

COMMERCIAL LI-ION BATTERIES MADE WITH NOVACIUM'S FIRST GEN ENGINEERED SiO_x MATERIAL

- Preliminary testing demonstrates a capability to improve performance by more than 14% without noticeable first-cycle degradation [1].

Montreal, Canada, February 15th, 2024 — [HPQ Silicon Inc.](#) (“HPQ” or the “Company”) ([TSX-V: HPQ](#)) ([OTCQB: HPQFF](#)) ([FRA: O08](#)), a technology company specializing in green engineering of silica and silicon-based materials is pleased to announce a first significant milestone reached by its France-based affiliate, NOVACIUM SAS (“Novacium”).

Novacium commissioned an external laboratory to produce 18650 industrial batteries using its engineered SiO_x material, for which HPQ Silicon Inc. holds exclusive global licenses. This process was initiated with the intent to validate the immediate industrial potential of its SiO_x material.

The first batch utilized 100% graphite anode material, serving as benchmark batteries for performance comparison. These benchmarks were then compared to the second batch, which consisted of a blend of 90% graphite and 10% of Novacium's first-generation engineered SiO_x anode material.

“Charging and discharging cycle tests are ongoing, and preliminary results, after 5 cycles, are not just promising, they exceed our expectations [1],” said Dr. Jed Kraiem Ph.D., COO of Novacium.



Image 1) Dr. Jed Kraiem PhD, COO of Novacium holding an HPQ and Novacium Gen 1 18650 industrial battery.

ACHIEVING 14% BATTERY CAPACITY IMPROVEMENT WITH SILICON INTEGRATION

Achieving a 14% overall improvement in industrial type full-battery capacity compared to the 100% graphite benchmark batteries is indeed a significant accomplishment. These results surpass HPQ/NOVACIUM theoretical estimate of validating a 10% improvement in battery performance for these tests.

The absence of a measurable first cycle degradation, despite incorporating silicon, is particularly noteworthy. Silicon is known to expand and contract during charging and discharging cycles, which can lead to capacity loss. The fact that this issue has been mitigated is a promising sign for the potential application of this technology in battery manufacturing.

ENGINEERED SiO_x MATERIALS STRATEGY

Novacium and HPQ are focused on creating engineered SiO_x anode materials designed to improve the performance of graphite-based lithium-ion batteries. These advancements target various applications, including energy storage systems, consumer electronics, and electric vehicles.

“Drawing on our technical expertise gained from the photovoltaic industry, our goal is to produce a proprietary engineered SiO_x anode materials using cost-effective equipment and highly scalable processes that are already proven in a multi-ton-scale pilot manufacturing line, therefore allowing for the seamless integration of our engineered SiO_x anode material into existing electrode mixing and coating equipment,” said Dr. Jed Kraiem PhD, COO of Novacium. *“The resulting Graphite and SiO_x mixture will not only significantly enhance battery capacity but also can be utilized without modification by large-scale gigafactories worldwide.”*

TEST OBJECTIVES

The primary aim of making industrial batteries from the start was to showcase our ability to produce graphite and engineered SiO_x anode materials that battery manufacturers can use without altering their existing production processes. This capability is central to our strategy. The initial outcomes not only highlight the adaptability and compatibility of Novacium's methods but also suggest the possibility for broader industry application.

Continuing the charging and discharging cycle tests will be crucial to further validate the long-term performance and durability of these batteries. If the positive trend observed in the initial cycles persists, it could significantly advance battery technology with potential implications for various applications, including electric vehicles and portable electronics.

“These first results exceed our expectations, especially considering that our initial series of tests used a non-optimized version of our SiO_x material. This leaves room for further improved results in the future,” said Mr. Bernard Tourillon, President and CEO of HPQ Silicon Inc. and NOVACIUM SAS. *“As more cycle testing results become available, we believe that they will further confirm our unique ability to make this product and the commercial potential of Novacium-engineered SiO_x-based anode materials.”*

WHY USE THE 18650 BATTERY MODEL?

The commercial-grade lithium-ion battery model 18650 was intentionally selected due to its widespread use in consumer electronics, power tools and electric vehicle battery packs. This choice was strategic and aimed at leveraging the 18650 battery's established reputation for durability, high energy density, and efficient power conversion capabilities. In other words, 18650 battery was chosen as “the most standard” Lithium battery on the market.

The 18650 battery, characterized by its cylindrical form factor (18mm x 65mm), offers a balance between size and power, making it larger than standard AA batteries but significantly more potent, with

a voltage of 3.7v and capacity ranging from 2500mAh to 3500mAh. Its high drain capability and ability to be recharged hundreds or thousands of times without significant degradation make it an ideal candidate for projects demanding consistent, high-level power output. By selecting this battery type, which is a cornerstone in the EV industry, we ensure seamless integration and avoid potential issues related to power conversion when transitioning between different types of batteries.

This decision capitalizes on the battery's reliability and efficiency and aligns with industry standards, providing a familiar reference point for further development and application in various technological arenas.

We are aware that in the future, the standard battery will evolve toward the 21700 battery, therefore we are in process of preparing a next series of test using these types of industrial batteries.

"Today's announcement marks a significant milestone, reinforcing our strategic alliance with our associated company, Novacium. With our exclusive global licenses, HPQ is strategically positioned in the global market as a reliable and sustainable source of innovatively engineered SiOx battery materials," Mr. Tourillon added.

REFERENCE SOURCES

- [1] Novacium technical team analysis of the data from the ongoing charging and discharging cycle tests conducted at a world-leading university, the name of which is kept confidential for competitive reasons.

About NOVACIUM SAS

Novacium is an HPQ associated company started in Q3 2022. This green technology startup is based in Lyon, France and is a partnership with HPQ and three of France's leading research engineers, Dr. Jed KRAIEM PhD, Novacium's Chief Operating Officer ("COO"), Dr. Oleksiy NICHIPORUK PhD, Novacium's Chief Technical Officer ("CTO"), and Dr. Julien DEGOULANGE PhD, Novacium's Chief Innovation Officer ("CIO"). Novacium is a new Research and Development company which allows the researchers to develop their own technology in high added value fields connected to renewable energy, and allows HPQ Silicon Inc, a Canadian company, to expand the depth and reach of technical team to help develop its silicon and new renewable energy projects.

About HPQ Silicon

[HPQ Silicon Inc. \(TSX-V: HPQ\)](#) is a Quebec-based TSX Venture Exchange Tier 1 Industrial Issuer.

HPQ is developing, with the support of world-class technology partners [PyroGenesis Canada Inc.](#) and [NOVACIUM SAS](#), new green processes crucial to make the critical materials needed to reach net zero emissions.

HPQ activities are centred around the following four (4) pillars:

- 1) Becoming a green low-cost (Capex and Opex) manufacturer of Fumed Silica using the **FUMED SILICA REACTOR**, a proprietary technology owned by HPQ being developed for HPQ by PyroGenesis.
- 2) Becoming a zero CO₂ low-cost (Capex and Opex) producer of High Purity Silicon (2N+ to 4N) using our **PUREVAP™ "Quartz Reduction Reactors" (QRR)**, a proprietary technology owned by HPQ being developed for HPQ by PyroGenesis.
- 3) Becoming a producer of silicon-based anode materials for battery applications with the assistance of NOVACIUM SAS.
- 4) HPQ SILICON affiliate NOVACIUM SAS is developing a low carbon, chemical base on demand and high-pressure autonomous hydrogen production system.

For more information, please visit [HPQ Silicon web site](#).

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For further information contact:

Bernard J. Tourillon, Chairman, President, and CEO Tel +1 (514) 846-3271

Patrick Levasseur, Director Tel: +1 (514) 262-9239

Email: Info@hpqsilicon.com