

## **HAZER PRODUCES 99.95% ULTRA-HIGH PURITY SYNTHETIC GRAPHITE**

- **Hazer successfully demonstrates purification of synthetic graphite for high-value lithium-ion battery market**
- **Purity level of 99.95% independently verified by the University of NSW**
- **Results show iron (Fe) impurity levels to be less than 50 ppm, within specification for the battery industry**
- **New lithium-ion battery-testing program launched in collaboration with The University of Sydney**

**PERTH, AUSTRALIA; MONDAY 28<sup>th</sup> AUGUST:** Hazer Group Ltd (“Hazer” or “the Company”) (ASX:HZR, HZRO) is pleased to announce that ongoing laboratory test work in collaboration with The University of Sydney, has confirmed Hazer’s ability to produce 99.95% ultra-high purity synthetic graphite from graphite concentrate produced via the Hazer Process.

This significant breakthrough demonstrates the potential for the company’s synthetic graphite to become a high-quality alternative product within rapidly growing end-user markets where ultra-high purity levels are required, such as for use in lithium-ion batteries.

Within these markets, ultra-high purity graphite can command significant price premiums, with UBS reporting in their June 2017 Global Commodities paper that synthetic graphite prices for battery anodes are between US\$12,000 – \$20,000 per tonne.

Hazer Group’s managing director Geoff Pocock said;

“Today’s milestone also represents a step change in Hazer’s graphite development strategy that began in early 2016. Hazer has now successfully shown substantial improvements in raw and purified graphite quality and demonstrates the ability to produce a range of different graphite products across the graphite value chain.

This approach has remained a core strategic focus and risk mitigation strategy, as Hazer’s vision is to cost effectively produce graphite with varying purity specifications that can penetrate multiple verticals across the entire graphite sector.”

### **Independently Verified 99.95% Synthetic Graphite**

The successful purification initially began with Hazer’s raw (non-optimised) 86% synthetic graphite, prepared using Hazer’s laboratory-scale Fluidised Bed Reactor. A two-stage chemical purification process then resulted in an ultra-high purity level product of 99.95% Total Graphite Concentration (TGC).

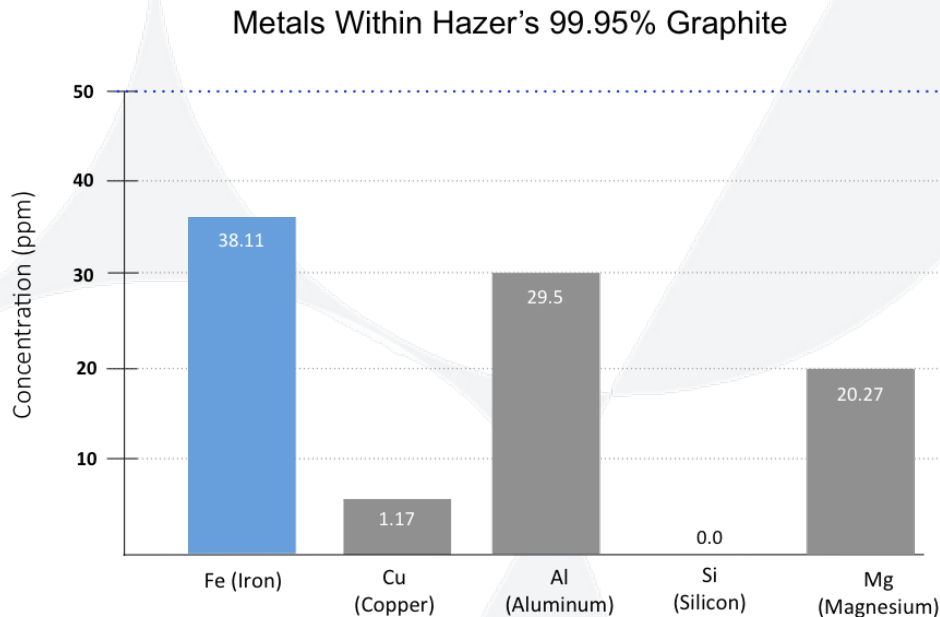
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Thermogravimetric Analysis (TGA) confirmed Hazer's TGC purity outcome, and illustrated Hazer's graphite product to be directly comparable to commercial graphite benchmarks currently utilised in lithium battery applications.

Graphite Samples Tested	Source	Verified Purity
Hazer Graphite		99.95%
Uncoated Natural Graphite (General energy density)	Targray	99.93%
Uncoated Artificial Graphite (Anode for Li-ion)	Targray	99.92%
Coated Natural Graphite (Anode for Li-ion sample 1#)	Targray	99.84%
Coated Natural Graphite (Anode for Li-ion sample 2#)	Targray	99.82%
Artificial Graphite Powder for Li-ion Battery	MTI	99.78%

(Figure 1) Thermogravimetric Analysis (TGA) is a process where carbon elements are burnt off to reveal the weight of metallic impurities, which provides an indication of the level of impurities in the product.

External validation of these results was carried out at the Inductively Coupled Plasma Laboratory based at the University of New South Wales. This laboratory independently verified the TGC purity of the material with iron (Fe), Copper (Cu), Aluminium (Al), Silicon (Si) and Magnesium (Mg) impurity levels to be less than 50 ppm each. These low levels of impurities have been previously reported to be within an acceptable range for commercial battery applications.



(Figure 2) Independent laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) results, a highly sensitive analytical technology for confirmation of metals and non-metal impurities.

## Newly Launched Lithium-ion Battery-Testing Program

Following on from this success in purification of graphite to battery grade specification, Hazer is pleased to announce that it has embarked on a new battery-testing program with small-scale Lithium-ion batteries using the group's 99.95% ultra-high purity graphite as the active material.

In collaboration with The University of Sydney, total discharge capacity, cycle rate capability and cycle life analysis will compare Hazers' 99.95% synthetic graphite performance against various commercial samples of graphite (including spherical coated natural graphite) concurrently assembled into reference coin cells.



(Figure 3) Hazer's battery analysis equipment within the University of Sydney will leverage cycle rate capability analysis to compare the company's 99.95% synthetic graphite performance against various commercial types of graphite.

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## Efforts Towards Commercial Opportunities Continue

Hazer has shown substantial improvements in both raw and purified graphite quality, as well as demonstrated the ability to produce a range of different concentrates across the graphite value chain. These exciting progressions indicate potential within the wider, multibillion-dollar graphite market, where huge demand exists for other applications of graphite, such as steel and lubricants.

As the company increases focus towards commercial opportunities, Hazer is working towards producing further samples of graphite with various specifications for 3<sup>rd</sup> parties to assess the value and potential market opportunities. The company is also taking steps towards sending raw samples to external parties to purify using existing larger scale techniques.

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### ABOUT HAZER GROUP LTD

Hazer Group Limited (“Hazer” or “The Company”) is an ASX-listed technology development company undertaking the commercialisation of the Hazer Process, a low-emission hydrogen and graphite production process. The Hazer Process enables the effective conversion of natural gas and similar feedstocks, into hydrogen and high quality graphite, using iron ore as a process catalyst.

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