Zentek Announces Development of Graphene-Wrapped Silicon Anodes

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Zentek Ltd., a Canadian IP development and commercialization company focused on next-gen healthcare solutions, announces that it has filed a provisional patent with the United States Patent and Trademark Office on a novel Graphene-Wrapped Silicon Anode material developed by Prof. Michael Pope, an Associate Professor in the Department of Chemical Engineering at the University of Waterloo along with Dr. Marianna Uceda and Dr. Zimin She.

A paper on this technology has been published in ACS Applied Materials & Interfaces on February 17th.

Zentek's CEO Greg Fenton commented: "We are very pleased to support Dr. Pope and his group at the University of Waterloo. Their innovation has the potential to improve the current lithium-ion battery by upgrading graphite to this graphene-wrapped silicon anode. Not only were the researchers able to demonstrate good performance with laboratory-scale half-cells, the performance was also validated with commercial lithium iron phosphate cathodes suggesting they could be a drop-in solution for enhancing already available battery technologies. We look forward to continuing our support of their research and development to potentially bring this technology to market. The company has begun discussions with a potential industry partner."

Key characteristics of graphene-wrapped silicon anode include:

– At practical mass loading of 2.5mg/cm2, the electrode achieved 2.04 mAh/cm2 and retained 79% of this capacity after 200 cycles against a lithium half-cell
– When paired with a commercial lithium iron phosphate cathode, the fully assembled battery retained 93.3% of its initial capacity over 100 cycles
– Works with current lithium-ion batteries as a replacement for graphite

– Requires further development and optimization work before it can be commercialized

Dr. Pope added: “Silicon is poised to replace graphite as the dominant anode material in current Li-ion and future, next-generation batteries. However, silicon expands by over 300% when the battery is charged and discharged, which has limited commercialization efforts. Our lab, through ongoing efforts supported by Zentek and the Natural Sciences and Engineering Research Council of Canada, has developed an improved method to enable high capacity, high cycle-life anodes by encapsulating them in a protective, crumpled graphene shell using a simple spray drying approach often used to generate much of the world’s dry powders. We look forward to our continued collaboration with Zentek which we hope will soon lead to a dominant, commercial anode technology.”

Read the original article on Zentek.