ASX Release 7 February 2017

BLACK ROCK MINING DELIVERS INDUSTRY LEADING BATTERY TEST RESULTS

Highlights

- Ongoing US accredited laboratory test work of Black Rock Mining´s Mahenge Graphite Project 99.95+wt% graphite concentrate **continues to deliver industry leading battery test results** including:
  - Uncoated graphite flakes producing a near perfect lithium-ion battery **reversible capacity of 371.28 mAh/g** out of a theoretically possible 372 mAh/g for natural graphite flakes;
  - Uncoated and coated spherical graphite in battery cells designed for long-term cycling demonstrated excellent performance characteristics with reversible capacities of 368.94 Ah/g and 354.26 mAh/g respectively;
  - Uncoated and coated spherical graphite delivered exceptionally low BET (Brunauer, Emmett and Teller) surface area values of 4.15 m^2/g and 0.82 m^2/g respectively, considered very suitable for high energy lithium-ion batteries;
  - Uncoated and coated irreversible capacity loss (ICL) values of 8.35% and 5.61% respectively which are regarded as exceptional for natural flake graphite, having the potential to lower cell cost and increase cell cycle life; and
  - Long term cycling of uncoated and coated graphite **showing virtually no change in battery performance with 25 cycles completed to date of a 100+ cycle period.**
- Test results suggest Mahenge Graphite Project graphite has the potential to **enable battery manufacturers to produce more stable lithium-ion batteries at a lower cost with a longer cycle life.**
- Potential to displace synthetic graphite in lithium-ion batteries once performance, cost advantages and the ability to consistently supply spherical graphite for long term production can be demonstrated.
- Industry leading battery test results drive ongoing discussions with potential partners.

Tanzanian graphite developer, Black Rock Mining Limited (ASX:BKT) ("Black Rock" or the "Company"), is pleased to announce battery test works continue to deliver industry leading results.

Black Rock Mining, Managing Director, Steve Tambanis commented:

> *"These results continue to demonstrate the industry leading product attributes of Black Rock´s Mahenge Graphite Project. The results demonstrate our graphite could deliver battery manufacturers with more stable lithium-ion batteries at a lower cost as well as a superior cycle life.*
>
> *They are also very important in enabling our ongoing discussions with potential partners that are critical for the success of the project."*

Overview

In 2016 Black Rock engaged a US accredited firm to commence spherical graphite and purification test works on its Mahenge Graphite Project graphite concentrate.

The current program builds on the successful spherical graphite and purification test work showing that the Mahenge Graphite Project spherical graphite has unique positive physical features that have the potential to improve the stability, battery safety performance and enhance the cycle life of lithium-ion batteries. The recently completed electrochemical tests reinforce these results.

Importantly, Black Rock believes it is leading the graphite industry in recognising the importance of the use of long-term cycling data in order to characterise the sustainability of battery performance with the Company's graphite. Long-term cycling is a pivotal performance characteristic within the battery industry.

Black Rock expects these further positive test results to support ongoing discussions with potential partners.

Key sections of the February 2017 report are provided below.

Production of spherical graphite – uncoated and coated

Natural crystalline flake graphite from BKT's Ulanzi resource in Mahenge, Tanzania has been upgraded through flotation to a concentrate purity level of 99.2%Cg. It was then refined**, in a singular pass, by the Company's proprietary, acid-free, environmentally benign carbothermal purification process to 99.99994 wt% C purity.** This material was used as a precursor for spheroidisation.

The refined material was treated by a sequence of steps to produce spheroidal uncoated and spheroidal surface coated graphites. The latter sample of a coated grade, lab code BKT161206001 (see Figure 1 below for a Scanning Electron Micrograph (SEM), had a particle size of D_{50}=25.8 μm and a Tap density of 0.95 g/cm^3. The former grade of the uncoated spheroidal flake, lab code BKT161206004, featured a particle size of D_{50}=23.4 μm a Tap density of 0.91 g/cm^3.

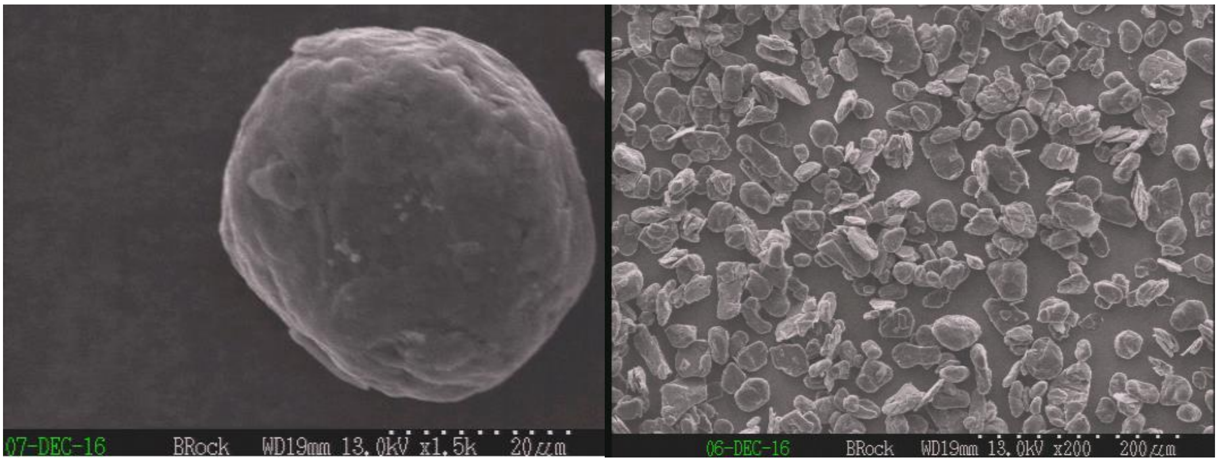

Figure 1. SEM of surface coated spheroidal flake, BKT161206001.

These values are in line with the current market expectations for graphite employed in high energy lithium-ion batteries (**LIBs**).

BET surface area values

The BET surface area values for Ulanzi flake after spheroidisation and classification to a desired particle size were determined to be 4.15 m^2/g and 0.84 m^2/g for the uncoated spheroidal BKT161206004 and coated spheroidal BKT161206001, respectively. **These values define the uniqueness of BKT's Ulanzi flake from several perspectives.** A typical value of BET in the uncoated spheroidal flake graphite is in the order of 6 to 12 m^2/g. We attribute the value of 4.15 m^2/g measured with the Ulanzi flake to the unique mineralisation of Mahenge resource in the Ulanzi area.

The explanation for the low BET is in the structure of graphite macromolecules from the particular geographic area and formation. The particles of Ulanzi material are characterized by thick, blocky flakes of low intrinsic porosity (refer Figure 2 below). This is evidenced by high packing density of the Ulanzi material on the backdrop of similar products. The lower the porosity, the fewer the number of absorption sites, the lower the BET surface area. In fact, the BET is so low that the Ulanzi flake could potentially pass the acceptance specifications of certain target battery customers without having to do, or with a very minimal deposition of the surface coating layer on top of flake particles.

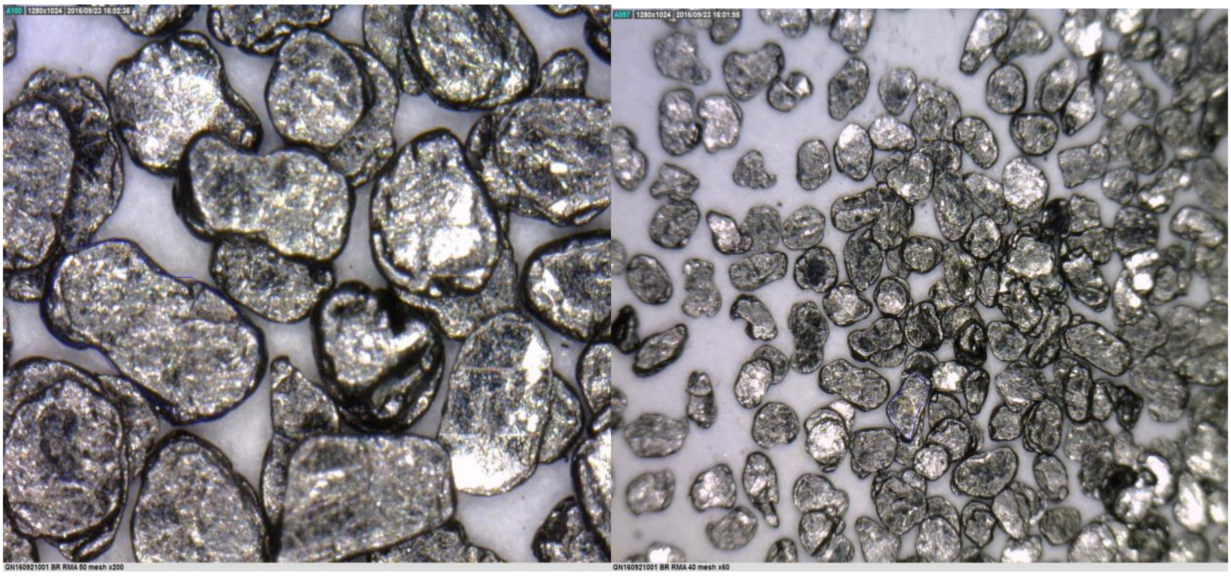

Figure 2. Optical micrographs demonstrating thick, blocky graphiteflakes

On the other hand, the BET surface area of 0.84 m^2/g for the coated spheroidal sample, BKT161206001, is a reflection of technological proficiency of BKT's proprietary surface coating process, which further reduces the surface area of the already exceptionally low BET precursor particle to another record low value. It has been postulated by the battery industry that irreversible capacity loss generally goes down while the battery safety (robustness against going into a thermal runaway) generally improves when the BET surface area decreases. Admittedly, there is a sweet spot where the BET surface area needs to be at, since high power capability of graphite will generally go down with an ultra-low BET of graphitic anode active material on the negative electrode side.

Coin Cells – CR2016

Coin cell batteries of a standard size CR2016 (20 mm diameter by 1.6 mm thick) were assembled with both coated (BKT161206001) and uncoated spheroidal graphites (BKT161206004). Lithium foil was used as a counter electrode. The BKT graphite was used as a working electrode; cells were cycled in several electrolytes, to include 1.0M $LiPF_6$ in EC/DMC (1:1 by wt) with additions of vinylene carbonate. The notional schematic and a cutaway view of cells, which have been tested is provided by reference by Figure 3.

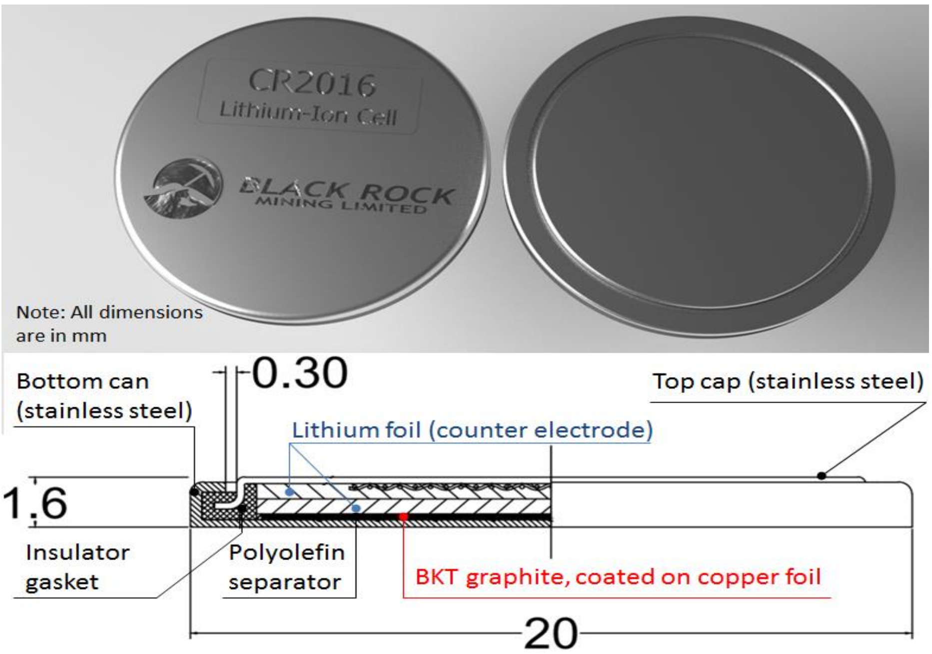

Figure 3. Notional schematic and a cutaway view of CR2016 coin cells, which were used in the subject study.

Cell testing and Irreversible Capacity Loss

The first test of the initial electrochemical performance study was conducted with an uncoated BKT graphite (sample BKT161206004) at the very slow charge/discharge rate of C/100. This rate is defined by a current that it took to fully intercalate (charge) and de-intercalate (discharge) graphite of a given sample weight of 13.063 mg/cm^2 over the period of time of approximately 100 hours continuously. The quoted cycling rate is approximately five times slower than the rate used to form graphite in actual lithium-ion batteries. The C/100 rate cycling was a preliminary exercise, whose purpose was to learn about the behaviour of Ulanzi flake. The result of this formation cycling is presented in Figure 4.

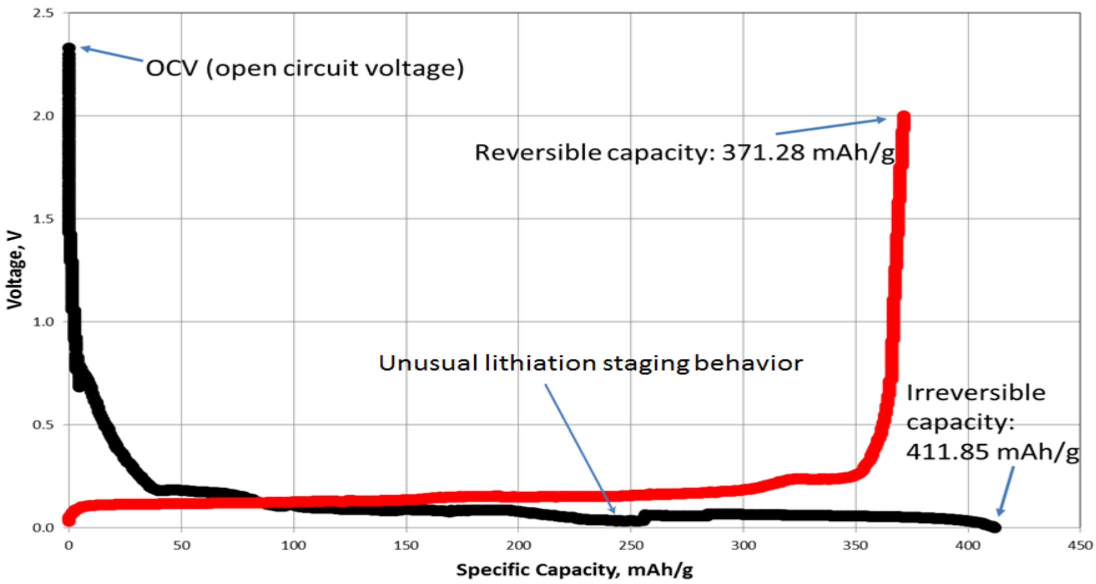

Figure 4. Initial Galvanostatic Behavior of Uncoated BKT Flake (sample BKT161206004) in a CR2016 coin cell vs. Li/Li$^+$ counter electrode at an ultra-slow cycling rate of C/100.

Several important observations could be derived from the data presented in Figure 4. First and foremost, the reversible capacity of uncoated graphite BKT161206004 reached the value of 371.28 mAh/g out of 372 mAh/g theoretically possible for unaltered natural crystalline flake graphite. **On a backdrop of many other commercially used carbon materials with a reversible capacity of less than 350 mAh/g, the BKT graphite performance is absolutely an impressive attribute.** Secondly, the irreversible capacity loss (ICL), which we define as 100% minus a percent fraction of reversible capacity over irreversible capacity is 9.85%. This is a robust performance value for uncoated graphites. Higher surface area materials often demonstrate 12+ % ICL, which require thicker top coatings at a greater incremental cost.

In the next series of tests the uncoated spheroidal graphite sample BKT161206004 was cycled at a much higher cycling rate of C/20. The latter rate is considered an acceptable formation cycling rate in the lithium-ion battery industry. The results of two initial cycles are presented by Figure 5. The graph presented in Figure 5 shows excellent graphite with a near theoretical reversible capacity of 368.94 mAh/g and a very moderate first cycle loss (ICL) of 8.35%. Low ICL is likely due, at least in part, to the naturally low BET surface area of BKT flake at 4.15 m^2/g.

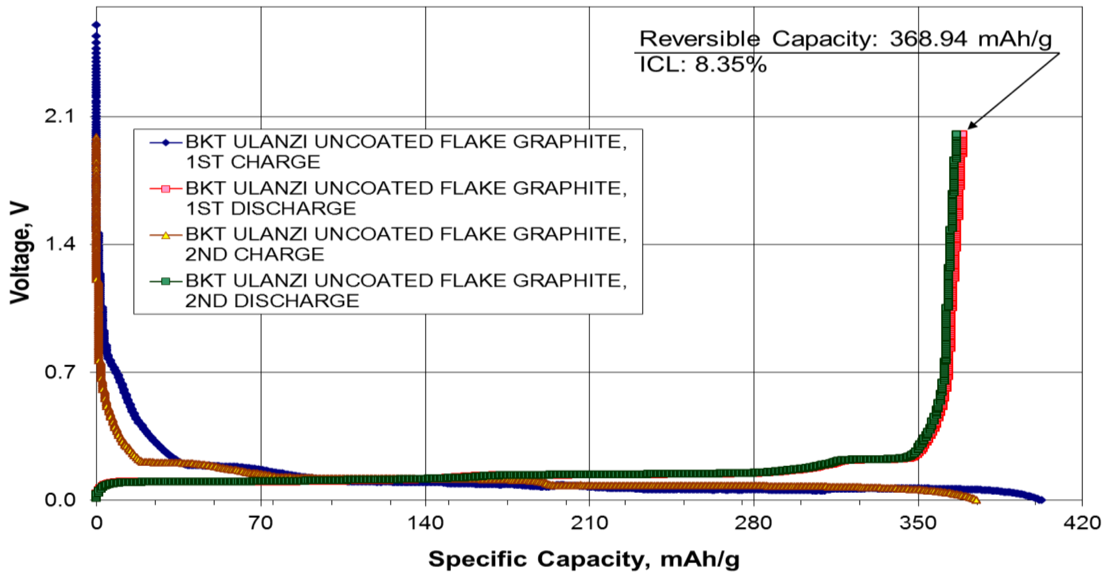

Figure 5. Initial Galvanostatic Cycling of Uncoated BKT Flake (sample BKT161206004) in a CR2016 coin cell vs. Li/Li^+ counter electrode at a battery industry typical cycling rate of C/20.

In the next progression of subject experimental program, the coated version of Ulanzi area flake (sample BKT161206001) was tested at a cycling rate of C/20. The results of cycling with this material are presented by Figure 6. The reversible capacity of this grade, short of system optimization, scored the value of 354.26 mAh/g. It is a known fact that classic nano-carbon-based surface coating reduces somewhat the reversible capacity of the uncoated graphite. However, a good coating will also reduce the irreversible capacity value with spheroidal flake, which is what happened in this study.

The ICL of the coated graphite registered at 5.61%, one of the best values on the graphite market. Low ICL is very important for battery manufacturers as it is an important contributor to the battery cost. It has to do with the fact that many batteries are made, sealed, and then sent for formation cycling. A cell, which uses a high ICL graphite will lose a lot of electrolyte during formation cycling. This, in turn, could expose a portion of the cathode to run dry. Considering that cathode is the main contributor to the cost of a lithium-ion battery, high ICL on graphite could be the cause of a battery inefficiencies and material waste. High ICL should be avoided at all costs and we are happy that BKT flake, with its exceptionally low 5.61% first cycle loss is in a cohort of leading graphites that identify themselves as an ultra-low ICL advanced battery materials.

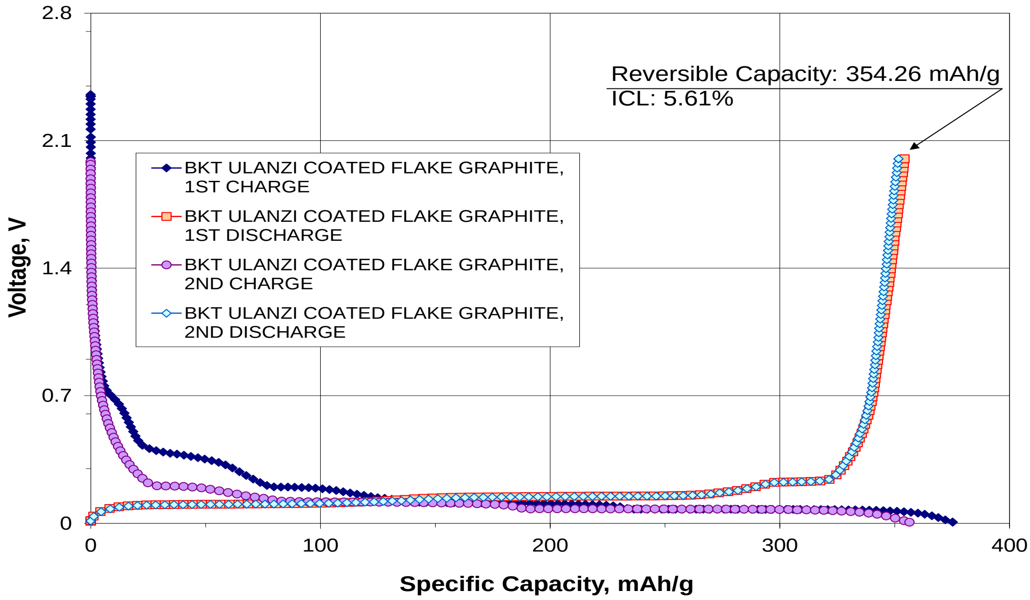

Figure 6. Initial Galvanostatic Cycling of surface coated BKT Flake (sample BKT161206001) in a CR2016 coin cell vs. Li/Li^+ counter electrode at a cycling rate of C/20.

Long-term cycling

This is formative test work as it provides data on the cycle life potential of cells.

We are excited to report on the initial results of long-term cycling of coated and uncoated versions of the Ulanzi flake. Long-term cycling is a critically important performance parameter which is often overlooked in the initial qualification programs. While the initial galvanostatic discharge curves report on the value of reversible capacity and ICL in flake, they do not answer the question of how **sustainable** this data is. OEM customers require long term cycling results.

The long-term cycling tests seek to assess the attributes of BKT graphite in a sustainable manner. Figure 7 shows that at the time of writing we have successfully cycled flake BKT161206001 (surface coated spheroidal graphite from Ulanzi resource) and BKT161206004 (uncoated spheroidal graphite from the same area) consecutively 31 and 25 cycles, respectively. Since the cycling is occurring at C/10 rate, the capacity values are somewhat lower than those reported for C/20 formation regime, but they are still excellent numbers, well in line with and/or exceeding the battery industry expectations. The fact that neither graphite shows any evidence of degradation upon cycling is a very positive characteristic, making both graphites lucrative candidates for a potential application as anode active materials in lithium-ion battery industry.

The key point of the uniform cycling test results is that the Mahenge SPG is remarkably stable and shows attributes that may result in longer LIB cycle life. Additional test work is ongoing on long-term cycling to prove this.

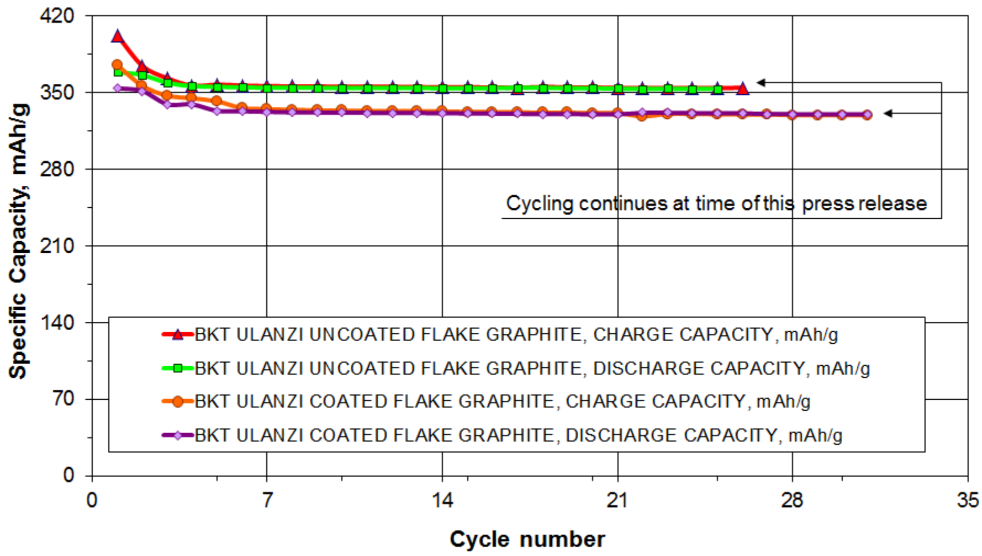

Figure 7. Initial long-term cycling data with surface coated BKT Flake (sample BKT161206001) and uncoated BKT Flake (sample BKT161206004) at C/20 formation followed by C/10 cycling regime.

Summary

- Independent testing indicates that Mahenge SPG has a number of unique performance characteristics with potential to manufacture lower cost and better performing lithium ion batteries
- These unique characteristics result from unusually thick, naturally dense and high purity graphite flakes, which form part of the Mahenge Graphite Project
- Additional independent development work has to be conducted to validate the highly encouraging potential for Mahenge graphite to:
  - Supply consistent high-grade graphite concentrates with superior electrochemical attributes compared to natural and synthetic graphite currently in the market
  - Potentially result in cheaper cost to construct lithium ion batteries with higher performance and longer lifespan (cycle life)
  - Potential to replace synthetic graphite in LIBs
- Mahenge graphite mineralisation is considered to be consistent in characteristics and distribution across. This is significant to end users as uniform/consistent graphite concentrates can be produced year-in year-out for decades.

Further Information
Steve Tambanis
Managing Director
Ph: + 61 407 689 231

Gabriel Chiappini
Director
Ph: +61 417 717 480

About Black Rock Mining

Black Rock Mining Limited is an Australian based company listed on the Australian Securities Exchange. The Company owns graphite tenure in the Mahenge region of Tanzania.

In December 2016, the Company announced a JORC compliant Mineral Resource Estimate of 203m tonnes at 7.8% TGC for 15.9m tonnes of contained Graphite, making this one of the largest JORC compliant flake graphite Mineral Resource Estimates globally. 50% of the Mineral Resource is in the Measured and Indicated categories.

The Company is currently completing a Pre-Feasibility Study likely to target the high grade portion of the Cascade Mineral Resource Estimate that contains 14.0m tonnes at 12.1% TGC. This Study is expected to demonstrate industry leading operational cash costs and a multi-generational mine for a project that can deliver a high purity product from conventional flotation circuit processing.

For further information on the company's development pathway, please refer to the company's website at the following link: http://www.blackrockmining.com.au and the corporate video presentation at http://www.blackrockmining.com.au/#video

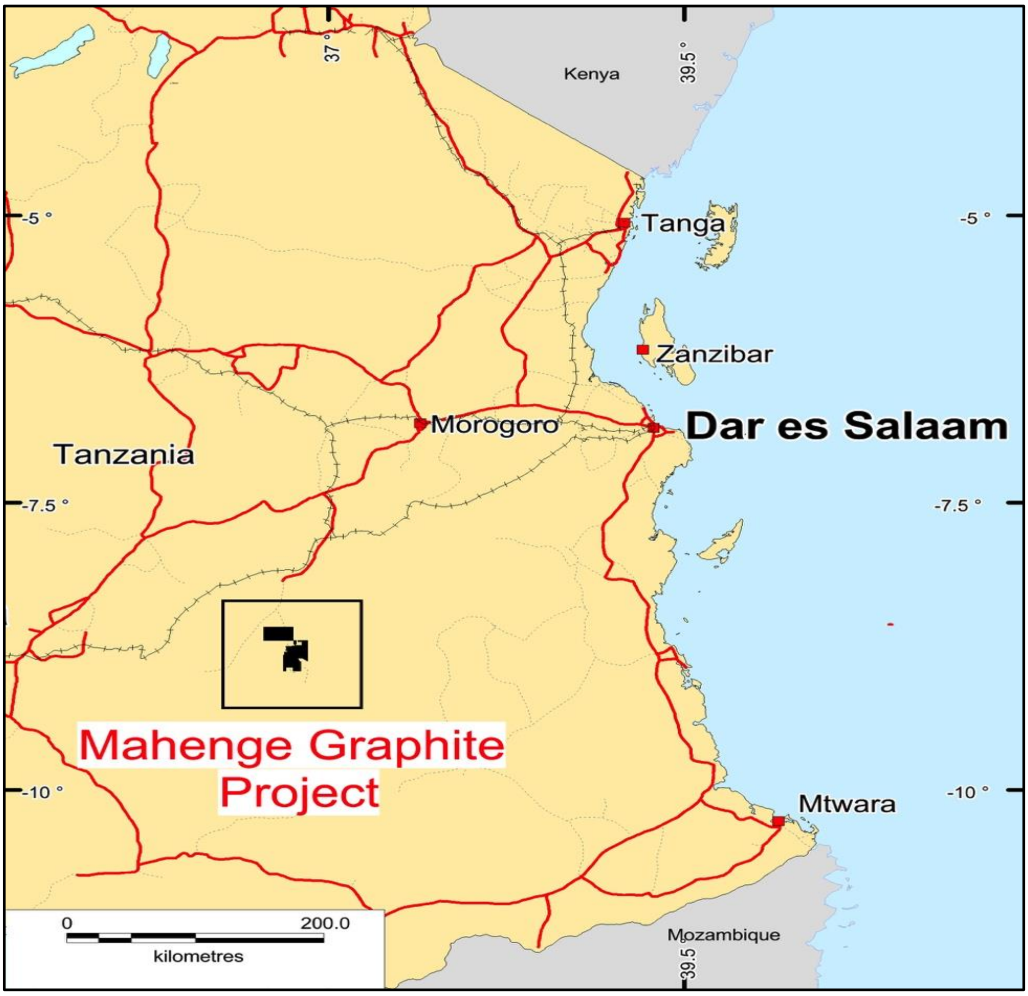

Figure 8: Location of Black Rock´s Mahenge Graphite Project within Tanzania

Competent Person's Statement

The information in this report that relates to Exploration Results and Exploration Targets is based on and fairly represents information and supporting documentation prepared by Mr Steven Tambanis (Managing Director of Black Rock Mining Limited). Mr Tambanis is a member of the Australian Institute of Mining and Metallurgy and has sufficient experience of relevance to the styles of mineralisation and types of deposits under consideration, and to the activities undertaken to qualify as Competent Persons as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Tambanis consents to the inclusion in this report of the matters based on his information in the form and context in which they appear.