

Rathkeen L. S. *The Prospective of Development of the Dimensional Metrology in the Field of Nanotechnologies and Microelectronics*. 2

The scientific session of The Department of the nanotechnologies and information technologies (DNIT) of Russian Academy of Science (RAS) took part in Moscow in 2010 under the leadership of the director of Physical and technological institute of RAS academician A. A. Orlikovskiy and was dedicated for the prospective of development of the dimensional metrology in the field of nanotechnologies and microelectronics. On the session were discussed different questions, such as standardization and metrological support of micro- and nanotechnologies, nanometrology for measuring of geometrical parameters of products, work of raster electronic and atomic power microscopes, precision measuring in the nanometer range, neutron and synchrotron research of nanomaterials, scanning probe microscopy for researching of nanosystems and nanomaterials.

Keywords: dimensional, metrology, nanotechnologies, microelectronics, standardization, nanometrology, scaling, REM, APM, neutron, synchrotron, nanosystems, nanomaterials

Dudin A. A., Kustov E. F. *The Theory of Calculating the Basic Parameters of Nanoparticles to Determine Their Composition* 7

In this paper we consider the problem of classifying nanoparticles, the composition and one of the ways to solve it. The authors present a theoretical description of the calculation of key parameters to determine their composition and classification. We are required to calculate formulas and their description. An original structure of the data table. Also, we have demonstrated the possible use of these data and the further stages of the decision by the authors concern the classification and determination of the composition of the nanoparticles.

Keywords: theory, composition, classification, parameters, structure, calculation

Sidorova S. V., Yurchenko P. I. *Study Nanostructures Islet Formation in Vacuum*. 9

Results of study nanostructures islet formation in vacuum by thermal evaporation are presented. The experimental stand and method of control growth of islet nanostructures during evaporation of copper are presented. The dependence of sizes of island nanostructures on the technological deposition parameters is shown.

Keywords: islet nanostructures, vacuum, atomic force microscope

Bogdanov S. A., Zakharov A. G., Lytyuk A. A. *Modelling of Potential Distribution in Schottky Barriers Taking into Account Edge Effect*. 12

A technique for evaluating the electrostatic potential distribution in a semiconductor materials of a metal-semiconductor contact with a Schottky barrier, taking in account edge effect and spatially inhomogeneous distribution of electrically active impurities in a semiconductor has been developed. This technique allows to prognosticate the most probable mechanism of charge carrier transport through metal-semiconductor contact taking in account its topology and to model its voltage-current characteristics.

Keywords: Schottky barrier, semiconductor, Poisson equation, electrostatic potential, edge effect, deep level

Voitsekhovskii A. V., Nesmelov S. N., Kulchitsky N. A., Melnikov A. A. *Light-Emitting Heterostructures AlGa_N/InGa_N/Ga_N with Multiple Quantum Wells*. 16

The physical properties of group III nitrides, as well as light emitting structures for visible and ultraviolet spectral ranges were considered. Design and characteristics of foreign and Russian light-emitting diodes based on heterostructures AlGa_N/InGa_N/Ga_N were described. The review of recent work devoted to improving of quantum efficiency of light-emitting diodes for visible spectral range was performed.

Keywords: nitrides of III group, visible band light-emitting diodes, multiple quantum wells, quantum yield

- Sinev L. S., Ryabov V. T.** *Coefficient of Thermal Expansion Balancing for Field Assisted Bonding of Silicon to Glass* 24
 Stresses caused by thermal expansion coefficients mismatch of anodically bonded glass and silicon samples are studied. An analytical model to determine graphically the optimum bonding temperature is presented. Recommendations on choosing bonding temperature are made.
Keywords: anodic bonding, field assisted bonding, thermal expansion, stress
- Malyshev A. V.** *Action of Fabrication Technique on Lithium-Titanium Ferrite Ceramic Electro-Physical Properties* 28
 For the first time electrophysical properties complex of lithium-titanium ferrite ceramics investigated. Interconnection between dielectric, magnetic and structural parameters was found. Redistribution of iron cation on sublattices and diffusion process from grain boundary in a volume of grain ferrite ceramic determined that characteristics interconnection.
Keywords: ferrite, microstructure, complex permeability, saturation magnetization, relaxation polarization, ferroelectric domain, thermogravimetric analysis
- Hromova L. P., Korostelev V. F.** *Formation of Quasicrystal Structures in Alloys on the Basis of Aluminum³³*
 On the basis of the analysis of thermodynamic functions and experimental data possibilities of change of crystal structure and interatomic interactions in alloys on the basis of aluminum are considered. Results of researches can be used by developers of materials with a demanded combination of properties.
Keywords: the association of the interaction of atomic groups, the covalent interaction of the components, the thermodynamics and kinetics of the amorphous, quasi crystals, x-ray phase analysis, the entropic nature of the stabilization of quasi-crystals
- Gromov D. V., Matveev Yu. A., Fedorov Y. V.** *Influence of Radiation on Gallium Nitride Elements Characteristics*. 39
 Radiation effects in microwave semiconductor devices based on gallium nitride have been analyzed. The characteristics of Schottky diodes and field-effect transistor structures have been investigated. The physical mechanisms in radiation change of GaN devices have been determined.
Keywords: gallium nitride, radiation, nanoheterostructures, two-dimensional electron gas, microwave devices

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