

FIREBIRD PRODUCES FIRST 99.999% ULTRA-HIGH-PURITY MANGANESE SULPHATE AND ADVANCES AUSTRALIAN BATTERY MATERIALS CAPABILITY

First 5N manganese sulphate produced and technical program using Australian Oakover ore commences

Highlights

- **Firebird has successfully produced a 99.999% ultra-high-purity** manganese sulphate.
- **Firebird stands as the sole Western company to have successfully manufactured 5N manganese sulphate**, positioning us at the forefront of high-purity battery material innovation.
- **Ultra-high-purity manganese sulphate is priced at a 33% premium** over typical high purity manganese sulphate grades and is not widely available.
- Designed to support continuous, automated operation, **the technology has significant potential for commercial-scale application.**
- **The fluoride-free process accommodates a broad range of feedstocks**, including low-grade, high-impurity manganese ores, waste materials and wastewater.
- **Firebird has commenced an additional technical program** at its Hunan Pilot Plant, supporting preparations for commissioning of the Australian Demonstration Plant (ADP) in Perth in 2027.
- **The program will process manganese ore from Firebird's 100%-owned Oakover Manganese Project in Western Australia**, building on previous successful processing campaigns undertaken in China, using the Company's proprietary flowsheet.
- **The program will be replicated as the first experimental campaign at the Australian Demonstration Plant** in Perth during initial commissioning activities.



Figure 1. Firebird's proprietary and integrated lithium manganese rich (LMFP & LMR) cathode process commences with the production of ultra-high-purity manganese sulphate (UHPMS).

Australian-owned Firebird Metals Limited (“FRB”, “Firebird” or “the Company”) is pleased to advise that it has successfully produced the Company’s first 99.999% (“5N”) ultra-high-purity manganese sulphate based on an in-line impurity extractant process. In addition, the Company’s Australian Demonstration Plant (ADP) Technical Lead, Dr Chris Passmore, has commenced a second technical program at the Company’s 100% owned Hunan Pilot Plant, processing Australian ore sourced from the Company’s 100% owned Oakover Manganese Project into high purity manganese sulphate, which is the first step in producing advanced manganese rich battery materials.

First 99.999% Ultra-High-Purity Manganese Sulphate Product Achieved

Firebird has developed a manganese-specific extractant and associated processing technology through its ongoing research and development program, successfully producing a 99.999% ultra-high-purity manganese sulphate. A recent production campaign at the Company’s 100% owned Hunan Pilot Plant and R&D facility achieved 5N manganese sulphate purity with most impurities below the lower detection limits (Table 1).

To the best of our knowledge, Firebird stands as the sole Western company to have successfully manufactured 5N manganese sulphate, positioning us at the forefront of high-purity battery material innovation.

Key features of the technology include:

- **Fluoride-free processing:** No fluorine-containing reagents are required, eliminating the need for specialised fluoride-resistant equipment materials and avoiding the generation of fluorine-containing waste residues.
- **Feedstock flexibility:** The process can treat a broad range of manganese-containing feedstocks, including low-grade, high-impurity ores, waste materials and wastewater.
- **Efficient manganese extraction:** The extractant delivers high manganese extraction efficiency with low extractant consumption.
- **Potential for scale-up:** The process is designed to support continuous, automated operation and has potential for commercial-scale application.
- **High product purity:** The manganese sulphate produced has low impurity levels and exceeds the purity requirements of relevant industry standards.

The technology combines feedstock flexibility, efficient extraction and high product purity with the environmental benefits of fluoride-free processing, supporting its potential application across a range of manganese feedstocks.

Securing ultra-high purity battery inputs upstream is strongly preferred; mitigating contamination downstream during p-CAM synthesis introduces prohibitive processing costs and technical complexities that may directly erode manufacturing margins. Furthermore, ultra-high purity manganese sulphate commands an approximate 33% price premium over standard battery-grade material, due to its structural scarcity within the advanced battery materials value chain.

Table 1. Firebird Ultra-High-Purity manganese sulphate results compared with China industry standards and third-party results. Impurities reported on a parts per million (ppm) basis.

Item	China Standard HG/T 4823-2023 Superior grade	China Standard HG/T 4823-2023 Qualified grade	Firebird Result	FRB Test Method	Third-party Result
MnSO ₄	99.99 Wt.%	99.99 Wt.%	99.999 Wt.%	Subtraction	
Mn	32.18 Wt.%	32.00 Wt.%	≥32.48 Wt.%	AAS	≥32.46 Wt.%
Fe	10	20	≤1	AAS	<5
Zn	10	20	≤1	AAS	≤5
Cu	10	20	≤1	AAS	≤5
Pb	10	15	≤1	AAS	≤5
Cd	5	10	≤1	AAS	≤5
Cr	10	15	≤1	AAS	≤5
K	30	50	≤1	AAS	≤5
Na	100	200	≤1	AAS	≤5
Ca	50	100	≤5	AAS	≤15
Mg	50	100	≤1	AAS	≤5
Ni	50	–	≤1	AAS	≤5
Co	50	–	≤1	AAS	≤5
Al	10	30	≤1	AAS	≤5

Australian Oakover Feedstock processed to UHPMSM

The program will process a representative subsample of manganese ore sourced from the Company's 100%-owned Oakover Manganese Project in Western Australia, which was recently prepared in Australia (refer ASX announcement 23 September 2026). The ore will be processed through Firebird's proprietary flowsheet directly into ultra-high-purity manganese sulphate monohydrate (UHPMSM).

The same program will be replicated as the first experimental campaign at the ADP in Osborne Park, Perth, as part of initial commissioning activities. Firebird will report product purity results once the program is complete and samples have been independently tested and validated.



Figure 2. ADP Technical Lead Dr Chris Passmore with a member of Firebird's China-based engineering team at the Hunan Pilot Plant.



Figure 3. Dr Chris Passmore working alongside Firebird's China-based team in the Hunan Pilot Plant.

Firebird CEO, Mr Ron Mitchell, commented:

"Manganese sulphate is a key chemical used in next generation manganese rich battery chemistries. The first production of a 5N manganese sulphate product purity is testament to the processing capability that Firebird has developed. Ultra-high purity battery input materials are essential for application in advanced, high-performance battery chemistries and these results are an important step in preparing our Australian technical team for the assembly, commissioning and operation of the Australian Demonstration Plant in Perth in 2027. Beyond the ADP this is a process that can be applied to a commercial scale facility and this commercialisation pathway will be a key workstream for the company throughout 2027.

"Furthermore, commencing a further production campaign utilising Australian Oakover ore is an important step in demonstrating our integrated pathway from Western Australian manganese feedstock to ultra-high-purity battery materials. Dr Passmore's work alongside our Hunan technical team is the ideal preparation ahead of replicating this campaign at our Australian Demonstration Plant during initial commissioning activities. We look forward to reporting independently validated product purity results once the program is complete."

This announcement has been authorised for release by the Board of Firebird Metals Limited.

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About Firebird Metals Limited (ASX:FRB)

Firebird is an Australian battery materials technology company developing **advanced manganese-based lithium-ion battery materials** for the EV and energy-storage markets. Its proprietary, patented and exclusively licensed technology enables the direct processing of manganese concentrate to cathode active materials (CAM) within a single integrated process line, pairing a high-efficiency kiln and advanced crystallisation with downstream processing know-how to target **lower cost and energy use**.

The Company's immediate focus is delivery of its **Australian Demonstration Plant (ADP) in Perth, supported by a \$2 million grant from the Australian Renewable Energy Agency (ARENA)** under the Battery Breakthrough Initiative. The ADP, Australia's first demonstration-scale facility processing manganese concentrate into high-purity manganese sulphate (HPMSM) and downstream battery materials, including CAM, is advancing rapidly through 2026. It builds on Firebird's operating pilot facility, which has demonstrated the full flowsheet from manganese ore to high-performance CAM, and will validate the process under Australian conditions while delivering HPMSM and cathode samples for customer qualification.

Firebird is advancing near-term HPMSM production for the lithium manganese iron phosphate (LMFP) market, alongside a lithium manganese rich (LMR) program for next-generation cathodes.

Firebird also holds 234 Mt of manganese resources in Western Australia, led by Oakover (176.7 Mt at 9.9% Mn, including Indicated 105.8 Mt at 10.1% Mn¹) and Hill 616 (57.5 Mt at 12.2% Mn²). The Company has the flexibility to source manganese ore through third-party suppliers and stockpiles, with mining optionality retained within its broader portfolio.

JORC Compliance Statement

This announcement contains references to Mineral Resource Estimates, which have been reported in compliance with Listing Rule 5.8 and extracted from previous ASX announcements as referenced. The Company confirms that it is not aware of any new information or data that materially affects the information previously reported and that all material assumptions and technical parameters underpinning the Mineral Resource Estimates continue to apply and have not materially changed.

¹ See ASX announcement dated 23 March 2023: Indicated Resource of 105.8Mt at 10.1%; Inferred Resource of 70.9Mt at 9.6% for global Resource of 176.7 Mt at 9.9% Mn.

² See ASX announcement dated 1 December 2021: Inferred Resource of 57.5 Mt at 12.2% Mn.