

Zablotskiy A. V., Baturin A. S., Sheshin E. P., Bormashov V. S., Nagirniy V. P., Korostilev E. V. *Measuring Tools Computer Simulation for Nanometrology* 2

There is a problem of numerical measurements at the nanoscale range where finite probe size of scanning microscopes leads to discrepancy between image and true shape of studied nanoobjects. To solve this problem we propose to supplement real experimental data with simulation results obtained by computer modeling. Typical order of measurements is the sequence "specimen—image—model—parameters" is replaced by the sequence "parameterized model of specimen—simulation of image formation—fitting parameters of specimen shape until the best coincidence between a real image and model one".

Keywords: AFM, SEM, nanometrology.

Abramov I. I. *Problems and Principles of Physics and Simulation of Micro- and Nanoelectronics Devices. VII. Quantum Wire Structures* 7

The models of quantum interference devices based on quantum wires were analyzed. The perspectives of quantum wire structures were considered.

Keywords: quantum wires, quantum interference devices, nanoelectronics.

Kuznetsova M. A., Luchinin V. V., Savenko A. Yu. *Physical and Technological Basis of Nanodimensional Ion Beam Technology Application for Creation of Micro- and Nanosystem Technique* 24

Results of technological operations development based on focused ion beam are represented. This includes nanodimensional precise local ion beam etching, ion assister (stimulated) chemical etching and ion assisted deposition of different materials. Relationship between main ion beam parameters and achievable characteristics of local etching and deposition processes of base electronics materials is determined. Examples of practical application of FIB technology are given in the field of design, modification and preparing of nano- and microsystem technique.

Keywords: focused ion beam, ion beam etching, ion assisted etching and deposition.

Dayneko S. V., Chistyakov A. A., Tedoradze M. G. *Multilayer Structures Based on Organic Semiconductors and CdSe and CdSe/ZnS Nanoparticles. Photovoltaic and Luminescent Properties* 32

Multilayer structures based on the matrices of CdSe and CdSe nanoparticles in semiconductors have been obtained and investigated. The presence of nanoparticles in organic semiconductors like polyimide is shown to lead to the appearance of photovoltaic effect. The processes of charge transfer have been investigated using laser luminescence method. The interaction between the nanoparticles and the molecules of organic semiconductors is based on charge transfer. The employment of CdSe nanoparticles embedded into organic semiconductors is perspective for increase the efficiency of photovoltaic processes in multilayer structures based on organic semiconductors.

Keywords: nanoparticles, photovoltaic effect, solar cells, luminescence.

Romanko V. A. *Prospects of Creation of High Efficiency Thermoelectric Energy Converters Made from Nanopowders of Semiconductor Materials* 34

Thermoelectric energy converters (TECs) are used in many scientific and technical devices and systems, as electric generators that convert the heat into the electric energy and as cooling devices that convert the electric energy into the cold or heat. TECs have the best all parameters among existing traditional energy converters, excluding only one parameter. They have by 2—3 times lower values of energy conversion efficiency. Theoretical and experimental investigations show that transition to semiconductor structures with characteristic dimensions of 5—100 nm open the way to increase TEC coefficient of performance by 2.5—6.0 times. The most prospective way of creation of high efficiency and inexpensive TECs is development of low dimension structures made from nanopowders of different semiconductor materials.

Keywords: thermoelectric energy converters, nanostructured thermoelectric materials, nanopowders.

Antzev G. V., Bogoslovsky S. V., Sapognikov G. V. *Contactless Noiseproof Sensors on Superficial Acoustic Waves* 38

New designing method of noiseproof contactless sensors on superficial acoustic waves on the basis of dispersive lines of a delay is offered. Results of modelling of a membrane pressure sensors are stated. The suboptimum kind of the law of change of the phase, which maintain a high sensitivity to deformation of sound-conductor, is defined. The offered approach provides high noise immunity and accuracy of contactless measurements. The offered approach provides a high the noiseproofing and accuracy of contactless measurements.

Keywords: pressure sensors, passive, dispersive lines of a delay.

Serokhovostov S. V. *Ways and Technologies of Micro Air Vehicle Miniaturization* 43

Considered are the problems of Micro Air Vehicles (MAV) miniaturization in the areas of aerodynamics, strength, powerplants, electrical devices for fixed flight task (velocity, height and flight time being fixed). Scaling peculiarities are analyzed for the case of "evolutional" decrease of MAV dimensions. Set of recommendations is formulated for the directions of investigations for further MAV miniaturization. Results are validated on the experimental vehicles.

Keywords: Micro Air Vehicle, miniaturization.

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