Keiretsu Forum Northwest Angel Investor Expo. The Expo was held in Redmond Washington at Microsoft's Executive Briefing and Conference Center.

Expo attendees are each given $3 Million in "Expo Bucks" to invest in their choice of presenting firms as an expression of how they value them.

Of the 19 ventures presenting, Ecellix was deemed more valuable than 17 others, placing #2 in the Expo's ranking.

In an interesting coincidence, the Expo's #1 ranked firm, Pattern Computing, is founded by Mark Anderson, who also founded and leads the Strategic News Service and sponsors the annual Future In Review Conference!

Ecellix made its debut as a venture in May 2018 at the TechConnect World Innovation Conference and Expo in Anaheim California.

Speaking to a room of global battery industry experts, Jerry Schwartz merely introduced a 2-minute video recorded on an iPhone and closed with our booth number.

More than 20 battery industry executives visited the Ecellix booth and requested appointments to discuss eCell. Since then, several have conveyed their commitment to evaluate eCell when we begin offering commercial quantities.

ECELLIX

BATTERY INNOVATIONS

Reimagining The Future of Batteries

Pro Forma Financial Projections
December 31, 2019

Proforma Income Statements

Ecellix, Inc.
Pro Forma Income Statements
Year ends Dec 31st

	2019	2020	2021	2022	2023	2024
TOTAL REVENUES	**$ -**	**$ 357,500**	**$ 2,737,500**	**$ 14,221,400**	**$ 52,599,600**	**$ 103,654,825**
Revenues						
eCell Products	$ -	$ 7,500	$ 287,500	$ 6,736,400	$ 21,595,500	$ 39,854,697
NRE Projects	$ -	$ 350,000	$ 450,000	$ 700,000	$ 1,050,000	$ 1,050,000
Initial License Fees	$ -	$ -	$ 2,000,000	$ 3,000,000	$ 8,000,000	$ 10,500,000
License Royalties	$ -	$ -	$ -	$ 3,785,000	$ 21,954,100	$ 52,250,128
Total Revenues	**$ -**	**$ 357,500**	**$ 2,737,500**	**$ 14,221,400**	**$ 52,599,600**	**$ 103,654,825**
Cost of Goods Sold						
WSU royalties on product	$ -	$ 150	$ 45,750	$ 270,428	$ 1,030,992	$ 2,052,097
eCell Products	$ -	$ 3,585	$ 183,625	$ 2,391,227	$ 6,436,730	$ 12,736,448
NRE Projects	$ -	$ -	$ 140,000	$ 280,000	$ 420,000	$ 420,000
Initial License Fees	$ -	$ -	$ -	$ -	$ -	
License Royalties	$ -	$ -	$ -	$ -	$ -	
Total Product COGS	**$ -**	**$ 3,735**	**$ 369,375**	**$ 2,941,655**	**$ 7,887,722**	**$ 15,208,545**
Total Net Sales						
Net Gross Margin $	$ -	$ 353,765	$ 2,368,125	$ 11,279,745	$ 44,711,878	$ 88,446,281
Net Gross Margin %				79.3%	85.0%	85.3%
OPERATIONAL EXPENSES						
Op Expenses						
Sales & Marketing	$ 335,310	$ 877,056	$ 2,097,751	$ 3,689,594	$ 17,214,205	$ 36,497,015
General & Administrative	$ 286,794	$ 739,292	$ 1,183,218	$ 1,357,714	$ 4,064,392	$ 5,295,627
Research, Development & Mfg	$ 377,607	$ 1,365,851	$ 2,621,048	$ 2,970,144	$ 9,616,149	$ 12,815,379
Total Operating Expenses	**$ 999,711**	**$ 2,982,200**	**$ 5,902,017**	**$ 8,017,451**	**$ 30,894,747**	**$ 54,608,021**
EBITDA	**$ (999,711)**	**$ (2,628,435)**	**$ (3,533,892)**	**$ 3,262,293**	**$ 13,817,131**	**$ 33,838,260**
EBITDA as a % of revenue					26.3%	32.6%
Interest						
Taxes		$ -			$ 1,931,816	$ 8,459,565
Depreciation		$ 33,708	$ 189,792	$ 301,667	$ 390,000	$ 425,833
****NET INCOME (LOSS)**	**$ (999,711)**	**$ (2,662,144)**	**$ (3,723,684)**	**$ 2,960,627**	**$ 11,495,315**	**$ 24,952,862**
NET MARGIN					21.9%	24.1%

Proforma Balance Sheets

Ecellix, Inc.
Pro Forma Balance Sheets
Year ends Dec 31st

	2019	2020	2021	2022	2023	2024
ASSETS:						
Current Assets						
Cash & Equivalents	228,823	6,040,387	22,013,995	24,751,289	61,596,603	86,917,798
Accounts Receivables		$142,500	$325,500	$485,000	$1,250,000	$1,800,000
Total Current Assets	**$228,823**	**$6,182,887**	**$22,339,495**	**$25,236,289**	**$62,846,603**	**$88,717,798**
Long-term Assets						
Equipment, Machinery	$21,808	$383,097	$1,122,056	$1,345,389	$995,389	$643,722
Other Long-term Assets	$0	$0	$0	$0	$0	$0
TOTAL ASSETS	**$250,630**	**$6,565,985**	**$23,461,551**	**$26,581,678**	**$63,841,992**	**$89,361,521**
LIABILITIES AND STOCKHOLDERS' EQUITY:						
Current Liabilities						
Accounts Payable	$11,000	$131,000	$295,000	$298,000	$998,000	$1,500,000
Short Term Loans (C-notes)	$1,405,000		$0	$0	$0	$0
Other Current Liabilities		$11,500	$30,500	$187,000	$252,000	$316,666
Total Current Liabilities	**$1,416,000**	**$142,500**	**$325,500**	**$485,000**	**$1,250,000**	**$1,816,666**
Stockholder's Equity						
Preferred Stock	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Common Stock	$ 134,340	$ 10,134,340	$ 30,134,340	$ 30,134,340	$ 55,134,340	$ 55,134,340
Retained Earnings	-$1,349,710	-$3,760,855	-$7,048,289	-$4,087,662	$7,407,653	$32,360,514
TOTAL LIABILITIES AND EQUITY	**$250,630**	**$6,565,985**	**$23,461,551**	**$26,581,678**	**$63,841,992**	**$89,361,521**

Proforma Cash Flow Statements

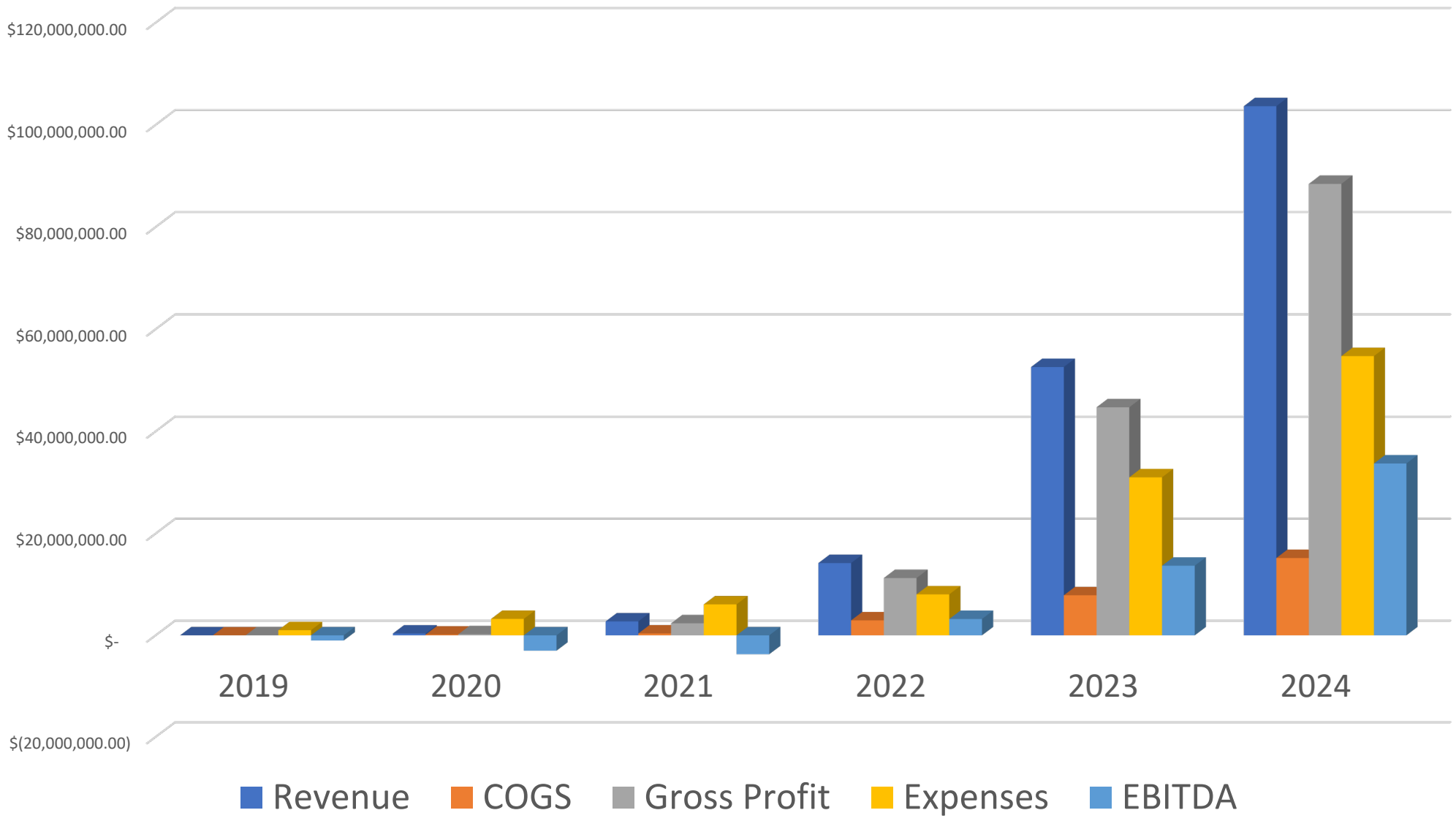
Ecellix, Inc.

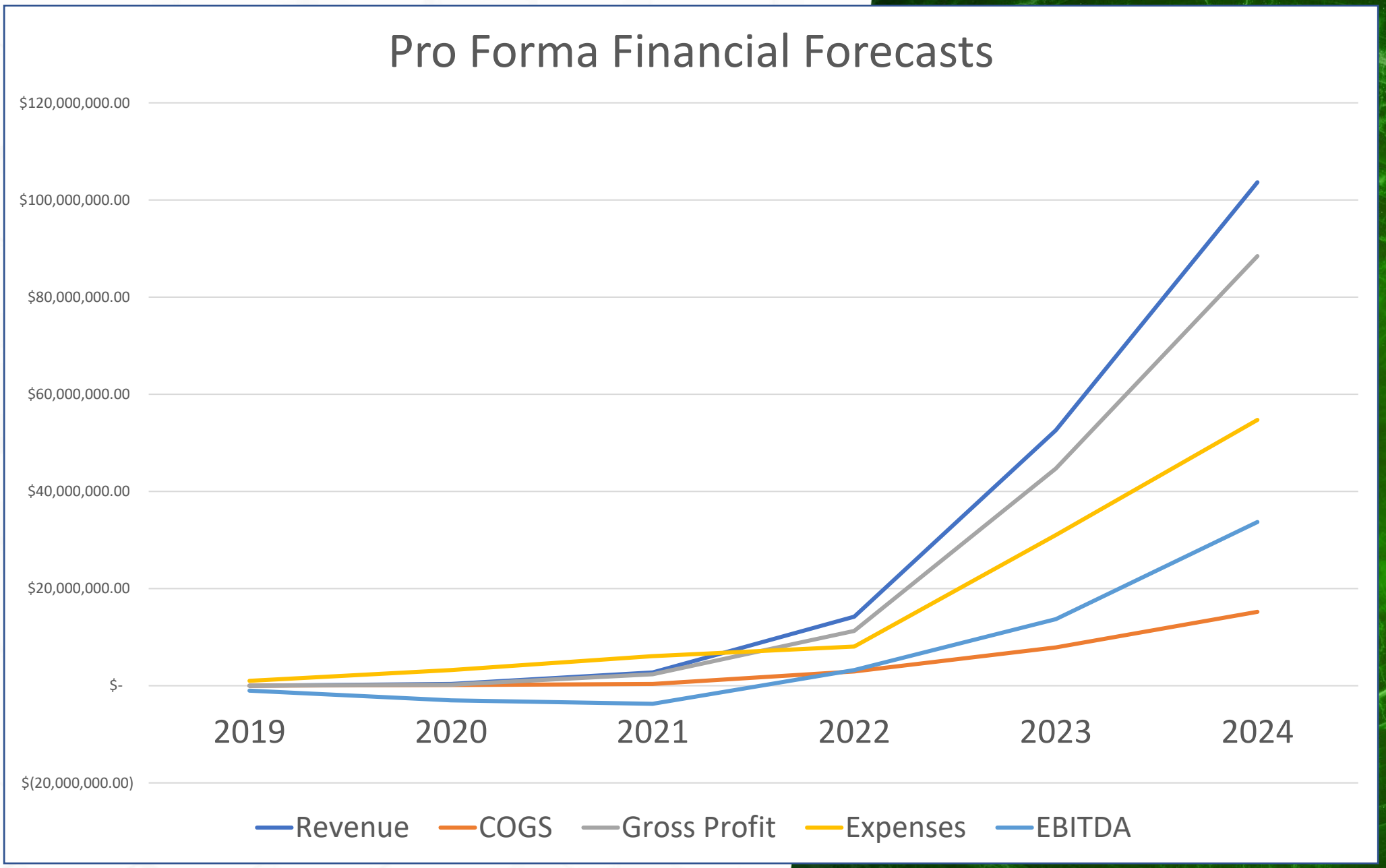
Pro Forma Cash Flow Statements

Year ends Dec 31st

	2019	2020	2021	2022	2023	2024
CASH FLOW FROM OPERATING ACTIVITIES						
Cash receipts from customers		$357,500	$2,737,500	$14,221,400	$52,599,600	$103,654,825
Cash paid to suppliers & employees	$999,711	$2,985,935	$6,271,392	$10,959,107	$38,782,469	$69,816,565
Cash paid for income taxes			$0	$0	$1,931,816	$8,459,565
Net cash flow from operating activities	**-$999,711**	**-$2,628,435**	**-$3,533,892**	**$3,262,293**	**$11,885,315**	**$25,378,695**
CASH FLOW FROM INVESTING ACTIVITIES						
Additions to equipment & investment items	$7,500	$410,000	$492,500	$525,000	$40,000	$57,500
Net cash flow from investing activities	**-$7,500**	**-$410,000**	**-$492,500**	**-$525,000**	**-$40,000**	**-$57,500**
CASH FLOW FROM FINANCING ACTIVITIES						
Proceeds from short term loans	$1,405,000					
Proceeds from equity raises		$8,500,000	$20,000,000	$0	$25,000,000	$0
Net cash flow from financing activities	**$1,405,000**	**$8,500,000**	**$20,000,000**	**$0**	**$25,000,000**	**$0**
NET INCREASE / DECREASE IN CASH						
Cash at the beginning of the period	$181,034	$578,823	$6,040,387	$22,013,995	$24,751,289	$61,596,603
Cash at the end of the period	**$578,823**	**$6,040,387**	**$22,013,995**	**$24,751,289**	**$61,596,603**	**$86,917,798**

Pro Forma Financial Forecasts




Pro Forma Financial Forecasts
$120,000,000.00
$100,000,000.00
$80,000,000.00
$60,000,000.00
$40,000,000.00
$20,000,000.00
$-
$(20,000,000.00)
2019
2020
2021
2022
2023
2024
Revenue
COGS
Gross Profit
Expenses
EBITDA

ECELLIX
BATTERY INNOVATIONS

Our Innovations

1. eCell™: high capacity silicon-dominant anode materials
2. Porous micron-scale structure with 90% Si / 10% C active materials
3. Attractive anode materials production cost anticipated
4. Drop-in solution: leverages existing equipment investment & processes
5. Swell-tolerant: unique cell structure – mitigates 340% Si expansion
6. Half-cell capacity: 3-5 times greater than graphite anodes
7. Cycle life: >500 cycles with <20% energy reduction at 0.5C
8. Market: huge >$25B addressable market for anodes (global)
9. Market timing: fossil fuel displacement - “Batteries are the new oil”
10. IP: Patents (global) pending and exclusive IP rights from WSU.

ECELLIX

BATTERY INNOVATIONS

Reimagining The Future of Batteries

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