

Rathkeen L. S. *The Problems of Standardization and Metrological Support of Nano- & Microelectronics* 2

In the middle of 2010 with the help of ROSNANO and Federal agency for technical regulation and metrological works in Chernogolovka (Moscow region) was organized The third school "Metrological works and standardization in nanotechnologies and nanoindustry". The main features of the metrological support and standardization in micro- and nanoelectronics were discussed among other problems on the sessions.

Keywords: metrology, standardization, microelectronics, nanoelectronics

Konoplev B. G., Ageev O. A., Smirnov V. A., Kolomiitsev A. S., Ilin O. I. *AFM Cantilever Tip Modification Using Focused Ion Beams*. 4

The paper presents the results of modification of the probe (cantilever) for atomic force microscopy (AFM), by deposition on the surface of cantilever nanosized tungsten whisker by focused ion beam (FIB) using a highly selective gas chemistry. Shown, that the FIB-modified probes a length of 5 microns and a radius of curvature of 50 nm can improve an accuracy of metrology test objects. The results can be used to develop the technological processes of manufacturing and modification of AFM cantilevers, and in studying the structures of micro- and nanosystems technology.

Keywords: atomic force microscopy, cantilever, focused ion beam, ion-induced deposition, spreading resistance

Arakeljan S. M., Kutrovskaia S. V., Kucherik A. O., Troitskii D. P., Prokoshev V. G., Bikov V. A., Leesment S. I. *Using Methods of Fractal Geometry for the Analysis of Morphological Properties and Quality Control of a Obtained Information file by Results of Nanosize Objects Measurements by Use Atom-Force Microscopy* 8

Methods of atom-force microscopy (ACM) gain the increasing distribution in research problems nanoobjects and nanostructures. Used approaches allow to obtain a card of properties of a surface with the high permission. For many measurements a question of principle about redundancy of spent measurements and possibility quality management of the obtained information. In the given work on the basis of fractal methods to geometry are offered, on an example of one-dimensional dependences, management methods quality and accuracy of a received information file on the basis of ACM measurements.

Keywords: atom-force microscopy, fractal dimension, an indicator Hurst, quality control of measurements

Grishina T. A., Melnikov A. A., Grishina V. Ju., Troshin B. V. *Electron Beam Interaction with the Field of Crystal Lattice and Concepts Wave Optics*. 14

The possibility of using concepts wave optics to describe the regularities of interaction electrons with the crystal lattice of submicroscopic objects is analyzed.

Keywords: wave optics, diffraction, electronic wave, crystal lattice

Tcherniega N. V., Samoylovich M. I., Belyanin A. F., Kudryavtseva A. D., Klescheva S. M. *Generation of Electromagnetic and Acoustic Emissions in Nanostructures Systems*. 21

Nonlinear optical effects in lattice SiO₂ nanosphere packings under pulse laser excitation are experimentally studied. Pulse generation of narrow-beam roentgen radiation is determined in samples, new mechanisms of the effect under consideration are proposed.

Keywords: opal matrices, acoustic vibrations of nanospheres, X-radiation

Ivanov M. B., Lazebnaya M. A., Kolobov Yu. R., Khranov G. V., Volkovnyak N. N., Kolobova E. G. *Investigation of Corrosion Resistance Microarc Calcium Phosphorous Coatings on Titanium VT 1-0 in Biological Fluids*. . . . 31

The results of studying the morphology, phase composition and physico-chemical surface parameters of combined bioactive calcium phosphate coatings prepared by MAO in an alkaline electrolyte on the titanium substrate of nanostructured technically pure titanium VT1-0, before and after their dissolution in isotonic sodium chloride solution, modeling biological fluid, were presented. Their low solubility during at least 2 months is shown.

Keywords: titanium VT1-0, corrosion resistance, calcium phosphate coatinge micro-arc oxidation, solubility

Shtennikov V. N. *Influence of Some Parameters of the Soldering Tool on Soldering Temperature* 37

According to the project "Strategy of development of electronic branch for the period till 2025" till 2019 it is planned on the basis of the international standards IPC and МЭК "to Provide lobbying of the Russian technologies as the international standards...".

The solution of a problem of maintenance of the set mode of the soldering has the big practical value for improvement of quality brazed connections of electronic devices.

In article the question of influence of sharpening of a soldering core on temperature of the contact soldering is considered.

Keywords: the device, quality, a soldering core, a contact soldering, temperature

Amelichev V. V., Godovitsyn I. V., Saykin D. A. *A Technology for Fabrication of High-Q Silicon Micromachined Resonators* 39

This paper describes the technology for fabrication of high-Q micromachined silicon resonators using SOI-wafer as material. The technology utilizes only one anodic bonding step and one soda-lime glass with recesses formed on it by wet etching. The SOI-wafer and the glass are batch processed, anodic bonding is performed at the back-end of the processing. A micromachined resonator is fabricated using the developed technology. The integrity of the whole structure is tested, good agreement of measured and calculated parameters is shown. The potential of the technology is discussed.

Keywords: microfabrication, silicon high-Q resonators, wafer level encapsulation

Fetisov Yu. K., Chashin D. V., Lebedev S. V., Segalla A. G., Ital'antsev A. G., Gornev E. S. *Piezoelectric Magnetic Field Sensor Based on a Planar Bimorph Structure with Current*. 45

Piezoelectric permanent magnetic field sensor using a planar bimorph lead zirconate titanate structure with additional current carrying conductor is described. The sensor operation is based on combination of the Ampere force and the piezoelectric effect. Sensitivity of the sensor was 10 equal to 10 W(A · kOe) and minimal detecting field was 0,1 Oe at the bending resonance frequency of the structure.

Keywords: magnetic field sensor, bimorph structure, piezoelectric, lead zirconate titanate

Dragunov V. P., Ostertak D. I. *Architecture and Analysis of Circuits of Microelectromechanical Electrical Energy Recuperators*. 49

Different circuits of microelectromechanical energy converter are analyzed and compared. The converter allows to periodically recover the energy taken from the primary source, and, therefore, to operate as microelectromechanical electrical energy recuperator. The analytical expressions for evaluation of the charge recuperated to the primary energy source are presented.

Keywords: energy harvesting, energy recovery, microelectromechanical energy recuperator, electrostatic mechanical-to-electrical energy converter

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