

Table of Contents

Preface, Committees and Sponsors

Chapter 1: Nanoscale SOI Structures, Devices and Sensors

An Experimental Study of Properties of Ultrathin Si Layer with Bonded Si/SiO₂ Interface O.V. Naumova, B. Fomin, V.P. Popov, V. Strelchuk, A. Nikolenko and A.N. Nazarov	3
Transport and Photoelectric Effects in Structures with Ge and SiGe Nanoclusters Grown on Oxidized Si (001) V.S. Lysenko, Y.V. Gomeniuk, S.V. Kondratenko, Y.Y. Melnichuk, Y.N. Kozyrev and C. Teichert	11
Effect of Ge-Nanoislands on the Low-Frequency Noise in Si/SiO_x/Ge Structures N.P. Garbar, V.N. Kudina, V.S. Lysenko, S.V. Kondratenko and Y.N. Kozyrev	21
Acoustic Phonon and Surface Roughness Spin Relaxation Mechanisms in Strained Ultra-Scaled Silicon Films D. Osintsev, V. Sverdlov and S. Selberherr	29
On the Mobility Behavior in Highly Doped Junctionless Nanowire SOI MOSFETs T. Rudenko, R. Yu, S. Barraud, K. Cherkaoui, P. Razavi, G. Fagas and A.N. Nazarov	35
High Sensitive Active MOS Photo Detector on the Local 3D SOI-Structure V.I. Holota, I. Kogut, A. Druzhinin and Y. Khoverko	45
Properties of Low-Dimensional Polysilicon in SOI Structures for Low Temperature Sensors A. Druzhinin, Y. Khoverko, I. Kogut and R. Koretskii	49

Chapter 2: New Functional Nanomaterials, Nanoscaled Devices for Electronics, Energy Harvesting, Light Emission, and Lighting

Carbon-Rich Nanostructured a-SiC on Si Heterostructures for Field-Effect Electron Emission A.N. Nazarov, S.O. Gordienko, P.M. Lytvyn, A.A. Stadnik, Y.Y. Gomeniuk, A.V. Vasin, A.V. Rusavsky, T.M. Nazarova and V.S. Lysenko	59
Characteristics of Hydrogen Effusion from the Si-H Bonds in Si Rich Silicon Oxynitride Films for Nanocrystalline Silicon Based Photovoltaic Applications A. SARIKOV, M. Voitovych, I. Lisovskyy, V. Naseka, A. Hartel, D. Hiller, S. Gutsch and M. Zacharias	69
Hybrid Solar Cells Based on CdS Nanowire Arrays D.O. Grynk, O.M. Fedoryak, P.S. Smertenko, N.A. Ogurtsov, A.A. Pud, Y.V. Noskov and O.P. Dimitriev	75
Formation of Ordered Si Nanowires Arrays on Si Substrate A.A. Evtukh, A. Druzhinin, I. Ostrovskii, A. Kizjak, A. Grigoriev, O. Steblova and S. Nichkalo	83
Reliability-Based Optimization of Spin-Transfer Torque Magnetic Tunnel Junction Implication Logic Gates H. Mahmoudi, T. Windbacher, V. Sverdlov and S. Selberherr	89

Chapter 3: Diagnostics of the Functional Nanomaterials and Devices

Magnetic Resonance and Optical Study of Carbonized Silica Obtained by Pyrolysis of Surface Compounds D. Savchenko, E.N. Kalabukhova, A. Sitnikov, A.V. Vasin, S. Starik, O. Gontar, G. Rudko, A.N. Nazarov, V.S. Lysenko and V. Tertykh	99
Electrical Properties of Composite Films with Silicon Nanocrystals in the Insulating Matrix A.A. Evtukh and O. Bratus	105
Positron Annihilation Lifetime Spectroscopy Measurement of Ge₅As₃₇S₅₈ Glass A. Stronski	111

Comparative Investigation of Structural and Optical Properties of Si-Rich Oxide Films Fabricated by Magnetron Sputtering	
L. Khomenkova, M. Baran, O. Kolomys, V. Strelchuk, A.V. Kuchuk, V.P. Kladko, J. Jedrzejewski, I. Balberg, Y. Goldstein, P. Marie, F. Gourbilleau and N. Korsunskaya	117
Charge Trapping in Hafnium Silicate Films with Modulated Composition and Enhanced Permittivity	
L. Khomenkova, X. Portier, A. Slaoui and F. Gourbilleau	125
Low Dislocation Density and High Mobility GaN Layers for DHFET Channels Grown on High-Temperature AlN/AlGaIn Buffer Layer by Ammonia MBE	
A.N. Alexeev, S.I. Petrov, D.M. Krasovitsky, V.P. Chaly and V.V. Mamaev	135
Peculiarities of the Impurity Redistribution under Ultra-Shallow Junction Formation in Silicon	
V.G. Litovchenko, B. Romanyuk, O. Oberemok, V. Popov, V. Melnik, K. Rudenko and V. Vyurkov	141

Chapter 4: Functional Nanomaterials for Medicine

Nanoparticles in Antivirus Therapy	
M. Lokshyn, V. Lozovski, V.S. Lysenko, V. Piatnytsia, M. Spivak and V. Sterligov	149
Application of Oxidized Silicon Nanowires for Nerve Fibers Regeneration	
V. Lichodievskiy, N. Vysotskaya, O. Ryabchikov, A. Korsak, Y. Chaikovsky, A. Klimovskaya, Y. Pedchenko, I. Lutsyshyn and O. Stadnyk	157