

Empire Metals Limited / LON: EEE / Sector: Natural Resources

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Empire Metals Limited
("Empire" or "the Company")

Exceptional Testwork Results Achieved on Titanium-rich Heavy Mineral Concentrate Samples
Unlocking the Potential of a Giant Titanium Project

Empire Metals Limited (LON: EEE), the AIM-quoted resource exploration and development company, is pleased to announce exceptional results from the hydrometallurgical testwork carried out on heavy mineral concentrates from the Pitfield Project ('Pitfield'), located in Western Australia. Acid leaching of the anatase-rich heavy mineral concentrate from gravity testwork resulted in almost complete extraction of the titanium from the anatase. The result is a major step forward in achieving a key objective of the Company to developing a process that will produce a high value +95% titanium dioxide (TiO₂) product.

Highlights

- **High-value product potential:** quality TiO₂ is in high demand, with global market prices ranging from 2,400 to over 4,000 per tonne for TiO₂ pigments and between 8,000 to 12,000 per tonne for titanium sponge^[1].
- **Exceptional recovery rates:** Initial leach tests achieved 95% dissolution of the most important titanium mineral, anatase, from heavy mineral concentrates.
- **Straightforward processing route:** A combination of gravity and flotation techniques offers a straightforward processing method to produce a clean, anatase-rich concentrate, which can be further upgraded via acid leaching to yield high-grade, high-purity TiO₂.
- **Strategic advantage:** The weathered cap at Pitfield is rich in anatase, it is the key titanium-bearing mineral, positioning the project as a significant source of high quality TiO₂ product.
- **Progressive development:** Empire's fully funded metallurgical testwork programme continues, with the team optimising recoveries and refining the flowsheet with input from leading industry experts. Regular updates will keep stakeholders informed.
- **Geopolitical market dynamics:** TiO₂ demand is robust and growing. Supply constraints are increasing in light of recent geopolitical developments, including Russia's proposed restrictions on titanium exports and European Union ('EU') and USA tariffs on Chinese production, which are expected to tighten global supply chains for titanium products.
- **Critical Mineral** In November 2024 the UK was the latest country to add titanium to its critical minerals list. It is also on the critical minerals list in the USA, Australia and the EU.

Shaun Bunn, Managing Director, said: *"I am extremely pleased to report that the initial "diagnostic" leach tests on the titanium-rich heavy mineral concentrates from gravity testwork, using an industry standard acid bake - water wash leaching process, resulted in 95% dissolution of the contained anatase, an exceptional result. The combination of gravity and flotation mineral separation techniques shows significant promise as a simple and conventional processing route for producing a clean anatase rich mineral concentrate which can then undergo further beneficiation via an acid leach to recover the TiO₂ into a high-grade, high-purity concentrate."*

"We are excited by these results, and they align with our goal to produce a high-grade, high purity titanium dioxide product for which there is strong demand and tightening supply due to market dynamics and increasing geopolitical tensions globally. We look forward to updating the market on additional testwork currently being carried out as we continue to rapidly advance our project."

Positive Hydrometallurgical Testwork Results

A heavy mineral concentrate was generated from a composite sample of the weathered zone, taken from the diamond drilling at the Cosgrove prospect (hole DD24COS002). This core sample underwent gravity separation and a heavy mineral concentrate (>3.6 and <4.4 SG) was produced, containing 12% TiO₂ including 6.5% as the mineral anatase.

Preliminary sighter leach testwork was carried out on this anatase-rich, heavy mineral concentrate using an industry standard acid bake - water wash leaching process. The leach response was very positive with 95% dissolution achieved on the anatase, whilst gangue silicate dissolution was 29% and iron oxides and hydroxides were only 13% (Table 1). These results confirm that the clean anatase contained within the Pitfield weathered zone can be easily leached through relatively simple and known hydrometallurgical processes.

The concentrate sample also contained approx. 7% Fe-Ti-oxide group minerals (this includes iron and titanium oxide minerals of varying composition, in a spectrum of weathering states). Dissolution of this mineral class was low under the conditions tested and further work is planned to improve the extraction from this mineral group. Further analysis of the mineralogy across the exploration targets will focus on the Fe-Ti-oxide minerals, to deliver a flowsheet that is optimised for titanium extraction from all minerals.

This test was the first in a series planned to test concepts from industry and literature. Further work will examine a wide range of options for maximising titanium recovery from the Pitfield weathered zone. Ore characterisation work on the samples taken from the recent diamond drilling programme will also continue in order to develop an understanding of the distribution of titanium bearing minerals in the weathered zone.

Table 1 Sighter Leach Elemental and Mineral Extraction

Elemental Extraction (%)		Mineral Extraction (%)	
Ca	45	Anatase	95
Cr	22	Titanite	49
Fe	17	Ilmenite	0.3
Mg	60	Fe-Oxides/Hydroxides	13
Si	2	Gangue Silicates	29



Figure 1 : Water leach in progress

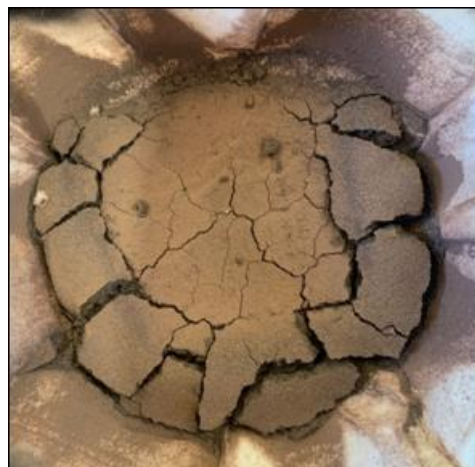


Figure 2: Water leach residue -remaining solids that have not dissolved in the acid bake water leach process.

Ongoing Flowsheet Optimisation

The Company continues to rapidly advance the process flowsheet development testwork and has initiated a number of work programmes, testing the various key components that are expected to form the basis of a metallurgical flowsheet ahead of designing a continuous pilot plant.

The key components currently under review include:

1. Ore Characterisation - Comminution

Standard comminution tests have been undertaken on mineralised drill core samples collected from the fresh bedrock as well as the overlying weathered cap zone to provide information on rock competency and energy input for breakage requirements. The weathered zone material was confirmed to be very soft whereas the fresh bedrock, whilst more competent, is expected to fracture readily due to the bedding planes within the sandstone and quartzite. The main

competent, is expected to fracture easily due to the bedding layers within the sandstone sediments. The new metallurgical samples prepared from the recently drilled diamond 'PQ' core have been submitted to the laboratories for a full range of comminution tests including low energy attritioning and wet scrubbing techniques.

2. Mineral Concentration

A heavy mineral concentrate was achieved from the preliminary gravity tabling tests on the anatase-rich weathered zone samples, with high a recovery of titanium and iron (up to 80% and 92% respectively) and importantly a high rejection of aluminium and silica minerals.

Following on from these successful gravity separation tests, completed on the deslimed weathered core samples, further optimisation work is underway looking at testing metallurgical processes that can further separate out the gangue minerals from titanium bearing minerals. The key mineral concentration techniques currently under investigation include:

- Additional gravity separation testwork, looking at regrinding and recycling various middling streams and testing the application of a Multi Gravity Separator (MGS): initial tests successfully produced a low-grade mineral waste stream and a titanium-rich mineral concentrate for further downstream processing however further concentration of the titanium should be achievable with the rejection of the iron-oxide minerals from the heavy mineral concentrate;
- Magnetic separation testwork is underway focused on separating weakly magnetic minerals, like the Fe-Ti-oxide minerals, from the non-magnetic minerals such as quartz or hematite;
- Preliminary froth flotation testwork on the weathered samples has also been positive. Sighter rougher tests produced a concentrate containing 78% of the TiO_2 bearing minerals with a rougher concentrate grade of 8.8% TiO_2 . Froth Flotation testwork has also commenced, focused on separating the finer gangue minerals from the titanium bearing minerals within the slime fraction. The slimes consist mainly of kaolin clays, which can be used to produce "China Clay", and contain some anatase which can be recovered separately.

3. Beneficiation

Bench-scale testwork is continuing on the leach response of both the titanium minerals and the associated gangue minerals, initially focused on bringing the titanium into solution, and then looking to optimise the leach solution chemistry and define the process steps for product finishing. The testwork is assessing acid types (HCl and H_2SO_4) and their consumption, options for reagent recycling, impurity management and options for producing a final high-purity titanium product.

4. Final product assessment

A high-grade, high-purity titanium product suitable as feedstock for chloride pigment production or conversion into titanium metal sponge has been identified as the most desirable final product for the project. The possible process chemistries in the leaching step provide a good synergy with this type of final product. The potential to produce a range of different products, depending on market demand, will be investigated in the testwork programme. Additionally, any opportunity to produce a viable by-product and to reduce waste streams is being explored.

The Pitfield Titanium Project

Located within the Mid-West region of Western Australia, near the northern wheatbelt town of Three Springs, the Pitfield titanium project lies 313km north of Perth and 156km southeast of Geraldton, the Mid West region's capital and major port. Western Australia is ranked as one of the top mining jurisdictions in the world according to the Fraser Institute's Investment Attractiveness Index published in 2023, and has mining-friendly policies, stable government, transparency, and advanced technology expertise. Pitfield has existing connections to port (both road & rail), HV power substations, and is nearby to natural gas pipelines as well as a green energy hydrogen fuel hub, which is under planning and development (refer Figure 3).





Figure 3. Pitfield Project Location showing the Mid-West Region Infrastructure and Services

Market Abuse Regulation (MAR) Disclosure

Certain information contained in this announcement would have been deemed inside information for the purposes of Article 7 of Regulation (EU) No 596/2014, as incorporated into UK law by the European Union (Withdrawal) Act 2018, until the release of this announcement.

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About Empire Metals Limited

Empire Metals is an AIM-listed exploration and resource development company (LON: EEE) with a primary focus on developing Pitfield, an emerging giant titanium project in Western Australia.

Exploration activity at Pitfield has confirmed the discovery of a new giant mineralised system extending over 40km by 8km by 5km deep. Drilling campaigns have confirmed high-grade TiO_2 mineralised zones across thick bedded intervals to a vertical depth of ~350m, confirming Pitfield as a world class, district-scale titanium mineral system.

Empire is now accelerating the economic development of Pitfield, with the objective of becoming a leading producer of high value titanium dioxide products.

The Company also has two further exploration projects in Australia; the Eclipse Project and the Walton Project in Western Australia, in addition to three precious metals projects located in a historically high-grade gold producing region of Australia.

[1] Source: TiPMC - pricing is based on historical analysis of the latest pricing cycles. Range includes both low tier and top tier quality products. Titanium sponge pricing covers both industrial and aerospace grades.

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