

1. Record Nr.	UNINA9910815580003321
Titolo	Carbon meta-nanotubes : synthesis, properties and applications / / [edited by] Marc Monthioux
Pubbl/distr/stampa	Hoboken, N.J., : John Wiley & Sons, 2012
ISBN	9786613316189 9781119960942 1119960940 9781283316187 1283316188 9781119954743 1119954746 9781119954736 1119954738
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (462 p.)
Classificazione	TEC021000
Altri autori (Persone)	Monthioux, Marc
Disciplina	620.1/17
Soggetti	Nanostructured materials Nanotubes Organic compounds - Synthesis
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
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 Doping2. 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 FeCl_3 ; 2.3.4 p-Doping of SWCNTs with SOCl_2 ; 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, PerspectivesReferences; 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 Effects4.2.2 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"--