

Outstanding expandable graphite results for Mahenge concentrate



4 August 2016

HIGHLIGHTS

- Independent laboratory assessment concludes that Mahenge concentrate is superior to Chinese sourced expandable graphite
- Expansion ratios up to 580 times achieved from first test programme due to the inherently thick and crystalline nature of Mahenge graphite flakes
- All size fractions $>75\mu$ suitable for expandable graphite applications
- Spherical graphite test results expected in late August 2016

Black Rock Mining Limited (ASX:BKT) ("Black Rock Mining" or "the Company") is pleased to announce excellent first-stage expandable graphite test results for its flake concentrates. This programme has been completed by German group Dorfner Anzaplan, a global specialist in graphite testing and analysis.

A key desirable factor for this market is the expansion rate of graphite for a given initial volume. Typical expansion multiples for premium products are between 200-400 times with higher multiples considered to be superior. The Mahenge concentrate sample easily surpassed this range with peak values of 530x to 580x for the >180 micron size fraction. These results easily surpass the performance characteristics of currently utilised product. Significantly, the finer flake fractions from 75 microns to 180 microns considerably outperformed similarly sized product from China, as did the $<75\mu$ fraction.

Graphite concentrates will be sent to end-users for assessment during the current quarter.

Quotations from the test report include:

"The expansion volumes for all flake sizes are demonstrating superior expansion properties referring to both flakes and powders"

"Typical Chinese expandable graphite powders of flake size $<180\mu\text{m}$ have an expansion volume of 140-160 cm^3/g compared with 380 cm^3/g achieved in the present test work"

"Chinese graphite powders of flake size $<75\mu\text{m}$ have an expansion volume of 40-60 cm^3/g compared with 165 cm^3/g in the present test work"

"Based on these results it can be concluded that this flotation concentrate is highly suitable for the preparation of expandable graphite"

The expandable graphite market

Expandable graphite is made by intercalating graphite flake crystals then heating them to force apart graphene layers into an expanded or 'fluffy' form. It is then rolled into continuous sheets or rolls, which have excellent electrical conductivity and thermal dissipation characteristics.

It is an essential product used in the manufacture of:

- Graphite foils for heat dissipation of electronic products such as laptops, tablets, smart phones and LED devices.
- Graphite foil/sheet for high temperature applications such as gaskets and thermal barriers
- Thermal insulation with flame retardant properties
- Application into intumescent (fire retardant) paints as an expandable graphite flake

Product pricing depends on the attributes of the expandable graphite for specific applications.

Expandable graphite test programme summary

The test programme utilised a 95.5% TGC flake concentrate, which was prepared prior to the new amended flotation process that has since returned higher purities. Nevertheless, with these lower purities, the test results confirm that Mahenge flake has superior characteristics to currently available material in the market. A key point is that the testing is first-stage and has the potential to be further optimised to deliver higher expansion ratios.

Testing involved detailed graphite characterisation followed by a series of intercalation and expansion processes to determine the response of the concentrate. All excerpts/quotations from the test report are in italics.

The assessment of graphite flake shape or morphology confirmed *“the fact that the flakes generally occur as large and thick flakes”*. First results from the spheronisation test programme are expected by the end of August. *Under the microscope the graphite flakes appear as well developed thick graphite flakes indicating a very high degree of crystallinity. The flakes are virtually free of surface coatings and show almost no intergrowth with mineral impurities.*

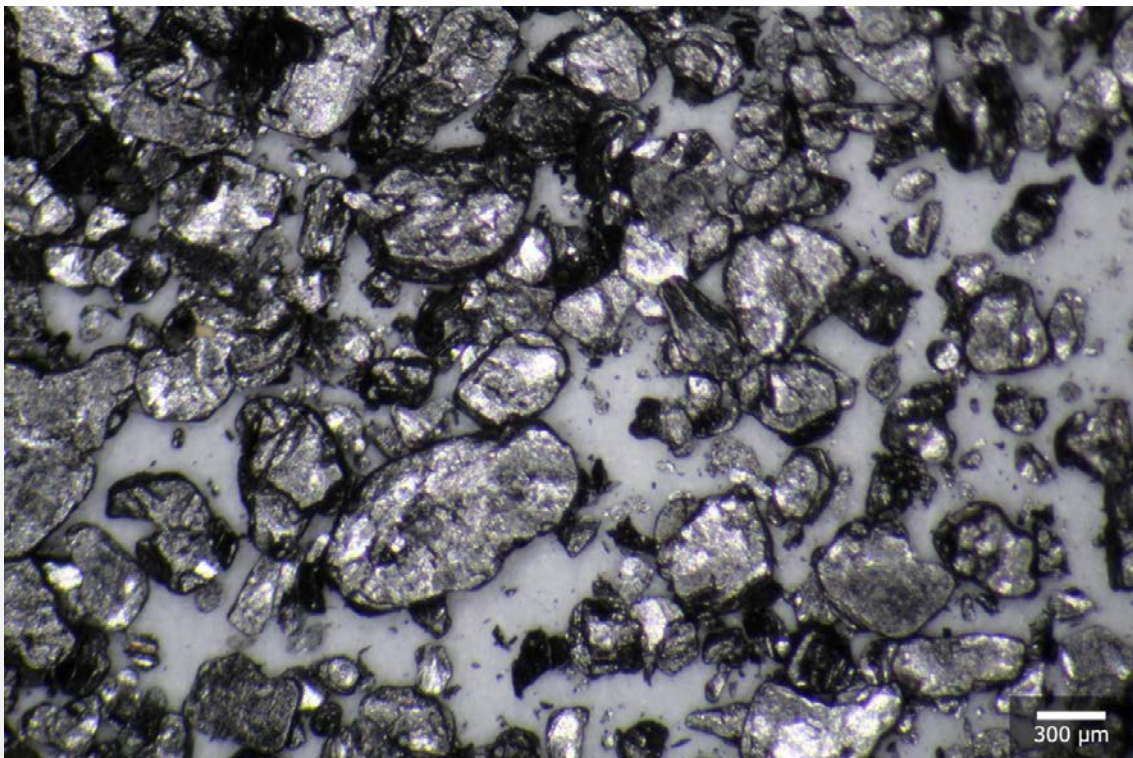


Figure 1: Microphotograph of graphite flotation concentrate as received

High-resolution scanning electron microscopy (SEM) images of flotation concentrate AZ GBR are illustrated in figures 2 to 4. Thick graphite flakes are visible with a low amount of fine flakes.

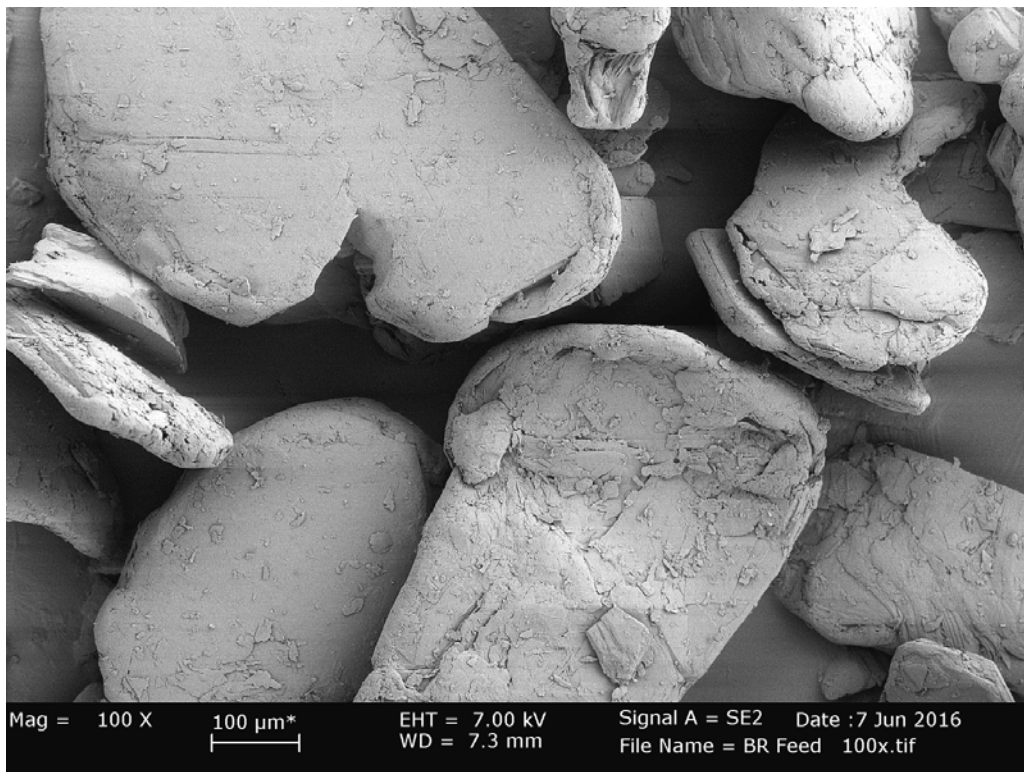


Figure 2: SEM micrograph of graphite flotation concentrate AZ GBR; magnification 100x

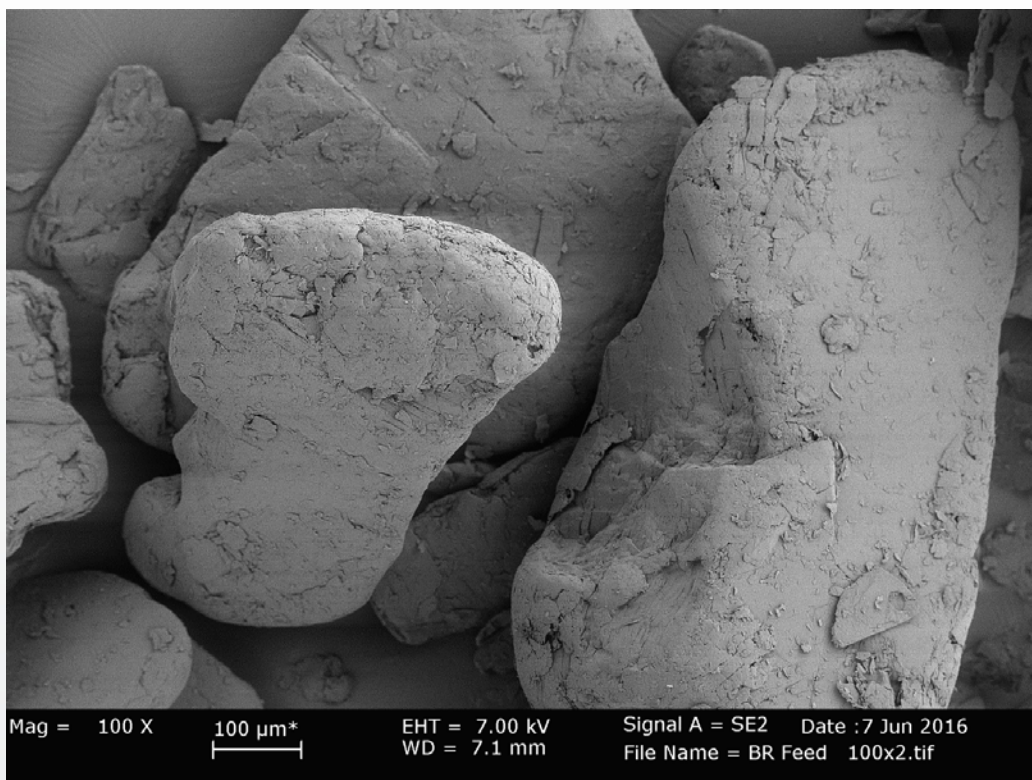


Figure 3: SEM micrograph of graphite flotation concentrate AZ GBR; magnification 100x

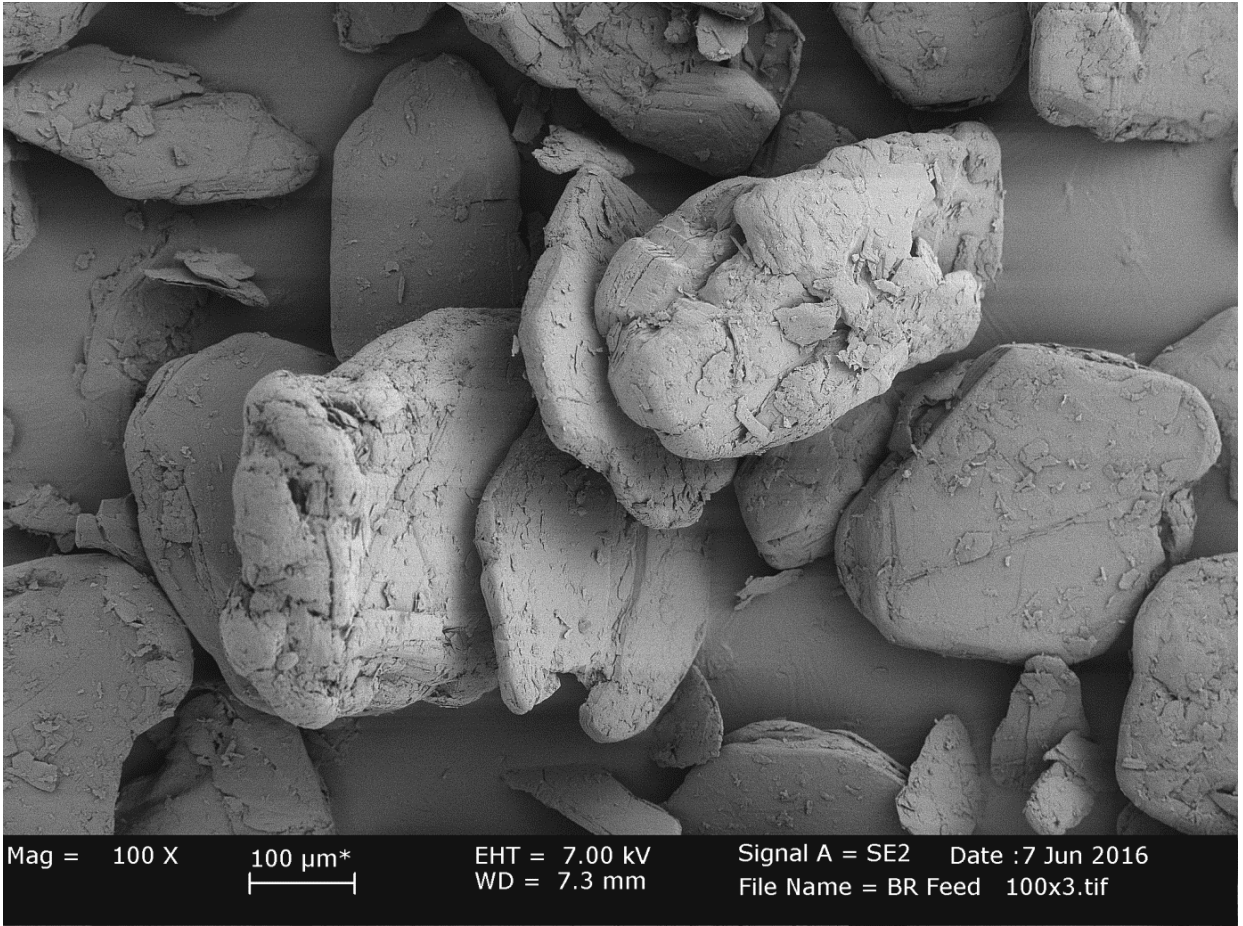


Figure 4: SEM micrograph of graphite flotation concentrate AZ GBR; magnification 100x

Table 1: size fraction analysis of graphite concentrate submitted for test programme

Flake size fractions of the sample AZ GBR

Size fraction	Mesh Sizing	Size fraction %
> 0.500mm	35	6.8
> 0.300mm	50	16.9
> 0.180mm	80	39.7
> 0.106mm	150	24.5
> 0.075mm	200	6.4
< 0.075mm	200	5.7
		100

Table 2: Expansion volume after cold treatment and medium retention time concentrate AZ GBR

Flake size		Temperature	
[µm]	[mesh]	800 °C [cm ³ /g]	1000 °C [cm ³ /g]
> 500	> 35		580
300 - 500	50 - 35		560
180 - 300	80 - 50	560	530
106 - 180	150 - 80	470	380
75 - 106	200 - 150	370	320
< 75	< 200		165

Table 1 shows a sizing analysis of the flake concentrate sample submitted to the laboratory. It indicates a significant bias towards coarser flake distribution. Table 2 provides an expansion volume summary by flake size and temperature. Of note, the majority of the concentrate sample consists of coarse flake and the expansion ratios are significantly higher than other expandable graphite samples tested by the laboratory.

For Chinese coarse flake sizes >180 microns, expansion ratios are in the range of 200x-300x. Mahenge graphite is typically double for expansion ratios.

For Chinese <180 micron powder the laboratory has sampled 140x-160x and recorded 380x for Mahenge graphite.

For Chinese fine graphite powder <75 microns the laboratory has sampled 40x-60x and recorded 165x for Mahenge graphite.

Summary

The expandable graphite test results by an independent laboratory confirm the potential of Mahenge graphite to supply products with excellent expansion characteristics into this established market. This provides an opportunity for the Company to diversify its product base into a sector that typically commands premium pricing based upon product specifications. Focus will remain upon developing Mahenge graphite for use in the high growth lithium ion battery market

The test results have generated a significant amount of hard data and physical test products that are being sent to expandable graphite end users for evaluation and feedback during the September quarter.

The flake characterisation work from this programme has also provided valuable insight as to flake properties for the current spherical test programme. First spheronising test results are due by the end of August 2016.

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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 maiden JORC compliant resource of 131mt @ 7.9% TGC for 10.4m tonnes of contained Graphite in February 2016, making this one of the largest JORC resources Globally. A positive scoping study in March 2016 led into the current Pre Feasibility Study, which is expected to be released in October 2016. The Company intends to complete a Definitive Feasibility study by March 2017.

An infill drill programme is nearing completion to convert the majority of this resource into Measured and Indicated classification. The updated JORC resource for Ulanzi is expected in September 2016 and a JORC resource for Cascades is expected in October 2016.

Competent Person 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. JORC mineral resource statement (February 2016)

Prospect	Category	Tonnes (Millions)	TGC (%)	Contained TGC (Millions tonnes)
Ulanzi	Indicated	35.0	8.3	2.9
	Inferred	<u>45.5</u>	<u>8.7</u>	<u>4.0</u>
	Sub-total	80.5	8.5	6.9
Epanko Nth	Indicated	17.6	6.4	1.1
	Inferred	<u>20.8</u>	<u>5.9</u>	<u>1.2</u>
	Sub-total	38.4	6.1	2.3
Cascade	Indicated	-	-	-
	Inferred	<u>12.3</u>	<u>9.5</u>	<u>1.2</u>
	Sub-total	12.3	9.5	1.2
COMBINED	INDICATED	52.5	7.7	4.0
	INFERRED	<u>78.6</u>	<u>8.1</u>	<u>6.4</u>
	TOTAL	131.1	7.9	10.4