

## Graphite/Carbon Nanofiber Composite Anode Modified with Nano Size Metal Particles for Lithium Ion Battery

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Natural graphite particles with average size of 15  $\mu\text{m}$  were used as the anode base materials for lithium ion battery. Carbon Nanofibers and nano size metal particles were incorporated into the graphite with different methods. Carbon nanofibers prepared from the chemical decomposition of ethylene gas over nickel-copper catalyst and silicon particles with submicron size were directly introduced into the graphite particles by mixing and ball milling. Submicron size nickel and tin particles were also incorporated into the graphite particles by impregnation of each metal salt. The incorporation of proper amount of carbon nanofibers into the graphite electrode improved the cyclic performance as well as the initial charge/discharge capacity. In the case of metal particles, the size and content were key factors for the electrode performance. The introduction of submicron size silicon powders exhibited the better electrochemical performance than the occasion of micro size in both initial charge/discharge capacity and cyclic characteristics.