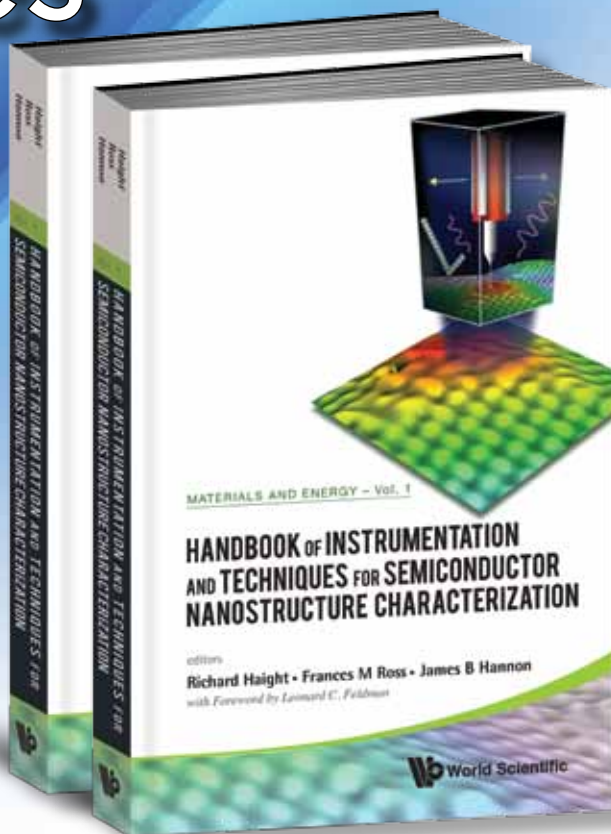


# Nanomaterials and Nanostructures



## Highlights

- **First comprehensive handbook** on instrumentation and techniques for semiconductor nanostructure characterization
- **More than 900 references** providing up-to-date information
- **With over 260 illustrations**

## HANDBOOK OF INSTRUMENTATION AND TECHNIQUES FOR SEMICONDUCTOR NANOSTRUCTURE CHARACTERIZATION (In 2 Volumes)

edited by **Richard Haight** (IBM TJ Watson Research Center, USA),

**Frances M Ross** (IBM TJ Watson Research Center, USA), **James B Hannon** (IBM TJ Watson Research Center, USA)

With Foreword by **Leonard C Feldman** (Director Institute for Advanced Materials, Devices and Nanotechnology, Rutgers University, USA)

**As** we delve more deeply into the physics and chemistry of functional materials and processes, we are inexorably driven to the nanoscale. And nowhere is the development of instrumentation and associated techniques more important to scientific progress than in the area of nanoscience. The dramatic expansion of efforts to peer into nanoscale materials and processes has made it critical to capture and summarize the cutting-edge instrumentation and techniques that have become indispensable for scientific investigation in this arena. This Handbook is a key resource developed for scientists, engineers and advanced graduate students in which eminent scientists present the forefront of instrumentation and techniques for the study of structural, optical and electronic properties of semiconductor nanostructures.

**Readership:** Advanced graduate students and professionals in physics, chemistry, materials science and nanoscience.

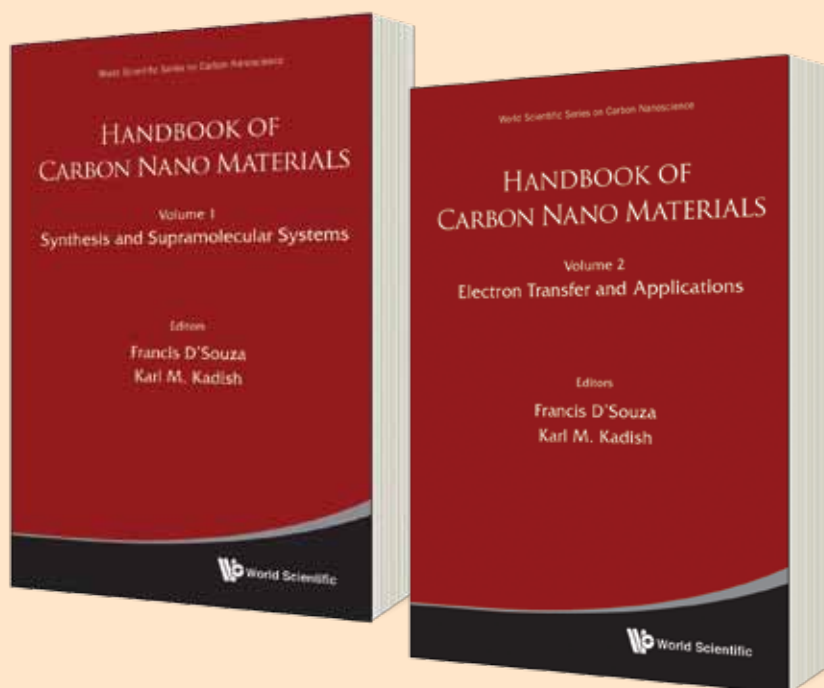
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<b>978-981-4327-82-4( ebook)</b>	<b>US\$494</b>	

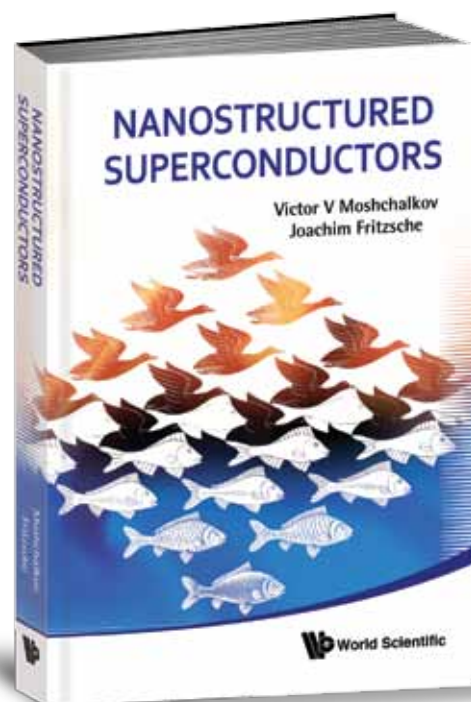
## NANOSTRUCTURED SUPERCONDUCTORS

by **Victor V Moshchalkov** & **Joachim Fritzsche**  
(*Katholieke Universiteit Leuven, Belgium*)

The main focus of the book is to present the effects of nanostructuring on superconducting critical parameters. Optimizing systematically flux and condensate confinement in various nanostructured superconductors, ranging from single nano-cells to their huge arrays, critical fields and currents can be increased up to their theoretical limits, thus drastically improving the potential for practical applications of nanostructured superconductors.

**Readership:** Graduate students and researchers in the field of superconductivity and nanomaterials.

<b>320pp</b>	<b>Mar 2011</b>
	<b>US\$98 / £64</b>
<b>978-981-4343-92-3 (ebook)</b>	<b>US\$127</b>



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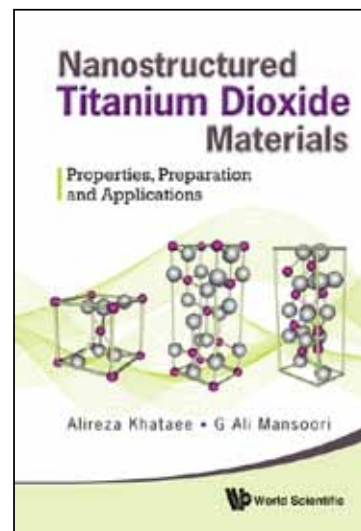
**NANOSTRUCTURED TITANIUM DIOXIDE MATERIALS**

Properties, Preparation and Applications

by **Alireza Khataee** (*University of Tabriz, Iran*) &**G Ali Mansoori** (*University of Illinois at Chicago, USA*)

This book briefly describes properties, production, modification and applications of nanostructured titanium dioxide focusing in particular on photocatalytic activity. The physicochemical properties of nanostructured titanium dioxide are. The preparation of  $TiO_2$  nanomaterials are primarily categorized by their preparation method. Examples of early applications of nanostructured titanium dioxide are reviewed. The review of modifications of  $TiO_2$  nanomaterials is mainly focused on the research related to the modifications of the optical properties of  $TiO_2$  nanomaterials. Photocatalytic removal of various pollutants using pure  $TiO_2$  nanomaterials,  $TiO_2$ -based nanoclays and non-metal doped nanostructured  $TiO_2$  are also discussed.

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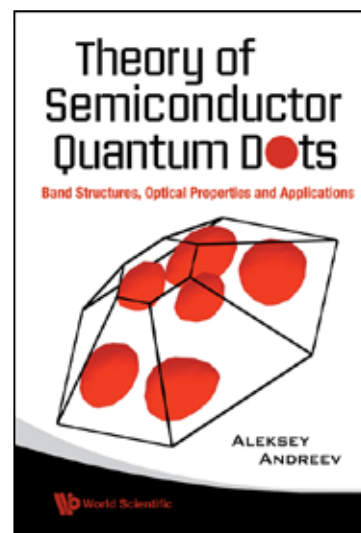
**200pp****Nov 2011****978-981-4374-72-9****US\$88 £58****THEORY OF SEMICONDUCTOR QUANTUM DOTS**

Band Structure, Optical Properties and Applications

edited by **Aleksey Andreev** (*Hitachi Cambridge Laboratory, UK*)

This monograph describes a detailed theory of the electronic band structure and optical properties of semiconductor quantum dots. The author provides a comprehensive description of an original approach based on a combination of the Fourier transform, the Green's function and plane-wave expansion techniques in the framework of multiband  $8 \times 8$  kp theory. The calculated band structure, optical properties and device applications are analyzed in line with available experiments for a large number of realistic quantum dot structures and various combinations of materials, such as InGaN, GaN/AlN, ZnSe, InGaAs (including dots-in-the-well), ZnSe/CdSe, and lead salts.

**Readership:** Researchers in the area of semiconductor dots and students & researchers in physics and electrical engineering. Some chapters are suitable for postgraduate courses.

**400pp (approx.)****Spring 2012****978-981-256-881-6****US\$133 £92****NANOPARTICLE REINFORCED COMPOSITES FOR STRUCTURAL APPLICATIONS**by **Hassan Mahfuzn** (*Florida Atlantic University, USA*) &**Vinod Dhanak** (*The University of Liverpool, UK*)

The idea of nanoparticle reinforced composites or nanocomposites came only about a decade ago after the remarkable discovery of carbon nanotubes and buckyballs. Infusion of these nanoparticles into various polymer matrices and their precursors opened up an important area of research in enhancing the properties of composite materials as we know today.

The idea behind this monograph is to systematically describe the scientific basis of nanoparticle dispersion into various polymers, their interactions at the atomic scale, and their influence on the bulk properties of composite materials. The attempt will be to trace the source of such significant improvement in material properties and capture the momentum of this important area of research in materials science.

**Readership:** Graduate students and researchers in nanocomposites.

**250pp (approx.)****Summer 2012****978-1-84816-482-6****US\$99 £68**

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## Textbooks

**NANOSTRUCTURES AND NANOMATERIALS**

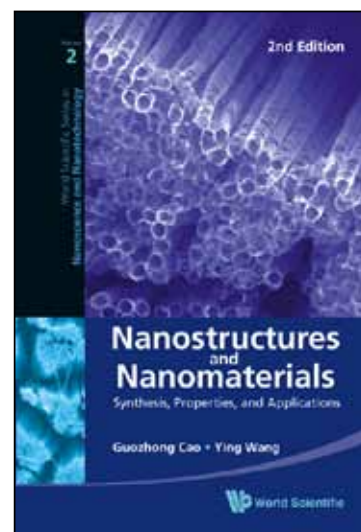
Synthesis, Properties, and Applications

**(2nd Edition)**by **Guozhong Cao** (*University of Washington, USA*) &  
**Ying Wang** (*Louisiana State University, USA*)**Bestseller**

This important book focuses not only on the synthesis and fabrication of nanostructures and nanomaterials, but also includes properties and applications of nanostructures and nanomaterials, particularly inorganic nanomaterials. It provides balanced and comprehensive coverage of the fundamentals and processing techniques with regard to synthesis, characterization, properties, and applications of nanostructures and nanomaterials. Both chemical processing and lithographic techniques are presented in a systematic and coherent manner for the synthesis and fabrication of 0-D, 1-D, and 2-D nanostructures, as well as special nanomaterials such as carbon nanotubes and ordered mesoporous oxides.

**Readership:** Senior undergraduates, graduate students, academics and researchers in nanomaterials and nanostructures.

596pp	Jan 2011	
978-981-4322-50-8	US\$180	£112
978-981-4324-55-7(pbk)	US\$99	£61

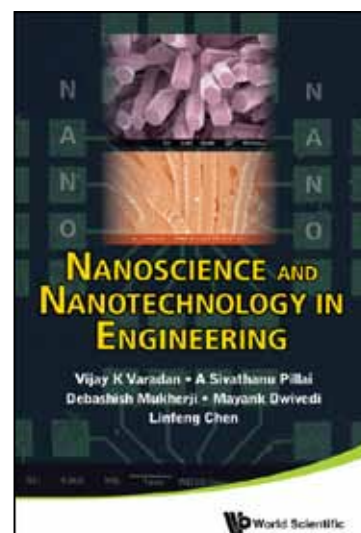
**NANOSCIENCE AND NANOTECHNOLOGY IN ENGINEERING**

by **Vijay K Varadan** (*University of Arkansas, USA*),  
**A Sivathanu Pillai** (*Defense Research and Development Organization, India*),  
**Debashish Mukherji**, **Mayank Dwivedi** (*Defense Research and Development Organization, India*) & **Linfeng Chen** (*University of Arkansas, USA*)

This book, which consists of eight self-contained chapters, provides the essential theoretical knowledge and important experimental techniques required for the research and development on nanoscience and nanotechnology in engineering, and deals with the five key topics in this area — *Nanoscience and Nanotechnology in Engineering* is based on the many lectures and courses presented around the world by its authors.

**Readership:** Undergraduates & researchers in nanoscience & nanotechnology in engineering.

324pp	Aug 2010	
978-981-4277-92-1	US\$68	£45

**AN INTRODUCTION TO INTERFACES AND COLLOIDS**

The Bridge to Nanoscience

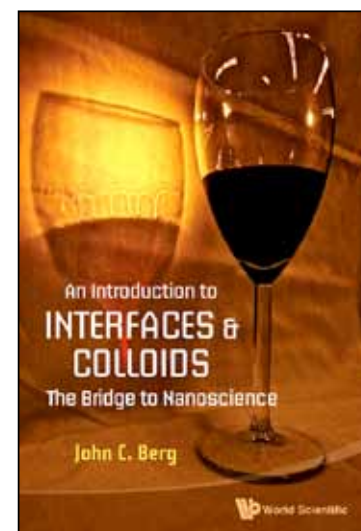
by **John C Berg** (*University of Washington, USA*)**Highly Recommended**

*"Born of decades of diverse experience performing research and teaching in the field of surface and colloid science, Prof. Berg's new textbook is a must buy for students just entering the field, as well as for experts. I find myself frequently referring to the book as a reference when writing grants. Prof. Berg's organization of the subject matter, combined with his exquisitely clear descriptions that provide a molecular level understanding of phenomena, have set a new standard for textbooks in the field."*

**Journal of Colloid and Interface Science**

**Readership:** Senior undergraduate and graduate students in chemistry, physics, materials science, chemical engineering, civil engineering, mechanical engineering and related fields.

804pp	Nov 2009	
978-981-4293-07-5	US\$95	£71
978-981-4299-82-4(pbk)	US\$68	£51



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by **R Saito** (University of Electro-Communications, Tokyo),  
**G Dresselhaus** (MIT) & **M S Dresselhaus** (MIT)

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**Fullerene Science & Technology**

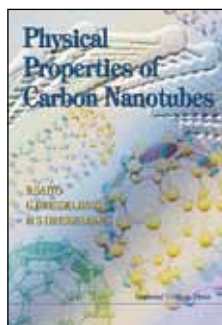
"Those involved in the research of carbon nanotubes will find this book useful for understanding the basic properties of carbon tube materials."

**IEEE Electrical Insulation Magazine**

**Readership:** Researchers and graduate students in condensed matter and solid state physics.

<b>272pp</b>	<b>Jul 1998</b>	
<b>978-1-86094-093-4</b>	<b>US\$50</b>	<b>£33</b>
<b>978-1-86094-223-5(pbk)</b>	<b>US\$34</b>	<b>£22</b>
<b>978-1-86094-379-9(ebook)</b>	<b>US\$65</b>	

**Bestseller**

**NANOSCIENCE AND TECHNOLOGY**

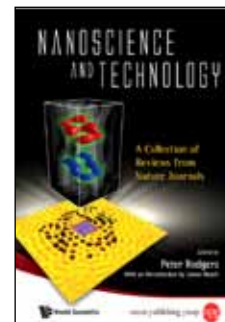
A Collection of Reviews from Nature Journals edited by **Peter Rodgers** (Nature Publishing Group)

"This collection of papers consists of some of the latest and most advanced reports in the field of nanoscience and nanotechnology. Topics covered include all aspects of the field: nano-optics, nano-electronics, nanofabrication, DNA manipulation and nano-bio. In each case the papers represent ground-breaking research, reported by some of the most prominent leaders in science and technology. This is a useful volume of value to all involved in today's research in nano-science and nanotechnology."

**Professor Leonard C Feldman, Rutgers University**

**Readership:** Chemists, physicists, materials scientists, engineers, biomedical scientists and anyone interested in nanoscience and nanotechnology.

<b>368pp</b>	<b>Aug 2009</b>
<b>978-981-4282-68-0</b>	<b>US\$215 / £142</b>
<b>978-981-4282-69-7(pbk)</b>	<b>US\$87 / £57</b>
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Series on Chemical Engineering - Vol. 4

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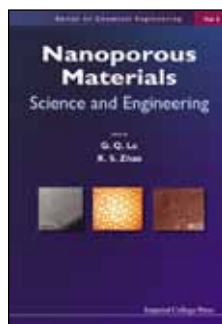
edited by **G Q Lu** (University of Queensland, Australia) &  
**X S Zhao** (National University of Singapore)

This book provides a series of systematic reviews of the recent developments in nanoporous materials. It covers (1) synthesis, processing, characterization and property evaluation; (2) functionalization by physical and/or chemical treatments; (3) experimental and computational studies on fundamental properties (4) applications, including photonic devices, catalysis, environmental pollution control, biological molecules separation and isolation, sensors, membranes, hydrogen and energy storage, etc.

**Readership:** Researchers in nanotechnology, chemical engineering, physical chemistry and solid state chemistry.

<b>912pp</b>	<b>Nov 2004</b>	
<b>978-1-86094-210-5</b>	<b>US\$329</b>	<b>£217</b>
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Annual Review of Nano Research - Vol. 3

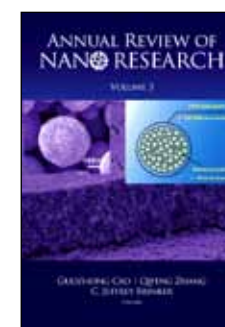
**ANNUAL REVIEW OF NANO RESEARCH**

edited by **Guozhong Cao** (University of Washington, USA), **Qifeng Zhang** (University of Washington, USA) & **C Jeffrey Brinker** (University of New Mexico, USA & Sandia National Laboratories, USA)

*Annual Review of Nano Research, Volume 3* focuses mainly on nanofabrication, nanomaterials and nanostructures, and energy application of nanomaterials. This review volume will serve dual purposes: either as an excellent introduction to scientists whose expertise lie in different fields but who are interested in learning about nanotechnology, or as a quick reference for experts active in the field of nanoscience and nanotechnology.

**Readership:** Research scientists and engineers in academia, research institutes and industry, as well as graduate students and upper-level undergraduate students in the physical sciences and engineering.

<b>576pp</b>	<b>Dec 2009</b>
<b>978-981-4280-51-8</b>	<b>US\$163 / £107</b>
<b>978-981-4280-52-5(ebook)</b>	<b>US\$212</b>

**OPTICAL PROPERTIES AND SPECTROSCOPY OF NANOMATERIALS**

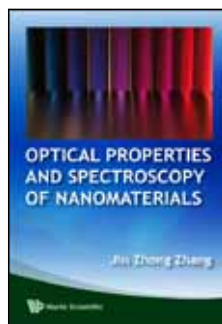
by **Jin Zhong Zhang**  
(University of California, Santa Cruz, USA)

"The extensive bibliography makes this book a good reference work representative of the field as a whole ... Overall the book is well organized and covers the necessary topics to serve as an introductory text to the properties and role of nanomaterials in optical and photonic applications ... the key strengths of the book are that it presents a nicely flowing birds-eye overview of nanomaterial optics and spectroscopy, and it is attractively priced."

**Journal of the American Chemistry Society**

**Readership:** Advanced undergraduates, graduate students and researchers in physics, chemistry, materials science and engineering.

<b>400pp</b>	<b>Jul 2009</b>
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<b>978-981-4327-78-7</b>	<b>US\$70</b>	<b>£46</b>
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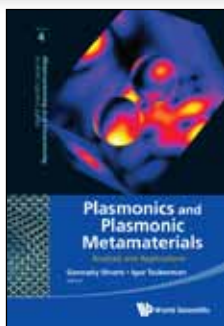
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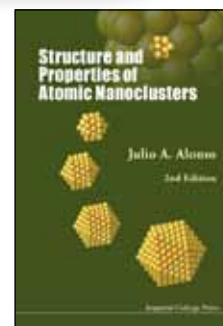
This book is a collection of the works of leading experts worldwide in the rapidly developing fields of plasmonics and metamaterials. These developments are promising to revolutionize ways of generating, controlling and processing light in the nanoscale. The technological applications range from nano-lasers to optical nanowaveguides to artificial media with unusual and exotic optical properties unattainable in natural materials. The volume cuts across all relevant disciplines and covers experiments, measurements, fabrication, physical and mathematical analysis, as well as computer simulation.

<b>350pp (approx.)</b>	<b>Nov 2011</b>	
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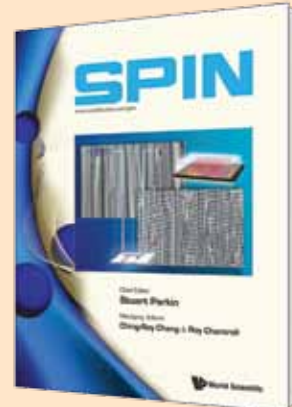
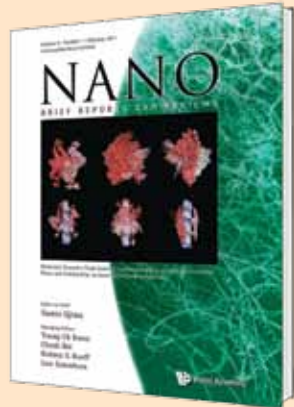
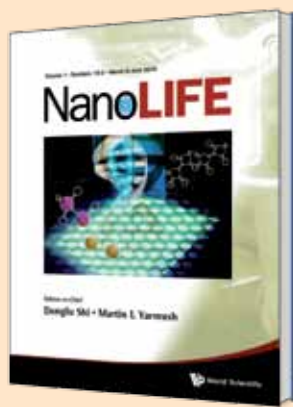
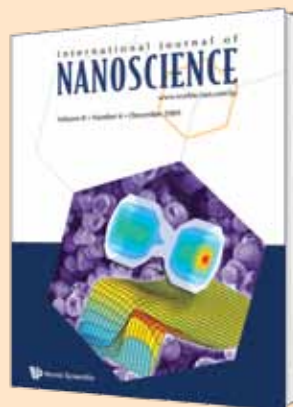
This monograph presents the main developments of atomic clusters and the current status of the field. It treats different types of clusters with very different properties: clusters in which the atoms or molecules are tied by weak van der Waals interactions, metallic clusters, clusters of ionic materials, and network clusters made of typical covalent elements. It includes methods of experimental cluster synthesis as well as the structural, electronic, thermodynamic and magnetic properties of clusters, covering both experiments and the theoretical work that has led to our present understanding of the different properties of clusters. The question of assembling nanoclusters to form solids with new properties is also considered.

<b>492pp</b>	<b>Aug 2011</b>	
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