

Verner V. D., Maltsev P. P., Saurov A. N. *MEMS and the Third Industrial Revolution* 2
Based on content analysis of a number of international conferences held in early 2012, shows a decisive role in the development of MEMS third industrial revolution.

Keywords: microelectromechanical systems, wireless sensors, global project, internet of things, monitoring, industrial revolution

Vorobjova A. I., Shulitski B. G. *Formation of Carbon Tube Arrays on Metal Electrodes with Use of Porous Aluminum Oxide* 5

Forming process of arrays of vertically oriented carbon tubes localized on metal electrodes with use thin porous anodic aluminum oxide on various functional substrates is considered. Synthesis of arrays of carbon tubes carried out a method of chemical vapor deposition of hydrocarbons.

Keywords: carbon tubes, porous aluminum oxide, nanosized structures, electrochemical processes

Malyshev K. V. *Quasiperiodic Superlattices Based Terahertz Quantum Cascade Laser* 12

The application of quasiperiodic AlGaAs-superlattices as an active element of the terahertz quantum cascade laser is offered and is theoretically investigated. It is revealed that Fibonacci superlattices, Thue—Morse superlattices and the combined superlattices generate multi-colour radiation in electric fields $F = 11 \dots 13$ kV/cm in a frequency band $f = 2 \dots 4$ THz. Triplets of coefficient of photon amplification G linearly depend on an electric field and maintain height of peaks more than 20 1/cm. Such quasiperiodic superlattice lasers are perspective for "terahertz technology".

Keywords: terahertz technology, quantum cascade laser, quasiperiodic structure, Fibonacci sequence, Thue—Morse sequence, superlattice

Despotuli A. L., Andreeva A. V. *Computer Modelling on Sub-Nanometer Scale the Ion-Transport Characteristics for Electronic Conductor/Solid Electrolyte Ideally Polarizable Heterojunctions*. 15

On the basis of new structurally-dynamic-kinetic approach in nanoionics, the computing experiments were performed. Processes of fast ion transport (FIT) in area of ideally polarizable coherent heterojunctions of electronic conductor/solid electrolyte — advanced superionic conductor (AdSIC) were investigated with sub-nanometer resolution. Ion-transport "hidden" variables and observable physical quantities were calculated on time scale $10 - 10^{-7}$ s. The proposed computer model allows predicting FIT-characteristics of supercapacitors based on AdSICs, devices required for development of nanoelectronics and microsystems.

Keywords: nanoionics, nanoionic devices, solid electrolytes, advanced superionic conductors, blocking heterojunctions, fast ion transport, computer modeling, hidden and observable variables, detailed balance, kinetic equation

Golodenko B. A., Golodenko A. B. *The Fractal Modeling of the Mechanism Generation Amorphous Tetrahedron Nuclear Structure* 23

On an example of silicon, the way of modeling of the mechanism generation amorphous for tetrahedronic nuclear structure is stated. It is shown, that generation of amorphous is simulated successfully by systems of the periodic iterated functions which arguments make sense deviations dihedral and valent angles of a nuclear cell of reproduced amorphous structure.

Keywords: amorphous nuclear structure, systems of the iterated functions, radial functions of distribution

Amelichev V. V., Budanov V. M., Gusev D. V., Mikhailov Yu. A., Sokolov M. E., Sukhanov V. S., Tikhonov R. D. *Design and Technology of Creation of Matrixes of Pressure Converters for Tactile Endoscopy Sensors* 27

The new design of crystals of matrixes of integrated converters of pressure MIPD-7 for tactile sensors on the basis of flat silicon membranes with tenzoresistor converters is developed and investigated. Tactile sensors on basis MIPD-7 passed a full cycle of clinical tests as a part of endoscopy equipment.

Keywords: tenzoresistor converter, the integrated tactile gauge

Get'man S. V., Alekseev S. A., Pinaev V. V., Dzyubanenko S. V. *Technology of Encapsulation of SAW Tag Chip for RFID Systems for Automotive and Rail Transport* 30

New technology of assembling and encapsulating of SAW RFID tags and modern approaches to the technology of bonding of diverse materials by glue are analyzed in the article.

Keywords: bonding, glutinous joints, SAW RFID tag

- Antipov A. A., Arakelian S. M., Kutrovskaya S. V., Kucherik A. O., Makarov A. A., Osipov A. V., Zimin S. P.** *Laser Obtaining of Colloidal Systems which Consist of Plumbum Chalcogenide Nanoparticles and its Deposition on a Substrate Using a Droplet Technology* 34
The results of the laser obtaining of semiconductor nanoparticles by continuous laser irradiation of near-IR range (up to 10^6 W/cm²) on a massive sample PbX in the liquid are demonstrated. The placing of PbX quantum dots on a substrate was made by the method of droplet deposition. Using a simulation model the formation's features of deposited layers in the process of evaporation were described.
Keywords: semiconductor particles, colloidal solution, the Monte-Carlo method
- Dragunov V. P., Dorzhiev V. Yu.** *Microelectromechanical Generator Based on Bennet's Doubler*. 39
The analysis of performance of the microelectromechanical generator based on Bennet's doubler was carried out. The efficiency of the generator as a unit for recharging a battery, taking into account the reverse currents of diodes was evaluated. The critical values of the main characteristics of the generator components were defined.
Keywords: micropower generator, ambient energy harvesting, mechanical-to-electrical conversion, electrostatic energy converter
- Raspopov V. Ya., Ivanov Yu. V., Paramonov P. P., Sabo Yu. I., Matveev V. V., Shvedov A. P.** *Backup Strap-down Attitude Control System on Russian-Made Measuring Base* 43
The work presents a study of the inertial measurement module, based on micromechanical gyroscopes MMG-APTRON (Central Research and Development Institute Electropribor Corporate Group JSC), ADXRS-642 (Analog Devices Co.) and compensation accelerometers AT1104 (ANPP Temp-Avia JSC). There presented the design of the measurement module for the construction of a backup strapdown attitude control system, which may be applied both on unmanned aerial vehicles and as a backup system on piloted aircrafts.
Keywords: gyrovertical, micromechanical sensitive elements, Allan variance
- Maltsev P. P., Matveenko O. S., Gnatyuk D. L., Lisitskiy A. P., Fedorov Yu. V., Krapukhin D. V., Bunezhina S. L.** *Multilayer Planar Antennas. Part 2. Achievement of Dual-Frequency, Circular or Elliptical Polarized Antenna Radiation* 46
Dual-frequency antennas based on multilayer planar radiating elements as well as achievement techniques of circular or elliptical polarized multilayer planar antenna radiation are reviewed.
Keywords: multilayer antenna, multilayer printed antenna, aperture coupled antenna, phased array, dual-frequency, circular or elliptical polarized antenna radiation
- Senichkin A. P., Bugaev A. S., Yachmenev A. E.** *The Peculiarities of Current-Voltage Characteristics of Nanowires System of Tin Atoms Inserted in Gallium Arsenide Crystal* 52
The peculiarities of current — voltage characteristics which were measured in directions along and across the system of nanowires of Sn atoms inserted and arranged in one plane of GaAs crystal were revealed, namely:
— the kink of the electrical current before saturation of the current arises at high electrical fields in the current direction along the nanowires. The kink existence is most likely due to disengagement of localized electrons;
— the instability of electrical current arise after saturation in high electrical fields if the current is measured across the nanowires.
Keywords: nanostructures, quantum wires, quantum threads, molecular beam epitaxy

For foreign subscribers:

Journal of "NANO and MICROSYSTEM TECHNIQUE" (Nano- i mikrosistemnaya tekhnika, ISSN 1813-8586)

The journal bought since november 1999.

Editor-in-Chief Ph. D. Petr P. Maltsev

ISSN 1813-8586.

Address is: 4, Stromynsky Lane, Moscow, 107076, Russia. Tel./Fax: +7(499) 269-5510.

E-mail: nmst@novtex.ru; http://novtex.ru/nmst/

Адрес редакции журнала: 107076, Москва, Стромьинский пер., 4. Телефон редакции журнала (499) 269-5510. E-mail: nmst@novtex.ru
Журнал зарегистрирован в Федеральной службе по надзору за соблюдением законодательства в сфере массовых коммуникаций и охране культурного наследия.
Свидетельство о регистрации ПИ № 77-18289 от 06.09.04.

Дизайнер Т. Н. Погорелова. Технический редактор Е. М. Патрушева. Корректор Е. В. Комиссарова

Сдано в набор 17.09.2012. Подписано в печать 22.10.2012. Формат 60×88 1/8. Заказ МС1112.

Цена договорная

Оригинал-макет ООО «Авансед солюшнз».

Отпечатано в ООО «Авансед солюшнз». 105120, г. Москва, ул. Нижняя Сыромятничская, д. 5/7, стр. 2, офис 2.