

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)

CONTENTS

Preface	xvii
Materials Research Society Symposium Proceedings.....	xviii

FILM GROWTH

* Crystallinity Uniformity of Microcrystalline Silicon Thin Films Deposited in Large Area Radio Frequency Capacitively-Coupled Reactors	3
Benjamin Strahm, Alan A. Howling, and Christoph Hollenstein	
Cone Kinetics Model: Insights Into the Morphologies of Mixed-Phase Silicon Film Growth	15
Howard M. Branz, Paul Stradins, and Charles W. Teplin	
Evolution of Film Crystalline Structure During the Ultrafast Deposition of Crystalline Si Films	21
Haijun Jia, Hiroshi Kuraseko, Hiroyuki Fujiwara, and Michio Kondo	

DEFECTS AND TRANSPORT

Electronic Transport in Co-Deposited Hydrogenated Amorphous/Nanocrystalline Thin Films.....	29
Y. Adjallah, C. Blackwell, C. Anderson, U. Kortshagen, and J. Kakalios	
Metastable Defects in Light Soaked Amorphous Silicon at 77 K.....	35
Tong Ju, Paul Stradins, and P. Craig Taylor	
Improved Passivation of a-Si:H /c-Si Interfaces Through Film Restructuring	41
M.Z. Burrows, U.K. Das, S. Bowden, S.S. Hegedus, R.L. Opila, and R.W. Birkmire	

*Invited Paper

SOLAR CELLS I

* Understanding of Passivation Mechanism in Heterojunction c-Si Solar Cells.....	49
Michio Kondo, Stefaan De Wolf, and Hiroyuki Fujiwara	
Correlation of Hydrogen Dilution Profiling to Material Structure and Device Performance of Hydrogenated Nanocrystalline Silicon Solar Cells	61
Baojie Yan, Guozhen Yue, Yanfa Yan, Chun-Sheng Jiang, Charles W. Teplin, Jeffrey Yang, and Subhendu Guha	
MW Plasma Enhanced CVD of Intrinsic Si for Thin-Film Solar Cells.....	67
Bas B. Van Aken, Hans Leegwater, Maarten Dorenkamper, Camile Devilee, Jochen Loffler, Maurits C.R. Heijna, and Wim J. Soppe	

CHARACTERIZATION

* Characterization of Amorphous/Crystalline Silicon Interfaces From Electrical Measurements	75
J.P. Kleider and A.S. Gudovskikh	
Probing Carrier Depletions on Grain Boundaries in Polycrystalline Si Thin Films by Scanning Capacitance Microscopy	87
C.-S. Jiang, H.R. Moutinho, B. To, P. Dippo, M.J. Romero, and M.M. Al-Jassim	
Characterization of the Mobility Gap in μ-Si:H Pin Devices.....	93
Bart Elger Pieters, Sandra Schicho, and Helmut Stiebig	
Characterization of Gap Defect States in Hydrogenated Amorphous Silicon Materials	99
Lihong (Heidi) Jiao and C.R. Wronski	

*Invited Paper

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)

***POSTER SESSION:
THIN-FILM GROWTH***

Polysilazane Precursor Used for Formation of Oxidized Insulator	107
Yuji Urabe and Toshiyuki Sameshima	
Boron Incorporation and Its Effect on Electronic Properties of Ge:H Films Deposited by LF Plasma	113
Andrey Kosarev, Alfonso J. Torres, Nery D. Checa, Yuri Kudriavtsev, Rene Asomoza, and Salvador G. Hernandez	
Low Temperature Deposition of Si-Based Thin Films on Plastic Films Using Pulsed-Discharge PECVD Under Near Atmospheric Pressure	119
Mitsutaka Matsumoto, Yohei Inayoshi, Maki Suemitsu, Setsuo Nakajima, Tsuyoshi Uehara, and Yasutake Toyoshima	
Pulsed Laser Heating-Induced Surface Rapid Cooling and Amorphization.....	125
Longzhang Tian and Xinwei Wang	

Studies on the Surface Reactions of Substituted Disilanes with Silica Surface	131
Tom Blomberg, Raija Matero, Suvi Haukka, and Andrew Root	

***POSTER SESSION:
AMORPHOUS, MICRO-, NANO-
AND POLYCRYSTALLINE SILICON***

Polycrystalline Silicon Thin-Film Solar Cells on ZnO:Al Coated Glass.....	139
Christiane Becker, Pinar Dogan, Benjamin Gorka, Florian Ruske, Tobias Hänel, Jan Behrends, Frank Fenske, Klaus Lips, Stefan Gall, and Bernd Rech	
Photoluminescence of Different Phase Si Nanoclusters in Amorphous Hydrogenated Silicon	145
Tatyana V. Torchynska	

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)

Electronic Properties of Nanocrystalline Silicon Deposited with Different Crystallite Fractions and Growth Rates	149
P.G. Hugger, J. David Cohen, Baojie Yan, Guozhen Yue, Xixiang Xu, Jeffrey Yang, and Subhendu Guha	
Doping Effects in Co-Deposited Mixed Phase Films of Hydrogenated Amorphous Silicon Containing Nanocrystalline Inclusions	155
C. Blackwell, Xiaodong Pi, U. Kortshagen, and J. Kakalios	
Nanocrystalline Silicon Diodes for Rectifiers on Flexible RFID Tags.....	161
Ian Chi Yan Kwong, Hyun Jung Lee, and Andrei Sazonov	
Low Temperature Synthesis of Nanocrystalline Silicon and Silicon Oxide Films by Plasma Chemical Vapor Deposition	167
Atsushi Tomyo, Hirokazu Kaki, Eiji Takahashi, Tsukasa Hayashi, Kiyoshi Ogata, and Yukiharu Uraoka	
Cyclically Varying Hydrogen Dilution for the Growth of Very Thin and Doped Nanocrystalline Silicon Films by Hot-Wire CVD	173
Fernando Villar, Aldrin Antony, Delfina Muñoz, Fredy Rojas, Jordi Escarré, Marco Stella, José Miguel Asensi, Joan Bertomeu, and Jordi Andreu	
Microstructure Effects in Hot-Wire Deposited Undoped Microcrystalline Silicon Films.....	179
Wolfhard Beyer, Reinhard Carius, Dorothea Lennartz, Lars Niessen, and Frank Pennartz	
Seeding Solid Phase Crystallization of Amorphous Silicon Films with Embedded Nanocrystals	185
Curtis Anderson and Uwe Kortshagen	

POSTER SESSION:
ALLOYS, STRUCTURAL PROPERTIES
AND SOLAR CELLS

Nanostructures with Group IV Nanocrystals Obtained by LPCVD and Thermal Annealing of SiGeO Layers.....	193
Bruno Morana, Andrés Rodríguez, Jesús Sangrador, Tomás Rodríguez, Óscar Martínez, Juan Jiménez, and Andreas Kling	
On Determination of Properties of Ultrathin and Very Thin Silicon Oxide Layers by FTIR and X-Ray Reflectivity	199
Martin Kopani, Matej Jergel, Hikaru Kobayashi, Masao Takahashi, Robert Brunner, Milan Mikula, Kentarou Imamura, Stanislav Jurecka, and Emil Pincik	
Structural and Opto-Electronic Properties of a-Si:H/a-SiN_x:H Superlattices	205
Stefan L. Luxembourg, Frans D. Tichelaar, Peter Kúš, and Miro Zeman	
Transient Photoconductivity Study of the Distribution of Gap States in 100°C VHF-Deposited Hydrogenated Silicon Layers	211
Monica Brinza, Guy J. Adriaenssens, Jatindra K. Rath, and Ruud E.I. Schropp	
Characterization and Light Emission Properties of Osmium Silicides Synthesized by Low Energy Ion Implantation	217
P.R. Poudel, K. Hossain, J. Li, B. Gorman, A. Neogi, B. Rout, J.L. Duggan, and F.D. McDaniel	

NOVEL APPLICATIONS

Multilayered a-SiC:H Device for Wavelength-Division (de)Multiplexing Applications in the Visible Spectrum.....	225
Manuela Vieira, Miguel Fernandes, Paula Louro, Manuel Augusto Vieira, Manuel Barata, and Alessandro Fantoni	
* Floating-Gate a-Si:H TFT Nonvolatile Memories	231
Yue Kuo and Helinda Nominanda	

*Invited Paper

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)***THIN-FILM TRANSISTORS I***

* Micro Crystalline Silicon TFT by the Metal Capped Diode	
Laser Thermal Annealing Method	243
Toshiaki Arai, Narihiro Morosawa, Yoshio Inagaki, Koichi Tatsuki, and Tetsuo Urabe	

ALLOYS: MICROCRYSTALLINE SILICON

Analysis of Compositionally and Structurally Graded Si:H	
and Si_{1-x}Ge_x:H Thin Films by Real Time Spectroscopic	
Ellipsometry	253
Nikolas J. Podraza, Jing Li, Christopher R. Wronski, Mark W. Horn, Elizabeth C. Dickey, and Robert W. Collins	
Two-Step Capacitance Transients From an Oxygen Impurity	
Defect	259
Shouvik Datta, J. David Cohen, Yueqin Xu, and Howard M. Branz	
Micro Photovoltaic Modules for Micro Systems.....	265
Nicolas Wyrsch, Sylvain Dunand, and Christophe Ballif	

FILM GROWTH AND CHARACTERIZATION I

Magnetic Resonance in Hydrogenated Nanocrystalline	
Silicon Thin Films	273
Tining Su, Tong Ju, Baojie Yan, Jeffrey Yang, Subhendu Guha, and P. Craig Taylor	
Voids in Hydrogenated Amorphous Silicon: A Comparison	
of ab initio Simulations and Proton NMR Studies.....	279
Sudeshna Chakraborty, David C. Bobela, P.C. Taylor, and D.A. Drabold	
Quality and Growth Rate of Hot-Wire Chemical Vapor	
Deposition Epitaxial Si Layers.....	285
Charles W. Teplin, Ina T. Martin, Kim M. Jones, David Young, Manuel J. Romero, Robert C. Reedy, Howard M. Branz, and Paul Stradins	

*Invited Paper

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)***CRYSTALLIZATION TECHNIQUES***

Influence of the Structural Properties of Micrococrystalline Silicon on the Performance of High Mobility Thin-Film Transistors.....	293
Kah-Yoong Chan, Dietmar Knipp, Reinhard Carius, and Helmut Stiebig	

THIN-FILM TRANSISTORS II

The Positive Gate Bias Annealing Method for the Suppression of a Leakage Current in the SPC-Si TFT on a Glass Substrate	301
Sang-Geun Park, Joong-Hyun Park, Seung-Hee Kuk, Dong-Won Kang, and Min-Koo Han	
High Performance Bottom Gate μc-Si TFT Fabricated by Microwave Plasma CVD	307
Akihiko Hiroe, Akinobu Teramoto, and Tadahiro Ohmi	

SOLAR CELLS II

* Production Technology of Large-Area, Light-Weight, Flexible Solar Cell and Module	315
Makoto Shimosawa, Shinichi Kawano, Takamasa Ishikawa, Tetsuro Nakamura, Yasushi Sakakibara, Shinji Kiyofuji, Hirofumi Enomoto, Hironori Nishihara, Tomoyoshi Kamoshita, Masahide Miyagi, Junichiro Saito, and Akihiro Takano	
Study of Large Area a-Si:H and nc-Si:H Based Multijunction Solar Cells and Materials	325
Xixiang Xu, Baojie Yan, Dave Beglau, Yang Li, Greg DeMaggio, Guozhen Yue, Arindam Banerjee, Jeff Yang, Subhendu Guha, Peter G. Hugger, and J. David Cohen	
Improved Photon Absorption in a-Si:H Solar Cells Using Photonic Crystal Architectures.....	331
Rana Biswas and Dayu Zhou	

*Invited Paper

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)***FILM GROWTH AND CHARACTERIZATION II***

Mechanical Properties and Reliability of Amorphous vs.	
Polycrystalline Silicon Thin Films.....	339
Joao Gaspar, Oliver Paul, Virginia Chu, and	
Joao Pedro Conde	

In Situ Transmission Electron Microscopy Investigation of	
Aluminum Induced Crystallization of Amorphous Silicon.....	345
Ram Kishore, Renu Sharma, Satoshi Hata,	
Noriyuki Kuwano, Yoshitsuga Tomokiyo,	
Hameed Naseem, and W.D. Brown	

Blue and Yellow Electroluminescence of MOSLED Made on	
Si-Rich SiO_x Film with Detuning Buried Si Nanoclusters Size	353
Chung-Hsiang Chang, Chi-Wee Liu, Chin-Hua Hsieh,	
Li-Jen Chou, and Gong-Ru Lin	

POSTER SESSION:
THIN-FILM TRANSISTORS

The Effect of Electrical Stress on the New Top Gate N-type	
Depletion Mode Polycrystalline Thin-Film Transistors	
Fabricated by Alternating Magnetic Field Enhanced	
Rapid Thermal Annealing.....	361
Won-Kyu Lee, Sang-Myeon Han, Sang-Geun Park,	
Sung-Hwan Choi, Joonhoo Choi, and Min-Koo Han	

Negative Bias Temperature Instability for P-Channel of	
LTPS Thin-Film Transistors with Fluorine Implantation	367
Chyuan-Haur Kao and W.H. Sung	

Hysteresis Phenomenon in Sequential Lateral Solidification	
Poly-Si Thin-Film Transistor at Low Temperature (213K).....	373
Sung-Hwan Choi, Sang-Geun Park, Won-Kyu Lee,	
Tae-Jun Ha, and Min-Koo Han	

Hydrogenated Nanocrystalline Silicon Thin-Film	
Transistor Array for X-Ray Detector Application	379
Kyung-Wook Shin, Mohammad R. Esmaeili-Rad,	
Andrei Sazonov, and Arokia Nathan	

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang

Table of Contents

[More information](#)

Temperature and Humidity Effects on the Stability of On-Plastic a-Si:H Thin-Film Transistors with Various Conduction Channel Layer Thicknesses	385
Jian Z. Chen and I-Chun Cheng	

***POSTER SESSION:
CRYSTALLIZATION TECHNIQUES***

Laser Fabrication of Sharp Conical Microstructures on Si Thin Films by Nd:YAG Laser Single Pulse Irradiation	393
Joe Moening and Daniel Georgiev	
Impurities and Grain Size Modeling in Recrystallized Silicon.....	399
Valeri V. Kalinin, Alexandre M. Myasnikov, and Vladislav E. Zyryanov	

***POSTER SESSION:
IMAGERS, SENSORS AND
NOVEL APPLICATIONS***

Improvement in pinpi'n' Device Architectures for Imaging Applications.....	407
P. Louro, A. Fantoni, M. Fernandes, G. Lavareda, N. Carvalho, and M. Vieira	
Noise Analysis of Image Sensor Arrays for Large-Area Biomedical Imaging	413
Jackson Lai, Denis Striakhilev, Yuri Vygranenko, Gregory Heiler, Arokia Nathan, and Timothy Tredwell	
Noise in Different Micro-Bolometer Configurations with Silicon-Germanium Thermo-Sensing Layer	419
Mario M. Moreno, Andrey Kosarev, Alfonso J. Torres, and Ismael Cosme	
Transient Current in a-Si:H-Based MIS Photosensors	425
Miguel Fernandes, Yuriy Vygranenko, Manuela Vieira, Gregory Heiler, Timothy Tredwell, and Arokia Nathan	

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
 Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang
 Table of Contents

[More information](#)

Physically Based Compact Model for Segmented a-Si:H n-i-p Photodiodes	431
Jeff Hsin Chang, Timothy Tredwell, Gregory Heiler, Yuri Vygranenko, Denis Striakhilev, Kyung Ho Kim, and Arokia Nathan	
Luminescent Colloidal Silicon Nanocrystals Prepared by Nanoseconds Laser Fragmentation and Laser Ablation in Water	437
Vladimir Svrcek, Davide Mariotti, Richard Hailstone, Hiroyuki Fujiwara, and Michio Kondo	
Optimized O/Si Composition Ratio for Enhancing Si Nanocrystal Based Luminescence in Si-Rich SiO_x Grown by PECVD with Argon Diluted SiH₄.....	443
Chung-Hsiang Chang, Chin-Hua Hsieh, Li-Jen Chou, and Gong-Ru Lin	
<i>SENSORS, TRANSISTORS AND ACTIVE MATRIX ARRAYS I</i>	
Fluorescence Detection of DNA Hybridization Using an Integrated Thin-Film Amorphous Silicon n-i-p Photodiode	451
A.C. Pimentel, R. Cabeça, M. Rodrigues, D.M.F. Prazeres, V. Chu, and J.P. Conde	
Noise Characterization of Polycrystalline Silicon Thin-Film Transistors for X-Ray Imagers Based on Active Pixel Architectures.....	457
L.E. Antonuk, M. Koniczek, J. McDonald, Y. El-Mohri, Q. Zhao, and M. Behravan	
High Fill Factor a-Si:H Sensor Arrays with Reduced Pixel Crosstalk	463
Y. Vygranenko, A. Sazonov, D. Striakhilev, J.H. Chang, G. Heiler, J. Lai, T. Tredwell, and A. Nathan	

Cambridge University Press

978-1-107-40857-9 - Amorphous and Polycrystalline Thin-Film Silicon Science and Technology—2008: Materials Research Society Symposium Proceedings: Volume 1066
Editors: Arokia Nathan, Andrew Flewitt, Jack Hou, Seiichi Miyazaki and Jeffrey Yang

Table of Contents

[More information](#)

***SENSORS, TRANSISTORS AND
ACTIVE MATRIX ARRAYS II***

Self-Aligned Amorphous Silicon Thin-Film Transistors with Mobility Above $1 \text{ cm}^2 \text{V}^{-1} \text{s}^{-1}$ Fabricated at 300°C on Clear Plastic Substrates.....	471
Kunigunde H. Cherenack, Alex Z. Kattamis, Bahman Hekmatshoar, James C. Sturm, and Sigurd Wagner	
Aligned-Crystalline Si Films on Glass.....	477
Alp T. Findikoglu, Ozan Ugurlu, and Terry G. Holesinger	
Monolithic 3D Integration of Single-Grain Si TFTs.....	483
Mohammad Reza Tajari Mofrad, Ryoichi Ishihara, Jaber Derakhshandeh, Alessandro Baiano, Johan van der Cingel, and Cees Beenakker	
Author Index	491
Subject Index.....	495