

Antipov A. A., Arakelyan S. M., Kutrovskaya S. V., Kucherik A. O., Nogtev D. S., Prokoshev V. G. *Formation of Extended Nanostructures Massives at Deposition of Metal Nanoparticles from Colloidal Solutions at Pulse-Periodic Laser Radiation* 4

The method of formation of nanostructured coverings on the basis of technology of deposition of metal nanoparticles from colloidal systems at action of pulse-periodic laser radiation is offered. Extended nanostructured massives are obtained. By used methods of fractal geometry the structural features of the generated layers are defined. The fractal diffusion model is offered for observable structures.

Keywords: colloidale systems, laser radiation, fractal geometry, nanostructures

Boronahin A. M., Ivanov P. A., Surov I. L. *Investigation of the Influence of Test Equipment Instrumental Errors on the Micromechanical Accelerometers Triad Calibration Results*. 9

The investigation of influence of test bench initial horizontal alignment uncertainty as well as axis nonorthogonality on the micromechanical accelerometers triod calibration results has been carried out. These experiments were made on small-size two-axis test table developed by Laser Measurement and Navigation Systems department of Saint-Petersburg Electrotechnical University.

Keywords: inertial navigation, error model, micromechanical accelerometer, small-sized two-axis test table

Usanov D. A., Skripal A. V., Romanov A. V. *Influence of External Physical Impacts on Microwave Characteristics of Composite Materials Containing Carbon Micro- and Nano-inclusions*. 12

Electrophysical properties of composite materials based on an epoxy glue with inclusions in the form of carbon nanotubes and particles of fine-dispersed graphite in a range of frequencies from 0.1 to 6 GHz are investigated. Research of influence of physical factors (ultrasound, pressure) on value of complex dielectric permeability of a composite material with carbon micro- and nano-inclusions, during its manufacturing is carried out.

It is shown, that there is optimum time of processing of a composite material ultrasound at which for the set concentration inclusions it is reached maximum its conductivity.

It is received, that with growth of value of external pressure, at consolidation a composite material, the imaginary part of dielectric permeability of a composite increases under the linear law.

Keywords: microstrip photonic structures, dielectric permittivity, composites, carbon nanotubes, ultrasound, pressure

Ilyin N. A., Nikonorova T. V., Sherstyuk N. E., Mishina E. D. *Optical Properties of Photonic Crystal Structures Based on Single Crystalline GaAs* 17

Results are presented of computational modeling and experimental studies of optical properties of 2-D photonic crystals (PhC). Electromagnetic field distribution in PhC — waveguide structures was investigated for various wavelengths and structures parameters of PhCs.

Keywords: photonic crystals, semiconductors, gallium arsenide, optical waveguides

Luparev N. V., Sheshin E. P., Chadaev N. N., Gordeev S. K., Korchagina S. B. *Diamond-Carbon Nanocomposites for Field Electron Emitters* 20

Results of nanostructured diamond containing carbon materials field emission properties investigation are presented. Composite samples with diamond particles size and pyrocarbon content varied in a broad range were investigated. Current-voltage characteristics and the field emission current dependence on the residual gases pressure were analysed.

Keywords: field emission, cold cathode, diamond-carbon composites, carbon materials

Belozubova N. E. *Method of Minimization of Non-Stationary Temperatures and Vibroaccelerations Influences on Sensors of Pressure on the Basis of Thin-Film Nano- and Microelectromechanical Systems*. 24

The method of minimization of non-stationary temperatures and vibroaccelerations influences on sensors of pressure on the basis of thin-film nano- and microelectromechanical systems is offered. Ways of balancing of thermal streams and geometrical, physical and chemical characteristics of elements of a design are considered at influence symmetric and asymmetric concerning an axis of elastic element N&MEMS of a non-stationary temperature field. Concrete realizations of their elements of designs are offered.

Keywords: thin-film nano- and microelectromechanical systems (NaMEMS), identical strain-sensing elements, transient temperature

Afonin S. M. *Correct Arrangements for a Automatic Control Systems Deformation of Piezoactuators for Nano- and Microdisplacement*. 30

Problems of using criterion absolute stability of automatic control systems deformation of compound piezoactuators for nano- and microdisplacement are discussed. Correct arrangements via criterion absolute stability for automatic control systems are proposed. Main features and principles of stability of automatic control systems deformation of compound piezoactuators and correct arrangements are given.

Keywords: piezoactuator for nano- and microdisplacement, control systems for deformation, correct arrangements, absolute stability

Mukhurov N. I., Efremov G. I., Zhvavyi S. P. *Functional Capabilities the Electrocurrent Microrelay* 39

The design and method of theoretical modelling the electrocurrent microrelay with meander strips is offered at equality and an inequality of currents. It is established, that base function in the normalized kind graphically represents a symmetric parabola with coordinates of an extreme point $m_0 = 0,5$ and $I^* = 0,5$. Efficiency of switching of vectors of forces of electromagnetic fields from an attraction is considered at a direct course on pushing away at reverse motion, an opportunity of use of the capacitor operative control of parameters.

Keywords: the electrocurrent microrelay, a current, electromagnetic and jet forces, planar-volume structure

Gousev D. V., Danilova N. L., Pankov V. V., Soukhanov V. S. *Microelectronic Converters of Pressure for Means of Regulation and Monitoring of Technological Processes in Power Saving up Systems* 43

Designs of microelectronic converters of the pressure executed on the basis of silicon structures are considered. The design providing protection of the microelectronic converter from influence of environment, and also use variants in thermal automatics is resulted.

Keywords: sensitive element of pressure, the gage of absolute pressure, the gage of differential pressure, the thermal automatics, the controller

Zhuravleva L. M., Plekhanov V. G. *Isotopetronics and Quantum Information*. 46

This paper describes the grounds of the quantum information and its connections with a physics. There is discussed very shortly the realization qubits in different mediums and presented their life — time in these mediums. The second part of the paper is devoted to the description of isotopical quantum processor in solid state. We are shown the perspective to use the excitons in quantum dots of isotope — mixed crystals as elementary gate of quantum processor.

Keywords: quantum information, realization qubits, isotopical quantum processor, excitons, quantum dots, elementary gate

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