



## Concern over battery grade graphite supplies

February 2010

### Double the world's graphite needed to satisfy projected lithium-ion battery production; synthetic the most promising suitor

Doubt was raised last month over the ability of the world's graphite industry to meet increase demand from the emerging lithium-ion (Li-ion) battery market, particularly in automobiles.

While much of the focus, led by this publication through its Lithium Supply & Markets conference, has been on lithium, there are fears that the graphite industry is being neglected and that supplies will not be able to meet projected medium term demand.

"We are woefully short [on lithium-ion battery grade graphite] in North America and Europe," leading graphite consultant George Hawley told to **IM**.



Nacional de Grafite in Brazil is presently looking into production of spherical graphite grades suitable for Li-ion batteries. Pictured is one of its flotation units at its processing facility in Minas Gerais (*see p.50*).

"If the market for Li-ion batteries develops as forecast, the need for graphite will be about 1m. tpa. This is double the world's present production of natural flake graphite, most of it coming from China," Hawley added.

Graphite is the second largest input material into a Li-ion battery by volume and should the growth in the industry continue as forecast, it is estimated that double today's world production will be needed.

For example, each Li-ion car battery will consume between 3-7kg of graphite.

Synthetic graphite could offer a possible solution to this problem as explained by Stephen Riddle, president of US based natural graphite producer Asbury Carbons.

"Li-ion batteries are demanding high quality graphite which is mostly synthetic graphite made by companies such as ConocoPhillips and by Hitachi Chemical to name a few," Riddle explained to **IM**.

"Synthetic graphite supply is not such a big issue since producers can add capacity as demand grows and the raw feedstock they use as a precursor is in plentiful supply," he added.

### Synthetic concerns

One concern for synthetic graphite producers, however, is the escalating costs of petroleum coke, a key raw material in the manufacture.

However, in a world where energy costs are escalating, especially the cost of petroleum coke, the economics of using synthetic graphite have been questioned.

Hawley commented that the synthetic graphite is porous, unlike natural flake, something which is an “undesirable trait” for battery producers.

The issue with natural Li-ion graphite however is cost. The most suitable grade is spherical graphite which has to be refined from flake graphite to a high purity resulting in big losses of material.

Around 70% of the graphite is lost in the process, one of the main reasons why the cost is between \$3,000-4,000/tonne.

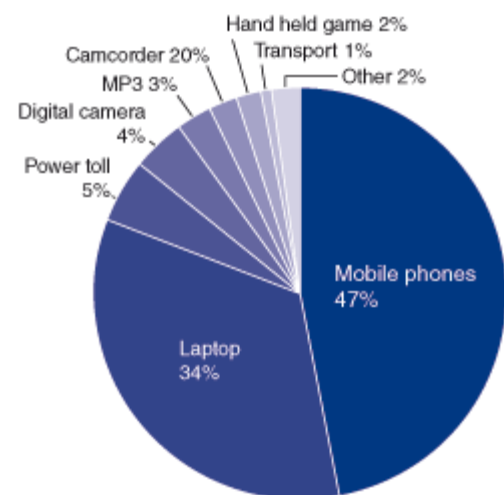
Spherical graphite is still in development and global suppliers are limited.

Despite the need to be aware of potential of the battery grade supply situation, Riddle believes it is too early to make any decision either way.

“Demand for Li-ion graphite to reach 1m. tpa is at least 25 years away or longer and I believe some or most of this increasing demand will be synthetic graphite,” Riddle said.

He concluded: “It is much too soon to determine which form of graphite natural or artificial will have the biggest demand in automotive applications. We will just have to wait and see how this growing application progresses.”

### Lithium-ion battery sales



Source: Nacional de Grafite, Roskill Information Services