

Thin end of the graphene wedge

While the rest of the sector boasts about how large their flake sizes are, Talga Resources Ltd managing director Mark Thompson is more inclined to champion how thin the company's graphite products can be.

Talga's favour of micro over jumbo comes down to the ability to produce, at low costs, the new wonder material of graphene.

First isolated by Andre Geim and Kostya Novoselov at the University of Manchester in 2003, graphene has been hailed as the first ever two-dimensional material. It consists of single atomic layers of carbon (around 0.3nm thick) while extending many hundreds of nanometres in the lateral dimension. Its properties are remarkable; it is thinnest and strongest material ever discovered (breaking strength of 42 Nm⁻², 100 times greater than steel). It shows electrical and thermal conductivity greater than copper

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at a fraction of the weight and absorbs only 2.3% of the light passing through it.

As such, it has been hailed as a revolutionary material but to date it has only been produced synthetically and in small quantities. However, Talga believes it has defined a processing path using ore from its high-grade Vittangi graphite project in Sweden.

“We are not about spherical [graphite],” Thompson said. “We are about thin and how expensive it is to make something which is thin.”

Using what appears a simple exfoliation process Talga has been able to cheaply produce graphene and micro-graphite from Vittangi ore. The company has now built a testing facility in Germany from which it is sending large-scale samples of product out to industry.

“We have been sending out the samples to get third-party validation which is a lot easier if you have a standard flake product,” Thompson said.

With bulk trial mining complete, this year Talga is focused on expanding processing and commercialisation.

“We are in Germany because there is a huge amount of customers there. We can scale up the samples and show customers what we can produce and they will begin to believe us.”

Having already completed test work on 0.5kg samples,



Mark Thompson

the pilot facility was now working on scaling up to 10kg and eventually 50kg samples.

“There is no high pressure, there is no change in temperature so it should be attainable,” he said.

Graphene is technically only a single atom thick but Thompson has discovered slightly thicker material (2-50 layers thick) is also intriguing researchers.

“Ten layer thick graphite has different qualities to flake graphite and a number of end-users want that product because there is more to ‘hang onto,’” Thompson said. “We are beginning to discover that micro-graphite is a whole other world of industrial applications and can fetch more than \$75,000/t.”

While the media has latched onto the science fiction-like possibilities for graphene, Talga is more focused on more established applications.

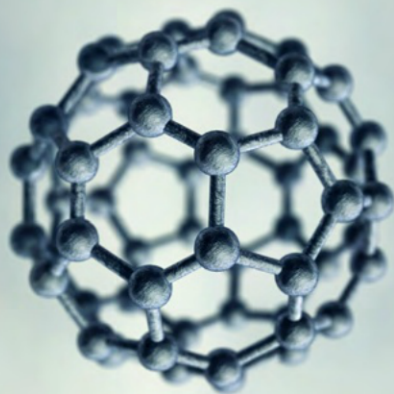
“What we are looking at is not futuristic; we are talking about using current production lines,” Thompson said.

Talga is targeting four key markets; coatings, energy (batteries, fuel cells, solar panels, printable circuits, etc), construction and composites (plastics, 3D printing, etc).

– Dominic Piper

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