

Semiconductor Fabrication

Technology and Metrology

Dinesh C. Gupta
editor



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Each paper published in this volume was evaluated by three peer reviewers. The authors addressed all of the reviewers' comments to the satisfaction of both the technical editor(s) and the ASTM Committee on Publications.

The quality of the papers in this publication reflects not only the obvious efforts of the authors and the technical editor(s), but also the work of these peer reviewers. The ASTM Committee on Publications acknowledges with appreciation their dedication and contribution of time and effort on behalf of ASTM.

Foreword

The Fifth International Symposium on Semiconductor Processing was held at Santa Clara, California on 1-5 February, 1988 under the chairmanship of Dinesh C. Gupta, Siliconix Incorporated. The Symposium was sponsored by ASTM Committee F-1 on Electronics and Semiconductor Equipment & Materials International [SEMI] in cooperation with National Institute for Standards and Technology [NIST], Stanford University Center for Integrated Circuits and IEEE Components, Hybrids & Manufacturing Technology Society.

The Symposium was made successful by the efforts of many persons who participated in the Advisory Board and various Committees. The guidance was provided by the Chairman and the Officers of ASTM Committee F-1 on Electronics and its various subcommittees including the Executive subcommittee. The following persons presided on the technical and workshop sessions: K.E.Benson, AT&T Bell Laboratories; M.I.Bell, J.R.Ehrstein, and R.D.Larrabee, National Institute for Standards and Technology; W.M.Bullis, Siltec Corporation; I-Wen Connick, Philips Research Laboratories; S.M.Cox, AT&T Technologies; T.E.Cynkar, Signetics Corporation; S.J.Fonash, The Pennsylvania State University; D.C.Gupta, Siliconix Inc.; W.A.Keenan, Prometrix Inc.; A.Lieberman, Particle Measuring Systems Inc.; J.W.Medernach, Sandia National Laboratories; D.Rogers, Cominco Ltd.; W.R.Schevey, Mancel Associates Inc.; P.S.Speicher, RADC/RBRE; R.B.Swaroop, Electric Power Research Institute; C.H.Ting, Intel Corporation; and R.H.Unger, Motorola Incorporated.

We are indebted to Kenneth Levy, KLA Instruments Corporation for the dinner speech, and are grateful to the members and guests of ASTM Committee F-1 and Standards Committees of SEMI who were called upon for special assignments during the two-year planning of the Symposium. Our special thanks to W.A.Baylies, Chairman, Committee F-1; P.L.Davis, SEMI; S.L.Kauffman, ASTM; R.I.Scace, National Institute for Standards and Technology and P.Wesling, Tandem Computers Incorporated.

Over one hundred and fifty scientists participated all over the world in the review process for the papers published in this publication. Without their participation, this publication would not have been possible.

And finally, we acknowledge the hard work and efforts of the staff of publication, review, editorial and marketing departments of ASTM in bringing out this book.

Contents

Introduction	1
---------------------	---

SILICON CRYSTAL GROWTH AND EPITAXIAL DEPOSITION TECHNIQUES

The Effect of a Rotational Magnetic Field on MCZ Crystal Growing— KENICHI YAMASHITA, SUMIO KOBAYASHI, TOSHIHIKO AOKI, YASUSHI KAWATA, AND TOSHIO SHIRAIWA	7
Silicon Slice Fracture Analysis— LAWRENCE D. DYER	18
Characterization of High Growth Rate Epitaxial Silicon from a New Single Wafer Reactor— MCDONALD ROBINSON AND LAMONTE H. LAWRENCE	30
Softening of Si and GaAs During Thermal Process— HISAAKI SUGA, MINORU ICHIZAWA, KAZUYOSHI ENDO, AND KENJI TOMIZAWA	43
Nucleation and Growth Kinetics of Bulk Microdefects in Heavily Doped Epitaxial Silicon Wafers— WITAWAT WIJARANAKULA, JOHN H. MATLOCK, AND HOWARD MOLLENKOPF	54
On the Application of Calibration Data to Spreading Resistance Analysis— HARRY L. BERKOWITZ	74
Epitaxial Silicon Quality Improvement by Automatic Surface Inspection— DAVID J. RUPRECHT, LANCE G. HELLWIG, AND JON A. ROSSI	87
Spreading Resistance Profiles in Gallium Arsenide— ROBERT G. MAZUR AND ROBERT J. HILLARD	96

FABRICATION TECHNOLOGY

High Dose Arsenic Implant for Bipolar Buried Layers— CARLOS L. YGARTUA AND ROBERT SWAROOP	115
Accurate Junction-Depth Measurements Using Chemical Staining— RAVI SUBRAHMANYAN, HISHAM Z. MASSOUD, AND RICHARD B. FAIR	126
Use of Polysilicon Deposition in a Cold-Wall LPCVD Reactor to Determine Wafer Temperature Uniformity— VLADIMIR STAROV AND LARRY LANE	150
Dry Etching Techniques for MMIC Fabrication on GaAs— JYOTI K. BHARDWAJ, ADRIAN KIEMASZ, MICHAEL A. STEPHENS, SARAH J. HARRINGTON, AND ANDREW D. MCQUARRIE	159
Dry Etching of Ion Implanted Silicon: Electrical Effects— JAMES M. HEDDLESON, MARK W. HORN, AND STEPHEN J. FONASH	174

Reaction Mechanisms and Rate Limitations in Dry Etching of Silicon Dioxide with Anhydrous Hydrogen Fluoride—L. DAVIS CLEMENTS, JAMES E. BUSSE, AND JITESH MEHTA	182
--	-----

Plasma Etching of Aluminum Alloys in BCl_3/Cl_2 Plasmas—CHING-HWA CHEN, STEVE DEORNELLAS, AND BILL BURKE	202
--	-----

MICROCONTAMINATION

NBS Submicron Particle Standards for Microcontamination Measurement—THOMAS R. LETTIERI	215
---	-----

Particulate Cleanliness Testing of Filters and Equipment in Process Fluids—SUSAN H. GOLDSMITH AND GEORGE P. GRUNDELMAN	222
---	-----

Parameters Controlling Counting Efficiency for Optical Liquid-Borne Particle Counters—ALVIN LIEBERMAN	230
--	-----

METALLIZATION AND INTERCONNECTS

A Correlation Study of Aluminum Film Wet Etch Uniformity with the Sputter Etch of Oxide Films—FRANCOIS M. DUMESNIL, MIKE BRUNER, AND MIKE BERMAN	243
---	-----

Crack Free and Highly Reliable Double Level Metallization Process Using Plasma Oxide and Silanol-Type SOG Layers—TOSHIMICHI IWAMORI, YASUSHI SAKATA, HITOSHI KOJIMA, AND YUJI YATSUDA	252
--	-----

VLSI Defect Detection, Classification, and Reduction from In-Process and Post-Process SRAM Inspections—HAROLD G. PARKS, CLAIR E. LOGAN, AND CAROL A. FAHRENZ	266
---	-----

Advanced VLSI Isolation Technologies—YUE KUO	284
---	-----

MATERIAL DEFECTS AND GETTERING

Application of Total Reflection X-Ray Fluorescence Analysis for Metallic Trace Impurities on Silicon Wafer Surfaces—PETER EICHINGER, HEINZ J. RATH, AND HEINRICH SCHWENKE	305
--	-----

Chemical Analysis of Metallic Impurity on the Surface of Silicon Wafers—TOSHIO SHIRAIWA, NOBUKATSU FUJINO, SHIGEO SUMITA, AND YASUKO TANIZOE	314
---	-----

Process-Induced Influence on the Minority-Carrier Lifetime in Power Devices—VINOD K. KHANNA, DEEP K. THAKUR, KHAIRATI L. JASUJA, AND WAMAN S. KHOKLE	324
---	-----

The Role of Oxygen Precipitates in the Gettering of Iron in Silicon—PANKAJ K. SINHA AND WILLIAM S. GLAUNSINGER	339
---	-----

The Calibration and Reproducibility of Oxygen Concentration in Silicon Measurements Using SIMS Characterization Technique—MICHAEL GOLDSTEIN AND JOSEPH MAKOVSKY	350
Defect, Dopant, and Device Modification Using Si(Ge,B) Epitaxy—GEORGE A. ROZGONYI, RATNAJI R. KOLA, KENNETH E. BEAN, AND KEITH LINDBERG	361
Effect of Pre- and Post-Epitaxial Annealing on Oxygen Precipitation and Internal Gettering in N/N⁺(100) Epitaxial Wafers—WITAWAT WIJARANAKULA, STEVEN SHIMADA, HOWARD MOLLENKOFF, JOHN H. MATLOCK, AND MICHAEL STUBER	371
Electrical Characterization of Electrically Active Surface Contaminants by Epitaxial Encapsulation—ALBERT DERHEIMER, S. TAKAMIZAWA, JOHN H. MATLOCK, AND HOWARD MOLLENKOFF	387
Optimum Polysilicon Deposition on Wafer Backs for Gettering Purposes—GABRIELLA BORIONETTI, MARCELLO DOMENICI, GIANCARLO FERRERO	400
CONTROL CHARTS, STANDARDS, AND SPECIFICATIONS	
Modification of Control Charts for Use in an Integrated Circuit Fabrication Environment—DAVID J. FRIEDMAN	415
Perkin-Elmer 544 Overlay Evaluation Using Statistical Techniques—GERALD A. KELLER, WHITSON G. WALDO, AND RICHARD F. BABASICK	427
Revolutionizing Semiconductor Material Specifications—ROBERT K. LOWRY	442
Economic Impact of Standards on Productivity in the Semiconductor Industry—GREGORY C. TASSEY, ROBERT I. SCACE, AND JUDSON C. FRENCH	450
APPENDIX	
Appendix—Workshop and Panel Discussions	463
INDEXES	
Author Index	471
Subject Index	473

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