# NanoXplore

## Performance Through Carbon Chemistry

November 2020
Annual General Meeting Presentation

Industrial Volume

Proprietary Technology

Low-Cost

# Forward-Looking Statements

Forward-Looking Statements. This presentation contains express or implied forward-looking statements, which are based on current expectations of management. These statements relate to, among other things, our expectations regarding management's plans, objectives, and strategies. All statements other than statements of historical fact could be deemed forward-looking, including, but not limited to, any projections of financial information; any statements about historical results that may suggest trends for our business and results of operations; any statements of the plans, strategies and objectives of management for future operations, including the timing, funding and construction of planned manufacturing facilities and sales offices; any statements of expectation or belief regarding future events, potential markets or applications, the sizes of addressable markets, expected technology developments, strategic partnerships and collaborations, or enforceability of our intellectual property rights; any statements about the projected or expected economic or other benefits of our products compared to petroleum-derived equivalents, future sales and any statements of assumptions underlying any of the foregoing.

Forward-looking statements are subject to a number of risks, assumptions and uncertainties, many of which involve factors or circumstances that are beyond our control.

Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the events and circumstances reflected in the forward-looking statements will be achieved or occur and the timing of events and circumstances and actual results could differ materially from those projected in the forward-looking statements. Accordingly, you should not place undue reliance on these forward-looking statements. All such statements speak only as of the date made, and we undertake no obligation to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise.



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# Company Snapshot

NanoXplore is a specialty chemical company. We are a manufacturer and supplier of advanced components and solutions based on our proprietary graphene technology. We serve transportation, renewable energy, energy storage and industrial markets.

We are a public company. Head-quartered in Montreal, Quebec and trade on the TSX Venture Exchange under symbol "GRA" (Market Cap ~$0.5B[1])

We have the largest graphene production capacity in the world[2] with a fully automated facility that can produce 4,000-metric tons per year of graphene powder

We offer graphene based solutions and composite parts for transportation, renewable energy, energy storage, and industrial markets

We are a global company. We are a group of 400 people and operate 8 production plants in Canada, Switzerland, and the United States, that support graphene production and composite parts manufacturing

Strong strategic and institutional shareholders: Martinrea International (MRE:TSX), one of the largest auto parts suppliers in North America, Fidelity Investments, Investissement Quebec, Caisse de depot et placement du Quebec, BDC CleanTech

Strong IP portfolio with multiple patents on graphene production, applications in composites and energy storage

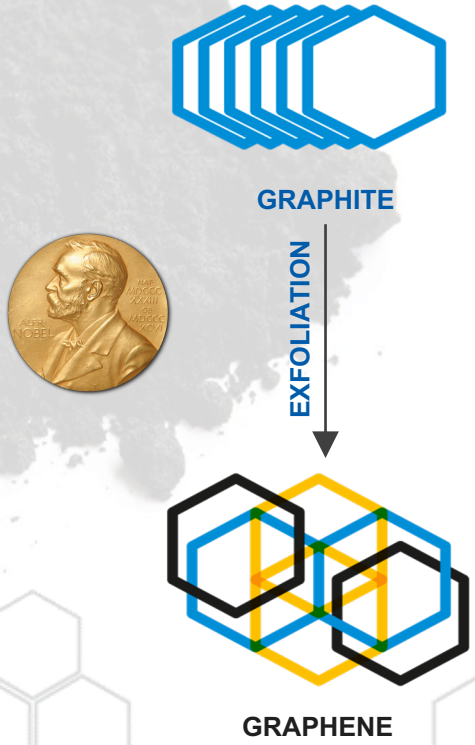
Blue-chip customers: Some of our customers include Volvo Truck, Paccar, GE, Daimler, Volvo Bus, Caterpillar, Itron


(1) As of Nov 17, 2020

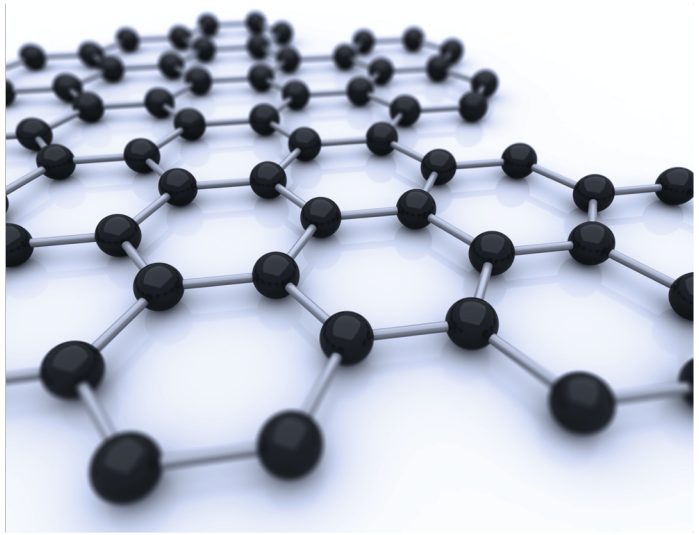
(2) IDTechEx Research, Dr. Richard Collins, "Is the Tipping Point for Graphene Commercialisation Approaching?"

# What is Graphene?

Discovered at Manchester University in 2004. Nobel Prize awarded in 2010




Graphene is pure carbon consisting of carbon atoms arranged in a few-layer honeycomb lattice



It is the lightest, strongest, thinnest, best heat- and electricity- conducting material discovered to date

- 200x stronger than steel
- Elastic like rubber stretching beyond 20% of its original length
- Higher thermal/electrical conductivities compared to that of Silver and Copper
- Extremely impermeable
- Almost completely transparent: transmits ~98% of light
- Unique electromagnetic properties

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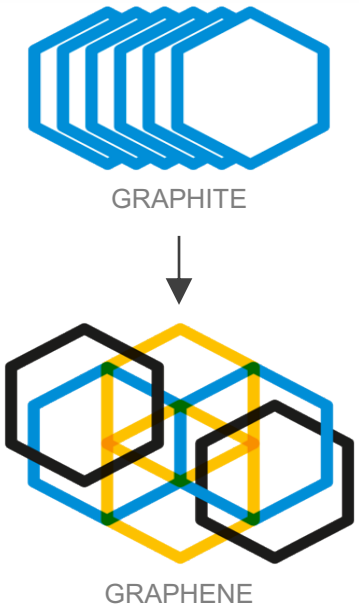
# Largest Graphene Producer

- ✓ A global graphene market leader and largest producer of graphene, being traded on the TSX Venture Exchange under symbol "GRA"
- ✓ Currently employs nearly **400** people with **8 production plants** in North America and Europe
- ✓ Head-Quartered in Montreal, Qc, Canada









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# Moving the Market – 4000 ton/yr Graphene Facility

- We take natural flake graphite (100,000 layers of carbon) and exfoliate the material via a mechanical-liquid exfoliation process proprietary to NanoXplore
- We produce very consistent and high-quality graphene in volume (6-10 atomic layers in thickness with 96-98% purity)
- Our new, state-of-the-art facility is a significant milestone for the company and the graphene industry

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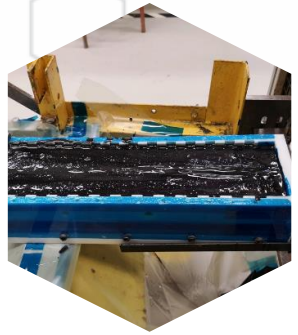
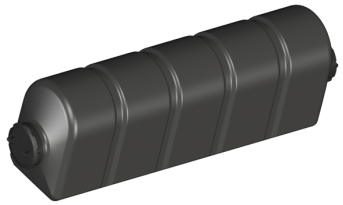
# NanoXplore's Current Graphene Offerings

Graphene Powder

Graphene in Thermoplastics



Graphene in Thermosets



Graphene-enhanced Molded Products

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# Our business model

1. **Basic Ingredient**
   - Graphite
   - CBFS
   - CH4
   - PolyAcryloNitril
2. **Enabled Raw Materials**
   - Graphene
   - Spherical graphite
   - Carbon Black
   - Carbon fiber
   - Carbon Nanotube

   ← Graphene Powder, Spherical Graphite
3. **Blends & Compounds**
   - Black Masterbatch
   - Performance compounds
   - Anode paste

   ← Graphene Black Masterbatch, Graphene Anode Paste
4. **Formed Plastic/ Coatings**
   - SMC
   - Pultrusion
   - Injection

   ← Graphene Enabled Composite and Molded Parts

| Company | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Imerys | ● | ● | | |
| Nippon Carbon | | ● | ● | |
| Cabot Corp. | | ● | ● | |
| Showa Denko | ● | ● | ● | |
| Tokai Carbon | | ● | ● | |
| Toray | ● | ● | ● | ● |
| Teijin | | ● | ● | ● |

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# Examples in Transportation: Truck Hood

Technology: Sheet Molding Compound (SMC)

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Graphene increases the strength and reduces the weight of molded parts

Proprietary Technology

Graphene composites demonstrate smoother surface and finish to Traditional hoods

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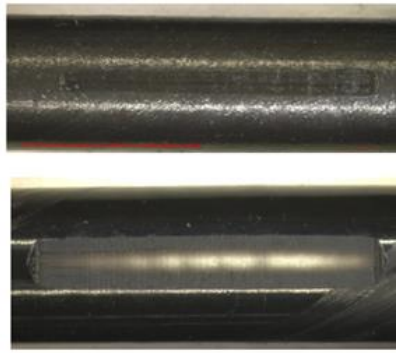
# Examples in Transportation: Fuel and Brake lines

| Material | Number of abrasion cycles | Improvement |
|---|---|---|
| Nylon/Graphene | 450,000 | 30X |

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# Examples in Renewable Energy: Windmill Blades





Technology: Pultrusion, Graphene increases the strength and reduces the weight

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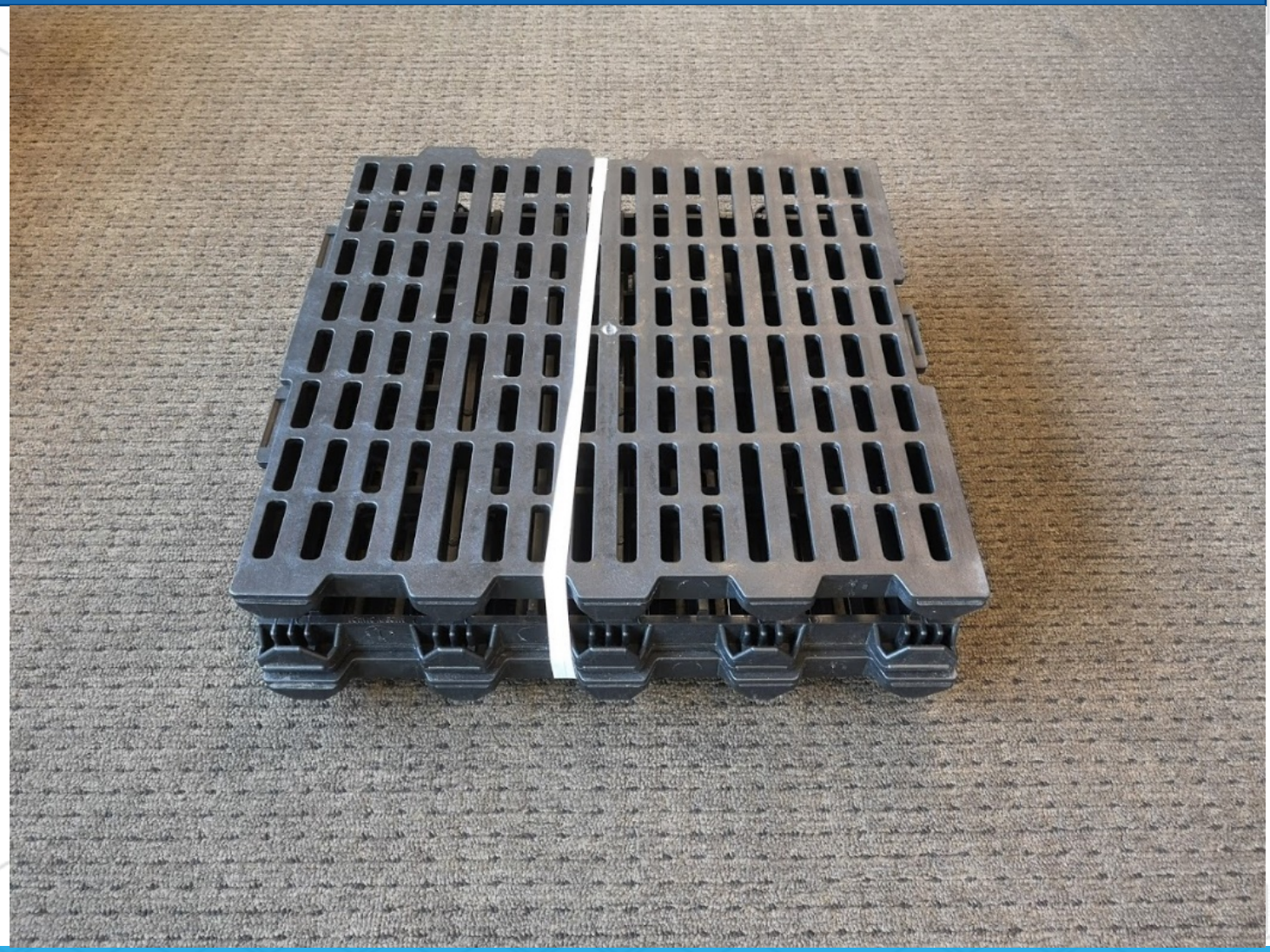
# Examples: Industrial and Agricultural flooring

100% made with recycled plastics

Graphene enables the use of recycled polypropylene without any virgin plastic

Parts are fully recyclable at the end of life



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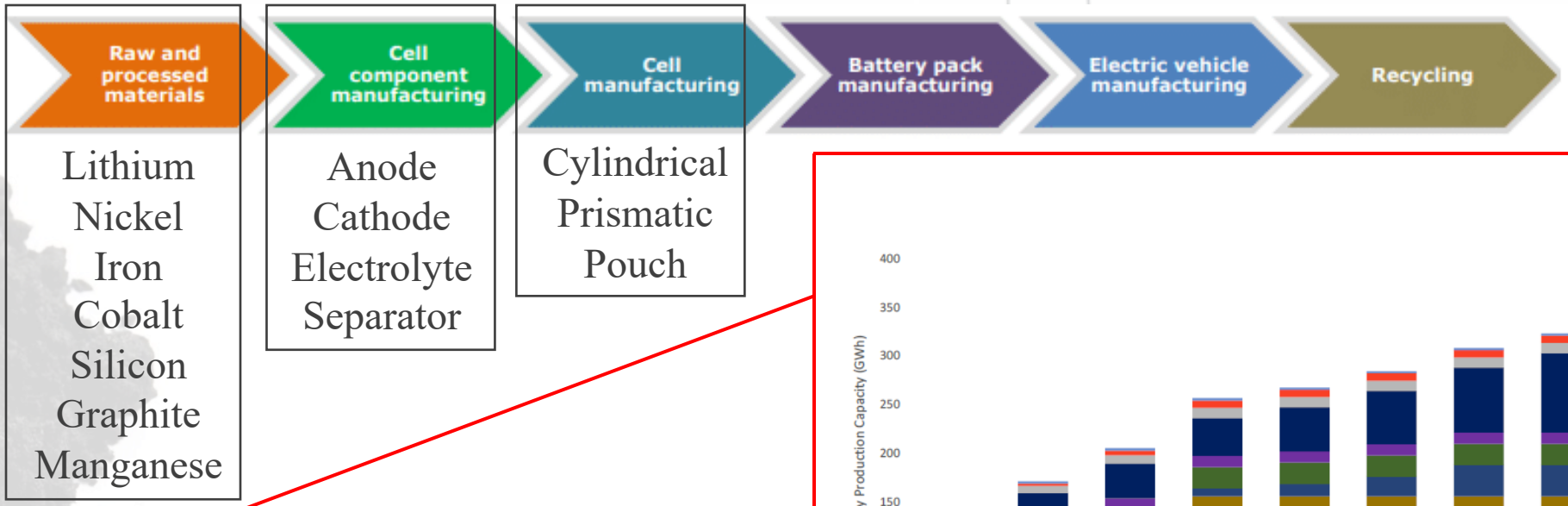
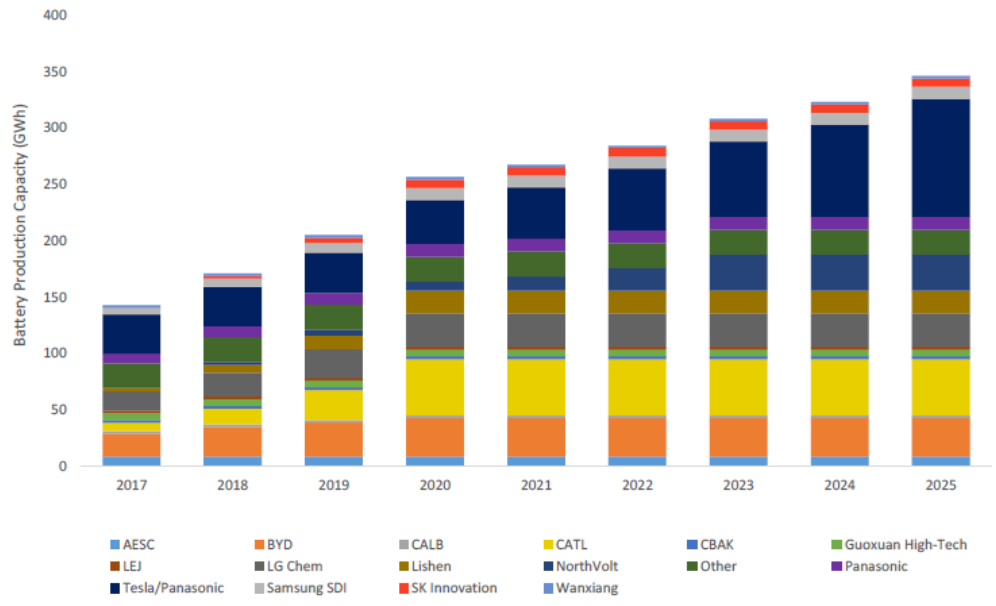
# Li-ion battery supply chain




Innovation trend (in-line with Tesla battery day Presentation)

- Move toward larger cylindrical cells (Main challenge is thermal runaway)
- Nickel rich cathode formulation (minimize cobalt consumption)
- Silicon rich anode formulation (minimize graphite consumption)




Industrial Volume

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# Graphene as an additive in batteries

Batteries

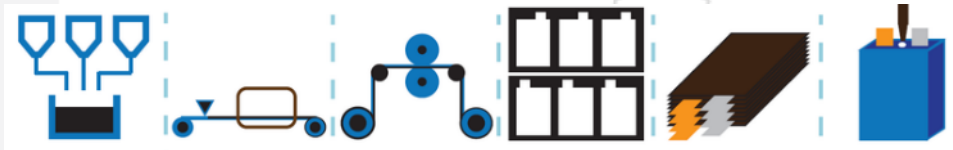
**Improve energy density, charge rate, and cycle life with Graphene**

Additive in **NMC111 cathode**

| Material | Discharge capacity Improvement |
|---|---|
| Super-P (Carbon Black) | - |
| Graphene 0X | 5% |

Active material in **anode** (after 70 cycles)

| Material | Reversible Capacity |
|---|---|
| MAGD (synthetic graphite) | 340 mAh/g |
| Graphene 0X | 345 mAh/g |



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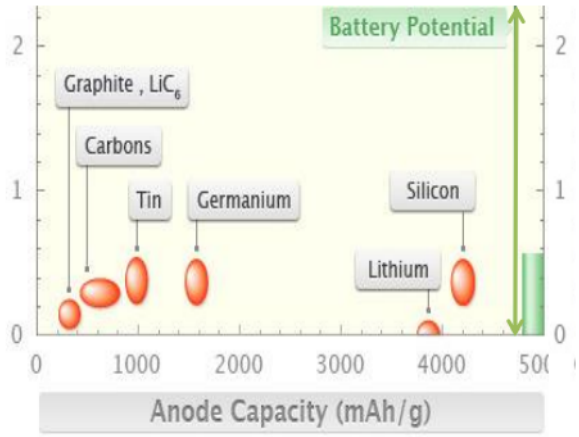
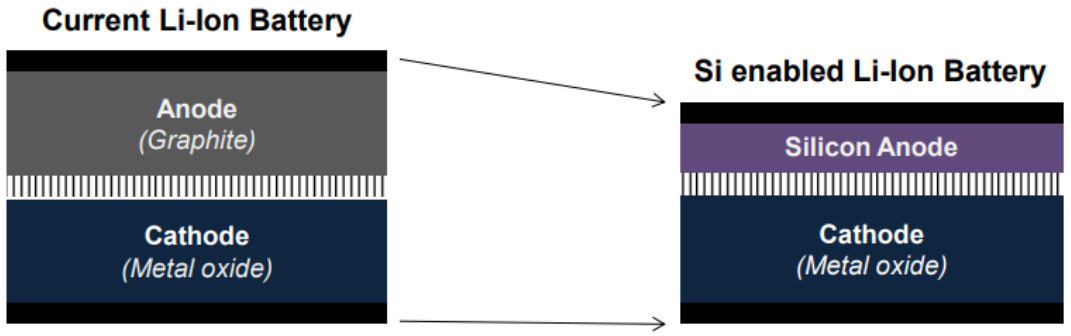
# Silicon Anode

| | Graphite | Silicon |
|---|---|---|
| Intercalation Reaction | $Li + 6C \leftrightarrow LiC_6$ | $4.4Li + Si \leftrightarrow Li_{4.4}Si$ |
| Potential vs $Li/Li^+$ | 0.05 V | 0.4 V |
| Gravimetric Capacity | 372 mAh/g | 4200 mAh/g |




- >10x (theoretical) increase in lithium storage capacity
- Vastly abundant
- Environmentally benign
- Well understood from semiconductor industry

Source: Nexeon.co.uk




| System | mAh/g ($AM_{Anode}$) | mAh/g ($AM_{Total}$) | Capacity Increase |
|---|---|---|---|
| **Silicon / NMC** | **2000** | **156** | **46%** |
| Graphite / NMC | 370 | 107 | |

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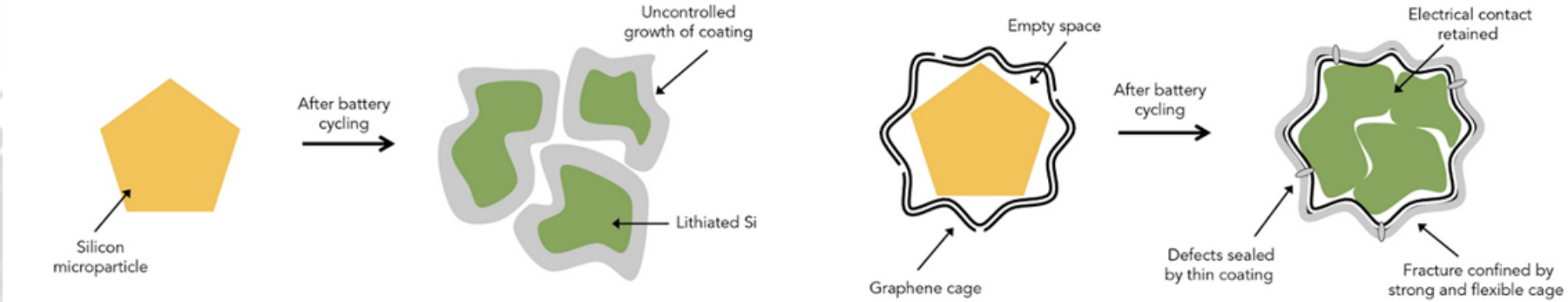
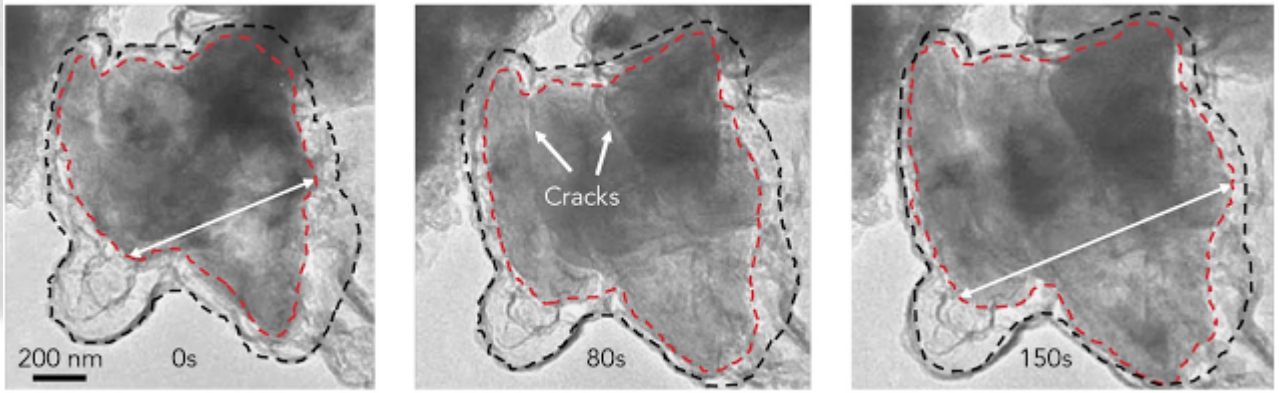
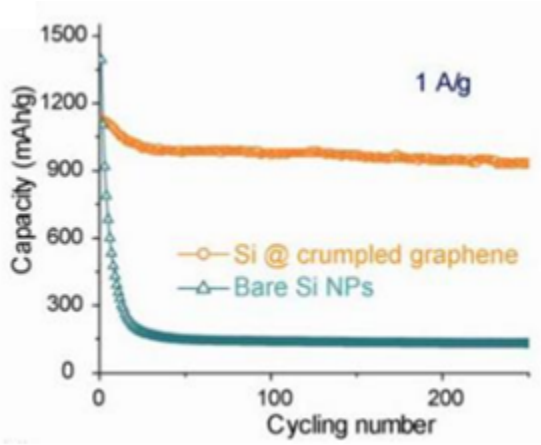
# Graphene Silicon anodes




*Time-lapse images from an electron microscope show a silicon microparticle expanding and cracking within its graphene cage as lithium ions rush in during battery charging. The cage is outlined in black, and the particle in red. (Y. Li et al., Nature Energy)*

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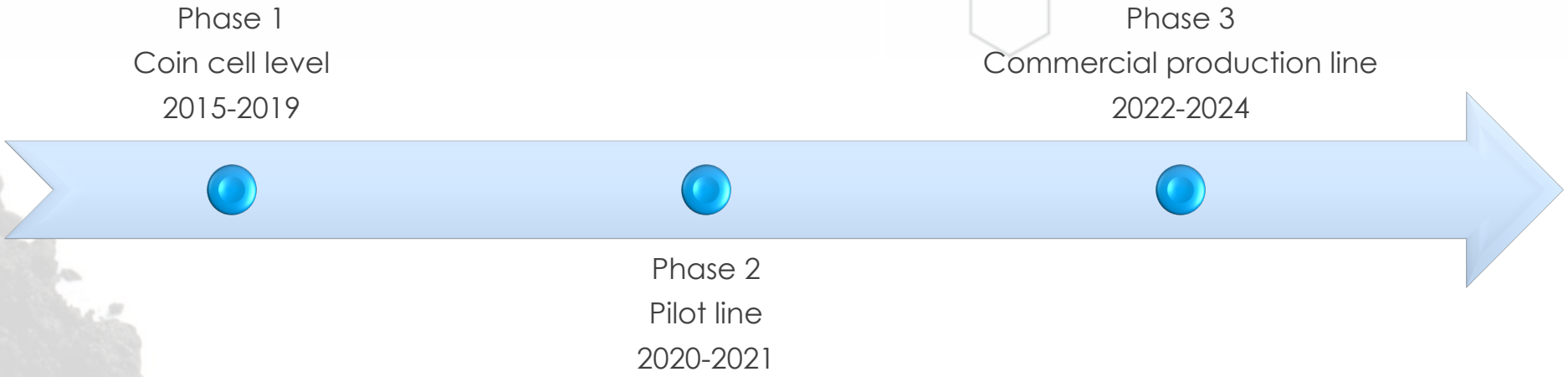
# Execution strategy




Phase 1:

- Lab testing is completed regarding graphene additive for anodes and cathodes paste
- First patent has already been published
- Funding needs for pilot lines has already been obtained

Phase 2:

- Feasibility report started in 2020
- Set up of a pilot line to produce anode paste
- Customer validation
- Supply chain partnership
- Obtaining permits, certifications and standards

Phase 3:

- Depending on the result of feasibility study, set up an anode paste manufacturing plant
- Construction, commissioning and start of production

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# Financial and Capital Structure

## Analyst Coverage

| | |
|---|---|
| National Bank Financial Markets | Rupert Merer |
| Echelon Wealth Partners Inc. | Amr Ezzat |
| Cormark Securities Inc. | MacMurray Whale |
| Beacon Securities Limited | Ahmad Shaath |
| Paradigm Capital | Marvin Wolff |
| Raymond James® | Michael Glen |

## Capital Structure (1)

| | |
|---|---|
| NanoXplore Symbol: | GRA |
| Listed Exchange: | TSX-V |
| Basic Shares: | 140,643,610 |
| Stock Price: | $3.68 |
| Convertible Debentures: | 5,434,783 |
| Options: | 3,585,133 |
| Fully Diluted: | 149,663,526 |
| Market Cap: | $518M |

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(1) As of Nov 18, 2020

# Q/A



- Industrial Volume
- Proprietary Technology
- Low-Cost