CONTENTS

The questions of the development of new arms on the base of microsystems technology are considered.

In this paper, different variant of sensor technology, which enable the manufacturing of semiconductor and thermocatalytic sensors of combustible and toxic gases with minimum power consumption are considered. These are technologies of thick films, fabrication of thin dielectric membranes based on aluminum oxide (TAF — Thin Alumina Membranes) and a combination of silicon micromachining with the deposition of thick film sensing layers. Two last methods allow us to fabricate sensors applicable in pocket and autonomous instruments.

State of the art and the future prospects of physics and technology of semiconductor nanoheterostructure, as well as nanotechnology of device fabrication of their basis are discussed.

The existing microcryogenic systems much more exceed electronic units of cooling in dimensions and mass. They have less resources and reliability. The modern level allows to execute cryogenic and electronic systems by the united nanotechnologies. As a result the cryogenic systems can be placed within electronic devices, for example, such as chips.

In this article, a study nonlinear vibrations of circular, square, trian-gular and hexagonal diaphragms with a clamped edges is presented. The analytical equations which help to simulate behavior of elastic elements for micromechanical systems are obtained. The dynamic analogue of the von Karman equations is used to establish the governing equations, taking into account the stretching of the mid-plane of the plate.

 General principles of distributed fiber-optic measuring network organization are presented. The fiber optic measuring network for lateral deformation amplitude distribution reconstruction is presented. The distributed fiber-optic measuring line is presented.

The opportunity for the molecular bilayer formation onto the solid support is proposed due to the self-assembling of the nonionic surfactant Brij-52 molecules on the gold surface. The obtained membranes were studied by electrochemical impedance spectroscopy. The structures have uniform structure and contained only a minor number of defects. The layer capacitance calculated from impedance spectra was close to the capacitance of the lipid bilayers which separates the two aqueous solutions of electrolyte, indicating that the self-assembling of Brij-52 resulted in formation of its bilayer on the gold electrode surface. The uniform bilayers of Brij-52 on gold support are stable, in contrast to lipids, which provide the opportunity of their application for analytical purposes. The simple methods for the preparing of direct affinity sensors based on developed Brij-52 bilayers are proposed. For DNA-sensor we propose to immobilize oligonucleotide on the surfactant bilayer surface by spontaneous infiltration of hydrocarbon chain bound to oligonucleotide into the hydrophobic region of surfactant bilayer. The adsorption of antibodies on bilayer surface has resulted in immunosensor development. The direct detection of affinity interactions in both cases has been investigated by impedance spectroscopy. The addition of complement into the DNA-sensor system led to the decrease of real part of the impedance. At the contrary the addition of specific antigen into the immunosensor system led to the increase of real part of the impedance. The obtained results are promising for the development of impedimetric affinity sensors for clinical or environmental applications.

By minor variation of geometrical parameters of the electrode system the practical problem of reception of the flat frequency response of an molecular electronic angular accelerometer in a wide frequency range and with the preset accuracy is solved.

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