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On an example of carbon in allotropic graphite modification the opportunity of a theoretical estimation of the top limit nanodimensions range of dispersoidal particles of substance is shown. Under the molecular diagrams of the condensed molecules of homologous line an aromatic hydrocarbons have calculated specific easing of an index of free valency of peripheral and internal atoms of carbon. Considering graphite as a limiting degree of condensation of aromatic hydrocarbons have estimated a critical diameter its nanoparticles.

On an example of system carbon-carbon the opportunity of realization the monostage nanocomposites technology is shown. Nanoparticles of carbon and carbon matrix, connecting them, are formed in uniform technological process. Are submitted structure and basic properties the nanocomposite of system carbon — carbon.

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Safronov A. Ja., Gornev E. S., Zaitsev N. A., Matjushkin I. V. *The Conceptualization of the Design Flow for Micromechanical Systems with Piezoelements 13*

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Atuchin V. V., Kidyarov B. I., Pervukhina N. V. *Systematics and Relationship between Physical Properties and Micro- and Macrostructure of Noncentrosymmetric Oxide Crystals. Part II. Nonlinear Optical Properties of Binary Oxide Crystals. . . 20*

The ellipses of acentricity have been established for 7 affinic groups of noncentrosymmetric binary oxide crystals, including the oxides with specific combination of acentric physical properties and two different chemical bond lengths L(E-O) and L(M-O). The extreme dependences of nonlinear optical susceptibility ($\chi^{(2)}$) on L(E-O) have been found for the sets of polar and nonpolar oxides possessing measurable nonlinear optical properties. Three characteristic regions containing the crystals with different $\chi^{(2)}$ level have been revealed into the

rosette of ellipses: crossing part of the ellipses; two symmetric parts of ellipses away the crossing part.

Laletin R. A., Burkhanov A. I., Sigov A. S., Vorotilov K. A. *Influence of Low- and Infralow Frequency Electric Fields on Behaviour of Domain Structure of PZT Films under Different Magnitudes of Mechanical Stress in the Material 26*

Results of a study of influence of mechanical stress magnitudes on dielectric properties of PZT ferroelectric thin film are presented. An external load (*G*) giving rise to a growing of residual stress (σ) along one of the film axes was applied to the sample. It was determined that under low and moderate electric fields the stress growing promotes increase of dielectric permittivity (ϵ') of the sample. The further increase of measuring field strength led to the inverse effect — decrease of ϵ' with rising of *G*. A tendency to widening of a half width of polarization loops (the dielectric losses) under applying of the higher mechanical loads was observed.

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Stephenkov Ju. A., Petruchin V. S., Diachenko Ju. G. *Experience in Self-Timed Microcontroller Core Design on Basic Gate-Array . . 29*

The article considers state and design problems of strictly self-timed (SST) electronic circuits. SST-circuits are "naturally reliable" as they guarantee preservation of capacity for work of the device in the wide range of environment conditions comparable to the physical restrictions for integrated circuits. The SST-circuitry to the full meets the requirements, showed to element base for critical areas of applications.

This article is devoted to development of effective means for designing and fabrication the SST-VLSI on home Gate Array (GA) 5503 basis. The preliminary results of the development (after simulation and topological design on native industrial CAD for basic gate-array "Kovcheg 2.6") of synchronous and SST-variants of test silicon "Microcore" are presented. This silicon implements functions of 8-bit microcontroller PIC18CXX (widely used in manufactured in Russia devices) computational core.

Beljaev V. *MEMS/MST in Modern Technology as an Example of Motocarstructure and Aviation 36*

The main criterions and the areas of use of microelectromechanical systems (MEMS) and microsystem technology (MST) product, the modern trends of market MEMS and MST are considered. The main foreign and Russia projectors and generators of products on the base of these technology are indicated. As an example of sensors for motocarstructure and aviation the process of exchange of traditional sensors on MST in USA and Russia is shown.

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