

Making lithium ion battery components more durable and efficient to improve battery capacity

NEO Battery Materials' Progressing on the Development and Commercialization of Longer Lasting Higher Energy Density Lithium Ion Battery Components

Investors looking for a cutting edge technology company in the electric vehicle (EV) battery components sector need look no further than NEO Battery Materials Ltd. (TSXV: NBM | OTCQB: NBMFF). NEO is a North American battery materials company with a current focus on developing silicon anode (the negative electrode in a battery) materials through its "ion-and electronic-conductive polymer nanocoating technology." Or, in simpler language, a 'silicon material' for batteries, used to make the anode last longer in service (make it capable of being charged and recharged more times without losing integrity or efficiency) and be capable of holding more energy, thus making the battery more durable and efficient

NEO states: "NEO has a focus on producing silicon anode materials through its proprietary single-step nanocoating process, which provides improvements in capacity and efficiency over that of lithium-ion batteries using graphite in their anode materials."

NEO's stock price has been on a tear in 2021; however, the recent pullback potentially gives a better entry point for investors.

NEO Battery Materials (TSXV: NBM) 1 year stock price chart



Source: Yahoo Finance

Another thing that investors love is active management that can rapidly progress a company and produce lots of good news. We'll take a look at the news flow summary below, just for November 2021.

- Nov. 23, 2021 – NEO Battery Materials appoints lithium-ion battery electrode binder and polymer technology expert, Dr. Byeong-Su Kim, to Scientific Advisory Board. The news states: “Utilizing robust binder technologies with characteristics such as a high elastic modulus can **help contain and control the volume expansion of silicon**, resulting in lower probabilities of particle pulverization and a cracking anode.”
- Nov. 18, 2021 – NEO Battery Materials receives approval for a core patent from the Korean Intellectual Property Office.
- Nov. 16, 2021 – NEO Battery Materials announces research consortium LOI with both the University of Toronto **and with an undisclosed global OEM for R&D and scale-up of**

EV Battery Materials. The preliminary project will involve the full electrode fabrication of silicon-carbon composite anodes through NEO's silicon particle nanocoating process....With the active material (silicon and/or graphite), binders and conductive additives as core components....

- Nov. 10, 2021 – NEO Battery Materials appoints Dr. Dongmok Whang, expert in low-dimensional nanomaterials and graphene, to Scientific Advisory Board. His research expertise lies in the field of fabrication and manufacturing of low-dimensional nanomaterials, especially **graphene, semiconductor nanowires, and porous nanostructures** for applications in electric vehicle lithium-ion batteries, fuel cells, and various energy storage solutions.
- Nov. 4, 2021 – NEO Battery Materials accomplishes **anode production capacity upscaling Project** over the past three months. The news states: “From the initial production rate of several grams per hour for manufacturing silicon anode materials at the lab-scale, **NEO's engineering team has accomplished to expand the rate to a level of several kilograms per hour.** This is a result of improving productivity by more than 1,000-fold, and the success of the Project at this level has given stronger validation for **the 120-ton semi-commercial plant that is scheduled to be commissioned by the end of next year.**” President & CEO Spencer Huh, added: “As NEO understands the need to fast-track into mass production, we are pleased to announce the accomplishment of the Upscaling Project. The Company is at the forefront of developing unique Si anode lines through the low-cost manufacturing process, and we are customizing solutions for various downstream users to optimize the products for high-power electric vehicle lithium-ion battery applications.”

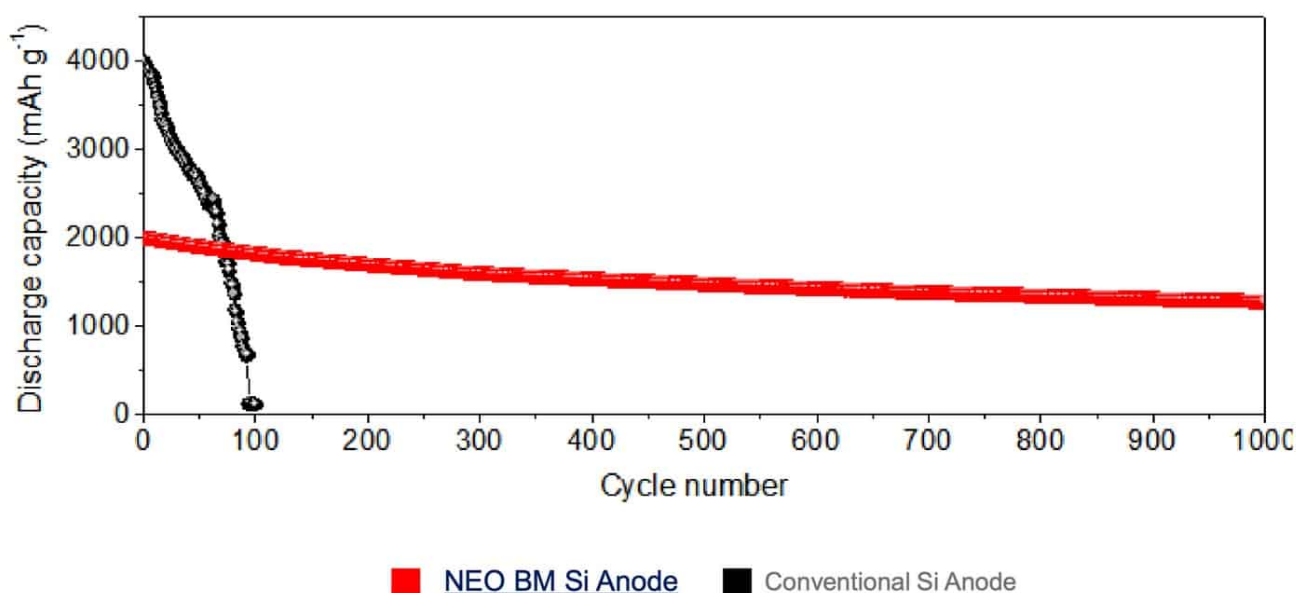
The above 5 news items, when added together' show the rapid

pace and progress NEO is achieving. Looking back on the previous two months there were even more great achievements by NEO. The standout news came on October 26 when NEO announced: **“Completion of semi-commercial plant conceptual design and initiates engineering EPC stage for construction.”** The facility will be in South Korea. President & CEO, Spencer Huh, stated: “NEO is now another step towards commercializing our silicon anode materials for EV lithium-ion batteries and is actively expediting our timelines and milestones.”

As shown below the problem with silicon in anodes can be that as the silicon absorbs the electrons it expands then cracks the anode, leading to a low cycle life (low longevity). NEO has managed to improve this by using its cost-effective and efficient one-pot, single-step, nanocoating process.

NEO Battery Materials state that their silicon anode materials are already achieving much higher cycles than competitors

Long Lasting pure Si Anodes > 1000 Cycles – Minimal Volume Expansion during Cycling



Source: NEO Battery Materials company website

Closing remarks

A lot of the details surrounding NEO Battery Materials’

achievements are not very well understood by investors. This is only natural as most investors are not battery material scientists.

The key to understanding NEO's work is that its silicon anodes or composite silicon graphite anodes can significantly improve battery capacity, which relates to greater energy density, and hence longer range for the same size battery. What EV manufacturers and customers all want is better performing batteries that result in longer driving range for a given size battery. Silicon anodes today present many challenges, especially cracking leading to poor cycle life. NEO is making great strides in solving this problem by producing silicon anode materials with a much longer cycle life.

If NEO can succeed in meeting commercial standards it will have Tesla and other EV and battery/anode OEMs knocking on its door. For now it appears there is plenty of promise, especially given the longer cycling results (1,000 cycles) and recent production scaling progress, as well as the interest from an OEM in joining NEO's research consortium.

NEO Battery Materials trades on a market cap of C\$39 million. It's one to watch.