

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. Wyrsh, 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. Jelialova, 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 Sputtering 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 TiO₂ Thin Films for Gas Sensors F. Edelman, A. Rothschild, 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 CaTiO₃ 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 Bi₂Te₃ 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 ZnCr₂Se₄ and CuCr₂Se₄ Spinel	
T. Groń, J. Wolff, K. Bärner and I. Okońska-Kozłowska	335
Defect-Induced Metal-Semiconductor Transition in Cu_xCo_yCr_zSe₄	
T. Groń, J. Kusz, K. Bärner, E. Maciążek and I. Okońska-Kozłowska	341
Fabrication of High Efficiency Cu(In,Ga)Se₂ Thin Film Solar Cells Prepared by Physical Vapor Deposition	
T. Negami	349
Growth and Characterization of Cu_xAg_{1-x}InSe₂ Thin Films by Pulsed Laser Deposition	
V.F. Gremenok, I.V. Bodnar, I. Martil, F.L. Martinez, S.L. Sergeev-Nekrasov and I.A. Victorov	361
Preparation of CuInS₂ Thin Films by Sequential Evaporation of In₂S₃ and CuS	
S. Bleyhl, M. Saad, K. Diesner, A. Jäger-Waldau and M.C. Lux-Steiner	367
Growth of CuGaSe₂ 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 CuInS₂-Films by Plasma Sulphurization of Cu-In Bilayers in a Magnetron Discharge in an Ar/H₂S-Atmosphere	
K. Ellmer, C. Salzmann, J. Bruns and J. Klaer	379
Polycrystalline Bulk CuInSe₂ with a Deviation from Valence Stoichiometry	
G.A. Medvedkin and M.A. Magomedov	385
Relation Between Photoconductivity and Deposition Conditions of Evaporated CuInSe₂ Polycrystalline Thin Films	
V.Y. Rud' and H.-. Schock	391
Microstructure of Cu-Rich CuGaSe₂ 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) Se₂-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)Se₂ 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)Se₂/CdS/ZnO Structures	
V.Y. Rud', Y.V. Rud' and H.-. Schock	421
Photoluminescence Study of Cu(Ga_xIn_{1-x})₃Se₅ and CuIn₃(S_xSe_{1-x})₅ Crystals with 0≤x≤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 $\text{CdS}_x\text{Se}_{1-x}$ 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. Furttsch, G.E. Georgiou, W. Mansfield, R. Masaitis, R. Opila and P.J. Silverman	583