

Alpha **HPA**

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ASX: **A4N**
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PROJECTS UPDATE

SUPPLYING DE-CARBONISATION

STAGE 1 – PPF

- **Al-nitrate production ~150 tonnes at target 5N (99.999%) purity**
- **HPA circuit equipment installation well progressed**
- **First HPA circuit equipment due to commence commissioning**

PRODUCT MARKETING

- **Test work commenced with multiple new global Li-B cathode manufacturers**
- **European marketing trip scales up end-user engagement**
- **Further expansion of Al-oxide coating of Li-B anode materials**
- **Indicative end-user bids for up to 80% of Stage 1 PPF HPA capacity**
- **Semiconductor CMP test work on Alpha's nano HPA shows outperformance**
- **Continued demand for Alpha's high purity alumina tri-hydrate (ATH)**
- **Stage 1 and Brisbane facility currently servicing 41 individual test orders**
- **Successful REACH registration for Al-nitrate export to the EU**

ALPHA SAPPHIRE

- **Construction of first sapphire growth units on schedule**
- **Assessment of site locations and renewable energy options underway**
- **Joint marketing activities with Ebner-Fametec commenced**

FULL SCALE PROJECT

- **Final stage Independent Technical Engineers (ITE) review underway**
- **Multi-product engineering now in final stages**
- **Project financing negotiations further advanced**

The Board of Alpha HPA Limited ('Alpha' or 'the Company') is pleased to provide an update on project activities for its HPA First Project and Alpha Sapphire, each representing the commercialisation and production of critical high purity aluminium products driving de-carbonisation.

The Company's Stage 1, Precursor Production Facility (PPF) in Gladstone, QLD is in production for 5N purity aluminium nitrate (Al-nitrate) precursors with an expansion underway to produce Alpha's full product offering.

The Company is concurrently satisfying the remaining conditions precedent to the full-scale Project Final Investment Decision (FID), with a focus on product sales, offtakes and project financing.

STAGE 1 – PPF

HPA circuit expansion

Alpha is currently deploying the \$15.5 million grant awarded under the Critical Minerals Development Program (CMDP) to install a small-scale commercial high-purity aluminas (HPA) circuit within Stage 1 and expand the capability of the Stage 1 PPF to include Alpha's full high purity aluminium product range.

Most major equipment orders have now been delivered and installed (see example images on following page). Items under construction off-site and due for delivery in the next 2 months include an HPA sinter oven, jet mill and rotary dryer. The Stage 1 PPF rooftop solar array contract has been awarded with installation to commence later this week.

Once fully deployed, the CMDP grant funding will facilitate:

- the expansion of Stage 1 PPF production capacity of aluminium nitrate and aluminium sulphate;
- the capability to produce up to 15tpa of additional capacity of HPA production, including nano HPA production to service end-users in the semi-conductor (CMP) sector;
- the capability to produce up to an additional 10tpa of high purity boehmite;
- the production of HPA tablets for synthetic sapphire glass growth, and'
- installation of a large rooftop solar array.

Within the last month, the HPA circuit design has been slightly modified to accommodate small-scale commercial production of Alpha's high purity alumina-trihydrate (ATH) to service the expanding end-user demand for this product.

Stage 1 production

Production of high purity Al-nitrate has continued, with cumulative Al-nitrate production having now reached approximately 150 tonnes at the target 5N (99.999%) purity level. Production levels are being maintained at around 850kg per day, as the conversion of Al-nitrate into additional product lines ramps up.

Ahead of the commissioning and installation of the Stage 1 HPA circuit, the Stage 1 PPF is now also at steady state for demonstration scale production of 4N purity gamma phase and alpha phase aluminas, as well as the production, on a 24 hour basis, of custom-shaped sintered HPA tablets for Ebner-Fametec.

These production lines are now servicing approximately 600kg of HPA product orders across a range of potential customers.

The Stage 1 PPF is also supplying Al-nitrate to the Brisbane facility to service end-user test orders for high purity boehmites (Al-O-OH), high purity alumina trihydrate (ATH) and high purity nano-aluminas.

Production capacity will be materially increased once the HPA circuit is fully installed and commissioned.



Aluminium Solvent Extraction (SX) Circuit – Stage 1 PPF



Aluminium Sulphate Centrifuge – delivered to site



Rotary HPA dryer/calcliner – ready to ship



Automated HPA tablet press – delivered to site



HPA Tunnel Kiln – in place

Major equipment deliveries – Stage 1 – HPA Circuit

PRODUCT MARKETING

Alpha's global marketing effort continues to gather momentum with a series of positive qualification test results and a number of significant global brands, particular in the lithium-ion (Li-ion) battery cathode sector, now working with the Company on expanded test work on Alpha's materials as cathode dopants*. Inbound enquiries on the Company's high purity alumina tri-hydrate (ATH) and high purity nano-aluminas have also expanded.

The Company is currently servicing over 41 product test orders from both the Stage 1 PPF and the Product Development Centre in Brisbane.

Test work commenced with multiple new global Li-B cathode manufacturers

The Company is pleased to welcome considerable expanded interest in Alpha's products from a number of global Li-B cathode manufacturers (OEMs).

A detailed matrix of qualification test work has now commenced with these new counterparties, including for the following products as cathode dopants:

- aluminium sulphate;
- gamma phase high purity alumina; and
- high purity alumina-trihydrate (ATH).

Key drivers in this expanded engagement with cathode OEMs has been interest in Alpha's high purity, low-carbon materials as well as supply chain compliance with the US Inflation Reduction Act (IRA).

** Cathode dopant refers to the addition of aluminium bearing compounds into or onto the cathode to stabilise the cathode active material.*

European marketing trip scales up end-user engagement

From late May to mid-June, Alpha completed a comprehensive marketing trip within the EU, with a focus on:

- engaging new Li-B sector end-users through exhibiting at the Stuttgart Battery Show;
- consolidating existing end-user relationships;
- in-person site visits to potential strategic counterparties; and;
- site visit to Ebner-Fametec (see Alpha Sapphire update below).

The Company was highly encouraged by the response from the various marketing efforts, with multiple new test work programs initiated and existing engagements materially advanced.

Further Expansion of Al-oxide coating of Li-B anode materials

Alpha has received a number of positive test results from end-users in respect of the Al-oxide coating process of graphite Li-B anode materials.

The coating process utilises Alpha's 5N Al-nitrate as the main aluminium precursor.

This has resulted in expanded test work, including coating testwork at small commercial scale for a Japanese based battery manufacturer.

First stage testing by a major EU based developer has confirmed significant technical benefits of the Al-oxide coating on carbon and moved to second stage test work.

In addition, and significantly built on the Stuttgart Battery Show engagement, Alpha has commenced Al-oxide coating test work with a further five Li-B anode material developers and OEMs.

Indicative end-user bids for up to 80% of Stage 1 HPA capacity

Following two successful rounds of scaled up product test work and small-scale sales, Alpha has now received indicative bids to supply one of its HPA products to an end-user in the semiconductor sector commencing early 2024.

The application and pricing are considered premium, with the customer bidding to take up to 80% of the HPA production capacity of Stage 1 once the expanded HPA circuit is in full operation. The end-user application has capacity to expand to over 500 tonnes over the next 3 years.

Supply discussions are being advanced, with a few remaining conditions precedent ahead of a final contract.

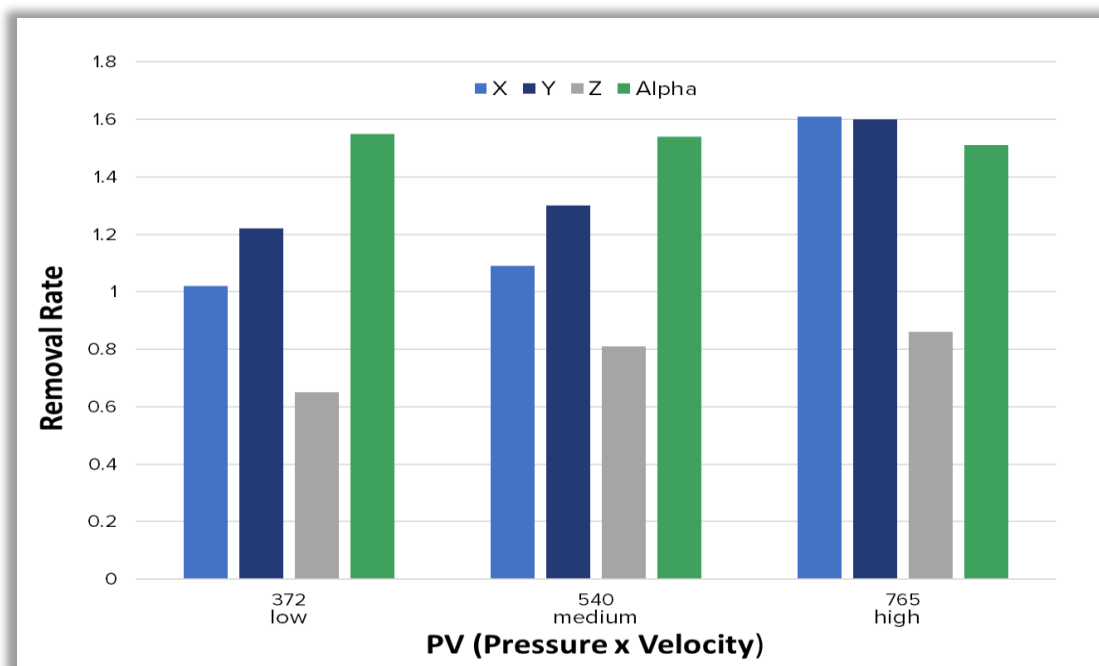
Semiconductor CMP test work on Alpha's nano HPA shows outperformance

As part of Alpha's wider engagement with the semiconductor sector on the application of its nano-HPA in CMP (Chemical Mechanical Polishing) slurries, the Company has commissioned specialist third party test work to understand the performance of our materials in this high-value application.

The test work was conducted both to educate our internal technical and sales team on Alpha's product offering and as a sales tool to assist in marketing to this sector.

Controlled test work assessing the performance of Alpha's nano-HPA as a CMP abrasive on silicon-carbide (SiC) semi-conductor substrates, confirmed outperformance when measured against industry incumbent slurries (shown as X, Y & Z in the graph below).

Summary results are shown below, confirming CMP slurries made with Alpha's material showed highest removal rates at the lowest PV values. PV values represent *pressure multiplied by velocity* of the polishing conditions, with performance at low PV's *strongly preferred* by the industry as this affords lower operating temperatures to minimise deformation of the substrate.



Removal rates of SiC substrates by CMP slurries at different PVs. Alumina based CMP slurries made with Alpha's HPA (in green) is compared against industry incumbent alumina based slurries (X, Y & Z)

Continued demand for Alpha's high purity alumina tri-hydrate (ATH)

End-user demand for Alpha's high purity alumina tri-hydrate (ATH) product continues to build momentum, with test orders for ATH now representing approximately 30% of orders. End-user demand applications include:

- Li-B cathode doping
- As a precursor to nano alumina for CMP polishing
- As a low carbon precursor to existing HPA production
- As a precursor to gamma alumina catalysts
- As a dopant for aluminium into alumina-silicate glass

Successful REACH registration for Al-nitrate export to the EU

Alpha has now successfully completed its REACH registration with the European Chemicals Agency (ECHA) for the import of Alpha's aluminium nitrate into the EU.

Successful REACH registration is a pre-condition for a significant supply contract with a major EU based end-user that the Company is seeking to close within the next month.

Construction of first sapphire growth units on schedule

The joint engineering team of Alpha and Ebner-Fametec are co-ordinating the construction and installation layout for the first two sapphire growth units purchased by the wholly owned Alpha subsidiary, Alpha Sapphire Pty Ltd, as per Phase A of the Ebner-Fametec agreement.

The construction of the units remains on schedule, with first equipment deliveries due late 2023, for installation and commissioning in early 2024.

Alpha representatives completed a site visit to Ebner-Fametec in June to view synthetic sapphire growth in operation with Alpha's feedstock materials and to conference on sapphire marketing strategies.



Synthetic sapphire growth units operating at Ebner-Fametec, Austria. These units are identical to those under construction for Alpha Sapphire and are currently being used to qualify Alpha's HPA feedstock.

Assessment of site locations and renewable energy options underway

Alpha is engaging with renewable energy supplier for the power requirements for Alpha Sapphire Phase B/C (100 sapphire growth units) of the Ebner-Fametec agreement. Renewable energy supply will influence site location, with the synthetic sapphire growth facility having the flexibility to be located for convenient access to reliable and competitively priced renewable energy. Space for expansion to the Nova phase (up to 1,000 additional sapphire growth units) in the same location is also a consideration in the site location assessment.

Joint marketing activities with Ebner-Fametec commenced

Alpha and Ebner-Fametec have commenced activities under the joint marketing arrangement agreed under the recent extension to the LOI.

Activities have included site visits to target customers in the EU with upcoming marketing to the LED and semiconductor end-user sectors in the Bay Area, California at Semi-Con West during July.

Marketing activities have already generated Requests For Quotations (RFQs) to supply synthetic sapphire to the optics sector.

STAGE 2 – FULL SCALE PROJECT

Multi-product engineering advanced

The Company continues to work on updating the Definitive Feasibility Study (DFS) for the full scale Stage 2 HPA First Project which will include new product lines. Discussions with key execution consultants and construction contractors have commenced to further the execution model. The major Structural, Mechanical, Piping (SMP) contractor under consideration has also submitted a competitive proposal for a large portion of the facility enabling a strong basis for cost estimation for the balance of the plant.

Focus on de-risking the schedule of works continues with a major milestone of signing the “Offer to Connect” from Ergon, the electrical energy transmission corporation for Central Queensland. This has the benefit of locking in the timing for energisation of the facility. Other vendor engineering packages have also been reviewed and updated as part of the DFS update.

Final Stage Independent Technical Engineers (ITE) review underway

Alpha has commenced the final stage ITE review process as required by project financiers incorporating the new products added since their prior engagement. The ITE expect to complete their work in the coming months covering off on capital expenditure, project schedule and execution strategy in support of project financing timelines.

Project financing negotiations advanced

In the context of the multi-product engineering and the ITE process described above, Project Financing negotiations have been materially advanced in the last weeks with Project Financiers including industry participants and the Australian and Queensland Governments, with a view to finalising a financing package for the construction of the full-scale Stage 2 HPA First Project.

Commenting on recent progress, Managing Director Rimas Kairaitis said:

“This is an intense and critical period for the Company as we look to finalise a number of key parallel work streams. The aligning thematics of end-user demand growth, de-carbonisation, supply chain security, and government level support for the critical minerals sector all remain highly favourable for the Alpha business.”

About the HPA First Project

The Company’s HPA First Project represents the commercialisation of the production of high purity aluminium materials using the Company’s proprietary licenced solvent extraction and HPA refining technology. The disruptive, low-carbon process technology provides for the extraction and purification of aluminium from an industrial feedstock to produce 4N (>99.99% purity) and 5N (>99.999% purity) aluminium materials for sale into high technology markets including the semiconductor, lithium-ion battery and LED lighting sectors.

Alpha completed a Definitive Feasibility Study in March 2020 following a successful pilot plant campaign in 2019.

Alpha is now in production at its Stage 1, Precursor Production Facility. The Stage 1 facility is also now being expanded to produce the full range of Alpha’s high-purity aluminium materials with \$15.5M grant funding from the Australian Government.

The Company is now in the mature phases of market outreach and project financing with respect to the full scale Stage 2 HPA First Project, with the expectation of positioning Stage 2 to Final investment Decision.

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