

Multifunctional Multicomponent Nanowires for Energy Conversion and Storage

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Abstract

Composites of functional materials have long been synthesized for achieving enhanced physical and chemical properties. Composite properties are achieved through many methods such as physical mixing of its components, chemical methods such as core/shell, hierarchical structures, nanoparticle-decorated nanowires, carbon structured reinforced porous materials and so on. In this era of energy intensive electronics and automobiles, and simultaneously having alarm from global atmospheric changes, generating electrical energy from renewable sources and storing them for further use are of extreme importance. One-dimensional nanostructures such as nanowires, nanorods, and nanobelts offer many advantages in energy conversion and storage devices such as channeled electron transport, anisotropic charge assembly, improved surface to volume ratio and so on. Many materials have screened in the past for high performance in energy conversion and storage devices; however, achievements in one of the properties has always been at the expense of another. If the composite materials are synthesized as one-dimensional materials, many properties could be assembled in a single material architecture. We have synthesized materials of unique advantages in a single nanowire or nanobelts and evaluated their usefulness in energy conversion and storage devices. Many bottlenecks in energy conversion and storage devices have been overcome using this protocol, the lecture would detail these developments.

Keywords: Renewable Energy, Asymmetric supercapacitors, Lithium Ion Batteries, nanostructured metal cobaltites, Pseudocapacitors.