

Direct growth of carbon electrodes for battery applications

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Graphitic carbon electrodes are well-established as an anode material for lithium ion batteries due to their low cost, high conductivity, and high capacity. More recently, many groups have published reports using carbon nanostructures as electrodes for intercalation of Li or as supporting structures for anode materials, including SWNTs, MWNTs, and graphene. However, in the majority of devices reported, the carbon electrode/support structure uses a binder to make or improve contact with the metal current collector.

In our present studies, we are investigating direct growth of carbon nano fibers (CNFs) on current collector materials as a means of preparing LIB anodes. Strong contact between the substrate and CNFs eliminates the need for a binder material, thereby increasing the expected mass-specific capacity of the electrode closer to theoretical values predicted by the Li/Li^+ reaction mechanism.

This presentation will discuss the progress of our studies, including preparation methods and preliminary device performance tests.