

11 Jul, 2024

Biomass-based graphite can lower EV battery costs – Graphjet CEO



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Theme **Metals, Retail & Consumer Products**

- ▶ **Synthetic graphite produced from biomass results in fewer CO₂ emissions, Graphjet says.**
- ▶ **CEO suggests that electric vehicle battery manufacturers mix in biomass-based graphite to lower costs.**
- ▶ **Graphite production outside China will not fully dislodge the nation's hold on the market.**

Malaysia-based Graphjet Technology produces synthetic graphite and graphene from palm kernel shells that are recycled from palm oil facilities. By using biomass, Graphjet's technology can reduce the carbon footprint associated with graphite and graphene production by up to 83% while cutting costs by up to 80%, the company said in a June 17 investor presentation.



Aiden Lee Ping Wei, co-founder, CEO and CFO of Graphjet Technology.

Source: Graphjet Technology.

Graphjet expects its manufacturing plant in Malaysia to reach industrial scale in the third quarter of this year, with an annual production capacity of 3,000 metric tons of graphite. Capacity is expected to reach 13,000 t/y by the second half of 2026.

In April, the company announced plans to build a plant in the US that will produce another 10,000 t/y of graphite using feedstock from the Malaysia facility.

The company is focused on single-layer graphene and synthetic graphite for electric vehicle batteries, medical devices and home appliances. Graphjet began trading March 15 on the Nasdaq and has a \$30 million offtake agreement with Toyota Trike Inc., an electric-bicycle

maker.

S&P Global Commodity Insights interviewed Aiden Lee Ping Wei, co-founder, CEO and CFO of Graphjet Technology, to discuss biomass-based graphite and its potential to shift the direction of the graphite industry. The following conversation has been edited for clarity and brevity.

S&P Global Commodity Insights: Please break down how you create synthetic graphite from feedstocks other than petroleum coke and coal tar pitch.

Aiden Lee Ping Wei: There are currently two different types of graphite in the industry. One is natural graphite from mines. [The other is] synthetic graphite, which can be produced from petroleum coke, needle coke or petroleum charcoal. We are a third type, which can be called a biomass-based synthetic graphite. Due to inconsistency problems with natural graphite, most EV battery producers are using a higher-grade artificial graphite. Our graphite solves the feedstock problem.

Our proprietary technologies and manufacturing process burn the biomass to make hard carbon, activate the carbon, so on and so forth, until you get graphite. Anything can burn into a carbon, but it depends on the consistency and the purity of the carbon. We burned corn starch, rubbish and plastics, and we chose the biomass waste palm kernel shells.

As a feedstock they are very consistent, very stable, and Malaysia is the second-largest palm oil producer, behind Indonesia. Every year, Malaysia has 5 million [metric tons] of palm kernel shell waste. Our conversion rate is a 3:1 ratio. We are talking about producing 10,000 tons of graphite, so we just need 30,000 tons of palm kernel shells.

How much will your graphite cost, and how does it compare with what is expected to hit the North American market?

We are burning biomass waste. The price is much more affordable compared to petroleum coke and needle coke. We are talking about \$50 for a ton of palm kernel shells, although the price has increased since 2022. Some are selling for \$50 to \$100 per ton.

We are working with a few [research and development] companies, a few universities, including MIT, on the verification and trial runs. Definitely, it would be equal or better quality than what is supplied on the market with a better-for-the-book cost, and [it would be] more sustainable.

Do you expect the overall synthetic graphite industry to shift toward more sustainable feedstock alternatives or recycling in the future? How can the industry decouple from China?

In terms of synthetic graphite, I don't think there will be a 100% shift to biomass graphite [from] a company like ours because of the domination of China in North America and around the world. We are talking about a few million tons of production output from China. Looking at the graphite coming from us and other producers, in the next five to 10 years [it] will only increase graphite output by up to 1 million or 2 million tons per year, and that is barely achievable without government and shareholder support.

In the near future, instead of using 100% of synthetic graphite made from petroleum coke, maybe EV battery-makers will replace 20% or 30% with biomass graphite to make them much more affordable.

How does your environmental footprint compare to traditional production processes for both synthetic and natural graphite, especially in energy use?

We are around 80% lower in CO₂ emissions just due to the fewer processes and ingredients, and we're also planning to neutralize our carbon emission maybe in two or three years. And our suppliers of palm kernel shells must be in compliance with the [Roundtable on Sustainable Palm Oil] standards or other [government-issued] regulations around deforestation, forced labor and issues like that.