

# CONTENTS

**Babaevsky P. G., Zhukov A. A., Zhukova S. A.** *Effect of Chemical Treatment on Structure Properties on Thin Polyimide Films and Coatings and on HF-plasma Etching Rate of "Sacrificial" Layers in Microsystem Technology* . . . . . 2

The research deals with problem of optimization of "sacrificial" polyimide layer etching process in manufacture of Microsystems on the basis of multilevel patterns. It is determined, that the physico-chemical modification of thin polyimide films and coatings by plasma-chemical hexametyldisilazane vapor treatment propagates through to all their thickness, changing their bond character, surface and bulk properties and nature of interphase interaction.

**Dragunov V. P.** *Nonlinearity of Elastic Elements of Micromechanical Systems* . . . . . 7

Deflection of thin diaphragms of the circular, square, triangular and hexagonal forms with clamped edges under various loads is studied. This research is limited to deflection  $W \leq h$ . It is shown, that, changing the sizes diaphragms MMS, it is possible to change a parity effective rigidity and maximal deflections of diaphragms of the different form. Is established, that in nonlinear approach under influence of an electrical field the size of a critical deflection of diaphragms is determined not only initial gap between electrodes, but also thickness of diaphragm.

**Evlyukhin A. B., Gerke M. N., Evlyukhina E. V.** *Theoretical Model of Probe Radiation in Near-Field Optical Microscopy of Single-Layer Nanostructure* . . . . . 13

Modeling of radiation distribution inside thin dielectric layer based in near wave zone of small source has been carried out. Near-field radiation is considered to be the second waves emitted by mesoscopic dielectric object which interacts with external electromagnetic wave. Theoretical model is based on the integral equations obtained from Maxwell equations by Green's function method. Numerical results are obtained in unretardation approach due to the fact that all distances in question system are much smaller than wave length of the external field. It was shown that the distribution of electric field intensity in the layer can notably depend on the field com-

ponents which are perpendicular to surfaces of the layer. It takes place even when these components are absent in the external waves.

**Nokhrin A. V., Makarov I. M., Lopatin Yu. G.** *Peculiarities of Research Technique for Investigation of Deformation-Induced Grain Growth in Nano- and Microcrystalline Superplastic Aluminum Alloys Using Atomic-Forced Microscopy* . . . . . 20

The basic methodical and technical approaches for investigation of grain-structure evolution of nano- and microcrystalline materials using atomic-forced microscopy have been developed. In particular, structure evolution of Al-Mg-Sc-Zr and Al-Zn-Mg-Sc-Zr alloys produced by equal channel angular pressing has been studied. As a preliminary treatment, the samples of Al-Mg-Sc-Zr and Al-Zn-Mg-Sc-Zr alloys were exposed to heat treatments (annealings) and superplastic deformation.

**Dalidchik F. I., Grishin M. V., Kovalevskii S. A.** *Features of Electronic Structures of Interacting Nanocarbon Particles* . . . . . 29

New topographic and spectroscopic phenomena due to weak exchange interaction of carbon atoms of different low-dimensional nanosystems (point defects, ensembles of ordered nanotubes on graphite, Moire patterns) are found and explained.

**Adamov Yu. F., Somov O. A., Shevchenko E. A.** *Systems on Chip in Modern Microelectronics* . . . . . 34

Analytical survey of VLSI systems and design methodology literature is proposed in this paper. The design systems evolution forecast is made. They will progress in direction of design flows consolidation between systems on circuit boards and systems on chips based on standard Macroblocks (IP-blocks) using.

**Erokhin V. V.** *Architecture-Specific BIST for IP Blocks* . . . . . 39

Possible approaches to built-in self-testing (BIST) of microprocessors are discussed. Micro Program Stimuli Source BIST method (MSS BIST) is presented. Possible applications of the method for non-microprogram controlled IPs (FSM-based) are discussed. The MSS BIST method combined with method of simulating of external environment provides high fault coverage percentage and small hardware overhead.

## For foreign subscribers:

Joint-stock company MK-Periodica. E-mail: [info@periodicals.ru](mailto:info@periodicals.ru) Tel.: +7(095) 284-5008. Fax: +7(095) 281-3798

The journal bought since november 1999.

Editor-in-Chief Ph. D. Petr P. Maltsev

ISSN 1684-6419.

Address is: 4, Stromynsky Lane, Moscow, 107076, Russia. Tel./Fax: +7(095) 269-5510.

E-mail: [it@novtex.ru](mailto:it@novtex.ru); <http://www.microsystems.ru>

Адрес редакции журнала: 107076, Москва, Стромьинский пер., 4. Телефон редакции журнала (095) 269-5510. E-mail: [it@novtex.ru](mailto:it@novtex.ru)  
Журнал зарегистрирован в Государственном Комитете Российской Федерации по печати. Свидетельство о регистрации № 018929 от 10.06.99.

Дизайнер Т.Н. Погорелова. Технический редактор И.С. Павлова. Корректор А. В. Лабудь

Сдано в набор 02.03.2004. Подписано в печать 14.04.2004. Формат 60×88 1/8. Бумага офсетная. Печать офсетная.

Усл. печ. л. 5,88. Усл. кр.-отт. 7,84. Уч.-изд. л. 7,13. Заказ 661. Цена договорная

Отпечатано в Подольской типографии ГУП ЧПК, 142110, г. Подольск, ул. Кирова, 25