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The fabrication technology for ordered packings from monodisperse silica nanospheres has been developed. This allowed new types of materials to be created: 3D superlattices, including the so-called photonic crystals or photonic band-gap materials.

Experiments to fill an interglobular space with semiconductors, superconductors, optically amplified, ferromagnetic and other materials have been carried out via specially devised techniques. Unique three-dimensional nanosystems thus created were found to exhibit quantum-size and other nanoscale effects such as, for example, nonlinear interaction between individual nanocluster electron subsystems.

The electrical characteristics of the logic gates based on semiconductor single-wall carbon nanotubes was studied. It was shown the ability of integration logic circuits on the *p*-type conduction nanotubes base.

It is described the increase of holographic measurements precision in MEMS-NEMS by means of using the interference of higher harmonic waves diffracted by a nonlinear hologram. The experimental setup is presented. The method of measurement of Young modulus using electrostatically-actuated beams is discussed.

Grishin M. V., Dalidchik F. I., Kovalevskii S. A., Kolchenko N. N., Samoilenko A. A. Investigation of Electron Traps in Thin Dielectric Films with the Method of Scanning Tunneling Spectroscopy 19

New method for investigation of electron traps in thin oxide films with STM is described. It gives the opportunity for recovering of pa-

rameters of spatial and energy distributions. The possibility of this method is demonstrated for traps in thin films of Al_2O_3 .

Analysis of the miniaturization processes for technical facilities shows, that micro systems one becomes moat importan in the area of miniaturization on system level. Integrated role of microsystem technique particularly will be increases in futher development of nano technology.

In article the basic group technological methods for manufacturing elements of the microelectromechanical systems representing volumetric three-dimensional structures are considered. Stages of microprocessing are stated.

The motion of a microcapsule in a tube of small diameter with a viscous fluid is considered. Calculation of velocities of a stream and the rate of flux for a case of a rotationally symmetric arrangement of a microcapsule in a tube is yielded. Calculation of hydrodynamic forces and the moment for an eccentric arrangement of a capsule in a tube also is given and diagrams for quality standard of influence of parameters of a capsule and a stream on the rate of flux and a field of velocities are constructed.

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