Some Applications of Nanowires

Nanowires are nanostructures that can be fabricated in many ways; eg, vapor-liquid-solid deposition, electrochemical deposition\(^1\), step-edge growth\(^2\) and lithographic techniques with many metals, semiconductors and insulators. Their dimensions, electronic properties and chemical composition depend on the method and materials used to fabricate it. Nanowires can be used as a gas sensor when they adsorb analyte gas molecules that supply or demand electrons from the surface changing the resistance of the wire. \(^3\) \(^4\). Owing to the high surface to volume ratio of these structures, nanowires like GaN can be used as photo catalysts where they yield high photocatalytic activity and reusability compared to thin films or micron dot arrays \(^5\). Use of nanowires in nano-electronics is an emerging field where field effect transistors\(^6\) and logic gates\(^7\) are created that would ultimately lead to sub-micron level circuits. By thermal annealing and passivation, performance of silicon nanowire field effect transistors can be enhanced \(^8\). Furthermore, nanowires have been used in lithium ion batteries anodes\(^9\) due to their special properties; eg, parallel transport of electrons and immunity to degradation of structure due to volume expansion\(^10\), thus giving high efficiency compared to traditional materials in energy storage devices. In order to increase the efficiency even more, bulk synthesis methods of nanowires have also been investigated \(^11\).

Bibliography


