Global graphene breakthrough for Talga

By Inside Construction, Monday 10 April 2017

Perth-based technology minerals company, Talga Resources, has had a breakthrough in the US$17 billion (AU$22.66 billion) concrete market.

The company has achieved outstanding results, verified by an independent test laboratory on graphene enhanced prototype concrete samples.

In July last year, Talga announced that in addition to raw graphite and graphene materials, Talga was developing fit-for-purpose products within four prime industry sectors - coatings, composites, building products/construction, and energy storage. Conductive concrete falls within the building products/ construction sector.

The company says thermally conductive concrete is a growing market, which has potential to be an early adopter of graphene enhanced products. Applications include thermal transfer materials for underground power transmission cables, domestic heating, road and bridge snow melting and tarmac de-icing.

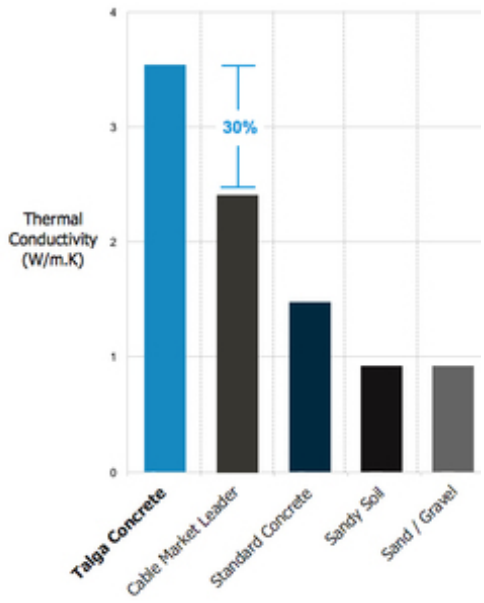

Figure 1: Thermal conductivity of Talga's concrete shows a 30% improvement over a current market leading product.

The results

Talga graphene enhanced concrete samples were recently tested at the commercial concrete/cement laboratory Betotech Baustofflabor GmbH in Erfurt, Germany.

A range of prototype formulations were prepared using a blend of primary ore and graphene from Talga's 100% owned Vittangi project combined with industry standard cements and aggregates.

Thermal conductivity results of the Talga concrete ranged up to 3.5 watts per metre kelvin (W/m.k), which is a significant, circa 30%improvement over a current market leading product (see Figure 1).

Further, the thermal conductivity improvement is achieved with extremely low loadings of graphene, blended with a larger amount of crushed primary Vittangi ore that is naturally highly conductive.

Talga's prototype products also demonstrated excellent free-flow properties, a vital attribute for commercial applications (lubrication "slump" test results of 650mm compared to 460mm in market leading products) and ability to reduce expensive flow agents by 50%. Further testing to quantify strength and other performance related attributes is continuing.

In parallel with development and testing, Talga has initiated commercial discussions with global leaders in the concrete industry. Industry is seeking partners that have supply and technical capabilities to deliver thermal conductivity improvements across concrete-based products in the global energy infrastructure and the civil, building and construction sectors.

"We are delighted with the test results of our first graphene enhanced concrete prototypes. They demonstrate significantly improved ability to transfer heat energy, opening a range of existing large scale construction and infrastructure markets for Talga's graphene and graphite products.

Our European location is situated on the doorstep of these markets and major infrastructure projects, such as Germany's 'Suedlink', where thousands of kilometres of underground power cables may require high thermally conductive concrete materials," Talga managing director Mark Thompson said.

"It is important to note that the most successful concrete prototype incorporates both primary graphite ore and graphene, making it feasible to target 100% resource utilisation from our flagship Vittangi graphite project. I am confident that, if successful, this could create a new environmental processing benchmark for the graphite ore processing industry and significantly further improve the economics and development footprint of our operations in Sweden."

The future

The thermal conductivity results set the stage for Talga to advance its various discussions with international players in the building and construction sector.

Talga will continue to progress its product and commercialisation strategy in this sector using prototype test results as the catalyst to initiate joint development programs with global suppliers in the industry, similar to the agreement recently announced with Chemetall, part of BASF.

A range of in-house concrete formulations were prepared and tested against multiple performance criteria, which included, but was not limited to, thermal conductivity and flow properties. Results for other concrete performance attributes are being finalised to provide test data on material strength, electrical conductivity and rheology.

LISTED UNDER TAG : CONCRETE, TALGA, THERMALLY CONDUCTIVE CONCRETE

LISTED UNDER CATEGORIES : PRODUCTS, AUSTRALIA, INTERNATIONAL