Positive Results Boost Lithium-ion Battery Program

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Corporate Information

ASX Code	**TLG, TLGOA**
Shares on issue	**181.9m**
Options (listed)	**44.9m**
Options (unlisted)	**36.2m**

Company Directors

Keith Coughlan
Non-Executive Chairman

Mark Thompson
Managing Director

Grant Mooney
Non-Executive Director

Stephen Lowe
Non-Executive Director

- **Recent larger scale testwork supports previous breakthrough results (ASX:TLG 17 Feb 2016) using Talga's graphite in Lithium-ion batteries**
- **Results show excellent stability and greater than 99.7% efficiency without capacity fade**
- **Data supports commencing industrial Li-ion 'pouch' cell testwork and commercial-style roll to roll anode formulations**
- **New tests to include Talga graphene and eco-friendly water-based formulations**

Advanced materials company, Talga Resources Ltd ("Talga" or "the Company"), is pleased to provide an update on testing of it's graphite in Lithium-ion ("Li-ion") batteries at the Warwick Manufacturing Group's ("WMG") Energy Innovation Centre, University of Warwick UK (Fig 1).

Under the testing program, graphite material produced at Talga's pilot processing facility in Germany was used to create the anodes of full coin cell Li-ion batteries.

The battery cells were tested for at least 1,000 hours under standard conditions and performed well, with results similar to the previous but smaller scale test programs, where the battery capacities were in the range of 360mAh/g and coulombic efficiency >99.7% (see Technical Glossary below).

The results are in line with standard industry graphite anode performance, but are significant as Talga's material did not require the energy intensive milling or shaping (grinding and spheronising) steps that add expense to the production of Li-ion batteries.

Additionally, the data supports Talga graphite being suitable for roll to roll fabrication of Li-ion anodes and larger pouch cell batteries (Fig 2).

This is considered important because it matches the large, continuous anode production techniques being used by global-scale battery manufacturers. In addition, pouch cells constitute the majority of battery cells used in electrical vehicles.

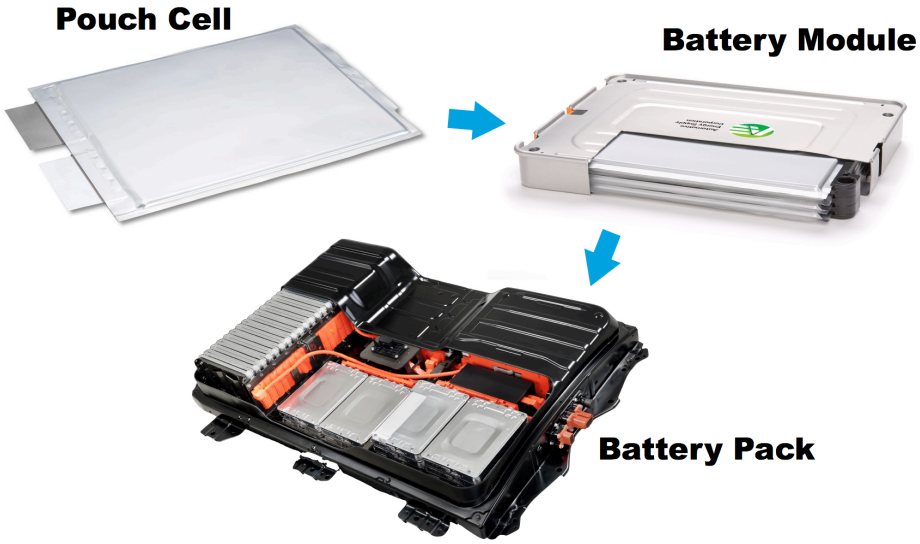
For example, Nissan Leaf and Chevy Volt battery modules use pouch cells, as do various models of Mercedes-Benz and Audi.

Figure 1 *WMG's Energy Innovation Centre (Battery Characterisation Laboratory).*

WMG THE UNIVERSITY OF WARWICK CATAPULT High Value Manufacturing

The pouch cell has a geometry that makes the most effective use of space and achieves up to 95 percent packaging efficiency, the highest possible amongst battery geometries.

Figure 2 *Example of pouch cells in a battery module and pack (courtesy of Nissan).*

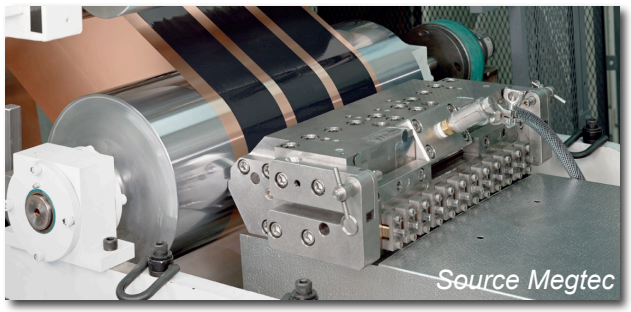


Next Steps

The results from this program encourage Talga to continue test work at increasing scale. A new work program has been established with WMG, whereby new Talga aqueous anode formulations (inks) will be used in larger, pouch battery cells and also full coin cells matched with common industrial Li-ion battery cathodes such as nickel manganese cobalt (NMC) and lithium iron phosphate (LFP).

In addition to graphite, this program will also test anode formulations made with Talga's graphene materials. Graphene nanoplatelets (GNP) and few layer graphene materials (FLG) are known to enhance high rate performance and may enable eco-friendly water-based anode formulations to replace toxic solvents currently used in the manufacture of Li-ion batteries. The Talga GNP and FLG aqueous formulations will also be tested under roll to roll coating conditions, suitable for commercial scale battery anode manufacture (Fig 3).

Figure 3 *Coating a copper foil with Li-ion anode material continuously in a roll to roll setup.*



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About Talga

Talga Resources Ltd *("Talga") (ASX: TLG) is an advanced material minerals company developing graphene and micrographite products for the coatings, energy storage, construction products and composites markets. Talga products have significant potential advantages in performance, value and application owing to unique ore and patent pending process technology.*

Talga sources graphite ore from its 100% owned deposits in Sweden, with pilot test processing at the Company's pilot test facility in Germany. Collaborative testing is underway with a range of corporations including industrial conglomerate Tata, UK listed Haydale and German based Jena Batteries.

TECHNICAL GLOSSARY

The following is a summary of technical terms:

Anode	The negative electrode in a battery during discharge. It refers to the electrode in an electrochemical cell where oxidation takes place, releasing electrons across a load cell. In Lithium-ion batteries, it consists of graphite and other carbons coated on copper.
Aqueous anode formulation	A chemical formulation that contains graphite mixed in a water based solution which is suitable to be coated on copper and dried to leave a pure graphite based layer to form the Li-ion battery anode.
Battery capacity	The total battery capacity, usually expressed in ampere-hours or milliampere-hours, available to perform work. The actual capacity of a particular battery is determined by a number of factors, including the cut-off voltage, discharge rate, temperature, method of charge and the age and life history of the battery.
Battery efficiency	Refer to coulombic efficiency.
Battery module	An assembly of cells in series and parallel encased in a mechanical structure.
Capacity fade/ ageing	Permanent loss of capacity with frequent use or the passage of time due to unwanted irreversible chemical reactions in the cell.
Cathode	Electrode that, in effect, oxidises the anode or absorbs the electrons. During discharge, the positive electrode of a voltaic cell is the cathode. When charging, that reverses and the negative electrode of the cell is the cathode.
Charge	The conversion of electric energy, provided in the form of a current, into chemical energy within the cell or battery.
Cell	A closed electrochemical power source. The minimum unit of a battery comprised of 4 key components including cathode, anode, electrolyte and separator. Li-ion battery cells come in three different shapes (design architecture) being prismatic, cylindrical or pouch.
Coin cell	An electrochemical device, composed of positive and negative plates and electrolyte, which is capable of storing electrical energy. It is the basic “building block” of a battery in lab scale tests using circular half or full coin shaped cells.
Coulombic efficiency	The ratio (expressed as a percentage) between the energy removed from a battery during discharge compared with the energy used during charging to restore the original capacity.
Cylindrical cell	Components of a battery assembled inside a cylindrical metal container.
Discharge	The conversion of the chemical energy stored within a cell to electrical energy, and the subsequent withdrawal of this electrical energy into a load.
Few layer graphene (FLG)	Stack of graphene having a total thickness of 5 layers or less.
Graphene	A single atom thick layer of crystalline carbon, with properties of strength, conductivity and transparency that stem from its unique 2D structure.

Graphene nanoplatelets (GNP)	Stack of Graphene having a total thickness of 5-100 layers and properties of strength and conductivity that far exceed that of Graphite.
Graphite	An allotrope of carbon in which carbon has sp^2 hybridisation. Can be found as a natural mineral or can be synthesised using great pressure and temperature. Natural Graphite consists of many stacked layers of Graphene, approximately 3 million layers of Graphene per millimetre of Graphite.
Lithium	A soft, silvery-white metallic element of the alkali group, the lightest of all metals.
Lithium-ion	Elemental Lithium devoid of an electron having an oxidation state of +1.
Lithium-ion battery	Rechargeable battery where lithium-ion shuttles between graphitic anode and cobalt, manganese, nickel and/or other metals in combinations as cathode.
mAh/g	Milli Ampere hours/ per gram – a unit for battery capacity/materials.
Milling	The process of breaking material into small fine parts by grinding following crushing, or machining/cutting material using rotating equipment.
Packaging efficiency	The mechanical structure used to contain and protect a battery's components (cells, electronic circuits, contacts etc.) – the efficiency with which the battery components can be packed in a given volume.
Pouch cell	Battery cell packaged into a flat-shaped flexible, heat-sealable foil pouch.
Prismatic cell	A slim rectangular sealed battery cell in a metal or inflexible case. The positive and negative plates are stacked usually in a rectangular shape rather than rolled in a spiral as done in a cylindrical cell.
Roll to roll fabrication	Continuous fabrication of battery cells using rolled sheets of battery components and coating them with the active materials as they roll onto a spool for subsequent cutting and packaging into cells.
Shaping/ Spheronising	The milling of graphite flakes into sub-15 micron sized spherical shaped particles to reduce size and surface area to suit formulations for Li-ion battery anodes.
WMG	Warwick Manufacturing Group belonging to the University of Warwick, UK.