28 January 2025

PREMIUM DUCTILE CAST IRON MADE WITH SARYTOGAN MICRO80C

Sarytogan Graphite Limited (ASX: SGA, "the Company" or "Sarytogan") is pleased to announce that premium ductile cast-iron has been made with its "Micro80C" graphite for a high-volume, high-margin market segment.

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https://sarytogangraphite.com.au/announcements

Highlights

- Sarytogan plans to make 3 product types: SPG for Li-ion battery anodes, UHPF for other battery and advanced industrial uses and "Micro80C" for traditional industrial uses.
- Sarytogan Micro80C Graphite has previously been demonstrated as a highly suitable recarburizer for grey cast-iron, and now for the premium priced ductile cast-iron market.
- The domestic market for premium recarburizers is growing with a recently announced investment in a ductile cast-iron plant to the nearby giant Temirtau integrated steel mill.

Figure 1 - Ductile cast-iron made with Sarytogan Graphite Micro80C passing bending tests

Sarytogan Managing Director, Sean Gregory commented:

"The Micro80C product family is an important baseload for the Sarytogan Graphite project, both for the early implementation of Stage 1a contemplated in the PFS and for the full build out of the project. This demonstration of high-performance in the application of ductile cast-iron opens the spectre to achieve premium prices in the base load market. Furthermore, the recent announcement of investment in this application at the nearby giant Temirtau steel mill is perfect timing for our project and they become a high priority target customer for us."

Sarytogan Product Mix Refresher

Sarytogan plans to produce 3 product types to place as many carbon units into as many markets as possible (Table 1) from its giant and exceptionally high-grade Mineral Resource (Table 3).

Table 1 - Sarytogan proposed products, demonstrated performance and pricing
([1]source: Wood Mackenzie, Lone Star Tech Minerals, Company analysis)

Product Groups	Micro80C	UHPF	USPG and CSPG
Grade (% C)	80 to 85	Up to 99.9992	>99.99
Sizings (µm)	D90 15, 10 & 5	D90 15, 10 & 5	d50 20,15 & 10
Pricing applied in the PFS[1] (US$/t)	$400 to $850	$3,000 to $12,000	$2,500 to $8,000
Uses	Traditional - Lubricants, Friction Products, Drilling Fluids, Recarburizer, Foundry	Advanced – Alkaline, Lithium, and Lead Acid Batteries; Nuclear and Synthetic Diamonds	Lithium-Ion Battery Anodes
ASX Announcements Demonstrating Performance	22 May 2024 28 October 2024 This announcement	11 April 2024 14 May 2024 17 June 2024 9 December 2024	8 February 2024 20 May 2024 11 June 2024

This announcement deals with the application of Micro80C as a recarburizer, specifically for the high-volume, high-margin market segment of ductile cast-iron.

Ductile Cast Iron vs Grey Cast Iron

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.

Sarytogan previously demonstrated its Micro80C graphite to be highly suitable for use as an iron recarburizer and specifically in the manufacture of grey cast-iron (refer ASX Announcement 28 October 2024).

Cast-iron is an alloy of iron with 2.14% to 6.67% carbon and 1-3% silicon. The microstructure of cast iron depends on the thermodynamic conditions and the chemical composition of the melt.

In grey cast-iron, the graphite crystallises as flakes (Figure 2). The flakes make the cast iron hard and brittle and suitable for use in non-mechanical applications like manhole covers, storm grates, and park benches. Graphite used for grey cast-iron tests typically trades at US$650-700 per tonne in Kazakhstan.

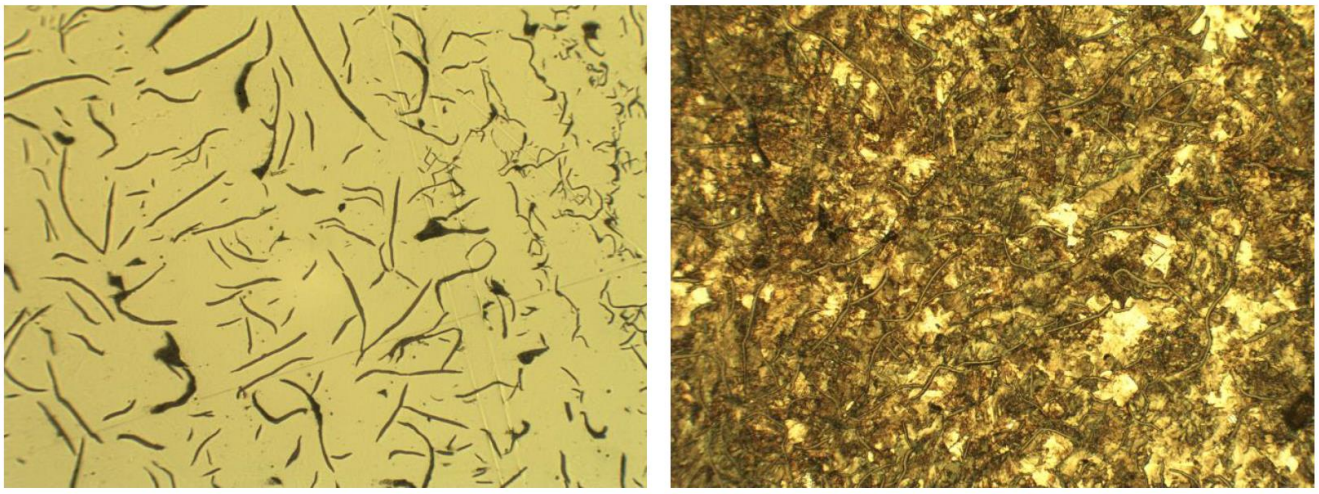

Figure 2 - Photo micrographs of grey cast-iron made with Sarytogan "Micro 80C" Graphite

In contrast, by controlling the chemical composition and thermodynamic conditions, the graphite can be crystallized as nodules for ductile cast-iron (Figure 3). Ductile cast-iron is characterized by reduced concentration of carbon (2.2 to 3.1%) and silicon (less than 1.6%) in its composition. The ductile cast-iron is more flexible and suitable for engineered applications like agriculture, heavy trucks, and rail.

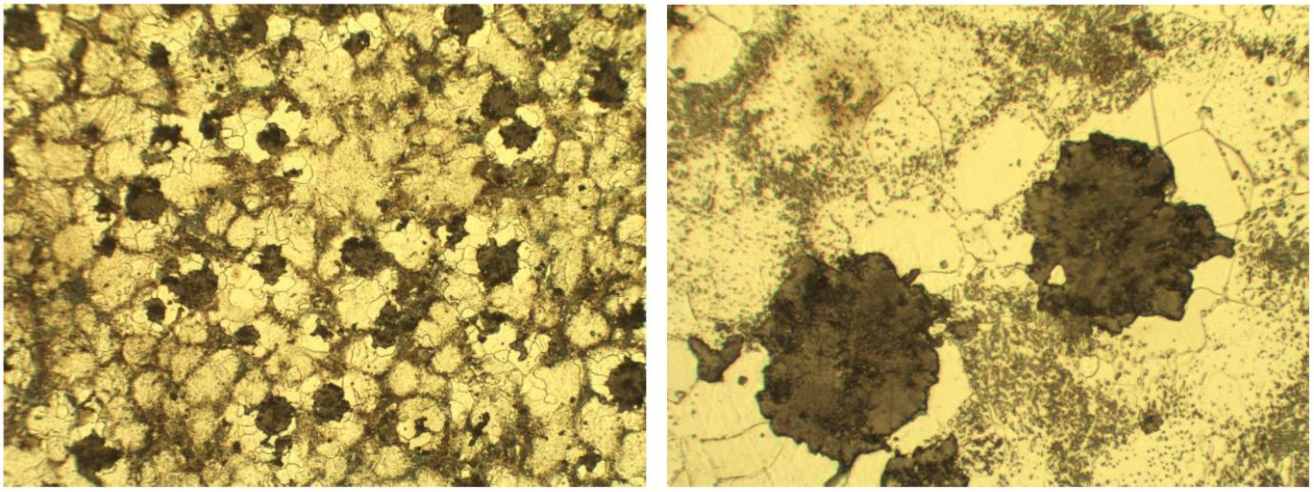

Figure 3 - Photo micrographs ductile cast-iron made with Sarytogan "Micro 80C" Graphite

Recarburizer for ductile cast-iron iron sells at a premium to grey cast-iron recarburizers with typical prices of US$1,000 to $3,000 per tonne depending on the individual application, grade and performance requirements.

Properties of Sarytogan Ductile Cast Iron

The ductile cast-iron made with Sarytogan "Micro80C" Graphite assimilated 92% of the Sarytogan "Micro80C" Graphite added to achieve an alloy composition of 2.8% C and 1.5%Si with low impurities. Machined dog bones of the alloy were tested in accordance with the applicable Kazakh "GOST" standards. The results (Table 2) meet the Kazakh standard for KCh 33-8 ductile cast-iron and equivalent standards in the US, UK and Japan.

Table 2 - Physical properties of ductile cast-iron made with Sarytogan "Micro80C" Graphite compared to previously announced results for grey cast-iron.

Measurement (average of 3)	Sarytogan Grey Cast Iron	Sarytogan Ductile Cast Iron
Brinell Hardness	229	161
Bending temporary resistance	613 MPa	1024 MPa
Tensile temporary resistance	327 MPa,	376 MPa
Relative elongation	0.4%,	8.5%
Compression temporary resistance	1045 MPa	1505 MPa

Investment in Kazakh Cast Iron Capacity

Only 200km north of the project near the industrial city of Karaganda is the 6 Mtpa Temirtau integrated streel mill, one of the largest in the world. In November 2024, the Qarmet state-owned plant announced a Chinese investment of US$161M in a 200,000 tonnes per annum plant to produce ductile cast-iron pipes.

Next Steps

The 20-tonne trial mining sample from Sarytogan is in undergoing milling tests at a laboratory in Karaganda, Kazakhstan. 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:

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 4).

Figure 4 - Sarytogan Graphite Deposit location.

Table 3 - 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

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 been estimated for the project by AMC Consultants totalling **229Mt @ 28.9% TGC** (Table 3, refer ASX Announcement 27 March 2023).

Sarytogan has produced bulk flotation concentrates at **80%-85% 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 4) was estimated using the Guidelines of the 2012 Edition JORC Code (refer ASX announcement 12 August 2024).

Table 4 - 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.