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Nota di contenuto	Carbon Meta-Nanotubes: Synthesis, Properties and Applications; Contents; List of Contributors; Foreword; List of Abbreviations; Acknowledgements; Introduction to the Meta-Nanotube Book; 1 Time for a Third-Generation of Carbon Nanotubes; 2 Introducing Meta-Nanotubes; 2.1 Doped Nanotubes (X:CNTs); 2.2 Functionalized Nanotubes (X-CNTs); 2.3 Decorated (Coated) Nanotubes (X/CNTs); 2.4 Filled Nanotubes (X@CNTs); 2.5 Heterogeneous Nanotubes (X*CNTs); 3 Introducing the Meta-Nanotube Book; References; 1 Introduction to Carbon Nanotubes; 1.1 Introduction 1.2 One Word about Synthesizing Carbon Nanotubes 1.3 SWCNTs: The Perfect Structure; 1.4 MWCNTs: The Amazing (Nano)Textural Variety; 1.5 Electronic Structure; 1.6 Some Properties of Carbon Nanotubes; 1.7

Conclusion; References; 2 Doped Carbon Nanotubes: (X-CNTs); 2.1 Introduction; 2.1.1 Scope of this Chapter; 2.1.2 A Few Definitions; 2.1.3 Doped/Intercalated Carbon Allotropes - a Brief History; 2.1.4 What Happens upon Doping SWCNTs?; 2.2 n-Doping of Nanotubes; 2.2.1 Synthetic Routes for Preparing Doped SWCNTs; 2.2.2 Crystalline Structure and Chemical Composition of n-Doped Nanotubes; 2.2.3 Modification of the Electronic Structure of SWCNTs upon Doping; 2.4 Electrical Transport in Doped SWCNTs; 2.2.5 Spectroscopic Evidence for n-Doping; 2.2.6 Solutions of Reduced Nanotubes; 2.3 p-Doping of Carbon Nanotubes; 2.3.1 p-Doping of SWCNTs with Halogens; 2.3.2 p-Doping with Acceptor Molecules; 2.3.3 p-Doping of SWCNTs with FeCl₃; 2.3.4 p-Doping of SWCNTs with SOCl₂; 2.3.5 p-Doping of SWCNTs with Acids; 2.3.6 p-Doping of SWCNTs with Superacids; 2.3.7 p-Doping with other Oxidizing Agents; 2.3.8 Diameter Selective Doping; 2.4 Practical Applications of Doped Nanotubes; 2.5 Conclusions, Perspectives; References; 3 Functionalized Carbon Nanotubes: (X-CNTs); 3.1 Introduction; 3.2 Functionalization Routes; 3.2.1 Noncovalent Sidewall Functionalization of SWCNTs; 3.2.2 Covalent Functionalization of SWCNTs; 3.3 Properties and Applications; 3.3.1 Electron Transfer Properties and Photovoltaic Applications; 3.3.2 Chemical Sensors (FET-Based); 3.3.3 Opto-Electronic Devices (FET-Based); 3.3.4 Biosensors; 3.4 Conclusion; References; 4 Decorated (Coated) Carbon Nanotubes: (X/CNTs); 4.1 Introduction; 4.2 Metal-Nanotube Interactions - Theoretical Aspects; 4.2.1 Curvature-Induced Effects; 4.2.2 Effect of Defects and Vacancies on the Metal-Graphite Interactions; 4.3 Carbon Nanotube Surface Activation; 4.4 Methods for Carbon Nanotube Coating; 4.4.1 Deposition from Solution; 4.4.2 Self-Assembly Methods; 4.4.3 Electro- and Electrophoretic Deposition; 4.4.4 Deposition from Gas Phase; 4.4.5 Nanoparticles Decorating Inner Surfaces of Carbon Nanotubes; 4.5 Characterization of Decorated Nanotubes; 4.5.1 Electron Microscopy and X-ray Diffraction; 4.5.2 Spectroscopic Methods; 4.5.3 Porosity and Surface Area; 4.6 Applications of Decorated Nanotubes; 4.6.1 Sensors

Sommario/riassunto

"The book will present different chapters corresponding to each of the meta-nanotube categories. There will be an introductory chapter that will provide the basics of what is needed to be known about pristine nanotubes to understand what is in the subsequent chapters. Each of the chapters that follow the introductory chapter will cover aspects from synthesis to applications, characterization, behavior, properties, and mechanisms. These chapters will focus on heterogeneous nanotubes, doped nanotubes, functionalized nanotubes, coated nanotubes and hybrid nanotubes, respectively, and will be followed by a final concluding chapter"--