



CATALOGUE

# NANOTECHNOLOGY 2014

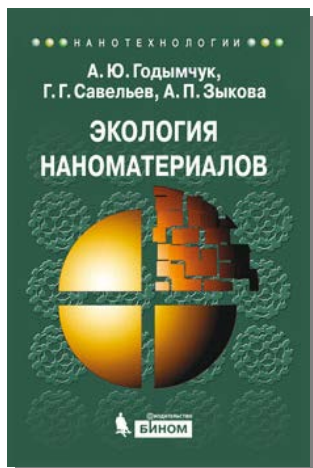
# CONTENTS

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3	ECOLOGY OF NANOMATERIALS: A TUTORIAL
3	ELECTRONIC PROPERTIES AND APPLICATION OF NANOTUBES
4	FUNDAMENTALS OF MATERIALS SCIENCE: TEXTBOOK
4	FUNDAMENTALS OF NANOSTRUCTURED MATERIALS. OPPORTUNITIES AND PROBLEMS
5	FUNDAMENTALS OF NANOTECHNOLOGY : TEXTBOOK
5	INNOVATIVE NANOCLUSTERS
6	INORGANIC NANOMATERIALS: A TEXTBOOK
6	INTRODUCTION IN PROCESSES OF INTEGRATED MICRO- AND NANOTECHNOLOGIES. 2-VOLUME SET
7	METHODS OF COMPACTION AND CONSOLIDATION
	OF NANOSTRUCTURED MATERIALS AND PRODUCTS: A TUTORIAL
7	METHODS OF OBTAINING AND RESEARCH OF NANOMATERIALS AND NANOSTRUCTURES.
	LABORATORY WORKSHOP ON NANOTECHNOLOGY: A TRAINING MANUAL, 2 <sup>ND</sup> ED.
8	MODELING OF 3D NANO CIRCUIT ENGINEERING
8	NANOBIOTECHNOLOGY: MANUAL
9	NANOELECTRONICS: A MANUAL, 2 <sup>ND</sup> ED.
9	NANOELECTRONICS. ELEMENTS, DEVICES: MANUAL
10	NANOELECTRONICS: THE MANUAL
10	NANOELECTRONICS: THEORY AND PRACTICE: A TEXTBOOK, 2 <sup>ND</sup> ED.
11	THE NANOMARKET: FROM NANOTECHNOLOGIES TO NANOPRODUCTS
12	NANOMATERIALS, 2 <sup>ND</sup> ED.
12	NANOTECHNOLOGY MATERIALS AND METHODS: THE MANUAL, 2 <sup>ND</sup> ED.
13	NANOWORLD WITHOUT FORMULAE
13	NONLINEAR EFFECTS IN NANO- AND MICROHETEROGENEOUS SYSTEMS
14	OBTAINING AND RESEARCH OF NANOSTRUCTURES
14	PHYSICAL BASICS OF SILICON NANOELECTRONICS
15	PROCESSES OF PLASMA ETCHING IN MICRO- AND NANOTECHNOLOGIES
15	RICHNESS OF THE NANO-WORLD. PHOTO-REPORT FROM THE DEPTHS OF MATTER
16	SMALL OBJECTS — BIG IDEAS. A BROAD VIEW OF NANOTECHNOLOGY
16	THE SOL-GEL TECHNOLOGIES. NANO-DISPERSED SILICA

# NANOTECHNOLOGY

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## ECOLOGY OF NANOMATERIALS: A TUTORIAL

A. Y. Godymchuk, G. G. Savelyev, A. P. Zykova

ISBN 978-5-9963-0523-0

272 pp., hardcover

145 x 215 mm

2012

This tutorial describes the potential and actual environmental risks arising from the interaction of nanomaterials with the environment. The analysis was made on the basis of the experimental study of nanomaterials migration and routes while penetrating into the ecosystem (atmosphere, hydrosphere, lithosphere), physico-chemical properties of nanosized sols, as well as research in the field of toxicology and ecotoxicology of nanomaterials in their interaction with plants, soil, invertebrates and mammals. Special attention is paid to issues of penetration, migration and removal of nanoparticles from the human body.

The authors formulate general conclusions and list perspective areas of research in the field of environmental of nanomaterials.

The book is intended for teachers and students specializing in the development and application of nanotechnology.



## ELECTRONIC PROPERTIES AND APPLICATION OF NANOTUBES

Dyachkov P. N.

ISBN 978-5-9963-0154-6

488 pp., hardcover

145 x 215 mm

2010

The monography reflects recent and modern aspects in the field of nanotubes studying and application. The reader would find methods on obtaining, structure, electronic, optical, mechanical, magnetic and emissive properties of nanotubes. The book describes surprising inventions done with the help of these new materials: one-electronic, field and quantum nanotransistor, chemical sensor controls, sources of optical and x-ray radiation, logic elements, memory cells and even a radio receiver with only one carbon nanotube.

Special attention is given to calculation of nanotubes' electronic structure using the method of linearized attached cylindrical waves. One of the sections describes the new direction in science — nanoelectromagnetism.

The book is intended for research assistants, students and post-graduate students of physical, chemical and engineering specialities.



## FUNDAMENTALS OF MATERIALS SCIENCE: TEXTBOOK

G. G. Bondarenko, T. A. Kabanova, V. V. Rybalko

ISBN: 978-5-9963-0639-8

760 pp. *hardcover*

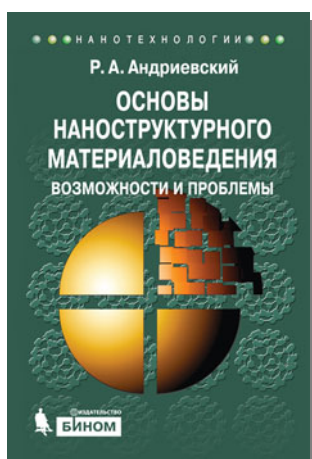
165 x 235 mm

**2014**

The textbook is one of the most unabridged modern educational titles on materials science. It presents fundamental data on the structure, physical and chemical properties, phase transformations and physical processes of a wide range of materials, including nanostructured, as well as their structure and properties research methods. Possibilities of nanostructures application for the solution of

various technical tasks are widely illustrated. In the annex to the textbook a reader would find test tasks with variable answers that are intended for intermediate and final control.

The book is intended for students and graduate students specializing in the area of condensed environments and materials science physics, as well as for experts of various equipment and technologies areas.



## FUNDAMENTALS OF NANOSTRUCTURED MATERIALS. OPPORTUNITIES AND PROBLEMS

R. A. Andrievsky

ISBN 978-5-9963-0622-0

252 pp., *hardcover*

145 x 215 mm

2012

The book describes the current trends of nanostructured materials science and unsolved problems in this area. The author systematized many data on the impact of size effects and the interfaces on the physical, physical-chemical and mechanical properties of nanomaterials, summarized and analyzed the thermal, radiation, deformation and corrosion stability data. A reader would find the most

typical nanomaterials features based on titanium, silicon compounds and their alloys.

The book is intended for researchers, teachers, engineers and university students working in the field of nanotechnology and nanomaterials.



## FUNDAMENTALS OF NANOTECHNOLOGY : TEXTBOOK

*N. T. Kuznetsov, V. M. Novotortsev, V. A. Zhabrev, V. I. Margolin*

*ISBN 978-5-9963-0853-8*

*397 pp., hardcover*

*190 x 170 mm*

**2014**

The authors of the textbook present the general ideas of nanotechnology and its conceptual problems. They affect self-organization and synergetic matters in the nanoworld and analyze possibilities of nanometrology. Specific features and nanoworld problems are considered.

The book is intended for undergraduate and graduate students, technical workers and scientists, as well as for all who are interested in problems of modern science.



## INNOVATIVE NANOCLUSTERS

*G. L. Azoev*

*ISBN 978-5-9963-0739-5*

*296 pp., hardcover*

*165 x 235 mm*

**2011**

For the first time the book introduces to readers a phenomenon of innovation clusters in the world and Russian nanotechnology industry. A reader will find the following information: why and how nanotechnological clusters are formed, how they are managed, what are the perspectives for Russia in this field. The book summarizes the global and local experience, highlights the failures and achievements, provides the ways of solving actual problems of nanotechnology clusters in Russia.

The book has been prepared within the Project of the Russian Ministry of Education and Science and is intended for developers and manufacturers of nanoproducts, the participants of innovative projects, teachers and students of nanotechnological and economic institutions. It will be useful for a wide range of managers.



## INORGANIC NANOMATERIALS: A TEXTBOOK

*E. G. Rakov*

*ISBN 978-5-9963-0625-1*

*477 pp., hardcover*

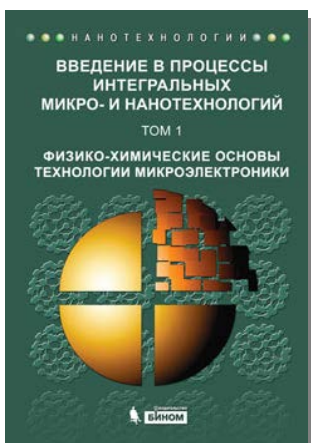
*145 x 215 mm*

*2013*

*(Nanotechnology)*

The study guide describes inorganic nanomaterials' properties and applications. Special attention is paid to nanoscience and nanotechnology terminology. The reader would find the information on unusual, atypical substances, materials and methods of their obtaining which helps him to develop his own ideas.

The book is intended for students specializing in the field of nanotechnology and nanomaterials, as well as for teachers.



## INTRODUCTION IN PROCESSES OF INTEGRATED MICRO- AND NANOTECHNOLOGIES. 2-VOLUME SET

*J. N. Korkishko (ed.)*

*ISBN 978-5-9963-0341-0*

*ISBN 978-5-9963-0335-9 (V. 1)*

*ISBN 978-5-9963-0336-6 (V. 2)*

*145 x 215 mm, hardcover*

*2010*

The book presents physical and chemical bases of microelectronics technology. Technological processes classification is described. Criteria defining the character of their course and quality of products are formulated. Special attention

is given to the processes of epitaxy, thin films obtaining, welding and soldering, machining and clearing of materials surface, as well as alloying, modifying and a photolithography.

Mechanisms of electric fields and radiations influence on some of these processes are reviewed. Division of the book into 2 volumes is caused by large content, at the same time each volume has its separate significance.

The book is intended for the students studying technology of microelectronics and radio engineering microelectronic devices, post-graduate students and specialists.



## **METHODS OF COMPACTION AND CONSOLIDATION OF NANOSTRUCTURED MATERIALS AND PRODUCTS: A TUTORIAL**

*O. L. Hasanov [et al.]*

ISBN 978-5-9963-0844-6

269 pp., hardcover

2013

145 x 215 mm

*(Nanotechnology)*

The authors describe the basic methods of compaction and consolidation of powdered nanomaterials for making products. The most of them are dedicated to bulk nanostructured materials and ceramic items with constructional and functional purposes. The reader would find detailed information about method

of powders ultrasonic compaction, constructions of collector pressed forms for various geometric shapes powder products production. The characteristics of the stress-strain state and the rheological properties of compacted powder materials are described.

The book is intended for students specializing in the field of materials science, as well as technology specialists.



## **METHODS OF OBTAINING AND RESEARCH OF NANOMATERIALS AND NANOSTRUCTURES. LABORATORY WORKSHOP ON NANOTECHNOLOGY: A TRAINING MANUAL, 2<sup>ND</sup> ED.**

*E. D. Mishina [etc.], ed. A. S. Sigov*

ISBN 978-5-9963-0617-6

184 pp., hardcover

145 x 215 mm

2013

*(The Textbook for Higher School)*

The author represents the descriptions of the laboratory works for students in the fields of "Nanotechnology in Electronics" and "Quantum Electronics". In the course of work the students will study some methods of nanoparticles and

nanocomposites obtaining, will acquire the skills to work with nanometer-sized objects and possess modern physicochemical methods of research. Each series of works is preceded by theoretical introduction, which can play the role of a brief lecture notes.

The book is intended for students, graduate students, teachers of classical, pedagogical and technological universities as well as for professionals working on the problems of development and application of nanotechnology.





## MODELING OF 3D NANO CIRCUIT ENGINEERING

*N. K. Trubochkina*

*ISBN 978-5-9963-0291-8*

*499 pp., hardcover*

*165 x 235 mm*

*2012*

The book presents the basic concepts of the theory of transition circuitry required for the development of new element basis of various types of supercomputers. The theory of transition circuitry features the new component concept of nanostructures synthesis, in which material and transition (connection) between the materials are used as a minimum component for the synthesis of circuits. A reader would find

data of experimental 2D and 3D modeling of physical and electric processes in silicon transition nanostructures with a minimum topological size of 10-20 nm and a comparative analysis of four types of circuitry.

The book can be recommended for researchers, graduate students and engineers specializing in the development of element base of supercomputers and alternative computing systems.



## NANOBIOTECHNOLOGY: MANUAL

*A.B. Rubin (Ed.)*

*ISBN 978-5-9963-0627-5*

*384 pp., hardcover*

*145 x 215 mm*

*2012*

This manual on the course "Nanobiotechnology" was created by the Chair of Biophysics and Bioengineering (the Biological Faculty of the Lomonosov Moscow State University). It includes description of modern instruments (atomic force microscopy, confocal microscopy, laser interference microscopy, Raman spectroscopy and EPR) and modeling techniques, as well as laboratory work

cycle devoted to the use of nanostructures (quantum dots, colloidal particles, liposomes).





### **NANOELECTRONICS: A MANUAL, 2<sup>nd</sup> ED.**

*A. A. Schuka*

*ISBN 978-5-9963-0735-7*

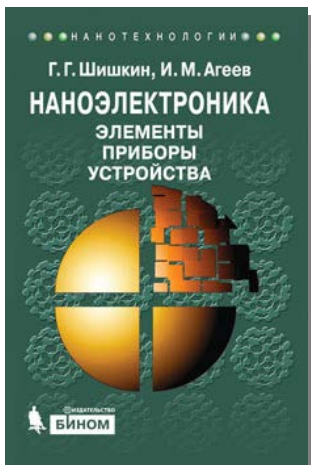
*342 pp.*

*145 x 215 mm, hardcover*

*2012*

The book includes description of the main directions in modern electronics development, which uses the physical effects occurring in nanostructures. The author analyzes the transition from micro- to nanoelectronic devices, presents descriptions of nanotechnology processes, elements, nanoelectronic devices and new materials, which are closely related to the priority area of nanoscience and nanotechnology development.

The book is intended for students, as well as for graduate students and researchers specializing in the field of nanoelectronics and nanotechnology.



### **NANOELECTRONICS. ELEMENTS, DEVICES: MANUAL**

*Shishkin G.G.*

*ISBN 978-5-9963-0638-1*

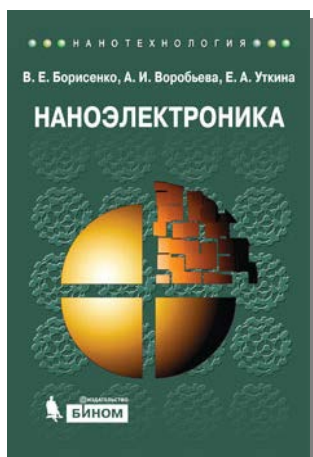
*408 pp., hardcover*

*145 x 215 mm*

*2011*

The manual describes physical and technological bases of nanoelectronics, including its functioning principles and characteristics of nanoelectronics devices on the basis of quantum-dimensional structures: resonance-tunnel, one-electronic and spintronic devices. Features of quantum computers, electronic devices on superconductors and nanobioelectronic devices are considered. Each chapter is supplied by testing questions and tasks for self-preparation.

The manual is intended for students of technical colleges, post-graduate students, teachers and practical experts in the field of electronics.



## NANOELECTRONICS: THE MANUAL

*V. E. Borisenko, A. I. Vorobyeva, E. A. Utkin*

*ISBN 978-5-94774-914-4*

*223 pp.*

*145 x 215 mm, hardcover*

*2009*

The manual deals with the fundamental physical effects taking place in nanostructures due to their lowered regularity. Classification of low denominated structures is given. The book describes approaches, that allow to form such structures in semiconductors, and also modern methods of their research. Features of charge carriers transport in nanodenominated structures are

discussed.

The manual will be helpful for students.

**Victor E. Borisenko** Professor, Doctor of Physical and Mathematical Sciences, the prorector on study of the Belarusian State University of Informatics and Radioelectronics. The author of more than 300 scientific articles and 5 books.

**Alla I. Vorobyeva** Ph. D. in Engineering, the scientific employee of the Belarusian State University of Informatics and Radioelectronics. The author of more than 100 scientific works, including 23 copyright certificates on inventions, 3 manuals and 60 scientific articles in domestic and foreign editions.

**Elena A. Utkina** Ph. D. in Engineering, the senior scientific employee of the Belarusian State University of Informatics and Radioelectronics. The author of more than 60 scientific publications, including 2 manuals and more than 30 scientific articles.



## NANOELECTRONICS: THEORY AND PRACTICE: A TEXTBOOK, 2<sup>ND</sup> ED.

*V. E. Borisenko, A. I. Vorobyeva, A. L. Danyluk, E. A. Utkina*

*ISBN 978-5-9963-1015-9*

*366 pp., hardcover*

*145 x 215 mm*

*2013*

*(Textbook for Higher School)*

The authors examine fundamental physical effects and electronic processes that are typical for nanoscale structures. The principles of operation and types of nanoelectronic devices for information processing are described. The textbook includes information on nanotechnological approaches which enable to create nanoelectronics device structures and spintronics. Along with the updated and

expanded theoretical material of the previous edition this textbook presents practical problems and test questions for self checking.

The book is intended for students, undergraduate and graduate students in the field of modern electronics and nanotechnologies.

**Victor E. Borisenko** Professor, Doctor of Physical and Mathematical Sciences, the prorector on study of the Belarusian State University of Informatics and Radioelectronics. The author of more than 300 scientific articles and 5 books.

**Alla I. Vorobyeva** Ph. D. in Engineering, the scientific employee of the Belarusian State University of Informatics and Radioelectronics. The author of more than 100 scientific works, including 23 copyright certificates on inventions, 3 manuals and 60 scientific articles in domestic and foreign editions.

**Elena A. Utkina** Ph. D. in Engineering, the senior scientific employee of the Belarusian State University of Informatics and Radioelectronics. The author of more than 60 scientific publications, including 2 manuals and more than 30 scientific articles.



**THE NANOMARKET:  
FROM NANOTECHNOLOGIES TO NANOPRODUCTS**

*G. L. Azoeva (Ed.)*

*ISBN 978-5-9963-0421-9*

*319 pp., hardcover*

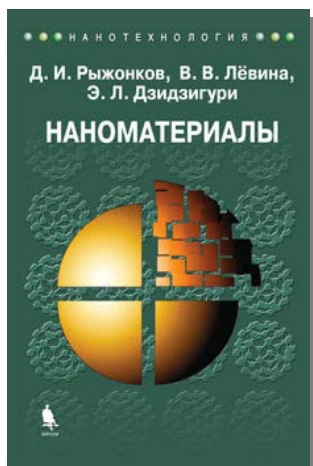
*165 x 235 mm*

*2011*

The book presents systematized description of the world and Russian nanomarket. The book forms a complex vision of the market, its threats and abilities, the knowledge about strategy and nanoindustry mechanisms implementation. The factual base is founded on the information from the world

consulting and analytical companies and field marketing researches of Russian nanoindustry.

The book is intended for employees of the scientific and industrial organizations developing and producing nanoproducts, teachers, students and post-graduate students of higher schools and other participants of nanotechnology network.



## **NANOMATERIALS, 2<sup>nd</sup> ED.**

*D. I. Ryzhonkov, V. V. Levin, E. L. Dzidziguri*

*ISBN 978-5-9963-0345-8*

*365 pp., hardcover*

*145 x 215 mm*

*2010*

The purpose of this manual is to describe various methods of obtaining superdispersed (nano-) materials: mechanical, physical, chemical, biological. Modern concepts of electric, magnetic, thermal, optical, diffusion, chemical and mechanical properties of nanomaterials are systematized. Dependence of these properties on nanoparticles' material structure and geometrical sizes are highlighted. Considerable attention is given to nanomaterials storage and

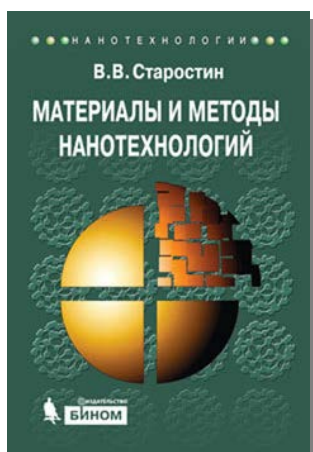
transportation.

The book is intended for graduate and post-graduate students and teachers.

**Dmitry I. Ryzhonkov** Professor of the National University of Science and Technology, Doctor of the Engineering Sciences.

**Vera V. Levina** Professor of the National University of Science and Technology, Doctor of Engineering Sciences, the winner of the State Award of the Russian Federation.

**Ella L. Dzidziguri** The senior scientific employee of the National University of Science and Technology, Ph.D. in Engineering Sciences. Area of scientific interests: x-ray diffractometry methods, including for nanomaterials structure and properties studying.



## **NANOTECHNOLOGY MATERIALS AND METHODS: MANUAL, 2<sup>nd</sup> ED.**

*V. V. Starostin*

*ISBN 978-5-9963-0346-5*

*431 pp.*

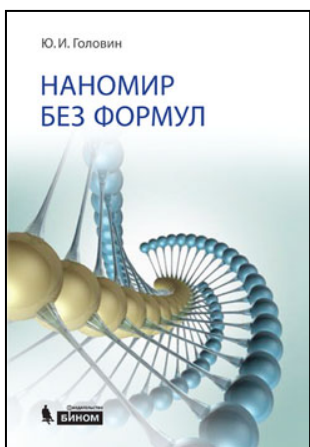
*145 x 215 mm, hardcover*

*2010*

The book introduces the basic knowledge about nanotechnology and nanoobjects, nanoparticle prominent features and properties. Considerable attention is given to functional and constructional materials (fullerene, carbon nanotube, Langmuir molecular films) and their application, and also to nanoparticle and ordered nanostructures obtaining methods. A reader would learn about the results of artificial nanoformation, probe nanotechnology methods, beam and other new lithographie methods.

The book is intended for graduate and post-graduate students of the higher educational institutions specializing in nanotechnology.

**Victor V. Starostin** Ph. D. in Engineering, the senior lecturer of the Moscow State Institute of Radiotechnics, Electronics and Automation. The author of 65 scientific and methodical works.



## **NANOWORLD WITHOUT FORMULAE**

*Yu. I. Golovin*

*ISBN 978-5-9963-0292-5*

*543 pp., hardcover*

*165 x 235 mm*

*2012*

The book describes the basic ideas and principles of nanoscience and nanotechnology in a way that is understandable for pupils, students, teachers, engineers and technical workers of related sectors, representatives of social and humanitarian professions who in the near future may run into nanotechnology in their subject areas or at the household level.

The author systematizes nanoobjects, methods of their obtaining and researching, describes the major directions of nanostructures science development and the most important spheres of nanoproducts application: electronics, aerospace engineering, medicine and health, defense and national security, and consumer goods. Ethical issues and socio-economic impacts of the nanorevolution are discussed.



## **NONLINEAR EFFECTS IN NANO- AND MICROHETEROGENEOUS SYSTEMS**

*S.A. Gridnev, Yu. E. Kalinin, A. V. Sitnikov, O.V. Stogniy*

*ISBN 978-5-9963-0294-9*

*448 pp., hardcover*

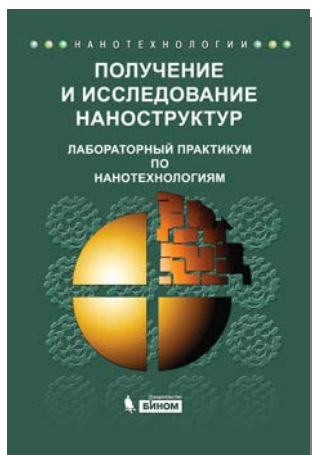
*145 x 215 mm*

*2011*

The research of nonlinear phenomena in multicomponent heterogeneous systems, which exist in amorphous, nano- and microcrystalline states, helps to ascertain the physical nature of many phenomena occurring in them and improve existing theoretical propositions. It also helps to develop new materials which possess unique physical properties. In order to solve these problems successfully it is very important to know the features of the atoms spatial arrangement in the

amorphous, nano- and microcrystalline solids and multicomponent heterogeneous systems, the basic mechanisms of electron transport in heterogeneous metal-insulator transition and formation mechanisms of magnetic anisotropy in a ferromagnet-dielectric nanocomposites, magnetoelectric phenomena in ferromagnetic-piezoelectric systems. The above features are discussed in this book.

The book is intended for professionals in the fields of chemistry, physics and materials science.



## ОБТАИВАНЕ И ИССЛЕДОВАНИЕ НАНОСТРУКТУР

A. A. Evdokimov [etc.]; A. S. Sigov (ed.)

ISBN 978-5-9963-0228-4

146 pp., hardcover

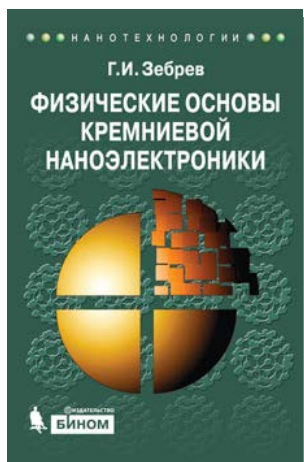
145 x 215 mm

2010

The book presents laboratory works descriptions for students (specialty "Nanotechnology in Electronics"). While performing these works students will get acquainted with some nanoparticles and nanocomposites reception methods, get skills of work with nanometre objects and acquire modern physical and chemical research methods. Each cycle of works is supplied with introduction which can be

considered as lectures summary.

The book is intended for graduate and post-graduate students, teachers of classical, pedagogical and technological universities, and also a wide range of the experts working in the field of nanotechnology.



## ФИЗИЧЕСКИЕ ОСНОВЫ КРЕМНИЕВОЙ НАНОЭЛЕКТРОНИКИ

G. I. Zebrev

ISBN 978-5-9963-0181-2

240 pp., hardcover

145 x 215 mm

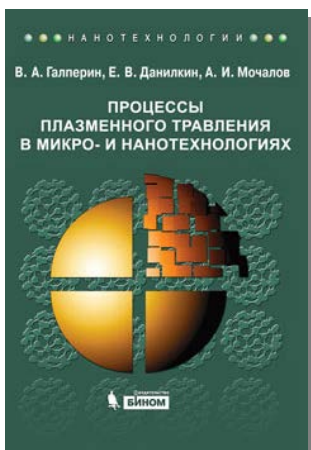
2010

The textbook deals with silicon nanoelectronics, which is interpreted as CMOS-based digital electronics with sub-100 nm nodes.

The following aspects are described in detail: elementary basics of quantum mechanics, physical kinetics and carrier transport; general trends of modern nanoelectronics (Moore's Law, scaling principles and its physical limits, heat production and trade-offs of miniaturization); electrostatics of MOS structure; basic models of I-V characteristics; carrier transport in channels, mobility, short- and narrow channel effects, DIBL, etc.; strong electric field effects in the FET channel including hot electron and impact ionization; original physics-based diffusion-drift model based on analytical solution of current continuity equation and capable to describe I-V characteristics of MOSFET in all operation regimes in a unifying manner and many others.

The book is intended for pre- and postgraduate students, as well as for practicing engineers involved in research in electronics industry.





## PROCESSES OF PLASMA ETCHING IN MICRO- AND NANOTECHNOLOGIES

*V. A. Galperin, E. V. Danilkin, A. I. Mochalov; W. P. Timoshenkov (ed.)*

*ISBN 978-5-9963-0032-7*

*300 pp., hardcover*

*145 x 215 mm*

*2010*

In the light of currently known nanotechnologies and micromechanics processes and systems of the vacuum-plasma etching, which find wide application in manufacture of modern superlarge integrated schemes, products of microelectromechanical systems and nanosystems are considered. Analysis of ways of meeting vacuum-technical requirements to such processes, description of control and diagnostic methods are provided. The book is intended for students of the higher schools studying processes of micro- and nanoelectronics, post-graduate students, engineers and the scientists occupied in the technology of integrated schemes and micromechanics.

**Alexey I. Mochalov** Doctor of Engineering Sciences, Professor of the Moscow Institute of Electronic Technology.



## RICHNESS OF THE NANO-WORLD.

### PHOTO-REPORT FROM THE DEPTHS OF MATTER

*Yu. D. Tretyakov (ed.)*

*ISBN 978-5-9963-0108-9*

*176 pp., hardcover*

*170 x 215 mm*

*2009*

This book presents a unique collection of scientific photographs obtained by various methods such as optical microscopy, scanning and transmission electron microscopy as well as scanning probe microscopy.

The book consists of 10 topics and contains more than 200 color and black-and-white photographs. Every topic of the book is preceded by a short introduction written in a popular manner which gives a general idea of the properties of each type of the materials. Photos and their descriptions illustrate various aspects of synthesis and structural features of inorganic substances.

Selection of material, captions and popular descriptions accompanying photographs will make it interesting for readers with different levels of knowledge such as researchers working in fields of chemistry, physics and matter science but also for everyone interested in nanotechnology.



### **SMALL OBJECTS — BIG IDEAS.**

#### **A BROAD VIEW OF NANOTECHNOLOGY**

*Ehrlich G. V.*

*ISBN 978-5-9963-0522-3*

*254 pp., hardcover*

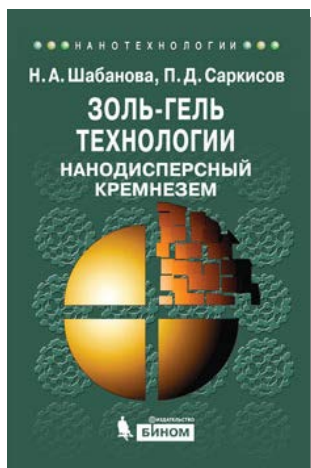
*165 x 235 mm*

*2011*

The purpose of this book is to give knowledge, inspire hope and dispel doubt. Let's look at nanotechnologies without preconception and we will see that they are nothing more than a new synthetic knowledge-based discipline, which unifies physical, chemical and biological knowledge. Let's look at the world around and

inside us and see many nanoobjects that constitute the material basis of life. We will visit the industry enterprises and discover a variety of nanotechnologies. Finally we will look into the future and imagine how nanotechnology can change our lives.

This science fiction book is intended for a wide range of readers who are interested in the problems of modern science and think about the future, including students of higher schools who will be the builders of this future world — the world of nanotechnology.



### **THE SOL-GEL TECHNOLOGIES. NANO-DISPERSED SILICA**

*N. A. Shabanova, P. D. Sarkisov*

*ISBN 978-5-9963-0521-6*

*328 pp., hardcover*

*145 x 215 mm*

*2012*

This monograph summarizes the research and practical experience in the field of chemistry and technology of nanosized silica in Russian and world practice. Authors' attention is directed to colloid-chemical basis of the sol-gel technology of hybrid organic-inorganic nanoparticles and porous materials synthesis, particles with hollow structure synthesis, etc. The authors present the analysis of different options of the sol-gel process accounting for the reactivity of silica, modern

theories of phase formation and aggregation stability of disperse systems. A reader would find formulation and main technological parameters of the sol-gel synthesis of functional nanomaterials with different parameters of composition, dispersion, porosity, structure and morphology.

The book is intended for a wide range of researchers, specialists from different industries, graduate students involved in the synthesis of nanosystems.

# THE BKL PUBLISHERS

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