
Preface

Carbon nanotubes are rolled up graphene sheets with a quasi-one-dimensional structure of nanometer-scale diameters. More than twenty years have passed since the pioneering work on carbon nanotubes by Prof. Iijima in 1991. During that time, carbon nanotubes have attracted much attention from physicists, chemists, material scientists, and electronic device engineers, because of their excellent structural, electronic, optical, chemical, and mechanical properties. Most of these unique properties mainly originate in the parent material, graphene, which has also been very intensively studied as a Dirac Fermion system. More recently, demand for innovative industrial applications of carbon nanotubes is increasing.

This book contains recent research topics covering syntheses techniques of carbon nanotubes and nanotube-based composites, and their applications. All of the chapters were written by researchers who are active on the front lines. This book consists of three parts. Part 1 mainly focuses on novel syntheses techniques for single- and multi-wall carbon nanotubes, nanocoils, and their composites. Some chapters in Part 1 describe theoretical aspects of nanotube composite formation. In Part 2, electrical and medical applications of carbon nanotubes are described. This part covers applications for gas sensors, transparent electrodes, and interconnects. Nanotube-based therapeutics and biological detection techniques are also reviewed. Part 3 mainly focuses on applications for green technologies, with much attention paid to energy storage and decontamination technologies. However, note that the above categorization is not rigorous: Some chapters are quite broad in scope and cover topics in more than one category.

I believe that this book will be of interest to physicists, chemists, material scientists, engineers, and students who are working on carbon nanotubes both in the academic and industrial domains

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