



Altech Chemicals
Limited

ASX ANNOUNCEMENT AND MEDIA RELEASE

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ALTECH SIGNS COLLABORATION AGREEMENT WITH LEADING SILICON PRODUCER

Highlights

- Collaboration agreement with leading Li-ion battery silicon powder supplier
- Silicon anode is the future in Li-ion batteries
- Silicon ten times capacity versus carbon anodes
- Volume change, low initial Coulombic Efficiency are roadblocks
- Alumina coating of silicon seen as long-term solution
- Applying Altech HPA and coating technology to silicon powders

Altech Chemicals Limited (Altech/the Company) (ASX: ATC) (FRA: A3Y) is pleased to announce that the Company has signed a collaboration agreement with a leading silicon producer to collaborate in developing a high capacity, long cycle life silicon anode active material targeted for use in lithium-ion (Li-ion) batteries.

The silicon company) is a leading producer of silicon metal with a proven ability to create new solutions and applications using state-of-the-art technology to drive innovation. It has technologies to produce high purity grade silicon with the flexibility to offer customised solutions to meet the increasing demands being placed on silicon from new applications such as the Li-ion battery; and is specifically developing tailor made silicon powders for the anode of Li-ion batteries. Alumina coating of silicon particles have the potential to solve the three major issues for silicon application in the Li-ion battery: expansion induce fragmentation, poor cyclability; and low initial Coulombic Efficiency (CE). A combination of the competencies and technologies of both companies offers tremendous potential and a potentially compelling solution for the industry.

At the recent battery day, electric car company, Tesla announced its goal to leverage silicon anode technology and to manufacture Li-ion batteries internally. The company stated that silicon solutions should be expected to dominate the battery market over the next five to seven years, as silicon has almost ten times the (theoretical) capacity compared to carbon-based materials, at some 3500mAh/g. Next to its superior electrochemical performance, silicon is also the most abundant material on earth after oxygen, eliminating potential shortage issues. However, there are currently three key impediments to be overcome in order to propel silicon's commercial application in Li-ion battery applications:

- Intrinsic volume changes of 300% or more during battery charge and discharge, leads to poor cyclability performance;
- Unstable formation of solid-electrolyte interphase (SEI) due to interaction between Si surface and electrolyte.
- Low Initial Coulombic Efficiency (CE), that is, high capacity loss on first battery cycle.

Altech is developing Anode Grade HPA and coating technology for the purpose of applying the coating to graphite particles that are typical of those currently used in the anode of the Li-ion battery. Both companies believe that the same technology can be applied to Silicon Co's Li-ion battery silicon powders.

Under the collaboration agreement, both companies will analyse the possibility of using Altech's HPA and technology to coat specifically designed silicon particles supplied by the silicon company. Altech will supply the coating technology and sole fund the test work.

Key terms of the agreement

Parties:	Altech Chemicals Limited and Silico Ferrosolar, S.L.U
Term:	1 year
Termination:	30 days notice
Development Costs:	Altech Chemicals Limited

– end –

Authorised by Iggy Tan (Managing Director)

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

Investor Relations (Europe)

Kai Hoffmann

Soar Financial Partners
Tel: +49 69 175 548320
Email: hoffmann@soarfinancial.com
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 (Al₂O₃) 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.