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Alexenko A. G., Calitsin A. A. *Russian Electronics: New Radio Communication Technology* 2

The paper is devoted to single-crystal integrated micro- and nanoelectronic realization prospects of new Russian broadband radio communication technology (protected by the Russia and the USA patents). Such realization is break-through in telecommunications, positioning, location techniques and will give to systems new qualities of personification, adaptability to manufacture, reliability, the cost price. Transition to this level depends on scaling the Fabless design industry i.e. revolutionary change of electronic branch and instrument making industry.
Keywords: system-on-chip (SoC), wireless nanosystems, fabless-industry of design, outsourcing, system nanotechnology, Wide Band, power processing, controlled ultra wide band radio frequency, C-UWB RF IP (Intellectual property) and component platform.

Kukovitsky E. F., Shustov V. A., Lvov S. G., Osin Yu. N., Musatov A. L., Izraelyants K. R., Ormont A. B. *High Emission Current Density Carbon Nanotube Field Emitters: Synthesis and Emission Characteristics*5

Carbon nanotube layers on silicon substrates with nickel silicide NiSi_2 interface layer were produced by chemical vapor deposition (CVD). According to the X-ray-diffraction analysis the silicide forms epitaxial film on silicon surface. Field emission characteristics of such layers with area $7 \times 10^{-4} \text{ cm}^2$ were measured in superhigh vacuum 10^{-9} Torr. Volt-ampere characteristics corresponds to Fowler-Nordheim theory with field enhancement factor $\beta = 780$. The value of emission current density is 900 mA/cm^2 . Such density keeps during 60 min work with relative current fluctuation value 0,1 %.

Keywords: carbon nanotubes, silicon substrates, nickel silicides, field emission.

Adamov D. Yu., Adamov Yu. F., Corshkova N. M. *Nanowires for Nanoelectronics*9

In this paper, it is presented the review of nanowires generation technology for the electronic devices. There are discussed self generation processes of silicon and heterostructure nanowires and the properties of MOS transistors structures, based on nanowires.

Keywords: nanowire, nanoelectronics, carbonic nanotube, planar technology, heterostructure nanowire, lithographic techniques, nanowire technology.

Bilenko D. I., Belobrovaya O. Ya., Galushka V. V., Jarkova E. A., Mysenko I. B., Terin D. V., Hasina E. I. *The Influence of an Adsorption on Capacitive Properties of Nanoporous Silicon*15

The capacitance properties of the diode structures on a basis of partially oxidized porous silicon in a range of frequencies of $10-10^6$ Hz are investigated under normal conditions and at adsorption of polar molecules. It is shown, that for samples with barrier Schottky in a low-frequency range the increase of capacity at adsorption exceeds 10^2 times. It is pointed on the possibility of capacitance sensors creation on the base of oxidized nanoporous silicon.

Keywords: nanostructures partially oxidized porous silicon, capacity, conductivity, adsorption, frequency dependence, sensor.

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A two-phase process of spikes formation on metal rods is studied. The process includes formation of a ring deepening on the surface of the rod with further thinning of its end. The method claimed can be used for manufacturing of the tunnel microscope with small radius of rounding.

Keywords: needle point, metallic kernel, electrolyte, electrochemical working, anodic dissolution.

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The multifractal treatment was used for description of water sorption in nanocomposites polyimide/organoclay. It has been shown sorption coefficient depends on meandering and chains immobility coefficients. Both mentioned factors are defined by nanocomposites structure and penetrant molecule (cluster of molecules) characteristics.

Keywords: nanocomposite, organoclay, sorption, water, multifractal analysis.

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It is explored the influence of mechanical activation of initial oxide intermixtures on a degree of dispersion of the synthesized powders and a microstructure of electrostrictive ceramics on the basis of lead magnesium niobate — lead titanate. It is shown, that diminution of the size of grain leads to reduction in dielectric permittivity, diminution of longitudinal strain, growth of the dielectric and electromechanical hysteresis.

Keywords: electrostriction, actuator, relaxor, ferroelectric, lead magnesium niobate, lead titanate, high energy milling.

Shtennikov V. N. *The International Standards IPC about Soldering Cores from the Steel* 28

Our researches allow to specify recommendations p. 3.8.6.1 of international standard IPC-HDBK-001.

In article the substantiation of offered specifications and settlement formulas is resulted.

Keywords: the device, assemblage, quality, the soldering, temperature.

Vlasenko V. A., Efimov A. G., Il'ichev E. A., Nemirovskii V. E., Poltoratskii E. A., Gorjachev A. V., Popkov A. F., Frolova G. V., Shupegin M. L. *MEMS Commutators for RF Devices* 30

The research results of microelectromechanical commutators for RF MEMS, obtained at the base of diamond like carbon films (DCLF) by thermal dissociation of polyphenylmethylsiloxane are presented at the first time. DCLF using allow to put out electrodes sealing effects, to decrease the signal losses (up to 100 dB) and to implement the high speed of commutation (~10 ns) of super high frequency (up to 2 GHz on Si and 10 GHz on GaAs substrates).

Keywords: phase converter, microelectromechanical commutator, diamond-like carbon films, plasma-chemical etching, radio-frequency microelectromechanical system — RF MEMS.

Belozubov E. M., Belozubova N. E., Vasil'ev V. A. *Thin-Film Strain Gauge Microelectromechanical Systems with Identical Strain-Sensing Elements* 34

Thin-film strain gauge microelectromechanical systems (TSMEMS) with identical strain-sensing elements are studied. Optimum element relations in different variants of such TSMEMS under transient temperatures are determined.

Keywords: thin-film strain gauge microelectromechanical systems (TSMEMS), identical strain-sensing elements, transient temperature.

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In the present work are considered and analyzed data on the influence of irradiation on the phase-change memory. We have examined the parameters of material $\text{Ge}_2\text{Sb}_2\text{Te}_5$ (GST) and memory cells based on it. Radiation effects in the GST were estimated. The results obtained are compared with available published experimental data on radiation hardness of memory cells and integrated circuits created on the basis of chalcogenide materials with different composition.

Keywords: phase-change memory, chalcogenide glasses, GST, radiation hardness.

Egorov V. V. *The Analytic Solution of Problem of Electromagnetic Field Scattering on Rough Plane Surface* 47

There are statistical fitches of field scattered by rough plane surface is calculated in that article. Vector components of boundary field are presented in simple form.

Keywords: boundary problem, irregularities of surface, boundary field, scattering field.

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