

28 October 2024

RECARBURIZER FOR HIGH-VOLUME CAST-IRON MARKET

Sarytogan Graphite Limited (ASX: SGA, "the Company" or "Sarytogan") is pleased to announce that Sarytogan "Micro80C" Graphite has been demonstrated to be suitable for use as a recarburizer for the high-volume grey cast-iron market.

Engage with management at our Investor Hub: <https://sarytogangraphite.com.au/link/NPwwDP>

Highlights

- During impurity removal in iron making, carbon is also removed. To make cast iron, 2-6% carbon must be added back in a process known as "Recarburizing".
- Sarytogan "Micro 80C" Graphite has been demonstrated as a highly suitable recarburizer for grey cast-iron.
- The market for grey cast-iron is enormous at 31Mtpa, requiring approximately 1 million tonnes per year of recarburizer.
- This could provide a base load for high volumes of Sarytogan Graphite, over and above the production rates assumed in the Pre-Feasibility Study.



Figure 1 – Manufacture of Grey Cast Iron with Agglomerated Sarytogan "Micro80C" Graphite.

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Sarytogan Managing Director, Sean Gregory commented:

"This additional high-volume use for Sarytogan Graphite could provide a base load for future expansion of the Sarytogan Graphite Project over and above the volumes envisaged in the recently completed positive Pre-Feasibility Study. The next step is the processing of the 20 tonnes of ore from the trial mine to produce samples for machine vendor test-work and customer qualification."

Manufacture of Sarytogan Grey Cast Iron

A sample of Sarytogan "Micro80C" Graphite from the bulk flotation concentrate at 83% Total Graphite Carbon (TGC) prepared in Australia was used in this test (refer ASX Announcement 13 November 2023). The sample was agglomerated to multi-millimetre size and calcined before being mixed with pig-iron in an induction furnace. The blended material is melted and poured into moulds. The cast iron is cooled into billets and then machined into "dog-bones" for strength testing (Figure 1).

Properties of Sarytogan Grey Cast Iron

The iron assimilated 95% of the Sarytogan "Micro80C" Graphite added to achieve an alloy composition of 3.6% C, 1.8%Si, 1.3% Mn, 0.026%P, 0.033%S (Figure 2).

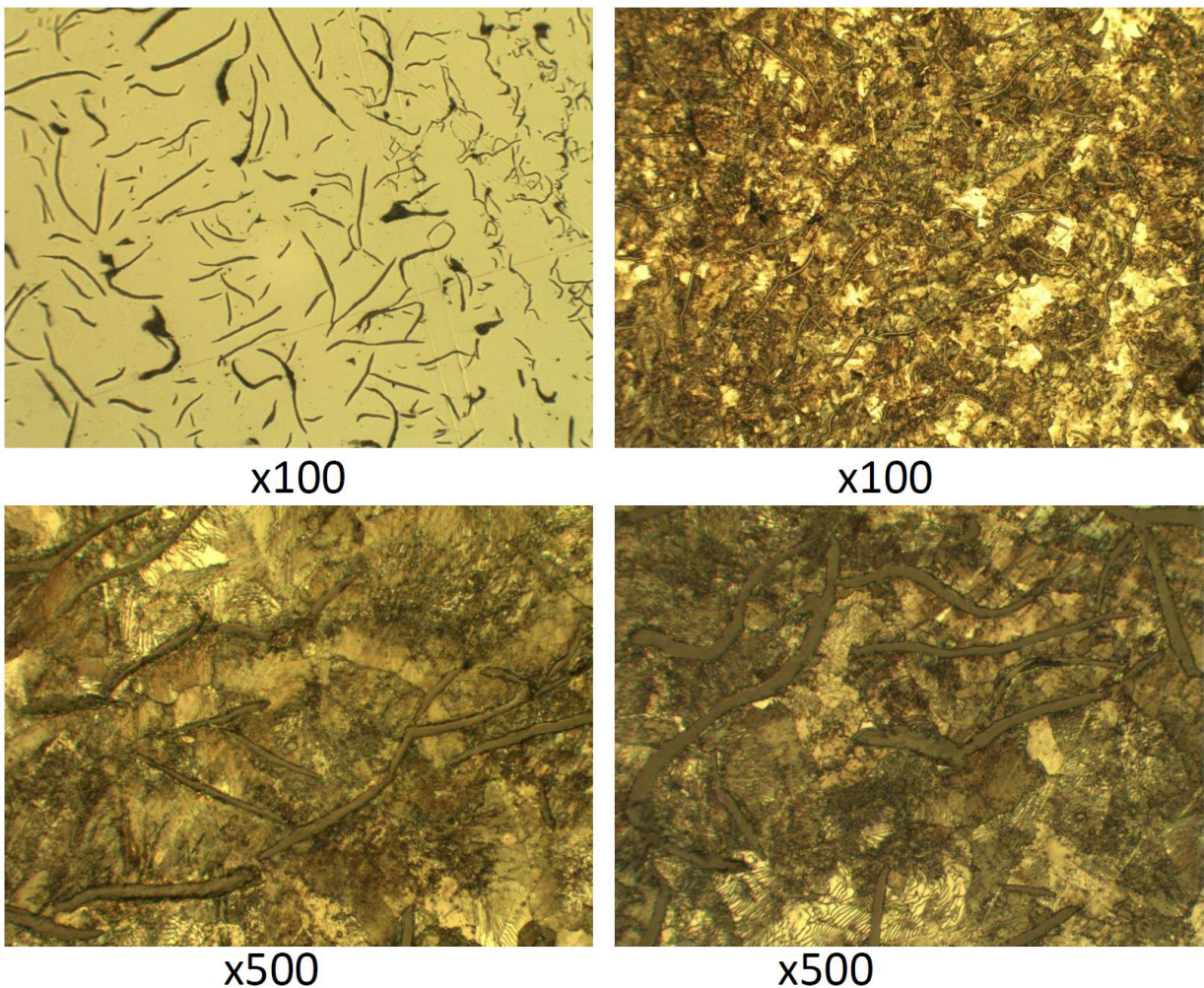


Figure 2 - Photo micrographs of grey cast-iron made with Sarytogan "Micro 80C" Graphite

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The grey cast-iron made with Sarytogan "Micro80C" Graphite was tested in accordance with the "GOST" standard 1412-85 applicable in the Kazakhstan market. The results (Table 1) all meet the Kazakh grade for SCh30 cast-iron as well as USA Grade #45 and Australian grade T300 (AS1830). A control sample made with synthetic graphite only achieved the lower grade of SCh10 cast-iron.

Table 1 - Physical properties of grey cast-iron made with Sarytogan "Micro80C" Graphite

Measurement	Value
Brinell Hardness	229
Tensile temporary resistance	327 Mpa,
Relative elongation	0.4%,
Compression temporary resistance	1045 Mpa

About Cast-Iron

Cast-iron is an alloy of iron with 2.14% to 6.67% carbon and 1-3% silicon. With its relatively low melting point, good fluidity, castability, excellent machinability, resistance to deformation and wear resistance, cast irons have become an engineering material with a wide range of applications and are used in pipes, machines and automotive industry parts, such as cylinder heads, cylinder blocks and gearbox cases.

During the production of pig-iron, unfavourable contaminants such as phosphorous and sulphur are burnt off. This also burns off carbon which must be replaced in precision quantities to achieve the desired levels for each application. Recarburizers can be added directly to molten pig-iron before casting.

The global cast iron market is 31 Mtpa. To increase the carbon content by an average of 3%, one million tonnes of recarburizer is required. Kazakhstan has a large steel industry, including the giant 6Mtpa Temirtau Steel Plant, located only 200km from the project.

The synthetic graphite used as a control sample in these tests typically trades at US\$650-700 per tonne in Kazakhstan.

Further tests may demonstrate suitability for Sarytogan "Micro80C" Graphite to be suitable for ductile cast-iron. This graphite trades at about US\$1,000/t.

Next Steps

The 20-tonne trial mining sample is in Karaganda ready for milling tests about to commence. One tonne of the milled ore will be air freighted to Australia for manufacture of flotation concentrate. Some of this will be air freighted to USA for purification. Hundreds of kilograms of product samples will then be available for vendor machine tests and customer qualification.

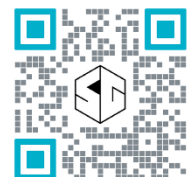
This announcement is authorised by:

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**Engage directly
with management
at our Investor Hub:**



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About Sarytogan

The Sarytogan Graphite Deposit is in the Karaganda region of Central Kazakhstan. It is 190km by highway from the industrial city of Karaganda, the 4th largest city in Kazakhstan (Figure 3).



Figure 3 - Sarytogan Graphite Deposit location.

The Sarytogan Graphite Deposit was first explored during the Soviet era in the 1980s with sampling by trenching and diamond drilling. Sarytogan's 100% owned subsidiary Ushtogan LLP resumed exploration in 2018. An Indicated and Inferred Mineral Resource has recently been estimated for the project by AMC Consultants totalling **229Mt @ 28.9% TGC** (Table 2), refer ASX Announcement 27 March 2023).

Table 2 - Sarytogan Graphite Deposit Mineral Resource (> 15% TGC).

Zone	Classification (JORC Code)	In-Situ Tonnage (Mt)	Total Graphitic Carbon (TGC %)	Contained Graphite (Mt)
North	Indicated	87	29.1	25
	Inferred	81	29.6	24
	Total	168	29.3	49
Central	Indicated	39	28.1	11
	Inferred	21	26.9	6
	Total	60	27.7	17

Total	Indicated	126	28.8	36
	Inferred	103	29.1	30
	Total	229	28.9	66

Sarytogan has produced bulk flotation concentrates at higher than **80% C** and further upgraded the concentrate up to **99.9992% C** "five nines purity" by thermal purification, without any chemical pre-treatment (refer ASX Announcement 5 March 2024). Sarytogan envisages three product types:

- Microcrystalline graphite at 80-85% C ("Micro80C") for traditional uses,
- Ultra-High Purity Fines (UHPF) for advanced industrial use including batteries, and
- Spherical Purified Graphite (USPG and CSPG) for use in lithium-ion batteries.

A Pre-Feasibility Study (PFS) was completed in August 2024 that outlined a staged development plan to match market penetration, minimise initial capital expenditure and deliver attractive financial returns.

An Ore Reserve of **8.6 Mt @ 30.0% TGC** (Table 3) was estimated using the Guidelines of the 2012 Edition JORC Code (refer ASX announcement 12 August 2024).

Table 3 - August 2024 Sarytogan Probable Ore Reserve estimate

Ore mass	TGC	Concentrate mass	Concentrate grade	TGC in conc. Mass
kt	%	kt	%	kt
8,587	30.0	2,654	81.4	2,160

Notes:

- Tonnes and grades are as processed and are dry.
- The block mass pull varies as it is dependent on the TGC grade, concentrate grade (fixed) and process recovery (fixed) resulting in a variable cut-off grade, block by block. The cut-off is approximately 20% TGC with minimal mass below 20% TGC contributing.

Sarytogan is also progressing copper porphyry exploration, initially at its Bainazar project and subsequently across a planned portfolio of copper exploration projects to be assembled across the highly prospective Central Asian Orogenic Belt.

Compliance Statements

The information in this report that relates to other Exploration Results is cross referenced to the relevant announcements in the text. These reports are available at www.asx.com.au. The information in this report that relates to Sarytogan Mineral Resources was first reported in ASX announcement dated 27 March 2023. The information in this report that relates to Sarytogan Ore Reserves was first reported in ASX announcement dated 12 August 2024.

The Company confirms that it is not aware of any new information or data that materially affects the information included in relevant market announcements and, in the case of estimates of Mineral Resources and Ore Reserves, that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Persons' findings are presented have not been materially modified from the original market announcements.

The Company confirms that all the material assumptions underpinning the production target, or the forecast financial information derived from the production target, in the initial public report (12 August 2024) continue to apply and have not materially changed.