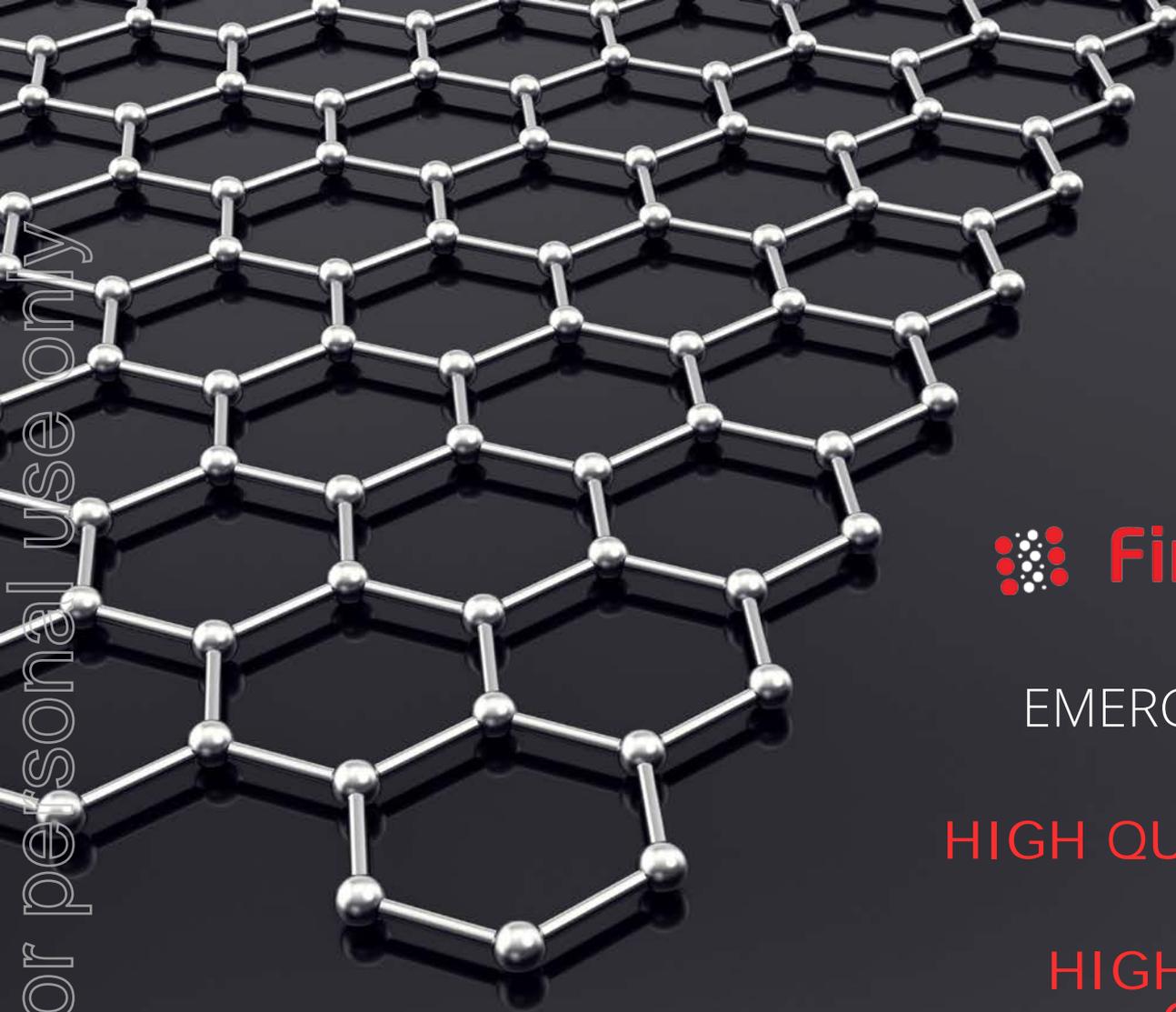


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 **First** Graphite Ltd

EMERGING PRODUCER
of
HIGH QUALITY GRAPHENE
and
**HIGH GRADE VEIN
GRAPHITE**

November 2016

Toward the Commercialisation of Graphene: Using High Grade Vein Graphite in its production

- How to produce high quality material?
- On a large scale?
- At a low cost?
- In a reproducible manner?

These are the Holy Grails of graphene producers and potential consumers the world over

Barriers to Developing Markets

A recent paper from The Graphene Council highlights the matters we are seeking to address

- **The cost of materials** – production process and resultant high cost of production
- **Production scale** – demand will require 1,000's of tonnes and current production capacities are in single digit tonnes
- **Production quality** – sufficient quantity at a consistent quality level

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Current Pricing Models

- A web search for on-line graphene provides a multitude of products and pricing.
- One such example has "*Dispersible Single layer Graphene with high surface area*" for sale at a mere US\$360 per 500mg.
- This equates to US\$720,000,000 per metric tonne – completely uncommercial for large scale use!
- Some other products, such as water dispersible graphene oxide, are US\$99 per 4mg/mL.
- Graphene oxide powder can be found for £112.50 per gram, £112,000,000 per tonne – again completely uncommercial for large scale use

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Current Supply Models

Most current suppliers produce graphene via one of the following methods

- Chemical exfoliation
- Chemical Vapour Deposition
- Mechanical shearing in stabilising liquids
- Plasma arc reactors

Some of these methods are scalable and some are restricted to laboratories and the kitchen.

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First Graphite Model

Source of our competitive advantage is the high grade of Sri Lanka's graphite.

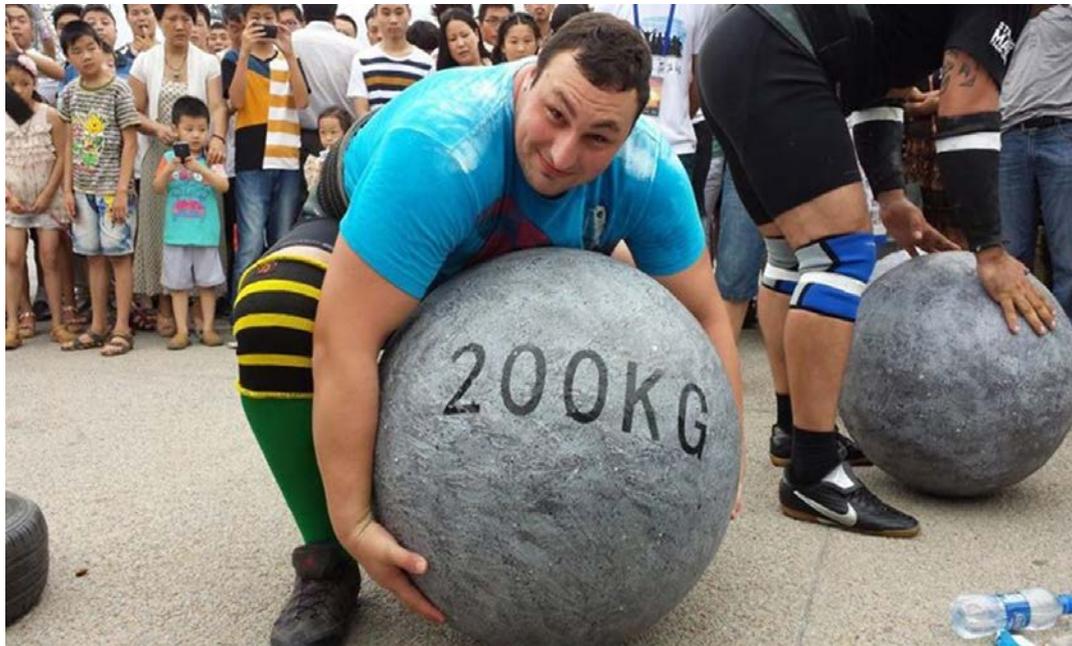


Approximately 20-25 kg of Sri Lankan vein graphite with a grade $>95\%$ TGC

First Graphite Model

Source of our competitive advantage is the high grade of Sri Lanka's graphite.

- Highest grade - >92% TGC as mined. No chemical processing required so nothing to interfere with graphene production
- Unique structure – not a flake graphite but a crystalline structure
- Low level of impurities, mostly silica, which is not intercalated in the graphite structure



By contrast 20 - 25kg of flake graphite at 10% TGC would be surrounded by 200kg of host rock

What Does this Mean for Graphene Production

Yield

- We currently achieve 80% or greater conversion of graphite to graphene
 - 1 tonne (1,000 kg) of 95% TGC ore will produce 760 kg of graphene platelets. The highest conversion rate in the world.

By way of comparison flake producers are yielding <10% of their ore into graphene, so

- 1 tonne of 15% TGC ore will produce 15 kg of graphene platelets

Competitive Advantage

- High yield from the world's highest grade raw material
- Lower unit production cost as a result of high yield
- More competitively priced product for commercialisation

What Does this Mean for Graphene Production

Large Platelet Size

- Again, the unique raw material when combined with our process that is producing large size platelets between 45µm and 78µm on a regular basis.
- Test work undertaken at the University of Adelaide demonstrated the quality of the prepared graphene from FGR's graphite is outstanding and comparable with the quality of graphene prepared by synthetic routes.

Competitive Advantage

- Largest tenement holder in Sri Lanka
- In house high grade feed stock for graphene production
- Extremely high conversion from graphite to graphene < 80%
- Small process footprint with low capex, can be incrementally increased.
- High quality low cost bulk graphene

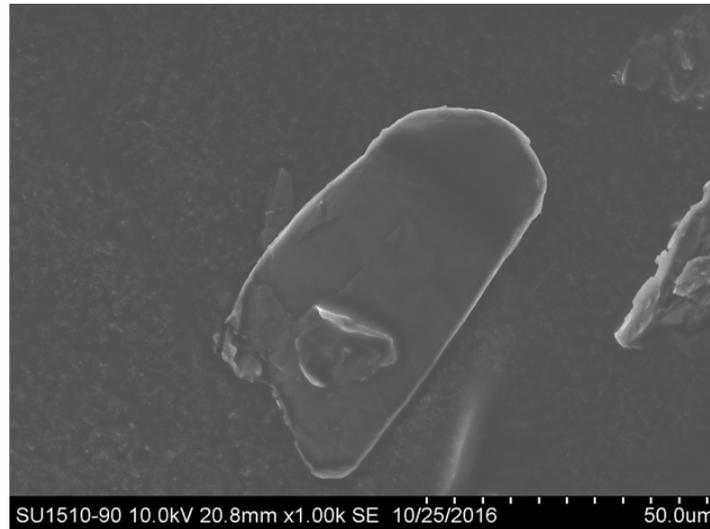
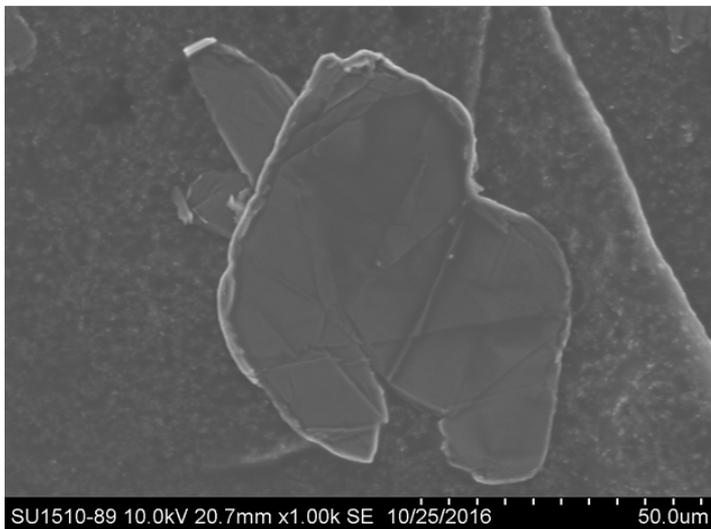
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What Does this Mean for Graphene Production

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Large graphene platelet size



Changing the Cost Structure

Capital Cost

- Phase 1 of our production unit is simple and has a low capital entry.
- Operators do not require specialist training
- Small foot print enables easy installation in a client's premises

Competitive Advantage

- Scalable units can be installed and expanded to meet increased demand
- Client may produce '*just in time*' graphene, reducing transport & storage costs as well as OHS and logistical issues



Phase 1 Unit operational at Nagrom, Kenwick, Western Australia

What are we doing next?

FGR are now consistently producing quantities of high quality, low cost graphene

- Phase 2 will address
 - methodologies for screening and sizing, washing and drying of the graphene being produced.
 - Bulk packaging of graphene products, tonnes not kg's.
 - Several methods are under consideration, including the use of secondary sonication screens and the use of a Vortex Fluidic Device (VFD) and Turbo Thin Film processing technology.
- Engaging marketing personnel to develop sales outcomes

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In Summary

- producing high quality graphene
- Control of high grade raw material is the precursor to this product
- Production process is scalable for production of the quantities which will be required by industry
- Capital and operating costs of the process make it attractive for industry partners.
- The graphene is a consistently high grade and reproducible.

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The potential quality and grade of targets are conceptual in nature, there has been insufficient exploration to determine mineral resources and there is no certainty that further exploration work will result in the determination of a mineral resources or that the production targets will be realised.

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