1 February 2022

ALTECH – GERMAN BATTERY MATERIALS PILOT PLANT DESIGN COMPLETED

Highlights

- German Coating Pilot Plant preliminary design completed
- Plant to be installed in Schwarze Pumpe Dock3 facility
- Design to produce 120kg coated anode material per day, ~37,000 kg per year
- Engineering contractor selection nearing completion
- Pilot plant to provide optimised inputs for 10,000tpa commercial plant design, and produce customer samples for testing and qualification

Altech Chemicals Limited (Altech/Company) (ASX: ATC) (FRA: A3Y) is pleased to announce that Altech Industries Germany GmbH (AIG) has completed the preliminary design for a pilot plant, to be constructed in Germany, to demonstrate Altech's proprietary battery materials alumina coating technology. The pilot plant is designed to produce up to 36,680 kilograms of anode grade coated battery material per year (120 kg per day). AIG, which is 75% owned by Altech and 25% owned by Frankfurt Stock Exchange listed Altech Advanced Materials AG, holds the exclusive rights for use of Altech's battery materials coating technology within the European Union.

The pilot plant design is intended for installation in the Dock3 facility adjacent to AIG's designated site at the Schwarze Pumpe Industrial Park (see Figures 1 and 2). AIG has secured approximately 300m^2 of floorspace within the Dock3 where the pilot plant will be located. Also, an on-site analytical laboratory is planned for the pilot plant. The laboratory will allow for the rapid assessment of pilot plant product purity and monitor physical parameters which will enable changes in processing parameters and operational setpoints to be modified quickly, as required. The Dock3 space is already connected to all required utilities and includes office space for the project and operations team.

Figure 1: Dock3 facility, Schwarze Pumpe Industrial Park, Saxony, Germany

Altech Chemicals Limited
ASX:ATC
ABN 45 125 301 206

Suite 8, 295 Rokeby Road,
Subiaco, Western Australia
6008 Australia

Telephone: +61 8 6168 1555
e-mail: info@altechchemicals.com
Website: www.altechchemicals.com

Figure 2: Leased bays in the Dock3 facility

The pilot plant design has been separated into two distinct areas of processing; precursor production, and battery material coating & calcination. Precursor production equipment shall be operated in batch mode, producing approximately 10kg per batch. Production is sufficient to feed the downstream anode material coating stage for approximately 30hrs of continuous production. Due to the nature of the metallurgical leach and crystallisation processes, and the high purity requirements of the plant end product, the process equipment shall be manufactured using fluoropolymer and ceramic materials. The design for the pilot plant also leverages the knowledge that Altech and selected equipment suppliers have developed during the design of its Johor HPA production facility. Centrifuge, filtration and calcination equipment shall be supplied by equipment vendors of full scale designs to enable the assessment of operating parameters and sizing scale up calculations.

The video for the pilot plant can be viewed on Altech's web site www.altechchemicals.com or https://youtu.be/f_ezE-_yjZA

Figure 3: Pilot Plant design

The coating & calcination section of the pilot plant has been designed to operate continuously with minimal shutdowns, to ensure consistency in the product material. Final product purity has been the major design consideration when selecting process equipment and the main materials of construction. Production from the battery material pilot plant shall be used to confirm the Altech process consistently achieves product purity requirements, optimise equipment design and process parameters for a full scale 10,000 tpa production plant, and to produce qualification samples for any potential joint venture offtake partners and end users.

Figure 4: Pilot Plant equipment

Figure 5: Pilot Plant equipment

AIG is currently in the final stages of engineering contractor selection, with the chosen company to be responsible for detailed engineering design, equipment procurement and installation.

At its Perth research and development laboratory, Altech has been successful in applying its alumina coating technology to both silicon and graphite particles, typical of those used in the anode of lithium-ion batteries, such as in the burgeoning electric vehicle industry. Alumina coated particles, when incorporated into a lithium-ion battery anode, improves battery energy capacity, life and performance. On 25 November 2021, the Company announced a significant breakthrough achieved by its research and development

laboratory located in Perth, Western Australia. After almost 12 months of challenging work, the R&D team "cracked the silicon barrier" and successfully produced a series of lithium-ion battery anode materials, which when tested showed ~30% higher energy retention capacity compared to conventional lithium-ion battery anode materials.

To achieve its breakthrough, Altech successfully combined silicon particles that had been treated with its innovative proprietary coating technology with regular battery grade graphite particles, to produce a lithium-ion battery electrode containing a composite graphite / silicon anode. When energised, these materials held 30% more capacity compared to a conventional graphite only anode material. Also, the previously unresolved obstacles for using silicon in lithium-ion battery anodes which were silicon particle swelling; prohibitive first-cycle-capacity-loss of up to 50%; and rapid battery degradation from each charge and discharge cycle, were also resolved during the laboratory testing of Altech's composite graphite/silicon battery anodes. Importantly, the batteries demonstrated extremely good stability and cycling performance over extended periods.

The lithium-ion battery industry has recognised that the required step change to increase lithium-ion battery energy density and reduced cost is to introduce silicon into battery anodes, as silicon has ~ ten times the energy retention capacity compared to graphite. Silicon metal has been identified as the most promising anode material for the next generation of lithium-ion batteries. However, until now, silicon was unable to be used in commercial lithium-ion batteries due to two critical drawbacks. Firstly, silicon particles expand by up to 300% in volume during battery charge, causing particle swelling, fracturing and ultimately battery failure. The second challenge is that silicon deactivates a high percentage of the lithium ions in a battery. Lithium ions are rendered in-active by the silicon, immediately reducing battery performance and life. The industry has been in a race to crack the silicon barrier.

Altech's potentially game changing technology has demonstrated that silicon particles can be modified to resolve the capacity loss caused by swelling and first-cycle-loss capacity. Phase 2 of Altech's planned R&D program will see the Company strive to improve on the 30% energy increase achieved in the first phase.

Authorised by: Iggy Tan (Managing Director)

– end –

For more information, please contact:

Corporate

Iggy Tan
Managing Director
Altech Chemicals Limited
Tel: +61 8 6168 1555
Email: info@altechchemicals.com

Shane Volk
Company Secretary
Altech Chemicals Limited
Tel: +61 8 6168 1555
Email: info@altechchemicals.com

Martin Stein
Chief Financial Officer
Altech Chemicals Limited
Tel: +61 8 6168 1555
Email: info@altechchemicals.com

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

Altech Chemicals Limited (ASX: ATC, "Altech" or "Company") is a specialty alumina technology and production company that has finalised Stage 1 and Stage 2 construction of its high purity alumina (HPA) plant in Johor, Malaysia, and continues with innovative research and development of its downstream alumina coating technology used to improve the battery life and performance in lithium-ion batteries. Altech's alumina coating technology is successful on both silicon and graphite particles, typical of those used in the anode of lithium-ion batteries, particularly within the burgeoning electric vehicle industry.

The Company has commenced a preliminary feasibility study (PFS) for the construction of a high purity alumina (HPA) battery materials coating plant in Saxony, Germany. The PFS is being undertaken by Altech's 75% owned German subsidiary, Altech Industries Germany GmbH (AIG). Work on the preliminary engineering design for the 10,000 tpa battery materials plant is in the final stages of completion. Altech has also commenced the green accreditation of the environmental credentials of the battery materials process.

Altech is further aiming to become one of the world's leading suppliers of 99.99% (4N) high purity alumina (Al_2O_3) 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 near surface 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 HPA plant 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. Stage 1 and Stage 2 early works construction has been completed on time and on budget.

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.