

Prischepov S. K., Vlaskin K. I. *Integrated and Hybrid Manufacture Technologies of Fluxgate Sensor*. 2

We consider methods to minimize the main differential fluxgate pattern lapses angular offset of the physical axis of sensitivity relative to the geometric axis. The principles of combining the coils and magnetic cores to perform modular precision fluxgates are determined. The features of hybrid and integrated manufacture technologies of the magnetic fluxgate sensors are presented.

Keywords: differential fluxgates; sensor pattern, a fluxgate electromagnetic system; flat inductance; thin magnetic film

Lu Ping, Gorbatenko Yu. A., Semenistaya T. V., Vorobev E. V., Korolev A. N. *Fabrication of Gas Sensors Sensing Elements Based on Polyacrylonitrile Films and Argentiferous Polyacrylonitrile Films Determining their Characteristics* 5

Samples of electroconductive films based on IR-pyrolized polyacrylonitrile (PAN) and argentum-containing PAN are obtained. Electrical properties are studied and the gas-sensitive characteristics of the obtained samples relative to nitrogen dioxide and chlorine are defined. The quantum-chemical calculations of the complexes formed by the interaction of polymers PAN with the particles of the detected gas — molecule NO_2 and the radical $\cdot\text{Cl}$ are carried out.

Keywords: functional polymers, electroconductive organic polymers, sensitive sensor element, quantum-chemical calculations of complexes

Topolov V. Yu., Filippov S. E., Vorontsov A. A. *Piezoelectric Effect and Anisotropy of Electromechanical Properties of Novel 1—0—3 Composites Based on Poled Ferroelectric Ceramics* 13

A structure of the 1—3-type composite is proposed that consists of a system of poled ferroelectric ceramic rods surrounded by a heterogeneous ceramic/polymer matrix with 0—3 connectivity. Analyzing the electromechanical properties of this composite, we have stated the considerable effect of the anisotropy of elastic moduli of the matrix on piezoelectric sensitivity, hydrostatic response, figures of merit and electromechanical coupling factors. A prediction of the effective parameters and their anisotropy is carried out for the composites based on either ferroelectric soft (PCR-7M) or anisotropic ferroelectric hard (PbTiO_3 -type) ceramics.

Keywords: piezo-active composite, hydrostatic response, electromechanical coupling factor, poled ferroelectric ceramic, anisotropy of properties

Vasil'ev V. A., Gromkov N. V. *Pressure with Frequency Output Based on Nano- and Microelectromechanical Systems, Temperature Resistance*. 19

Considered pressure sensors with frequency output based on thin-film tenso-resistive nano- and microelectromechanical systems, temperature resistance. Presented original topology arrangement tenzoelements on the membrane sensor and circuit frequency converters.

Keywords: pressure sensors, nano- and microelectromechanical systems, temperature, frequency converters

Mukhurov N. I., Efremov G. I., Zhvayyi S. P. *Effect of Preliminary Deformation of Elastic Elements of Electrostatic Microrelays. Part 2. The Deformed Holders*. 25

Variants of electrostatic microrelays are investigated with is elastic the deformed holders in a volumetric and planar design. The effect of creation of internal mechanical pressure in electrostatic microrelays is considered due to deformation of holders. The basic mathematical ratio and examples of designs are resulted.

Keywords: electrostatic microrelay, planar and volumetric structure, active electrostatic and reactive mechanical forces, elastic deformation of the holders

Belkin M. E., Loparev A. V. *Microwave-Band Optoelectronic Oscillator: Modeling, Investment of Spectral and Noise Features* 29

A design scheme and operating principles of a microwave-band optoelectronic oscillator (OEO), which combines relatively low phase noise and wide tuning band are highlighted. The results of the development of OEO's object-oriented model using optoelectronic CAD VPItransmission MakerTM and the simulation results of its spectral and noise characteristics are described. The prototype of OEO tunable in the band of 2,5—15 GHz is produced and investigated with the results validating the correctness of the model. A comparison with the other microwave oscillators based on the traditional scheme is conducted.

Keywords: microwave photonics, microwave-band optoelectronic oscillator, frequency noise

Maltsev P. P., Matveenko O. V., Gnatyuk D. L., Lisitskiy A. P., Fedorov Yu. V. *Review of Implementation of 5 GHz Integrated Planar Antennas with Minimal Size* 34

Wide usage of wireless devices such as WLAN, WiMAX demands development of small-size antennas for the band 2,3—5,75 GHz. In this review types and topologies of planar monopole antennas denoted band are examined. Numerous implementations of primary type of antennas (monopole with double-sided metallization) are described. The monopole antennas protected by patents also described.

Keywords: planar antenna, electrical radiator, monopole, radiation pattern

Timoshenkov S. P., Anchutin S. A., Morozova E. S., Golovan A. S., Shilov V. F. *Development of a System of Object Angular Position Initial Alignment Based on Micromechanical Accelerometers* 45

The article shows results of designing and making of a system of object angular position initial alignment based on micromechanical accelerometers. Description and principle of operation of the system of initial alignment are shown, test results are given.

Keywords: micromechanical accelerometer, angular position, initial alignment

Leontiev V. L., Milhaylov I. S. *About the Building the Potential of the Atomic Interaction Based on Orthogonal Finite Functions* 48

The review is given the manual of building the potential of the atomic interaction based on orthogonal finite functions. This potential raises efficiency of software for modeling of nanoobjects.

Keywords: molecular dynamics, orthogonal finite functions

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