

Nanotechnology



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Carbon Nanotubes Discovered by Sumio Iijima in 1991 (Dresselhaus), carbon nanotubes have been widely studied and researched for their significance and applications. Scientists have acknowledged great importance of these structures regarding their electrical, mechanical, optical, physical and chemical properties. The main objective of this paper is to provide an in-depth description of current carbon nanotube technology. The main topics that are covered include detailed introduction, bonding structure, manufacture, properties, and their applications in the fields of electronics engineering, optical technologies, nanomechanic devices and materials engineering especially in composite materials. Synthesis techniques used for the production of carbon nanotubes have also been taken into consideration, which include arc discharge, laser ablation, electrolysis, chemical vapor deposition, ball milling, diffusion flame synthesis, polymer heat treatment, and low-temperature solid pyrolysis (Cheap Tubes Inc.). Techniques for the purification of these tubes, like oxidation, acid treatment, centrifugal concentration, annealing, sonication to break down carbon nanotubes, filtering and functionalization techniques, have also been discussed. The types of energy storage for which carbon nanotubes are used, their modeling aspects and storage features, have been taken into account. These types mainly include electrochemical hydrogen storage, electrochemical lithium storage, gas-phase intercalation, and charge storage in supercapacitors (Loyseau 530). Carbon nanotubes' exclusive characteristics and matchless nanostructure makes them fundamental components of forthcoming energy storage devices (Luniya). Hence, special focus has been put on the use of carbon nanotubes in energy device industry to discover the limitations and opportunities that exist in this

field. The report is accompanied by an extensive literature review to support the significance of the topic.

Works Cited

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