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Improvement of master-level education in the field of physical sciences in Belarusian universities

WP2: Book on Functional Nanomaterials (BSU)

Progress of e-Book "Functional nanomaterials"

Version: 29.11.2017
The course leader: Alexander FEDOTOV - BSU

Chapters/Papers	University	Contributors	Current status
Executive summary	BSU	A. Fedotov, V. Odzhaev	In progress
Introduction	BSU	A. Fedotov, V. Odzhaev	In progress
Chapter 1: Concepts of Low-Dimensional Effects	BSU	A. Fedotov	Fully completed
Chapter 2: Introduction to Physics of Surface/Interface	BSU	A. Fedotov	Fully completed
Chapter 3: Thermal Properties of Nanomaterials	BSU	M. Tivanov	Completed English version
Chapter 4: Chemistry of Nanomaterials	BSU	A. Mazanik	Fully completed
Chapter 5: Physics of Carbon Low-dimensional Systems and Device Structures	BSU	N. Poklonski	Fully completed

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Chapters/Papers	University	Contributors	Current status
Chapter 5: Physics of Carbon Low-dimensional Systems and Device Structures	BSU	N. Poklonski	Fully completed
Chapter 6: Arrays of carbon nanostructures: fabrication, properties and applications	BSU	V. Ksenevich	Completed Russian version
Chapter 7: Conductive Polymers	BSU	V. Odzhaev (V.Odjaev)	Completed Russian version
Chapter 8: Electrically conductive nano-composites	BSU	N. Gorbachuk, A. Fedotov	Fully completed
Chapter 9: Magnetotransport and Magnetism in Nanocomposite and Multilayered Materials	BSU	J. Fedotova, J. Kasiuk A. Fedotov	Fully completed
Chapter 10: Nanoscale Materials and Structures for Spintronics	BSU	M. Lukashevich	Completed Russian version

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Chapters/Papers	University	Contributors	Current status
Chapter 11: Nanomaterials for Power Engineering	BSU	A. Mazanik	Fully completed
Chapter 12: Fluorescent quantum dots for bioimaging	GrSU	N. Strekal	Fully completed
Chapter 13: Plasmonic nanomaterials for photonics, biochemistry and quantum technology	GrSU	N. Strekal	Fully completed
Chapter 14: Nanofibers: synthesis, properties and applications	BSTU	N.R. Prokopchuk, Zh.S. Shashok	Fully completed
Chapter 15: Elastomeric compositions with carbon nanomaterials	BSTU	K.V. Vishnevskii, Zh.S. Shashok	Fully completed

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Chapters/Papers	University	Contributors	Current state
Chapter 16: Paints and coatings, modified carbon nanomaterials	BSTU	N.R. Prokopchuk, A.L. Shutova	Fully completed
Chapter 17: Plasma-chemical synthesis of nanocomposite polymer coatings	GSU	A.V. Rogachev, A.A. Rogachev, M. Yarmolenko	Completed Russian version
Chapter 18: Carbon coatings doped with metals	GSU	A.V. Rogachev, D.Pilipcov, N. Fedosenko	Fully completed
Chapter 19: Sol-gel synthesis of functional materials	GSU	D. Kovalenko V. Gaishun A. Semchenko	Fully completed
Chapter 20: Micro- and nanosensors	KU Leuven	Joan Peuteman	Completed English version

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RESUME

1. **Fully completed 14 Chapters from 20**
2. **Completed Russian versions of 4 Chapters**
3. **Completed English versions of 2 Chapters**

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NEXT STEPS

1. **Translation of 6 Chapters**
2. **Finalizing of Introduction and Executive Summary**

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BRIEF CONTENT OF THE BOOK

1. **Concept of low-dimensional systems (**the size of objects, at least in one dimension, is close to the *correlation radius* (or *characteristic length*) of a physical phenomenon for a particular quasiparticle system**)**

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BRIEF CONTENT OF THE BOOK

2. Introduction to Physics of Surface (we explain the reasons why surface and interface play very important role in contemporary electronics)

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BRIEF CONTENT OF THE BOOK

3. Structure and basic properties of nanomaterials
(Thermal properties, Chemistry of nanomaterials, Carbon-based nanomaterials and structures, Nanomaterials for Power engineering**)**

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CONTENT OF BOOK

4. Electric and magnetic properties of nanomaterials (polymers, granular nanocomposites, multilayered structures, spintronic nanomaterials**)**

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CONTENT OF BOOK

5. Optics of nanomaterials (Fluorescent quantum dots, Plasmonic nanomaterials for photonics, biochemistry and quantum technology**)**

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CONTENT OF BOOK

6. Technology and properties of polymeric and carbon-based nanomaterials (fibers, elastomers, paints, coatings, etc.)

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CONTENT OF BOOK

7. Micro- and nanosensors

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Thank you for attention

Questions?

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