ASX ANNOUNCEMENT

Exceptional yields and electrochemical performance of coated spherical graphite

HIGHLIGHTS

- **Electrochemical results indicate that Chilalo spherical graphite can be produced into the super-premium class of active anode materials for lithium-ion batteries in the EV and energy storage sectors – this class of active anode materials sells for US$18,000 – US$22,000 per tonne.**
- **Superior battery electrochemical performance of Chilalo coated spherical graphite, including:**
    - **Reversible capacity (the measure of specific capacity rating) of 368 mAh/g[1] – this is near theoretical capacity of 372 mAh/g; and**
    - **Irreversible capacity loss (essentially demonstrating the retention of specific capacity from charge to charge) is < 7%.**
- **These results exceed the specifications of the major EV manufacturers and basically mean that lithium-ion batteries using Chilalo coated spherical graphite will have exceptional cycle life and very high recharge efficiency compared to competing products (ie. represent a premium product).**
- **Unoptimised testwork delivered exceptional 64% yields into usable spherical graphite (compared to industry average of ~40%) – this will substantially enhance the economics of Evolution's battery anode materials production plant.**
- **These results provide compelling justification for Evolution to advance the feasibility and construction of a battery anode materials production facility either in parallel with the development of Chilalo or soon thereafter.**
- **Evolution has produced sufficient data during this program to immediately commence qualification initiatives for its coated spherical graphite with leading battery manufacturers.**
- **Evolution will continue to work with its US technology partner to optimize and improve results and produce specific sizes and grades for targeted battery manufacturers.**
- **Further processing and battery testing of the purified, non-spherical by-product from the spheroidisation process is ongoing to determine suitability as conductivity enhancement in battery cathodes and electrically conductive coatings – successful results would further enhance the economics of the planned battery anode materials plant.**

Evolution Energy Minerals ("Evolution" or the "Company") (ASX: EV1, FSE: P77) is pleased to report the results of testwork aimed at the production of uncoated and coated spherical graphite from thermally purified graphite from the Company's Chilalo Graphite Project in Tanzania. The testwork builds upon earlier tests that confirmed thermal purification could produce an ultra-high purity of 99.9995 wt% C prior to milling and shaping.

Phil Hoskins, Managing Director of Evolution Energy Minerals, commented, "*Evolution is pleased to report the outstanding spheroidisation and electrochemical performance of our Chilalo flake graphite. Our inverted process flow sheet has achieved significantly higher yield into usable spherical graphite compared to traditional particle shaping circuits. Following the application of our proprietary surface coatings to spheroidised particles, the resulting coated spherical graphite exceeds the specifications of leading EV battery manufacturers.*

[1] mAh/g = Specific capacity rating of the battery in milliampere hours (mAh) per gram of anode material.

"Preliminary battery testing has demonstrated electrochemical performance that is essentially as good as it gets for coated spherical graphite, due primarily to the unique properties of Chilalo flake graphite. These factors point toward the suitability of Chilalo graphite to producing the highest quality lithium-ion battery anode materials that attract premium prices and to Evolution's downstream processing technology providing a leading cost and margin position in the industry."

Testwork Stages

Evolution is working with a US technology partner, an established manufacturer of advanced battery materials and experienced graphite supplier to the battery industry, on a series of tests to determine the suitability of Chilalo's fines product for downstream processing into higher value battery anode materials.

The initial testwork stage established that graphite from Chilalo contained extremely low amounts of Molybdenum and Boron. Elemental analysis of impurities in Chilalo's 95% C flake graphite fines concentrate identified extremely low levels of naturally occurring Molybdenum and Boron, opening the pathway to premium performance batteries (where extremely low concentrations of Molybdenum are a pre-requisite), and nuclear-grade graphite (which require naturally low levels of Boron).[2]

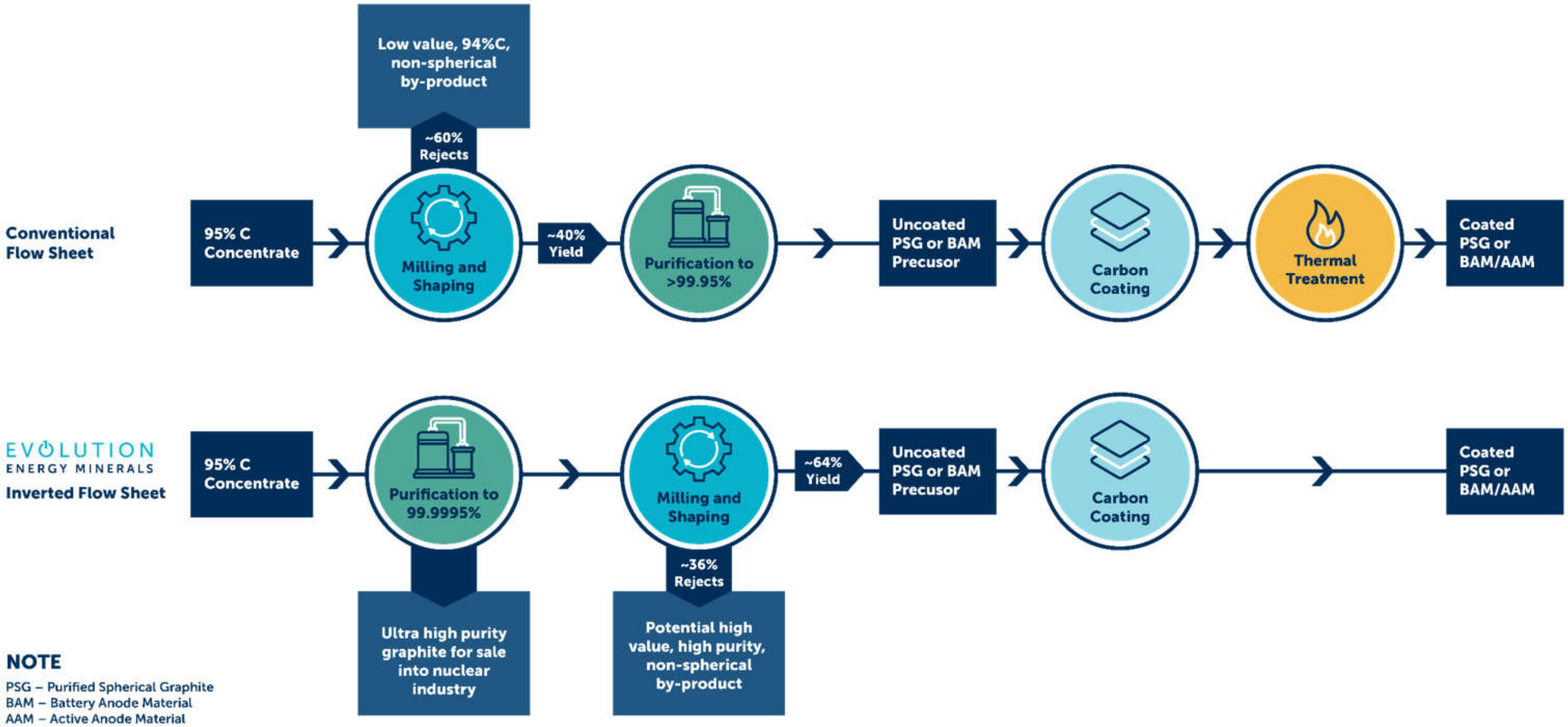
The second testwork stage involved thermal purification of the graphite to achieve battery grade (>99.95% C). This purification resulted in an extremely high purity of 99.9995% C, which exceeds the purity requirements of both the battery and the very high value nuclear sector. Evolution adopted an 'inverted' flow sheet whereby the purification step is undertaken prior to milling and shaping into spheroids, which is the opposite of the traditional approach.

This current testwork stage took the 99.9995% C thermally purified graphite and undertook a process of shaping and milling, otherwise known as spheroidisation. Traditional flow sheets that mill and shape first generally have a yield of ~40%, with the 60% rejected suitable only for low value by-products. Evolution's process has resulted in significantly higher yields, with the rejected material potentially being suitable for high-value by-product applications due to its very high purity.

Following spheroidisation, the uncoated spheroidal material was then subjected to a proprietary coating process with soft carbon, with the resulting carbon coated spherical graphite having properties that meets the specification of some of the leading EV battery producers in the world.

[2] See ASX announcement 6 July 2022.

Figure 1: Inverted vs Traditional Flow Sheet



Spheroidisation of thermally purified Chilalo graphite

The shaping precursor was thermally-purified graphite with an initial purity of 99.9995% C, tap density of 0.67 g/cm^3, and surface area of 1.99 m^2/g. Energy dispersive scan (**EDS**) analysis of this precursor material reveals extremely pure flake with no notable foreign impurities. The concentration of iron, which is one of the main deleterious elements in batteries, was measured by ICP-OES as 0.97ppm, (more than 10x lower than the level of 10ppm required for premium performance lithium-ion and alkaline batteries).

The purified precursor material was milled to a particle size (d50) of approximately 16 microns. It was then spheroidized with an overall yield of 99.7%. Several spheroidisation process settings were tested, ultimately resulting in the production of 63.96 wt. % spherical graphite and 36.04 wt. % of non-spherical graphite.

The EDS analysis of the uncoated spherical graphite recovered after spheroidisation confirmed that the material remains 100% carbon, meaning that no impurities were introduced during the shaping process. This differs materially from traditional methods of making spherical graphite, where spheroid yields are typically lower and cross-contamination, coupled with excessive tool wear, occurs.

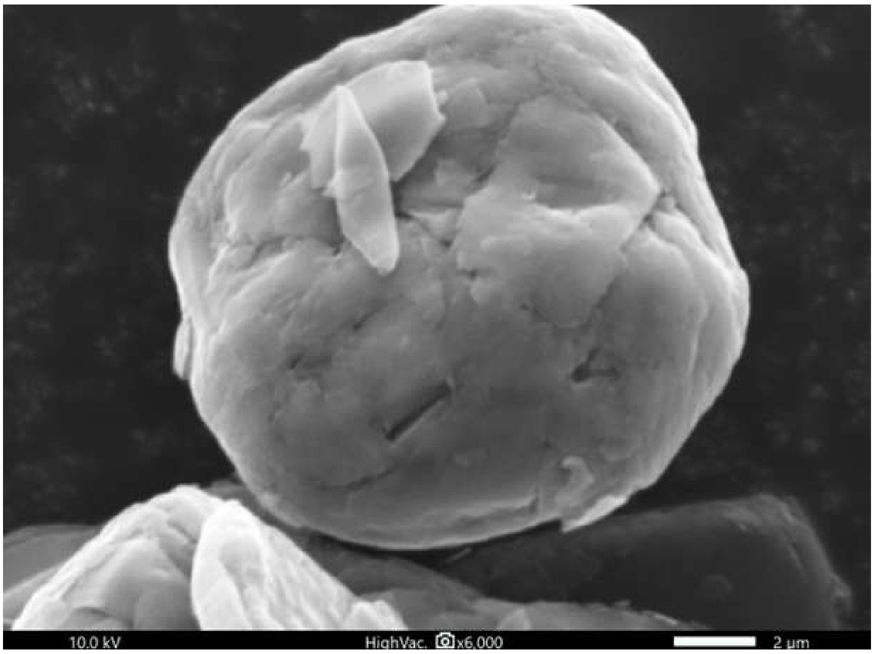
Set out below are some advantages that Chilalo's natural graphite product and process have over existing products using conventional technologies.

1. Significantly higher yields in spherical graphite

   Additional benefits are realized through higher spheroidisation yields. In a conventional milling circuit, a typical yield of spherical particles is approximately 1.5% per mill. In the scenario where all 23 mills operate, the spherical yield amounts to 34.5%. In contrast, Evolution's process flow sheet yields 64%, which is still unoptimized yet almost twice the yield of traditional technologies. These yields have a significant positive impact on the economics of a battery anode materials plant, generating higher revenue from spherical graphite for every tonne of flake graphite feedstock.

   The high yields achieved are attributed to a combination of the favourable properties of Chilalo flake (being very pliable into spheroids) as well as to the spheroidisation technology employed. Figure 2 shows a Scanning Electron Micrograph (**"SEM"**) of a typical spheroidal particle formed through the aforementioned method.

Figure 2: SEM analysis of Chilalo's thermally purified uncoated spherical graphite



2. Testwork of non-spherical 'rejects' or by-products

   Conventional spherical graphite flowsheets typically produce:
   - ~35-40% yield into saleable coated spherical graphite; and
   - ~60-65% 'rejects' representing a 94% C, non-spherical, low value by-product.

   In contrast, Evolution has achieved:
   - 64% yield into a premium quality coated spherical graphite; and
   - Evolution's US technology partner is conducting a series of demonstration projects to process the 36% non-spherical, high-purity by-product into both:
     - battery cathode conductivity enhancement materials; and
     - premium-performance electrically conductive coatings.

   Positive results from the demonstration projects on the non-spherical by-product would significantly enhance the economics of Evolution's proposed downstream battery anode plant by producing high-value products from 100% of the fine flake feedstock.

3. Reduced tool wear of Evolution flow sheet

   Conventional technologies process spherical graphite at a starting purity of approximately 94-95% C. A cascade milling circuit, typically consisting of 21-23 pin mills outfitted with air classifiers, is employed. As the predominant impurities in flake graphite are iron oxides, alumina, and silica, impurities have a significant abrasive effect on mill parts. Evolution's flowsheet realizes a number of benefits by spheroidising ultrapure flake, with its impurity-free graphite acting as a dry film lubricant, as opposed to being abrasive, on the mill components. This will significantly reduce the repair and maintenance costs relative to those of its competitors.

4. Reduced footprint for Evolution downstream operations

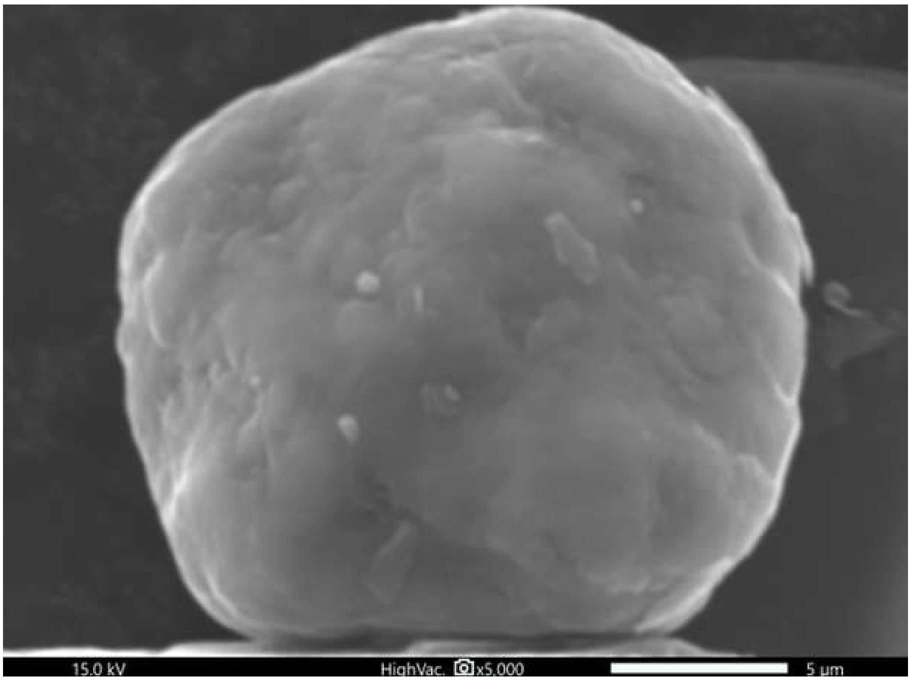
   Evolution's process flowsheet proposes to use state-of-the-art Japanese shaping mills. These mills operate on a different principle than those in a cascade circuit. Rather than a 23-mill daisy chain, particle shaping technology from Japan uses a single mill to achieve the same result. As a result, the footprint of Evolution's future operations will be significantly smaller given its selected technology.

Coating

Spheroidal graphite generated in the particle shaping operation was then subjected to surface coating. The coating source is known as soft carbon; upon heat treatment, its properties can be tailored to meet the requirements for high-power and high-energy applications in lithium-ion batteries. The resultant carbon-coated spherical graphite had the following properties: tap density of 0.95 g/cm^3, d50[3] of 25 µm, and BET surface area of 2.8 m^2/g, which already meets the specification of some of the leading EV battery producers in the world. Milling process adjustments can easily result in the production of spheroidal carbon-coated graphite with a finer particle size, in order to meet the requirements of other EV manufacturers in the future. Figure 3 illustrates SEMs of the surface-coated graphite produced from purified Chilalo flake.

[3] d50 = median particle size

Figure 3: SEM analysis of Chilalo's thermally purified coated spherical graphite



Electrochemical performance of uncoated and coated spherical graphite

Electrochemical testing is undertaken to determine the expected level of performance of spherical graphite as the anode material in lithium-ion batteries. The key measures include:

- Reversible capacity – this represents the specific capacity (i.e. driving longer battery life);
- Irreversible capacity loss – this measures the coulombic efficiency of a discharge process, essentially demonstrating the retention of specific capacity from charge to charge; and
- Tap density – this measures the mass of spheroids that can be packed into a fixed battery volume (the higher the better).

Evolution's US technology partner has assembled industry standard CR2016 cells with lithium counter electrodes for initial testing. The stated capacities were achieved at a C/10 formation rate, meaning that the cell was charged and discharged over ten hours for each part of the cycle.

Table 1 below demonstrates how Chilalo's coated spherical graphite meets the definition of super-premium class of active anode materials.

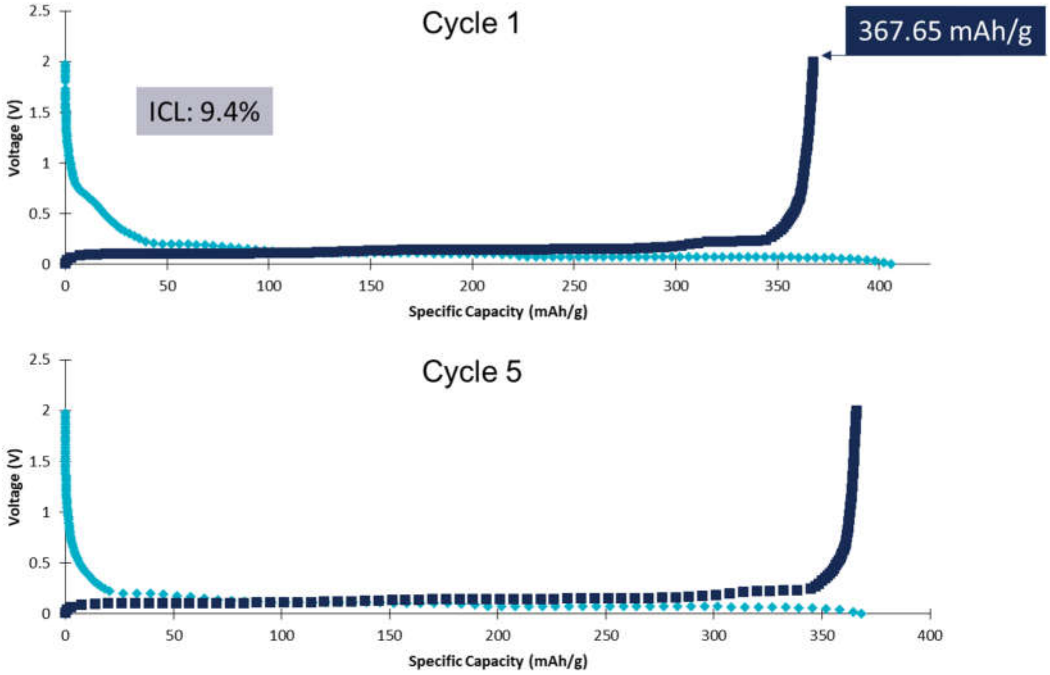
Table 1: Comparison of Chilalo's results to the electrochemical parameters determining premium and super-premium anode materials for use in the lithium-ion battery industry

	Premium anode materials	Super-premium anode materials	Chilalo uncoated spherical graphite	Chilalo coated spherical graphite
Purity (wt. % C)	99.9 – 99.95%	>99.98%	99.9995%	99.9995%
Reversible capacity (mAh/g)	> 350mAh/g	> 360mAh/g	~368mAh/g	~368mAh/g
Irreversible capacity loss (%)	< %	< 7%	N/A	< 7%
Tap density (g/cm^3)	> 0.90	> 1.00	0.97[1]	0.95[1]
Price range per tonne (FOB plant)	US$8k–10k	US$18k–22k	Not a finished product	US$18k–22k

[1] It is a mere technical formality that further optimisation will improve the Tap density to >1 whilst ensuring the other parameters are maintained.

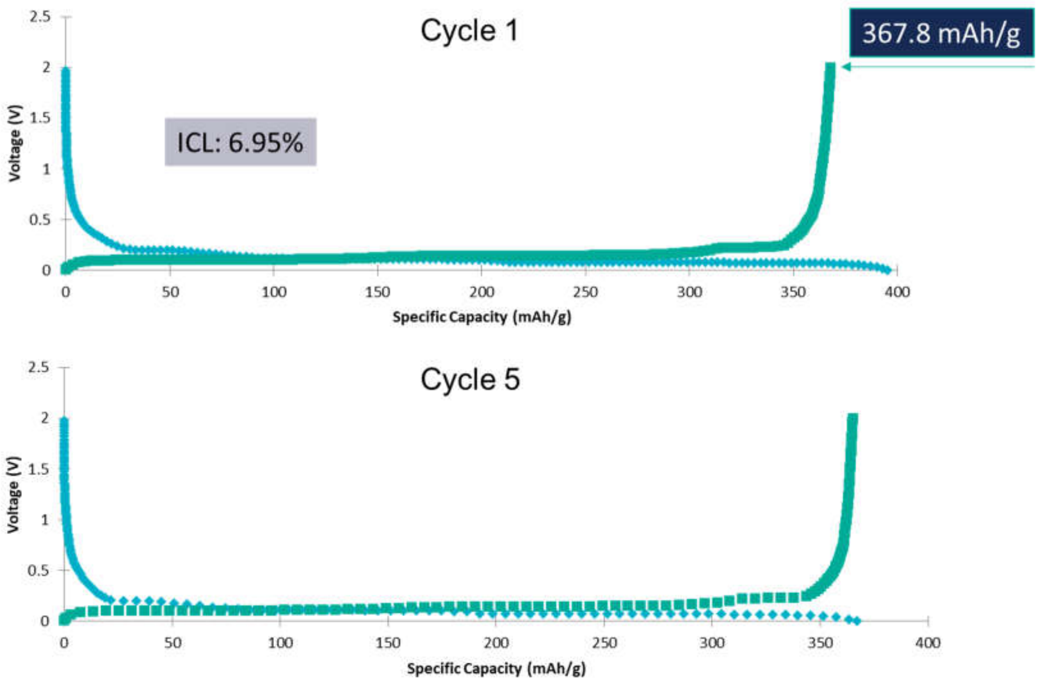
Initial testing of the electrochemical performance of Chilalo's uncoated spherical graphite returned a reversible capacity of 367.65 mAh/g (see Figure 4), which is very impressive considering that 372 mAh/g is the theoretical maximum reversible capacity achieved by conventional spherical graphite. The Irreversible Capacity loss was registered at 9.4% which needs to be under 10% for uncoated spheroidal graphites intended for premium performance applications.

Figure 4: CR2016 coin cell data for Evolution's uncoated spherical graphite



Coated spherical graphite demonstrated even better reversible capacity of 367.8 mAh/g while the irreversible capacity loss dropped to <7%, confirming that Chilalo's coated spherical graphite can be produced into the super-premium class of active anode materials for use in lithium-ion battery anodes in the automotive and utility energy storage sectors (see Figure 5).

Figure 5: CR2016 coin cell data for Evolution's coated spherical graphite



Graphite was analysed for five continuous charge-discharge cycles and demonstrated excellent stability in the electrochemical capacity, cycle over cycle. Testing is continuing and Evolution is confident that improved results can be achieved.

Next steps

Long-term cycle testwork is ongoing, with further results expected in the coming weeks. The Company also expects to finalise the demonstration projects on the non-spherical by-product, aiming to produce battery cathode conductivity enhancement materials and premium performance electrically conducting coatings.

This announcement has been approved for release by the Evolution board of directors.

For further information please contact:

Phil Hoskins
Managing Director
phoskins@ev1minerals.com.au
T: +61 8 9200 4960

Michael Bourguignon
Executive Director
mbourguignon@ev1minerals.com.au
T: +61 8 9200 4960

Andrew Rowell
White Noise Communications
andrew@whitenoisecomms.com
T: +61 400 466 226

European investor relations
Eva Reuter
Dr Reuter Investor Relations
e.reuter@dr-reuter.eu
T: +49 69 1532 5857

ABOUT EVOLUTION (ASX:EV1)

Development ready
Chilalo Graphite Project in Tanzania

58% > 80 Mesh
World leading flake size = highest margins

Unique offtake and downstream collaboration
Extensive product qualifications with YXGC, global leader for EG and foil

Framework agreement
To provide Tanzanian government certainty

FID by H2 2022
Strategic ESG fund cornerstone support

Sustainable battery anode strategy
Superior performance, environmentally friendly thermal purification

Carbon neutrality
Pursuing net zero carbon from day one

Evolution's vision is to become a vertically integrated company that will only supply sustainably sourced graphite products and battery materials.

This will be achieved by combining our unique graphite source with industry-leading technology partners, working closely with customers and producing diversified downstream products in both Tanzania and strategically located manufacturing hubs around the world. Evolution is committed to being global leaders in ESG and ensuring its operations support the push for decarbonisation and the global green economy.