Thermal processing achieves up to 99.99994% purity of Mahenge graphite concentrates

22 November 2016

HIGHLIGHTS

- BKT is evaluating purification options for its high purity Mahenge flake graphite concentrates
- Using a 99.2% TGC flake graphite concentrate, both acid and thermal purification methods were assessed:
    - Thermal purification of concentrate achieved up to 99.99994% purity from first pass testing
    - Acid purification of spherical graphite achieved 99.98% TGC, exceeding battery grade specifications
- These tests confirm the amenability of Mahenge graphite to produce concentrates and spherical graphite that surpass the highest standards of end users
- Thermally purified Mahenge graphite has potential to enter specialised markets where ultra-high purity graphite commands additional price premiums
- Cell testing underway to determine performance characteristics of Mahenge Spherical Graphite

Black Rock Mining Limited (ASX.BKT) ("Black Rock Mining" or "the Company") is pleased to provide an update on the ongoing product development programme for Mahenge Graphite.

Following up on the manufacture of spherical graphite from >99% TGC concentrates, a test programme has evaluated both conventional acid purification and thermal purification processes.

Managing Director Steven Tambanis commented: *"Achieving 99.99994% purity from single stage thermal treatment is yet another excellent outcome of the ongoing product development programme. In the space of a few months we have confirmed excellent expandable and spherical test results, exceptionally high spherical graphite yields for battery applications and now confirmation that both flake concentrates and spherical products can deliver sector-leading purities.*

These results could only be achieved by starting with an exceptionally high purity precursor concentrate – a unique feature of our Mahenge graphite. Battery cell testing is underway and we expect to announce preliminary results in early 2017."

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Product Development Programme

The product development programme is designed to fully evaluate all characteristics of high purity Mahenge graphite concentrates.

To date the programme has confirmed:

- Excellent expandable graphite characteristics of up to 580 times for coarse flake, superior to expandable graphite currently in the marketplace.
- The ability to manufacture spherical graphite with high spheronising yields
- Confirmation that Mahenge graphite flakes are thick with the high tap densities for concentrates

Summary

Thermal purification tests have returned exceptionally high purity graphite results up to 99.99994% TGC from a straightforward process. These are the highest purity samples handled by our test facility, and arguably the highest purity natural crystalline flake graphite ever produced from African flake. This result is attributed to weak particle-to-particle interaction between the graphite ore and impurities. This, in turn, results in easy separation of foreign particulates from graphite. Correspondingly, the resultant purity level of the Mahenge flake has set the record high purity level in the natural crystalline flake graphite industry sector.

- The Company has now confirmed that both acid and thermal purification routes are viable options to achieve ultra pure end products of the highest standards
- Thermal purification can be adjusted to achieve desired purities for specific end products
- Acid purification of Mahenge Graphite is expected to require much lower reagent volumes (and lower cost) than competitor graphite concentrates to achieve desired spherical graphite purities
- Battery cell testing of ultra high purity spherical graphite is underway with the expectation of achieving class leading results

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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, Tanzania, a Country that hosts world-class graphite mineralisation. The Company announced a JORC compliant resource of 162.5mt @ 7.8% TGC for 12.7m tonnes of contained Graphite in October 2016, making this one of the largest JORC resources Globally. This Global Resource also contains a higher grade portion of 38.7Mt @9.9% TGC. A positive scoping study in March 2016 led into the current Pre Feasibility Study, which is expected to be released in November 2016. The Company intends to complete a Definitive Feasibility study by March 2017.

Extensive metallurgical testing has achieved sector leading >99% TGC concentrate purity from a simple flotation circuit. High quality expandable and spherical graphite has been produced at independent test facilities in Europe, Japan and the USA.

Competent Person's statement

The information in this report that relates to Exploration Results and Mineral Resources is based on information compiled by Steven Tambanis, who is a member of the AusIMM. He is an employee of Black Rock Mining Limited. Steven Tambanis has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 and 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Steven Tambanis consents to the inclusion in the report of the matters based on their information in the form and context in which it appears.

Appendix 1

Technical Analysis on Black Rock Mining's Mahenge Concentrate Purification process

Purification tests –thermal and acid

Thermal purification testing of two samples returned a total impurity level of 0.569ppm (parts per million) and 3.907ppm respectively for the refined run-of-mine concentrate that has originated as a 99.2 wt% TGC precursor (Test 1) and milled, spheronised uncoated version that originated from the same precursor (Test 2). The test facility commented that this was the highest purity natural crystalline flake graphite they had tested, period.

Scientists working on the Mahenge Resources project attributed this outstanding result to a structural characterisation observation that impurities in the Mahenge's Ulanzi graphite are predominantly situated on the surface of flake particle, as opposed to being embedded within the particle.

During the refining process, these impurities tend to come off easily upon exposure to high temperatures and/or a reaction with chemicals. Minor mineral impurities embedded into the flake body have been observed.

The residual electrostatic attractive forces between graphite flakes and mineral impurities appear to be weak, which leads to simpler liberation of impurities from the graphite ore. This phenomenon appears to be one of several unique features of Mahenge graphite.

For battery use, the thermal product far exceeds the 99.95 wt%C desired purity, so potential exists to amend processing conditions to save on energy expense and still meet/exceed battery grade specifications. This exceptionally pure thermal graphite product has potential for use outside of the battery market in applications that command ultra high purity graphite.

Acid purification tests of spherical graphite have achieved 99.98%TGC, exceeding the requirements of spherical graphite for advanced battery applications (i.e. 99.95 wt%C). A benefit of having >99% TCG feed as compared to a 94% TGC feed is that approximately one sixth of the reagents will be required to purify the graphite, a significant reduction in reagents, costs and acid plant effluent treatment/neutralisation.

The key result from the above testing is that both purification routes are viable options for commercial processing.

Please refer to the following page for the ICP analysis.

ICP Analysis

Material ->	**Black Rock**	**Black Rock**
ELEMENT	**Test 1**	**Test 2**
P (Phosphorus)	0.003	0.035
S (Sulfur)	0.022	0.188
As (Arsenic)	0	0.035
Sn (Tin)	0.04	0.109
Zn (Zinc)	0.014	0.002
Cr (Chromium)	0.002	0
W (Tungsten)	0.001	0
Si (Silicon)	0	1.436
Te (Tellurium)	0	0.027
Pb (Lead)	0	0.01
Cd (Cadmium)	0.001	0.001
Co (Cobalt)	0.007	0.007
Ni (Nickel)	0.002	0.001
Fe (Iron)	0.01	0.014
B (Boron)	0.002	0.004
Mn (Manganese)	0	0
Hf (Hafnium)	0.005	0.006
Ge (Germanium)	0.001	0
Ta (Tantalum)	0.003	0.002
Mg (Magnesium	0.01	0.001
Mo (Molybdenum)	0	0.397
V (Vanadium)	0.001	0
Be (Beryllium)	0	0
Cu (Copper)	0.019	0.043
Ag (Gold)	0.008	0.007
Ti (Titanium)	0.01	0.007
Zr (Zirconium)	0.004	0.003
Ca (Calcium)	0.006	0.008
Al (Aluminium)	0.002	1.188
Ga (Gallium)	0.137	0.123
Ba (Barium)	0.001	0
Na (Sodium)	0.228	0.225
Li (Lithium)	0.027	0.027
K (Potassium)	0.003	0.001
Total impurities PPM	**0.569**	3.907

Table 1: ICP analysis of Mahenge graphite concentrates showing total impurity levels of 0.569ppm, or 99.99994 wt%C purity for the unmilled purified graphite (Test 1) and milled, spheroidized purified graphite (Test 2). Note that ICP analysis cannot show oxygen analyses. The silicon, iron and aluminium reported in the above table represent minerals containing oxygen. This is not expected to significantly alter the preliminary results announced within this report.