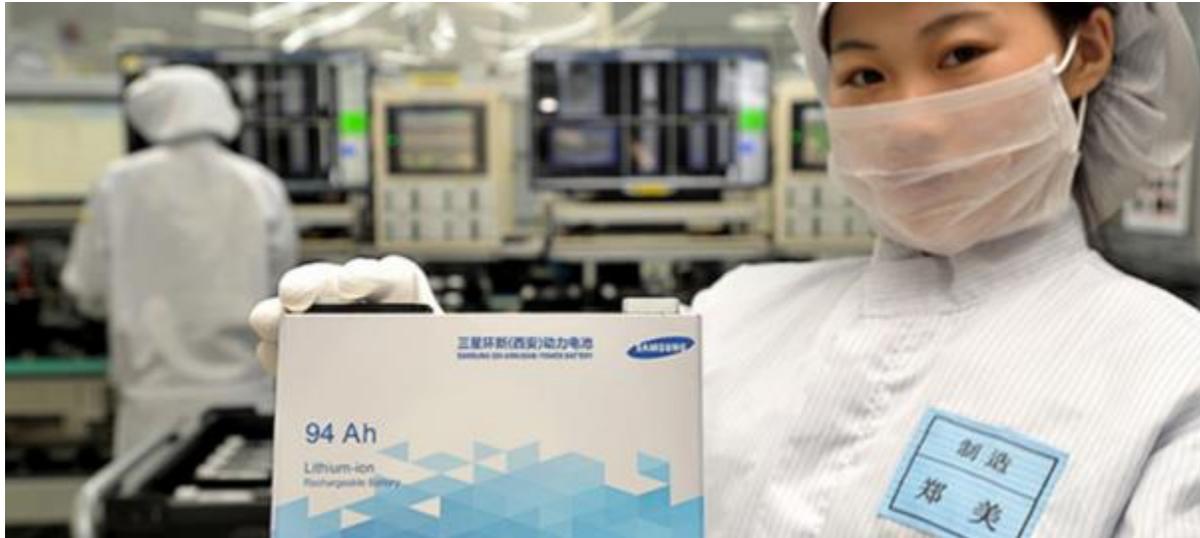


<http://benchmarkminerals.com/Blog/graphite-demand-from-lithium-ion-batteries-to-more-than-treble-in-4-years/>



GRAPHITE DEMAND FROM LITHIUM ION BATTERIES TO MORE THAN TREBLE IN 4 YEARS

4th May 2016

Demand for graphite (carbon) used as anode material in lithium ion batteries is set to increase by over 200% in the next four years as global cell production surges on the back of maturing pure electric vehicle demand and the inception of the utility storage market.

New data from **Benchmark Mineral Intelligence** forecasts the anode market – which is nearly exclusively served by naturally sourced spherical graphite and synthetically produced graphite – to increase from 80,000 tpa in 2015 to at least 250,000 tpa by the end of 2020 while the market could be as large as 400,000 tpa in the most bullish of cases with no supply restrictions.

Taking the most conservative case, **Benchmark** estimates that over 360,000 tonnes of medium flake graphite will be needed as a feedstock source for the spherical material by 2020. This is nearly a doubling of the flake concentrate market in 2015 should the natural-to-synthetic demand proportions remain the same in 2020.

At present, China produces 100% of the world's spherical graphite which is predominately sourced from mines in Heilongjiang province in the country's north-east.

Demand is being underpinned by major expansions in the lithium ion battery industry that are underway worldwide as the sector matures from megawatt plants to gigawatt scale operations.

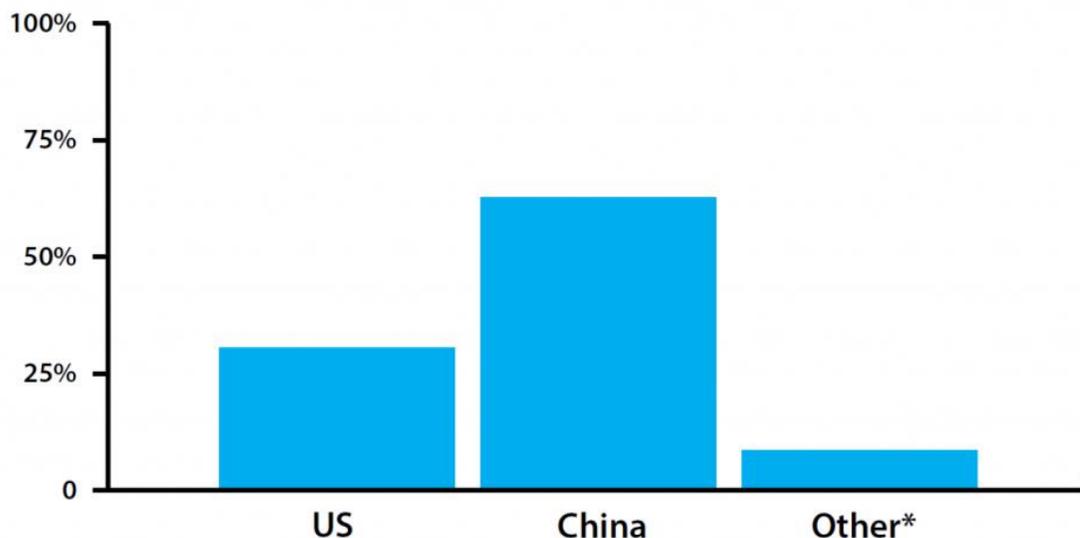
Benchmark is tracking at least 12 lithium ion megafactories worldwide, seven of which are located in China and two in the US. By far the largest plant under construction is Tesla Motors' Gigafactory 1 in Nevada – a \$5bn investment set to reach its 35GWh capacity by 2020.

However, nearly 70% of new lithium ion battery demand for raw materials will be coming from China as the country's major cell manufacturers, such as ATL and Lishen, expand their operations in a race to become the world's lowest cost producer.

Investments in new lithium ion battery capacity out to 2020 are in excess of \$12bn and rising according to **Benchmark** data.

This is set to have a significant impact on demand for graphite anode material as cell manufacturers seek to lock up long term supplies of the material.

■ EXPECTED NEW LITHIUM ION BATTERY CAPACITY IN 2020



*Includes Korea, Europe and Taiwan

Source: Benchmark Mineral Intelligence

Natural or synthetic?

Today, 65% of all battery anode material is sourced from natural spherical graphite, 30% from synthetic graphite material and the remaining 5% from other alternatives such as lithium titanate, silicon and tin used in very small amounts in different technologies and testing of new anode formulas.

Analysing the consumption trends over the last 10 years, there is little doubt that battery consumers prefer naturally sourced graphite which is much lower cost to produce and has a lower environmental impact than synthetic graphite.

However, consistency of supply remains a problem for the material as the feedstock flake graphite is sourced from multiple mines in China, each of which have different raw material 'signatures' – impurities that vary from mine to mine.

With synthetic graphite, as it is man made from lower quality carbon raw materials such as petroleum coke, producers can offer a more consistent product albeit it at a higher price.

Prices: Graphite versus lithium

While lithium prices are experiencing their strongest ever surge, graphite has lagged behind.

Flake graphite – the feedstock source for spherical graphite – is seeing little to no upward pressure after being weighed down by a lack of demand in the steel sector, its primary market.

However, new price data from Benchmark has started to show rising prices for uncoated spherical graphite, 99.95% C, 15 micron in size, FOB China.

Price ranges in the market have risen from \$2,500 to \$3,000/tonne in Q4 2015, to \$2,800 to \$3,200/tonne in Q2 2016.

It will take some growth in the battery market – which is presently the second largest end market for natural flake graphite in the derivative spherical form – before it begins to have a meaningful impact on the flake concentrate price. At present, the steel industry, especially in China and the US are far more influential factors.

However, should the battery market grow as expected and consumption parameters remain at today's levels, it will overtake refractories as the number one market for flake graphite by 2020.

Benchmark Consultancy is a service that offers independent market advice on the natural graphite supply chain based on data collected in-house, first hand. If you need a data, advice or a market study, contact Andrew Miller for a quote > amiller@benchmarkminerals.com

Benchmark Data | Graphite is a monthly subscription service that offers detailed data on flake graphite supply, demand and prices, including spherical graphite. For a free sample or to subscribe contact Andrew Miller > amiller@benchmarkminerals.com

Benchmark World Tour 2016 is a free market focused seminar on the lithium ion battery supply chain with an emphasis on raw material supply, including graphite and lithium. Secure your place in Europe, North America, Australia and Asia [here](#).

Graphite Supply Chain 2016 is a high value industry conference and networking event that will focus on the key trends, data and analysis in natural graphite. Secure your place today by emailing Ismene Clarke of Benchmark's partner, IMFORMED, [here](#).