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Sommario/riassunto	This Handbook covers the fundamentals of carbon nanotubes (CNT), their composites with different polymeric materials (both natural and synthetic) and their potential advanced applications. Three different parts dedicated to each of these aspects are provided, with chapters written by worldwide experts in the field. It provides in-depth information about this material serving as a reference book for a broad range of scientists, industrial practitioners, graduate and undergraduate students, and other professionals in the fields of polymer science and engineering, materials science, surface science, bioengineering and chemical engineering. Part 1 comprises 25 chapters

covering early stages of the development of CNT, synthesis techniques, growth mechanism, the physics and chemistry of CNT, various innovative characterization techniques, the need of functionalization and different types of functionalization methods as well as the different properties of CNT. A full chapter is devoted to theory and simulation aspects. Moreover, it pursues a significant amount of work on life cycle analysis of CNT and toxicity aspects. Part 2 covers CNT-based polymer nanocomposites in approximately 25 chapters. It starts with a short introduction about polymer nanocomposites with special emphasis on CNT-based polymer nanocomposites, different manufacturing techniques as well as critical issues concerning CNT-based polymer nanocomposites. The text deeply reviews various classes of polymers like thermoset, elastomer, latex, amorphous thermoplastic, crystalline thermoplastic and polymer fibers used to prepare CNT based polymer composites. It provides detailed awareness about the characterization of polymer composites. The morphological, rheological, mechanical, viscoelastic, thermal, electrical, electromagnetic shielding properties are discussed in detail. A chapter dedicated to the simulation and multiscale modelling of polymer nanocomposites is an additional attraction of this part of the Handbook. Part 3 covers various potential applications of CNT in approximately 25 chapters. It focuses on individual applications of CNT including mechanical applications, energy conversion and storage applications, fuel cells and water splitting, solar cells and photovoltaics, sensing applications, nanofluidics, nanoelectronics and microelectronic devices, nano-optics, nanophotonics and nano-optoelectronics, non-linear optical applications, piezo electric applications, agriculture applications, biomedical applications, thermal materials, environmental remediation applications, anti-microbial and antibacterial properties and other miscellaneous applications and multi-functional applications of CNT based polymer nanocomposites. One chapter is fully focussed on carbon nanotube research developments: published papers and patents. Risks associated with carbon nanotubes and competitive analysis of carbon nanotubes with other carbon allotropes are also addressed in this Handbook.
