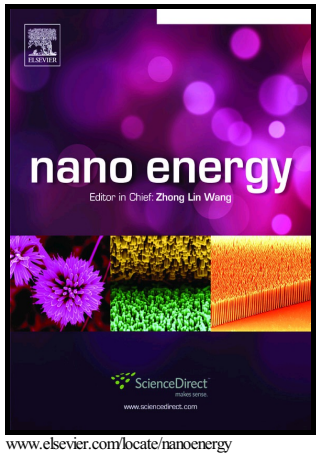

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Abstract

In this paper, we report a flame deposition method to prepare carbon nanoparticles (CNPs) from coconut oil. The CNPs were further modified with a piranha solution to obtain surface-carboxylated carbon nanoparticles (*c*-CNPs). When used as an anode for sodium-ion batteries, the CNPs and *c*-CNPs respectively delivered discharge capacities of 277 and 278 $mAhg^{-1}$ in the second cycle at a current density of 100 mAg^{-1}. At the 20^{th} cycle, the capacities of CNP and c-CNPs were 217 and 206 $mAhg^{-1}$ respectively. The results suggest that modification of the CNPs with the piranha solution improved neither the charge storage capacity nor the stability against cycling in a sodium-ion battery. When the CNP and *c*-CNP were used an anode in a lithium-ion battery, 2^{nd}-cycle discharge capacities of 741 and 742 $mAhg^{-1}$ respectively at a current density of 100 mAg^{-1} were obtained. After 20 cycles the capacities of CNP and *c*-CNP became 464 and 577 $mAhg^{-1}$ respectively, showing the cycling stability of the CNPs was improved after modification. The excellent cycling performance,