



8 March 2021

## **ENCOURAGING PHASE 1 BATTERY PERFORMANCE TESTS USING HPA COATED GRAPHITE**

### Highlights

- First phase of 100 cycle battery tests completed
- Coated graphite performance is encouraging and meets expectations
- Further test runs to demonstrate repeatability
- Potential improvements to lithium-ion battery life, capacity and chargeability

Altech Chemicals Limited (Altech/the Company) (ASX: ATC) (FRA: A3Y) is pleased to advise that it has now completed the first phase of battery performance testing of graphite particles coated with high purity alumina (HPA), using Altech's proprietary coating technology.

For the first round of testing, a batch of battery electrodes were produced using non-coated standard anode grade graphite particles (the control), and a separate batch was produced that contained anode grade graphite particles coated with HPA using Altech's technology. One hundred cycles of cell charge and discharge were completed. Results for the coated graphite anodes compared to the non-coated anodes were positive and encouraging. Test work will now proceed to the next stage where additional runs of battery charge and discharge will be undertaken with the aim of obtaining results that demonstrate repeatability and consistency.



**Figure 1 – Coin batteries used for performance tests**



**Figure 2 – Battery test cycling unit**

On 22 December 2020, Altech announced the successful demonstration of its alumina coating technology – the coating of graphite particles typical of those used in anode applications within lithium-ion batteries (anode grade graphite), with a nano layer of high purity alumina (HPA). The demonstration showed that Altech's technology was able to deposit an uniform and consistent layer of alumina onto anode grade graphite particles. The uniformity and consistency of an alumina layer on anode grade graphite is expected to be important to improve lithium-ion battery performance.

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On 12 February 2021, the Company announced the commencement of a pre-feasibility study by its 75% owned German subsidiary Altech Industries Germany GmbH, for the construction of a battery materials high purity alumina (HPA) coating plant in Saxony, Germany – the battery test results will be incorporated into the study. The battery test work is part of the Company’s strategy to focus on tailoring its high purity alumina into specialised products targeted at more efficient applications within the lithium-ion battery industry.

Altech’s General Manager Operations and chief scientist, Dr Jingyuan Liu was very encouraged by the initial phase of results, *“We now have to optimise the testing conditions and conduct additional tests to demonstrate repeatability and consistency. The performance of the alumina coated graphite is meeting our expectations so far”*, he said.

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*Wir sprechen Deutsch.*

**About Altech Chemicals (ASX:ATC) (FRA:A3Y)**

Altech Chemicals Limited (Altech/the Company) is aiming to become one of the world's leading suppliers of 99.99% (4N) high purity alumina (Al<sub>2</sub>O<sub>3</sub>) through the construction and operation of a 4,500tpa high purity alumina (HPA) processing plant at Johor, Malaysia. Feedstock for the plant will be sourced from the Company's 100%-owned kaolin deposit at Meckering, Western Australia and shipped to Malaysia.

HPA is a high-value, high margin and highly demanded product as it is the critical ingredient required for the production of synthetic sapphire. Synthetic sapphire is used in the manufacture of substrates for LED lights, semiconductor wafers used in the electronics industry, and scratch-resistant sapphire glass used for wristwatch faces, optical windows and smartphone components. Increasingly HPA is used by lithium-ion battery manufacturers as the coating on the battery's separator, which improves performance, longevity and safety of the battery. With global HPA demand approximately 19,000t (2018), it is estimated that this demand will grow at a compound annual growth rate (CAGR) of 30% (2018-2028); by 2028 HPA market demand is forecast to be approximately 272,000t, driven by the increasing adoption of LEDs worldwide as well as the demand for HPA by lithium-ion battery manufacturers to serve the surging electric vehicle market.



German engineering firm SMS group GmbH (SMS) is the appointed EPC contractor for construction of Altech's Malaysian HPA plant. SMS has provided a USD280 million fixed price turnkey contract and has proposed clear and concise guarantees to Altech for plant throughput and completion. Altech has executed an off-take sales arrangement with Mitsubishi Corporation's Australian subsidiary, Mitsubishi Australia Ltd (Mitsubishi) covering the first 10-years of HPA production from the plant.

Conservative (bank case) cash flow modelling of the project shows a pre-tax net present value of USD505.6million at a discount rate of 7.5%. The Project generates annual average net free cash of ~USD76million at full production (allowing for sustaining capital and before debt servicing and tax), with an attractive margin on HPA sales of ~63%. (Refer to ASX Announcement "Positive Final Investment Decision Study for 4,500TPA HPA project" dated 23 October 2017 for complete details. The Company confirms that as at the date of this announcement there are no material changes to the key assumptions adopted in the study).

The Company has been successful in securing senior project debt finance of USD190 million from German government owned KfW IPEX-Bank as senior lender. Altech has also mandated Macquarie Bank (Macquarie) as the preferred mezzanine lender for the project. The indicative and non-binding mezzanine debt term sheet (progressing through due diligence) is for a facility amount of up to USD90 million. To maintain project momentum during the period leading up to financial close, Altech has raised ~A\$39 million in the last 24 months to fund the commencement of Stage 1 and 2 of the plant's construction; Stage 1 construction commenced in February 2019 with Stage 2 early works completed at the end of June 2020.

**Forward-looking Statements**

This announcement contains forward-looking statements which are identified by words such as 'anticipates', 'forecasts', 'may', 'will', 'could', 'believes', 'estimates', 'targets', 'expects', 'plan' or 'intends' and other similar words that involve risks and uncertainties. Indications of, and guidelines or outlook on, future earnings, distributions or financial position or performance and targets, estimates and assumptions in respect of production, prices, operating costs, results, capital expenditures, reserves and resources are also forward-looking statements. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions and estimates regarding future events and actions that, while considered reasonable as at the date of this announcement and are expected to take place, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of the Company, the directors and management. We cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this announcement will actually occur and readers are cautioned not to place undue reliance on these forward-looking statements. These forward-looking statements are subject to various risk factors that could cause actual events or results to differ materially from the events or results estimated, expressed or anticipated in these statements.