ISBN(softcover): 978-3-908450-43-6 ISBN(eBook): 978-3-0357-0686-4

Table of Contents

Preface

Atomic Structure and Properties of Extended Defects in Silicon
M.F. Chisholm, R. Buczko, M. Mostoller, T. Kaplan, A. Maiti, S.T. Pantelides and S.J. Pennycook 3

Electrical Activity of Tilt and Twist Grain Boundaries in Silicon
A.K. Fedotov, A.V. Mazanik, E.A. Katz, Y. Ilyashuk, A. Drozdovski and L.E. Polyak 15

Computer Simulation of Impurity Diffusion in the Vicinity of Grain Boundaries
A.K. Fedotov, M. Chuiko and A.V. Mazanik 21

Impurity Effect on the Dislocation DLTS Spectrum in Silicon
O.V. Feklisova, G. Mariani-Regula, B. Pichaud and E.B. Yakimov 27

Formation and Annihilation of New Donors in Ribbon Growth on Substrate Silicon
D. Karg, A. Voigt, J. Krinke, C. Häßler, H.-. Höfs, G. Pensl, M. Schulz and H.P. Strunk 33

Electrical Properties of Oxygen Precipitates Formed During Two Step Low Temperature Annealing
E.B. Yakimov, O.V. Feklisova, M. Acciarri, A. Cavallini and S. Pizzini 39

Grain Boundary Effects in Ionic and Mixed Conductors
J. Maier 45

Qualitative and Quantitative Analysis of Thin Film Heterostructures by Electron Beam Induced Current
R. Scheer 57

Laser Beam Induced Current Characterization of High Efficiency Chalcopyrite Solar Cells
G.A. Medvedkin and J. Wennerberg 69

Effective Diffusion Length of Multicrystalline Solar Cells
C. Donolato 75

Injection and Collection Diffusion Lengths of Polycrystalline Thin-Film Solar Cells
R. Brendel and U. Rau 81

Hydrogenated Microcrystalline Silicon for Photovoltaic Applications
N. Wyrsch, P.A. Torres, M. Goerlitzer, E. Vallat, U. Kroll, A. Shah, A. Poruba and M. Vanecek 89

Intrinsic Microcrystalline Silicon for Solar Cells
O. Vetterl, P. Hapke, O. Kluth, A. Lambertz, S. Wieder, B. Rech, F. Finger and H. Wagner 101

Deposition of Microcrystalline Silicon Films by Magnetron Sputtering
M. Tzolov, Y. Jeliazova, R. Carius, L. Houben, F. Finger and N. Tzenov 107

Thin Films Hydrogenated Silicon Deposited by Direct Current Magnetron Sputtering at High Rate
R. Cherfi, G. Farhi and M. Aoucher 113

Low-Temperature Deposition of Microcrystalline Silicon by Microwave Plasma-Enhanced Sputtering
P. Müller, W.M. Holber, W. Henrion, E. Nebauer, V. Schlosser, B. Selle, I. Sieber and W. Fuhs 119

Influence of Deposit Thickness on the Microstructure and Surface Roughness of Silicon Films Deposited from Silane
B. Caussat, J.P. Couderc, L. Vasquez, A. Figueras, A. Vander Lee, D. Cot, J. Durand, V. Paillard, E. Scheid, B. Legros-de Mauduit, A. Vilà and J.R. Morante 125

Adaptation of Microelectronics Simulator to the Polycrystalline Silicon Technology
T. Gaillard, H. Lhermite, O. Bonnaud and R. Rogel 131

Thickness Control of the Amorphous Buffer Layer of Hydrogenated Nanocrystalline Silicon: Effect of the Dopant Concentration
F. Gourbilleau, A. Achiq, P. Voivenel and R. Rizk 137

Structure Dependence of the Electrical Conductivity of Hydrogenated Nanocrystalline Silicon Films
A. Achiq, R. Rizk, F. Gourbilleau, P. Voivenel, B. Garrido, J.L. Pérez-Rodríguez and J.R. Morante 143

Highly Doped Microcrystalline SiGe Films: Structure and Transport Properties
F. Edelman, T. Raz, Y. Komem, M. Stölzer and P. Zaumseil 149

Photoluminescence Measurements of Microcrystalline Silicon
M. Meister, J. Weber, M. Furtsch and H. Muenzel 155

Silicon Produced by Thermal Chemical Vapour Deposition on Ceramic Substrates for Photovoltaic Applications
A.J.M.M. Van Zutphen, A. Von Keitz, M. Zeman and J.W. Metselaar 161

Grain Matrix Made with Excimer-Laser Crystallization of Thin Silicon Films
P.C. Van der Wilt and R. Ishihara 169

Grain Boundary Location Control by Patterned Metal Film in Excimer Laser Crystallized Polysilicon
L. Mariucci, R. Carluccio, A. Pecora, G. Fortunato, F. Massussi, V. Foglietti, D. Della Sala and J. Stoemenos 175

Characterisation of Excimer Laser Crystallised Polysilicon by X-Ray Diffraction and by Channeling Contrast in a Scanning Electron Microscope
S. Loreti, M. Vittori, L. Mariucci and G. Fortunato 181

Multicrystalline Silicon Thin Films: Laser Crystallization Conditions and Properties
G. Andrä, J. Bergmann, F. Falk, E. Ose and N.D. Sinh 187

Laser-Crystallized Polycrystalline Silicon on Glass for Photovoltaic Applications
R. Dassow, J.R. Köhler, M. Grauvogl, R.B. Bergmann and J. Werner 193

Properties of Poly-Si Obtained by Solid Phase Crystallization of Differently Produced a:Si:H Thin Films
M.L. Addonizio, P. Delli Veneri, G. Fameli, S. Loreti, C. Minarini, C. Privato, G. Sinno, E. Terzini and M. Vancini 199

Transmission Electron Microscopy and Raman Analysis of the Crystallisation Process of a-Si on Glass for Low Seed Density
J.L. Alay, A. Vilà, J.M. Morante, T. Mohammed-Brahim, M. Sarret and O. Bonnaud 205

Fine-Crystalline Silicon Grown at Low Temperatures: Investigations by High-Resolution Microscopy
C. Ross, J. Herion, L. Houben, R. Carius and H. Wagner 211

Study of Polysilicon Produced by Solid Phase Crystallization of Hydrogenated Amorphous Silicon Deposited at High Rate
G. Farhi, M. Aoucher and T. Mohammed-Brahim 217

Polycrystalline Silicon Films Produced by Low Pressure Chemical Vapour Deposition for Microswitch Applications: The Stress as Dependent on Deposition Conditions, Doping Type, and Thermal Treatments
S. Lucas, K. Kis-Sion, J. Penven, O. Bonnaud and J. Pinel 223

Ultrathin Quasi-Monocrystalline Silicon Films for Electronic Devices
T.J.T.J. Rinke, R.B. Bergmann, R. Brüggemann and J. Werner 229

Atomic Layer Deposition of ZnO Films and Their Application to Solar Cells
A. Yamada and M. Konagai 237

Properties of Transparent Conducting Indium Tin Oxide Films Deposited by Reactive e-Beam Evaporation on Heated Glass
G. Sinno, C. Minarini, S. Loreti, G. Di Francia and A. Salluzzo 249

Large Area Device Quality Indium-Tin-Oxide Thin Films by Magnetron Sputterting
P. Thilakan, E. Terzini, G. Nobile, S. Loreti, C. Minarini, T. Polichetti and G. Sasikala 255

Ion Assisted Reactive Magnetron Sputtering as a Deposition Method for High Quality Thin Films of Compound Semiconductors
K. Ellmer 261

Structure and Properties of TiO_2 Thin Films for Gas Sensors
F. Edelman, A. Rothshild, Y. Komem, V. Mikhelashvili, A. Chack and F. Cosandey 269

Texture Etched Aluminium Doped Zinc Oxide-Structural and Electrical Properties
A. Löffl, H. Kerber, H.-. Schock, O. Kluth, L. Houben, B. Rech and H. Wagner 277

Electron Spin Resonance Centers in Donor-Doped $CaTiO_3$ Single Crystals
K. Ueda, H. Hosono and H. Kawazoe 283

Modification in the Chemical Bath Deposition Apparatus, Growth and Characterization of CdS Semiconducting Thin Films for Photovoltaic Applications
G. Sasikala, P. Thilakan and C. Subramanian 291

Process by PbSe Thin Film Deposition Reactions by Close-Spaced Vapor Transport Technique
S. Kertoatmodjo, Nugraha and F. Guastavino 297

Comparative Study of Isothermal Grain Growth of CdS and CdTe in the Presence of Halide Fluxes
J. Hiie, M. Altosaar and E. Mellikov 303

p-Type Doping of CdTe
V. Valdna 309

Charge Transport and Photoelectric Processes in Polycrystalline Cadmium Telluride Surface-Barrier Structures
L.A. Kosyachenko, V.M. Sklyarchuk, Y.F. Sklyarchuk and K.S. Ulyanitsky 315

Deposition Study of Bi_2Te_3 Thin Films by Close-Spaced Vapor Transport and Close-Spaced Sublimation
S. Kertoatmodjo, A. Mostavan, R. Adi, Yanuar, F. Marhoun and F. Guastavino 321

High Temperature Electrical Conductivity in ZnS:Cu:Cl Ceramics and in $CdSe_xTe_{1-x}$ Polycrystalline Solid Solutions
K. Lott, T. Nirk, E. Gorokhova and E. Ryzhikov 329

Influence of the Layer Oxidation on the Electrical Conductivity and the Positron Trapping in the Polycrystalline $ZnCr_2Se_4$ and $CuCr_2Se_4$ Spinels
T. Groń, J. Wolff, K. Bärner and I. Okońska-Kozłowska 335

Defect-Induced Metal-Semiconductor Transition in $Cu_xCo_yCr_zSe_4$
T. Groń, J. Kusz, K. Bärner, E. Maciążek and I. Okońska-Kozłowska 341

Fabrication of High Efficiency $Cu(In,Ga)Se_2$ Thin Film Solar Cells Prepared by Physical Vapor Deposition
T. Negami 349

Growth and Characterization of $Cu_xAg_{1-x}InSe_2$ Thin Films by Pulsed Laser Deposition
V.F. Gremenok, I.V. Bodnar, I. Martil, F.L. Martines, S.L. Sergeev-Nekrasov and I.A. Victorov 361

Preparation of $CuInS_2$ Thin Films by Sequential Evaporation of In_2S_3 and CuS
S. Bleyhl, M. Saad, K. Diesner, A. Jäger-Waldau and M.C. Lux-Steiner 367

Growth of $CuGaSe_2$ Thin Films by Metal Organic Chemical Vapour Deposition from Different Organometallic Sources
N. Romain, G. Orsal, M.C. Artaud and S. Duchemin 373

Formation of Polycrystalline $CuInS_2$-Films by Plasma Sulphurization of Cu-In Bilayers in a Magnetron Discharge in an Ar/H_2S-Atmosphere
K. Ellmer, C. Salzmann, J. Bruns and J. Klaer 379

Polycrystalline Bulk $CuInSe_2$ with a Deviation from Valence Stoichiometry
G.A. Medvedkin and M.A. Magomedov 385

Relation Between Photoconductivity and Deposition Conditions of Evaporated $CuInSe_2$ Polycrystalline Thin Films
V.Y. Rud' and H.-. Schock 391

Microstructure of Cu-Rich $CuGaSe_2$ Thin Films
V. Nadenau, H.-. Schock, M. Krejci, F.-. Haug, A.N. Tiwari and H. Zogg 397

Light-Induced Metastabilities in the Interface Region of Cu(In,Ga) Se_2-Based Photovoltaic Devices Studied by Laplace Transform Junction Spectroscopy
P. Zabierowski, M. Igalson and H.-. Schock 403

Air-Annealing Effects on Polycrystalline $Cu(In,Ga)Se_2$ Heterojunctions
U. Rau, D. Braunger and H.-. Schock 409

Photoelectrical Properties of In/p-$(Cu,Ag)(In,Ga)(Se,Te)_2$ Surface-Barrier Structures
Y.V. Rud', V.Y. Rud', V.F. Gremenok, E.P. Zaretskaya, D.D. Krivolap, I.V. Bodnar and S.L. Sergeev-Nekrasov 415

Polarization Photosensitivity of Polycrystalline-Film $Cu(In,Ga)Se_2$/CdS/ZnO Structures
V.Y. Rud', Y.V. Rud' and H.-. Schock 421

Photoluminescence Study of $Cu(Ga_xIn_{1-x})_3Se_5$ and $CuIn_3(S_xSe_{1-x})_5$ Crystals with $0 \le x \le 1$
F. Guastavino, K. Zeaiter, L. Djellal, Yanuar, D. Bayaa, M. Abdelali and C. Llinares 427

Fullerene-Based Thin Films as a Novel Polycrystalline Semiconductor
E.A. Katz 435

Low Dislocation Density Multicrystalline Silicon for Photovoltaic Applications
C. Häßler, E.-. Reisner, W. Koch, A. Müller, D. Franke and T. Rettelbach 447

Phase Field Modeling of the Growth of mc-Silicon from the Melt
M. Apel and I. Steinbach 453

Low-Temperature Silicon Epitaxy by Ion-Assisted Deposition
L. Oberbeck, R.B. Bergmann, N. Jensen, S. Oelting and J. Werner 459

Profiled Poly-Silicon Films by Hot-Wire Chemical Vapour Deposition for Solar Cells on Cheap Metal Substrate
J.K. Rath, F.D. Tichelaar and R.E.I. Schropp 465

Optical Characterization of Ru_2Si_3 and Ru_2Ge_3 by Various Spectroscopic Methods and by Band Structure Calculations
W. Henrion, M. Rebien, V.N. Antonov and O. Jepsen 471

Cubic Silicon Carbide Films Grown by Reactive Magnetron Sputtering at Relatively Low Temperature
S. Kerdiles, F. Gourbilleau, R. Rizk, J.L. Pérez-Rodríguez, B. Garrido, O. González-Varona, L. Calvo-Barrio and J.R. Morante 477

Defect Engineering in Polycrystalline Silicon Using Ultrasound
S.S. Ostapenko 485

Defects Modification by Ultrasound in Crystals
I. Ostrovskii, J.M. Khalack, A.B. Nadtochii and H.G. Walther 497

Method for the Evaluation of the Influence of Gettering and Bulk Passivation on Non-Uniform Block-Cast Multicrystalline Si Solar Cells
H. Nagel, A.G. Aberle and S. Narayanan 503

Influence of Hydrogen Plasma Treatment on Electric Properties of Polycrystalline CdS_xSe_{1-x} Films
S. Manego, A.V. Mazanik, M. Tarasik, Y. Trofimov, A.K. Fedotov, A.G. Ulyashin and A. Yanchenko 509

Wet-Chemically Passivated Silicon Interfaces: Characterization by Surface Photovoltage Measurements, and Spectroscopic Ellipsometry Methods
H. Angermann, W. Henrion, A. Röseler and M. Rebien 515

Improving the Quality of Polycrystalline Silicon String Ribbon for Fabricating High Efficiency Solar Cells
H.E.A. Elgamel and J. Gobrecht 521

Polycrystalline Silicon Thin Film Transistors: State of the Art and Improvement of Electrical Characteristics
O. Bonnaud 529

Leakage Current of Unhydrogenated Solid Phase Crystallized Silicon Thin Film Transistors
B. Tala-Ighil, A. Rahal, H. Toutah, T. Mohammed-Brahim, K. Mourgues and O. Bonnaud 541

Process to Fabricate High Performance Solid Phase Crystallized n-Type and p-Type Thin Film Transistors on Glass Substrate
K. Mourgues, F. Raoult, Y. Helen, T. Mohammed-Brahim, R. Rogel and O. Bonnaud 547

An Analytical Model for Rectifying Contacts on Polycrystalline Semiconductors
U. Rau and J. Werner 553

Modelling of the Doping Effect on the Capacitance of the Metal/N-Polysilicon/Oxide/N-Silicon Structure
H. Dib, Z. Benamara, A. Boudissa, B. Zebentout, R. Naoum, F. Raoult and O. Bonnaud 559

a-Si/c-Si Heterojunctions as a Tool to Realise Solar Cells Based on Thin Poly-Silicon Growth on Glass
R. De Rosa, M.L. Grilli, G. Sasikala, M. Tucci and F. Roca 565

Heterojunctions for Polycrystalline Silicon Solar Cells
R.M. Hausner, N. Jensen, R.B. Bergmann, U. Rau and J. Werner 571

Properties of p-n Diodes Made in Polysilicon Layers with Intermediate Grain Size
G. Beaucarne, J. Poortmans, M. Caymax, J. Nijs and A. Mertens 577

W-Polycide Gates with a Thin Polysilicon Layer: Microstructure and Resistivity
Y.O. Kim, J. Bevk, M. Furtsch, G.E. Georgiou, W. Mansfield, R. Masaitis, R. Opila and P.J. Silverman 583