

- Kartashev V. A.** *Surface Relief Visualization in the Probe Microscopy*. . . . . 2  
 The method of nanorelief visualization, including the relief points projecting on the underlay plane and painting with color that depends on relief point height is proposed. The problem how to choose the underlay plane relatively with the relief has the minimal level difference is solved. Such choice specifies the best conditions for the finest structure of the examined surface visualization. The practical use of the proposed method shows that it gives more accurate pictures than the least squares method traditionally used in the probe microscopy.  
**Keywords:** gradient painting method, visualization of measurements, probe microscopy software
- Gareev K. G., Gracheva I. E., Kazantseva N. E., Luchinin V. V., Moshnikov V. A., Petrov A. A.** *Investigation of Sol-Gel Processes' in Multicomponent Systems Products Proceeding with Formation of Magnetic Nanocomposites* . . . . . 5  
 Products of sol-gel processes with the formation of magnetic nanocomposites based on simple and complex ferrites with spinel-type structure were carried out by atomic force microscopy, reflection high-energy electron diffraction, Auger spectroscopy and vibrating sample magnetometry.  
**Keywords:** ferrite, nanocomposite, sol-gel, reflection high-energy electron diffraction, atomic force microscopy, vibrating sample magnetometry
- Morosov A. I., Sigov A. S.** *Electric Field Induced Remagnetization in the Two-Layer System Ferromagnet-Magnetoelectric* . . . . . 10  
 We study the conditions that are necessary for the turn of magnetization of the ferromagnetic layer under electric field applied to BiFeO<sub>3</sub> magnetoelectric layer of the two-layer exchange-coupled system. Such a process is shown to be possible only in the case that bismuth ferrite atomic planes parallel to the interface are spin compensated planes, for example, planes of the (001) type of the pseudo-cubic crystal lattice.  
**Keywords:** MRAM, electric field recording, multiferroic, multilayer nanostructures
- Bugaev A. S., Galiev G. B., Maltsev P. P., Pushkarev S. S., Fedorov Yu.V.** *Semiconductor Heterostructures InAlAs/InGaAs with Metamorphic Buffer In<sub>x</sub>(Al<sub>y</sub>Ga<sub>1-y</sub>)<sub>1-x</sub>As: Design, Technology, Application* . . . . . 14  
 The relaxation of strained epitaxial layers and applicable models are considered in synoptic article. The fields of semiconductor metamorphic heterostructures InAlAs/InGaAs application are designated. The influence of metamorphic buffer composition profile and technological regimes during its growing on electrophysical and structural properties of the metamorphic buffer itself and the whole heterostructure are investigated.  
**Keywords:** InAlAs/InGaAs, misfit dislocations, inverse step, metamorphic buffer, molecular-beam epitaxy, cross-hatch surface morphology, threading dislocations, relaxation of epilayer, strained epilayer, surface roughness
- Agasiev A. A., Maharramov E. M., Akhundov Ch. G., Mamedov M. Z., Sarmasov S. N.** *Conductivity in Dispersed Metal Films* . . . . . 24  
 In this paper the dependence of conductivity of platinum and nickel films with different thickness on the temperature and applied voltage was considered. This dependence can be explained by thermoelectron emission and by the model of Neugebauer and Webb.  
**Keywords:** electrical, structural defects, tunneling, thin film
- Smolin V. K.** *Memristors — Perspective Elements Base of Micro- and Nanoelectronic*. . . . . 27  
 Review of engineering and design features of nonvolatile devices implementation based on resistors with memory — memristors. Defined perspective of evolution such type of memory.  
**Keywords:** memristor, memory type MRAM, FRAM, ReRAM
- Samoylovich M. I., Rinkevich A. B., Bovtun V., Belyanin A. F., Kempa M., Nuzhnyy D., Tsvetkov M. Yu., Klescheva S. M.** *Optical, Magnetic and Dielectric Properties of Opal Matrices with the Filling of Rare-Earth Manganites in Interspherical Nanospacing*. . . . . 31  
 The composition and structure of the samples on the basis of lattice packings of nanospheres SiO<sub>2</sub> (opal matrices) containing in interspherical nanospacing clusters of crystalline phases of rare-earth manganese.  
**Keywords:** nanocomposites, opal matrix, manganese

**Baburov V. A., Pavlov A. Yu.** *Research and Development of Precision Capacitors, Working in Centimeter and Millimeter Wavelengths Ranging* . . . . . 36

The paper presents results of the development of and measurement of *S*-parameters of thin-film capacitors. Capacitors are formed on surface of gallium arsenide. On the basis of the data obtained, managed, with the help of special software to simulate the capacitors of different topologies operating at frequencies up to 40 GHz.

**Keywords:** *S*-parameters, silicon nitride, thin-film capacitors, AWR MO modeling

**Glukhova O. E., Kolesnikova A. S.** *Emission Properties of Bamboo-Like Tubular Nanoemitters* . . . . . 39

Emission properties of long bamboo-like nanotubes have been investigated. It is shown that bamboo-like nanotubes with a certain distance between the bridges have superior emission properties than that of the hollow nanotubes. The emission properties of the bamboo-like nanotubes improve with the increase of the distance between the bridges.

**Keywords:** bamboo-like nanotube, ionization potential, energy gap, emissive capacity, work function

**Kalinin V. A., Chaschin V. V.** *Passive Thermal Sensors on Surface Acoustic Wave Effect for State Control Systems of High-Voltage Equipment Contact Groups* . . . . . 42

Results of development passive wireless thermal sensors on surface acoustic wave (SAW) effect are represented. Justified relevance of development. Explained the principle of operation. Construction of thermal sensor and SAW thermal sensitive elements, the main properties of the sensor, test results are represented. Identified priorities for the next stages of development.

**Keywords:** microsystem technics, thermal sensors, piezoelectric resonant sensors, surface acoustic wave sensors, acoustoelectronic sensors, passive thermal sensors, langasite, LGS

**Maltsev P. P., Matveenko O. S., Gnatyuk D. L., Lisitskiy A. P., Fedorov Yu. V., Krapukhin D. V., Bunegina S. L.** *Multilayer Planar Antennas. Part 1. Types, Realizations, Advantages.* . . . . . 45

Modifications of multilayer antennas in particular the aperture coupled antennas are reviewed. It is shown that these antennas are most suitable for phased array, wireless systems and sensor networks as they provide maximum bandwidth and gain of radiation pattern at minimum size compared to antennas with two metalization layer.

**Keywords:** multilayer antenna, multilayer printed antenna, aperture coupled antenna, proximity coupled antenna, driven patche, parasitic patche, substrate integrated waveguide, phased array

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