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ALTECH – EXPANSION OF RESEARCH LABORATORIES FOR POUCH CELL BATTERIES

Highlights

- Expansion of its Research and Development Laboratories in Perth
- Capability of manufacturing full-sized pouch cells batteries
- Scale-up anode material production with an additional tube furnace

Altech Chemicals Limited (Altech/Company) (ASX: ATC) (FRA: A3Y) is pleased to announce an expansion of its Research and Development Laboratories in Perth, Western Australia to allow the production of pouch cell size batteries to proceed to the next stage of the Silumina Anodes™ Project.

Altech announced in November last year that it had achieved the game-changing breakthrough and produced a lithium-ion battery with 30% more energy capacity than a conventional graphite-only lithium-ion battery. The Company was able to successfully incorporate alumina-coated silicon into the graphite anode of lithium-ion batteries and achieve higher energy capacity, as well as increased cyclability. The battery performance testing was conducted with the industry standard coin cell rechargeable lithium-ion batteries.

Coin battery cells provide a very useful comparison at the early research stage, but they have limitations, because of their design and construction. When developing new active material for lithium-ion batteries, the cell chemistry is first optimized in smaller format coin cells and then progressively scaled up to full-sized pouch cells to provide more information on electrochemical performance, energy density, and safety. To assess anode material against EV application targets, a scale-up from coin cell to pouch cell is necessary.

The pouch cell, a common design of a lithium-ion battery, is in a vacuum-packed thin plate shape in which many layers of thin cathode and anode electrodes are arranged. (See Figure 1). Conductive foil tabs welded to the electrode and sealed to the pouch carry the positive and negative terminals to the outside. The pouch cell pack design is used in current consumer, military, and automotive applications.



Figure 1 – Standard LIB Pouch Cells

By having an in-house pouch cell production and testing facility, electrical abuse scenarios, whereby the cell is required to operate outside nominal voltage and current limitations, can be tested. Physical and environmental abuse scenarios, whereby the cell is subjected to temperature extremes or mechanical deformation, can also be tested.

Pouch Cell Equipment



Figure 2 – Pouch Cell Glove Box



Figure 3 – Pouch Cell Vacuum Sealer

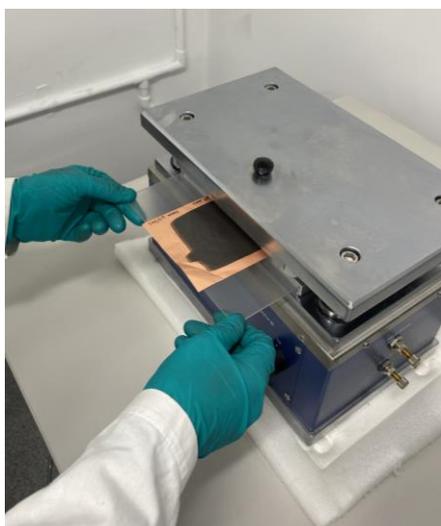


Figure 4 – Pouch Cell electrode making



Figure 5 – Pouch Cell Assembly Equipment

Proposed Testwork

Altech plans to assemble lithium-ion pouch cells for high-power applications. Electrochemical tests will apply on both coin cells and pouch cells with the same electrode to know whether the performance measured in coin cells is representative of full-sized cells. It is also important to understand the different contributions of mechanical and thermal factors to the degradation process in each cell format. Once optimized in electrochemical properties, Altech will also undertake a safety test on pouch cells using its Silumina Anodes™ material in-house, or collaborate with external laboratories.

Expansion of Silumina Anodes™ Making Capability

Manufacturing a pouch cell with multiple layers requires more anode material and additional cell-making equipment. During the first quarter of 2022, Altech installed and commissioned a larger-scale tube furnace in its Research and Development Laboratories in Perth. The new furnace has the capability of producing larger kilogram samples per batch.

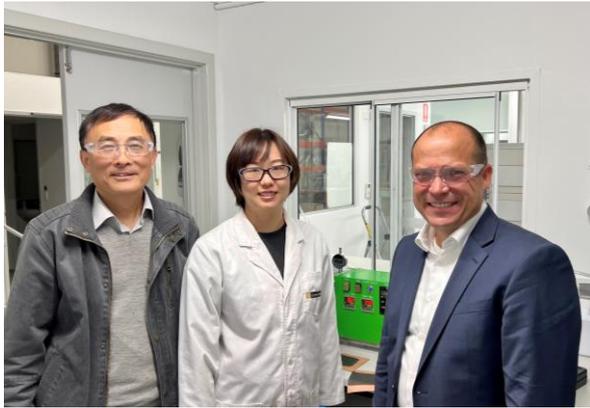


Figure 6 – German director visiting the R&D Lab



Figure 7 – New tube furnace

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

Altech Chemicals ("Altech" or "Company") is a specialty battery materials technology company that has licenced its proprietary high purity alumina coating technology to 75% owned subsidiary Altech Industries Germany GmbH (AIG), which has commenced a definitive feasibility study for the development of a 10,000tpa silicon/graphite alumina coating plant in the state of Saxony, Germany to supply its Silumina Anodes™ product to the burgeoning European electric vehicle market.

This Company recently announced its game changing technology of incorporating high-capacity silicon in lithium-ion batteries. Through in house R&D, the Company has cracked the "silicon code" and successfully achieved a 30% higher energy battery with improved cyclability or battery life. Higher density batteries result in smaller, lighter batteries and substantially less greenhouse gases, and is the future for the EV market. The Company's proprietary silicon graphite product is registered as Silumina Annodes™.

The Company is in the race to get its patented technology to market and recently announced the results of a preliminary feasibility study (PFS) for the construction of a 10,000tpa Silumina Anode™ material plant at AIG's 14 hectare industrial site within the Schwarze Pumpe Industrial Park in Saxony, Germany. The European graphite and silicon feedstock supply partners for this plant will be SGL Carbon and Ferroglobe. The project has also received green accreditation from the independent Norwegian Centre of International Climate and Environmental Research (CICERO). To support the development, AIG has commenced construction of a pilot plant adjacent to the proposed project site to allow the qualification process for its Silumina Anodes™ product. AIG has executed NDAs with two German automakers as well as a European based battery company.

Silumina Anodes™

HPA Project

Altech is also further aiming to become a supplier 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, and has finalised Stage 1 and Stage 2 construction of its HPA plant in 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. The HPA project is significantly de-risked with a bankable feasibility study completed, senior lender project finance from German government owned KfW IPEX-Bank approved, and a German EPC contractor appointed – with initial construction works at the site completed. In addition to the senior debt, conservative (bank case) cash flow modelling of the HPA plant shows a pre-tax net present value of USD 505.6million at a discount rate of 7.5%. The project generates annual average net free cash of ~USD76million at full production. Altech is in the final stages of project finance with a potential raising of US\$100m of secondary debt via the listed green bond market. In addition, US\$100m of project equity is being sought through potential project joint venture partners.