

Table of Contents

Preface

Defect Engineering in VLSI-Technologies

H. Reimer, W. Nitzsche and M. Reiche 1

Gettering in Silicon by Oxygen Related Defects, Stacking Faults and Thin Polycrystalline Films

R.J. Falster 13

Advances in the Understanding of Oxygen and Carbon in Silicon

C. Claeys and J. Vanhellemont 21

Investigations of the Structure, Formation, and Annihilation of Thermally Induced Donors in Silicon

J. Reichel, M. Reiche and H. Geuther 33

Effect of Volume Defects on Gold Gettering in CZ-SI

K. Schmalz, I. Babanskaya, H. Gdanitz and F.G. Kirsch 41

Investigations of the Behaviour of Transition Metals in Silicon

W. Nitzsche, O. Brodersen, S. Hopfe, M. Reiche and I. Burck 49

Defect Engineering for BiCMOS-Technology

G. Ritter, K.-. Ehwald and P. Schley 57

Investigation of Gettering Phenomena in Semiconductors by Simultaneous Charge

Collection Microscopy and Cathodoluminescence

M. Eckstein, A. Jakubowicz, M. Bode and H.U. Habermeier 65

Implantation Induced Defect Modification in P Doped Bipolar Structures

D. Krueger and J. Dziesiaty 73

The Properties of the Defects in Heavy Implanted Silicon

V.G. Litovchenko and B.N. Romanyuk 79

Defect Formation and Lateral Oxidation during LOCOS Processing

D. Knoll, T. Grabolla and K.-. Ehwald 93

Defects and Their Influence on Parasitic Devices in Integrated Circuits

R. Prejdoa 101

Volume Defect Formation in CZ SI Wafers and Related Electrical Effects

F.G. Kirsch, P. Fricke, J. Reichel, I. Babanskaya, R. Bertoldi, G. Buchheim, C. Hansch, P. Hübner, H.-. Machold and R. Scharfe 103

Buried Layer Processing for Advanced Bipolar Technology

E. Simoen, L. Deferm, J. Vanhellemont and C. Claeys 111

Oxygen Precipitation in Silicon: Correlation of the Experimental Results Obtained with IR Spectroscopy, Preferential Etching and X-Ray Topography

E. Hild, J. Seres, E.K. Pal, S. Nouredin and T. Kormány 119

Gettering of Fast Diffusing Impurities by Radiation Defects in III-V Semiconductors

C. Ascheron, M. Rieth and H.A. Klose 127

On the Two-Step Nucleation in Internal Gettering for CMOS Fabrication Process

J. Jablonski, K. Kucharski and J. Wojciechowski 129

Creation of Deep Denuded Zones in CZ Silicon Wafers

G. Kissinger, W. Kissinger, K. Tittelbach and K. Schmalz 135

Defect Engineering for ULSI Epitaxial Silicon

G.A. Rozgonyi and R.R. Kola 143

Computer-Simulation of Gold-Redistribution in Silicon

H. Gdanitz and K. Schmalz 159

An Attempt to Simulate Oxygen Precipitation in Silicon

M. Macek 165

Defect Formation in Dislocation-Free Silicon Containing Oxygen

M.G. Mil'vidskii, V.V. Voronkov and V.J. Reznik 171

Influence of Preannealing on Oxygen Precipitation

S. Nouredin and T. Kormány 173

Silicon Intrinsic Gettering Durability and Effectiveness

D. Sachelarie, A. Badoiu, G. Gradinaru, M. Stoica, M. Sachelarie and V. Vivescnu 179

Effect of Heat Treatment on Defect Formation in Silicon	181
N.A. Sobolev, Y.V. Vyzhigin, V.V. Eliseev, V.A. Kostylev, V.M. Likunova and E.I. Sheck	
Effects of Rapid Thermal Annealing Treatments on Electrical and Structural Properties of Silicon	
E. Susi	187
Defect Reactions in Semiconductors	
M. Suezawa and K. Sumino	197
Electronic States in Plastically Deformed Silicon	
A. Castaldini, D. Cavalcoli and A. Cavallini	211
Defect Formation and Impurity Redistribution Due to the Electric Field and Elastic Stresses in Interface Regions	
V.V. Bolotov, V.M. Emeksuzyan and V.A. Stuchinski	221
Interaction of Point Defects with Interstitial Clusters, Dislocations and Impurities During in SITU Electron Irradiation of Silicon Crystals in the Electron Microscope	
A.L. Aseev, L.I. Fedina, D. Hoehl and H. Bartsch	235
Dependence of Phosphorus Transient Enhanced Diffusion on Depth Position of Extended Defects in Ion Implanted Silicon	
P. Zaumseil, U. Winter, R. Fabbri, M. Servidori and S. Solmi	243
Impurity Gettering in Semicrystalline Silicon Solar Cells	
M.A.G. Soler, I. Pereyra and A.M. Andrade	251
Formation and Defect Structure of Fe-B-Fe Complexes in Silicon	
W. Gehlhoff and U. Rehse	257
Electrical Activity and Impurity Precipitation in Silicon Grain Boundaries	
J.L. Maurice	265
Photo-Thermal Ionization Spectroscopy of Point Defects in Semiconductors	
H.G. Grimmeiss and M. Kleverman	277
Kink-Point Defect Interaction and Mobility of Dislocations in Semiconductors	
B.Y. Farber, H.G. Minasyan and V.I. Nikitenko	289
I. Conductivity Along Dislocations: Temperature Dependence and Nonlinear Effects II. Combined Resonance and Structure Peculiarities of Plastically Deformed Silicon	
V.V. Kveder, T. Mchedlidze, Y.A. Ossipyan and A.I. Shalynin	301
Recrystallization and Defect Formation in Ion-Implanted Silicon Studied by Transmission Electron Microscopy	
H. Bartsch and W. Einbrodt	309
Auger Recombination in Heavily-Doped p+ Silicon	
S. Voinigescu, A. Müller and C. Anton	315
Photo-Capacitive Spectroscopy of Sulphur Atoms and Heat Treatment Defects in n-Si <S>	
V.M. Arutyunyan, A.P. Akhoyan, R.S. Barseghyan and B.O. Semerdjian	323
EPR Detection of Complex Platinum-Related Defects in Silicon	
M. Höhne	329
Defect Kinetics and Impurity Diffusion During Hot Implants Into Silicon	
K. Holldack, H. Kerkow and M. Reiche	335
The Peculiarities of Deep Level Defect Passivation in SI by Atomic Hydrogen	
S.V. Koveshnikov, S.V. Nosenko and E.B. Yakimov	341
Dislocation Motion in Compound Semiconductors	
J. Schreiber, H.S. Leipner and H.-. Höche	343
Dislocation Structures after Microdeformation of CaAs Single Crystals	
H.S. Leipner and M. Surowiec	349
The Effect on the Schottky Barrier Height of Diffusion of Pt into Si From PtSi	
L. Moller, J. Chevallier and A. Nylandsted-Larsen	355
Electron Pulse Irradiation of Semiconductor Devices	
M. Lenk, R. Mehnert, A. Müller, L. Prager and E. Koch	361
Charge Collection Microscopy in Gettering and Defect Engineering	
M. Kittler	367
Lifetime in Silicon	
D.K. Schröder	383

Scanning Infra-Red Microscope Investigation of Oxide Particles in Czochralski Silicon Heat-Treated for Intrinsic Gettering	395
Z. Laczik, G.R. Booker and R.J. Falster	
Laser Scanning Tomography: A Study of the Defect Cluster Nucleation and Growth in Silicon	403
J.P. Fillard, P. Gall, M. Castagne and J. Bonnafé	
The Effect of Low-Energy Electron and Ion Beams on Properties of Near Surface Layers in Semiconductor Crystals	409
E.B. Yakimov	
The Capacitance Microscope: A Non-Contacting Stylus Technique for the Investigation of Semiconductor Surfaces	411
H.P. Kleinknecht and H. Meier	
Synchrotron Radiation X-Ray Studies on Strain in Semiconductor Crystals	423
J. Matsui	
Positron Studies of Thermal-Induced Defects in Silicon	435
N.Y. Arutyunov and V.Y. Traschakov	
DLTS Investigations of the Carbon-Related Centers in Si	443
C.A. Londos	
The Noise Spectroscopy of Defects and Impurities in Compensated Silicon	449
Z.N. Adamyan, V.M. Arutyunyan and Z.H. Mkhitaryan	
Determination of Generation Lifetime and Surface Generation Velocity by Sine-Voltage Sweep C-V Method	453
P. Peykov, T. Diaz and T. Carillo	
Silicon Plates Homogeneity Diagnostics Method by Means of Semiconductor-Electrolyte Structure Surface Photovoltage Measurement	457
A.O. Arackelyan, A.K. Arevyan, V.M. Arutyunyan, M.S. Kazaryan, V.A. Melicsetyan and V.L. Elbackyan	
Electrically Active Near-Surface Implantation Defects in Silicon and GaAs	461
J. Bollmann and H.A. Klose	
Trap-Spectroscopy in Insulating Layers	467
H.J. Fitting	
Insulator Investigations in MIS Structures with Constant-Capacitance-DLTS Technique	471
H. Koester, M. Schmidt and W. Ecke	
A Theoretical Model of the Surface Avalanche Method	477
G. Gradinaru	
Application of High T_c Superconducting Thin Films in Microelectronics-Possibilities and Illusions	483
H.U. Habermeier	
Semiconductor Dynamic Memories	495
D. Landgraf-Dietz	
Effect of Vibration Frequency and Sample Composition on Acoustic Properties of Y-Ba-Cu-O High-T_C Superconductors	501
J. Engert, H.-. Kaufmann, P.P. Pal-Val, V.D. Natsik, K. Rudolph and W. Matz	
SOI-Films by Zone Melting Recrystallization of Polycrystalline Silicon	507
W. Bertoldi and B. Tillack	
Heterogeneous Ion Synthesis of Isolating Layers in Si	517
M.Y. Barabanenkov, A.F. Borun, A.B. Danilin, A.A. Malinin and V.N. Mordkovich	
Spectroscopic Ellipsometry Studies of Silicon on Insulator Structures	525
J. Vanhellemont and H.E. Maes	
Silicon-on-Insulator Technology by Si-MBE	533
M. Maeder and A. Zehe	
Defect Microchemistry at the Si/SiO₂ Interface Grown on Polycrystalline Silicon Sheets. Hydrogenation Effect Study	539
D. Ballutaud and M. Aucouturier	
Interfacial Defects Study of the Gallium Arsenide on Silicon Heterostructure	547
A. Rocher and M.N. Charasse	
Some Aspects of Interface and Surface Engineering of Al_xGa_{1-x}As-Ga_yIn_{1-y}As Compound-Semiconductors	555
G. Heymann	

SOI by Silicon Dioxide Thermal Bonding	561
W. Kissinger and H. Hofmann	
Defect Engineering in SOI-Structures Formed by High Dose Implantation of Reactive Ions	565
W. Skorupa	
Strain and Critical Thickness of MBE Grown CaF₂-Insulators on Si(111)	571
A. Tempel, M. Mäder and A. Zehe	
Defect Control in Thick SOI-Films Produced by Zone Melting Recrystallization	579
B. Tillack, K. Hoeppner, H.H. Richter and R. Banisch	
Defects and Their Influence on Parasitic Devices in Integrated Circuits	585
R. Prejdova	
Formation and Structure of Iron-Impurity Complexes in Silicon	591
C.A.J. Ammerlaan	
Defect Formation in Dislocation-Free Silicon Containing Oxygen	603
M.G. Mil'vidskii, V.V. Voronkov and V.J. Reznik	