Novel industrial scale production of nanocarbons for anode materials

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Our society urgently need lithium ion battery (LIBs) with both higher energy and power density. The lithium ion battery communities of researchers from the academia, industry and government are driven to develop new anode materials with higher energy and power that can substitute the current graphite (370mAhg^{-1}) utilization, to meet the most stringent requirement for hybrid and electric vehicles, stationary and industrial applications. Among the next generation of anode materials for LIBs such as intercalated/de-intercalated, alloy/de-alloy, and conversion materials, alloy materials based on silicon, tin and germanium are considered very promising due to their high theoretical lithium storage capacities of respectively~ 4200, 993, 1600 mAh g^{-1} [1].

In the present work we focus our attention on the admirable properties of a variety of advanced carbon materials suitable for current and post LIBs with improved power and energy performance compared to existing graphite anode materials. These materials include micro and nanographites, graphene and silicon composites with surface modifications.

Figure 1 shows the results for Talga's graphene type materials cycled in half cell. Stable capacity as high as 420 mAh/gr are observed and a low first cycle reversibility loss (<10%). The utilization of aqueous slurry further enhanced the processablity and cycle life. These naturally sourced materials are produced with a proprietary electrochemical room temperature process in aqueous media using a natural graphite ore that is cut as electrodes in an electrochemical cell. The purified materials are suitable for blending with various active materials (silicon, tin, germanium) while cost effectively improving the performance. Talga is a material supplier working on next generation anode materials, and can offer a secure supply of battery materials from its 100% owed resources in Sweden with, a minimal CO_2 footprint due to its unique green processing techniques that eliminate the need for high power production steps and meet the increasing demands of global Gigafactories (Figure 2).

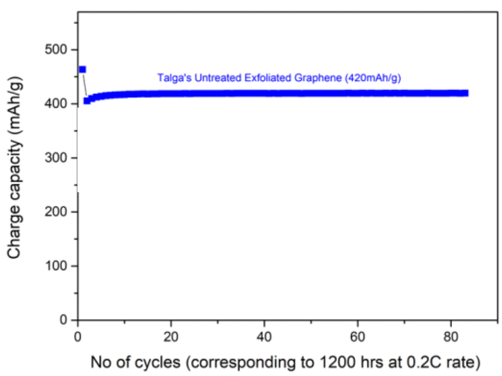

Figure 1 Talga's graphene type material

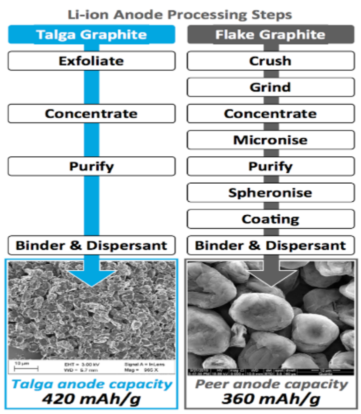

Figure 2 Talga's industrial process

[1] S. Goriparti, E. Miele, F. De Angelis, E. Di Fabrizio, R. P. Zaccaria, and C. Capiglia, Journal of Power Sources, Volume 257, 1 July 2014, Pages 421-443.