

Table of Contents

Preface and Committee Members

I. Technology of Semiconductor-On-Insulator Structures and Devices

ZnO Films and Crystals on Bulk Silicon and SOI Wafers: Formation, Properties and Applications

E. Chubenko, A. Klyshko, V. Bondarenko, M. Balucani, A.I. Belous and V. Malyshev 3

Influence of Hydrogen Plasma Treatment on a-SiC Resistivity of the SiC/SiO₂/Si Structures

S.O. Gordienko, A. Nazarov, A.V. Rusavsky, A.V. Vasin, N. Rymarenko, V.G. Stepanov, T.M. Nazarova and V.S. Lysenko 21

Diamond – Graphite Heterostructures Formed by Nitrogen and Hydrogen Implantation and Annealing

V.P. Popov, L.N. Safronov, O.V. Naumova, D.V. Nikolaev, Y.N. Palyvanov and I.N. Kupriyanov 27

Hydrogen Gettering within Processed Oxygen-Implanted Silicon

A. Misiuk, A. Barcz, J. Bak-Misiuk, A.G. Ulyashin and P. Romanowski 35

II. Physics of New SOI Devices

Gate Control of Junction Impact Ionization Avalanche in SOI MISFETs: Theoretical Model

V. Dobrovolsky, F. Sizov and S. Cristoloveanu 43

Semi-Analytical Models of Field-Effect Transistors with Low-Dimensional Channels

A. Kohmyakov and V. Vyurkov 51

Model of Nonuniform Channel for the Charge Carrier Transport in Nanoscale FETs

V.P. Popov and M.A. Ilnitsky 59

High Temperature Effects on Harmonic Distortion in Submicron SOI Graded-Channel MOSFETs

M. Emam, M.A. Pavanello, F. Danneville, D. Vanhoenacker-Janvier and J.P. Raskin 67

Some Issues of Modeling the Double Barrier Metal-Oxide-Semiconductor Tunnel Structures

B. Majkusiak and A. Mazurak 77

Electrical Properties of High-*K* LaLuO₃ Gate Oxide for SOI MOSFETs

Y.Y. Gomeniuk, Y.V. Gomeniuk, A. Nazarov, P.K. Hurley, K. Cherkaoui, S. Monaghan, P.E. Hellström, H.D.B. Gottlob, J. Schubert and J.M.J. Lopes 87

Effects of High-Energy Neutrons on Advanced SOI MOSFETs

V. Kilchytska, J. Alvarado, O. Militaru, G. Berger and D. Flandre 95

III. SOI Sensors and MEMS

Polysilicon on Insulator Structures for Sensor Application at Electron Irradiation & Magnetic Fields

A. Druzhinin, I. Marymova, I. Kogut and Y. Khoverko 109

On-Chip Tensile Testing of the Mechanical and Electro-Mechanical Properties of Nano-Scale Silicon Free-Standing Beams

U. Bhaskar, V. Passi, A. Zulfiqar, U. Södervall, B. Nilsson, G. Petersson, M. Hagberg, T. Pardoën and J.P. Raskin 117

Non-Standard FinFET Devices for Small Volume Sample Sensors

M. Zaborowski, D. Tomaszewski, L. Łukasiak and A. Jakubowski 127

3D SOI Elements for System-on-Chip Applications

I.T. Kogut, A.A. Druzhinin and V.I. Holota 137

Routes towards Novel Active Pressure Sensors in SOI Technology

B. Olbrechts, B. Rue, T. Pardoën, D. Flandre and J.P. Raskin 145

IV. Nanodots, Nanowires and Nanofilms

Photovoltage Performance of Ge/Si Nanostructures Grown on Intermediate Ultrathin SiO_x Layers

A.O. Podolian, V.V. Kuryliuk, A.B. Nadtochiy, S.V. Kondratenko, O.A. Korotchenkov, Y.N. Kozyrev, V.K. Sklyar, M.Y. Rubezhanska and V.S. Lysenko 159

Interface and Bulk Properties of High-*K* Gadolinium and Neodymium Oxides on Silicon

Y.Y. Gomeniuk, Y.V. Gomeniuk, A. Nazarov, V.S. Lysenko, H.J. Osten and A. Laha 167

Effect of Ge Nanoislands on Lateral Photoconductivity of Ge-SiO_x-Si Structures

V.S. Lysenko, Y.V. Gomeniuk, Y.N. Kozyrev, M.Y. Rubezhanska, V.K. Sklyar, S.V. Kondratenko, Y.Y. Melnichuk and C. Teichert 179

A Model of the Evolution of the Au/Si Droplet Ensembles during Rapid Thermal Annealing at High Temperatures

A. SARIKOV, A.I. Klimovskaya, O. Oberemok, O. Lytvyn and O. Stadnik 187

The Nanometer Scaled Defects Induces with the Dislocation Motion in II-VI Insulated Semiconductors

V.N. Babentsov, V.A. Boyko, A.F. Kolomys, G.A. Shepelski, V.V. Strelchuk and N.I. Tarbaev 195