Breakthrough Cycling Performance on All-Solid-State Electrolyte Batteries with NEO's Metallurgical-Grade Silicon Microparticle Anodes

written by Raj Shah | September 14, 2021

September 14, 2021 (Source) – NEO Battery Materials Ltd. (**TSXV: NBM**) (**OTCQB: NBMFF**) ("**NEO**" or the "**Company**") is pleased to announce that NEO's metallurgical-grade silicon (Si) microparticle anode materials have achieved exceptional stability and breakthrough cycling performance with an all-solid-state electrolyte compared to the cells of conventional liquid electrolytes.

NEO's low-cost, metallurgical-grade silicon particles of micron-size were able to sustain its original specific capacity of 3000 mAh/g without major capacity loss or performance degradation in the cell as shown in the data below. A sulfide-based solid-state electrolyte, argyrodite, was utilized with a 100% loading of NEO's silicon microparticle anode materials. The battery test was conducted and validated by a South Korean third-party laboratory.

The Need to Shift from Silicon Nanoparticles to Microparticles

Metallurgical-grade silicon microparticles are the most promising candidate for next-generation silicon anode materials in electric vehicle and energy storage applications due to the cost-savings that can effectively drive down battery costs (in dollars-per-kilowatt-hour). On average, the microparticles are 8 to 10 times less expensive than the same nanoparticles. However,

its poor performance from the volume expansion issue stands as a substantial hurdle for commercialization.

“NEO, hence, is focusing on the performance improvement of metallurgical-grade silicon microparticles through the Company’s proprietary nanocoating technology. Implementing silicon microparticles into the anode material will be a complete game-changer for the lithium-ion battery industry. As released previously, NEO enabled a 6-minute ultra-fast charging with the microparticles, and today, we are more than excited to announce that the low-cost Si anode made by NEO’s modification can exhibit substantial cycling performance in argyrodite-based all solid-state electrolytes,” commented Dr. J. H. Park, Director and Chief Scientific Advisor of NEO.

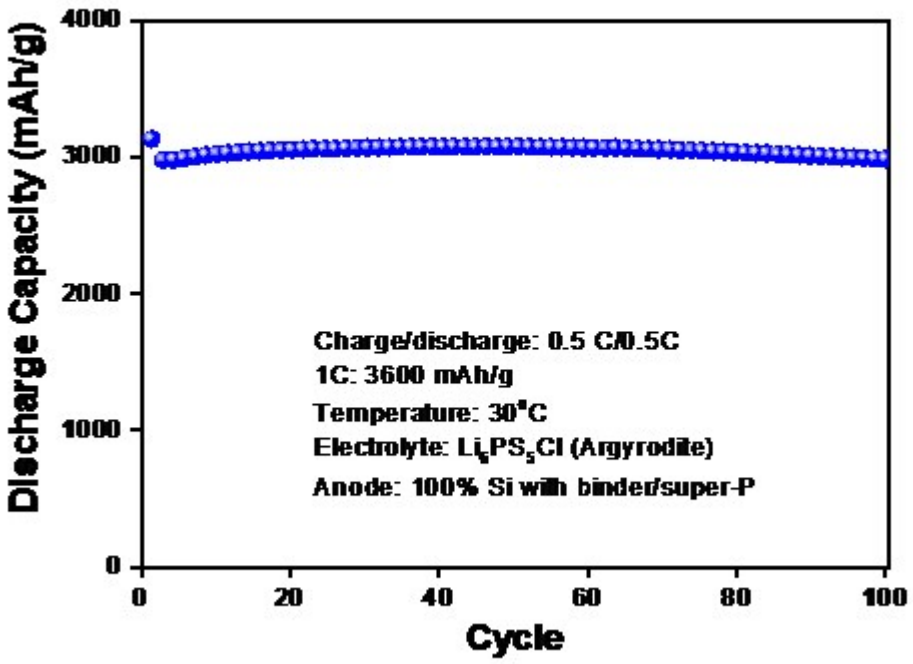


Figure 1

To view an enhanced version of Figure 1, please visit: https://orders.newsfilecorp.com/files/4661/96418_8949df1734b69b03_001full.jpg

Recent Development of Lithium Argyrodite Solid-State Electrolytes for Solid-State Batteries

Solid electrolytes play a key role to enable superior safety reliability and high performance for all-solid-state lithium batteries. Among the diverse selection of solid electrolytes, argyrodites represent a relatively new and promising class of sulfide-based lithium-ion superconductors due to their high ionic conductivity at room temperature, low-cost and good compatibility with lithium (Li). Li argyrodite solid-state electrolytes are a vital component to develop high-performance all-solid-state batteries, and numerous players in the battery supply chain are attempting to commercialize this product.

Mr. Spencer Huh, President and CEO of NEO, added, “The first phase of NEO’s silicon anode materials will be applicable for general liquid-type conventional lithium-ion batteries for EVs, but our unique nanocoating solution for the production of low-cost and high-performance Si anodes will concurrently accelerate the commercialization timeline of all-solid-state batteries. Under the NDAs with established and reputable solid-state battery developers, NEO will continue to expand our collaboration through moving forward with the testing of NEO’s micron-sized silicon anodes, and we expect to enter the battery supply chain through diversified routes. Additionally, with the semi-commercial facility, the mass production of NEO’s silicon anodes is approaching near.”

About NEO Battery Materials Ltd.

NEO Battery Materials Ltd. is a Vancouver-based company focused on battery metals and materials. NEO has a focus on producing silicon anodes materials through its proprietary single-step nanocoating process, which provides improvements in capacity and efficiency over lithium-ion batteries using graphite in their anode materials. The Company intends to become a silicon anode active materials supplier to the electric vehicle industry. For

more information, please visit the Company's website at: https://www.neobatterymaterials.com/.

On behalf of the Board of Directors

Spencer Huh
President and CEO
604-697-2408
shuh@neobatterymaterials.com

This news release includes certain forward-looking statements as well as management's objectives, strategies, beliefs and intentions. Forward-looking statements are frequently identified by such words as "may", "will", "plan", "expect", "anticipate", "estimate", "intend" and similar words referring to future events and results. Forward-looking statements are based on the current opinions and expectations of management. All forward-looking information is inherently uncertain and subject to a variety of assumptions, risks and uncertainties, including the speculative nature of mineral exploration and development, fluctuating commodity prices, the effectiveness and feasibility of technologies which have not yet been tested or proven on a commercial scale, competitive risks and the availability of financing, as described in more detail in our recent securities filings available at www.sedar.com. Actual events or results may differ materially from those projected in the forward-looking statements and we caution against placing undue reliance thereon. We assume no obligation to revise or update these forward-looking statements except as required by applicable law.

Neither TSX Venture Exchange nor its Regulation Services Provider (as that term is defined in the policies of the TSX Venture Exchange) accepts responsibility for the adequacy or accuracy of this release.