

Novel All-Carbon Nanotube Battery

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Abstract

Future portable power applications in the marketplace will demand greater specific energy and power from lithium battery technology. These requirements cannot be met by conventional batteries or through extrapolation of the capabilities of conventional systems. New materials and systems must be developed to meet these stringent future requirements.

Nanomaterials offer a new exciting alternative to the standard materials traditionally used for fabrication of batteries. The work described herein deals with a novel approach to the use of nanomaterials in the electrodes of lithium-ion batteries. We have synthesized and chemically modified carbon nanotubes and subsequently tested these modified nanotubes as electrodes in small lithium batteries. The work described includes electrochemical characterization of the novel electrodes as well as to determination of the specific energy of simple one-cell batteries containing these novel electrodes. We have been able to demonstrate a laboratory cell with a specific exceeding 600Wh/kg and pulse power exceeding 3kW/kg.