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978-1-107-41356-6 - In Situ Process Diagnostics and Intelligent Materials Processing

Edited by Peter A. Rosenthal, Walter M. Duncan and John A. Woollam

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***In Situ* Process Diagnostics
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In Situ Process Diagnostics and Intelligent Materials Processing

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TABLE OF CONTENTS

Preface ix

Materials Research Society Symposium Proceedings x

PART I: SENSOR TECHNOLOGIES AND SEMICONDUCTOR DIAGNOSTICS

***Real-Time Monitoring of Semiconductor Growth by Spectroscopic Ellipsometry 3**
B. Johs, J. Hale, C. Herzinger, D. Doctor, K. Elliott, G. Olson, D. Chow, J. Roth, I. Ferguson, M. Pelczynski, C.H. Kuo, and S. Johnson

***In Situ Fourier Transform Infrared Spectroscopy for Real-Time Diagnostics of Thin-Film Processes 15**
P.R. Solomon, S. Charpenay, W. Zhang, A.S. Bonanno, P.A. Rosenthal, J.E. Cosgrove, K.K. Kinsella, and P.J. Kung

***Rotating-Compensator Multichannel Ellipsometry: Applications in Process Development for Nanocrystalline Diamond Thin Films 23**
R.W. Collins, Joungchel Lee, P.I. Rovira, and Il-sin An

***SPA Monitoring of GaN MOVPE Surface 35**
Naoki Kobayashi and Yasuyuki Kobayashi

Material Balance Modeling of End-Point Uniformity in Silicon Dioxide Plasma Etching 41
J.J. Chambers, K. Min, J.R. Hauser, and G.N. Parsons

Reflection High-Energy Electron Diffraction as an Intrinsic Material Property Sensor for Machine Condition Transfer Function in Molecular-Beam Epitaxial Growth of III-V Compound Semiconductors 47
P. Chen, C. Wang, A. Madhukar, T. Khan, A. Small, Z. Yan, and R. Viswanathan

In Situ RF Diagnostic for PECVD Process Control 53
S. Raoux, K.S. Liu, X. Guo, and D. Silvetti

In Situ Monitoring of Anodic Oxide Growth on Si(001) by Interface Second-Harmonic Generation 59
S. Janz and J.A. Bardwell

CVD Growth and Excimer Laser Processing of SiGe Alloys Monitored by Single Wavelength Ellipsometry and Atomic Force Microscopy 65
R. Larciprete, G. Padeletti, S. Cozzi, and S. Pieretti

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Cambridge University Press
978-1-107-41356-6 - In Situ Process Diagnostics and Intelligent Materials Processing
Edited by Peter A. Rosenthal, Walter M. Duncan and John A. Woollam
Frontmatter
[More information](#)

Real-Time Feedback Control of Thermal Cl₂ Etching of GaAs Based on *In Situ* Spectroscopic Ellipsometry 71
T. Parent, R. Heitz, P. Chen, and A. Madhukar

X-ray-Diffraction Study of Laser-Material Interactions With an Ultrafast Table-Top X-ray Source 77
T. Guo, C. Rose-Petrick, R.X. Jimenez, J.A. Squier, B.C. Walker, K.R. Wilson, and C.P.J. Barty

Infrared Emission Spectra of Indium Phosphide at Elevated Temperatures 83
H. Rogne, P.J. Timans, and H. Ahmed

Characterization of a Solid-Source Delivery System for Metalorganic Chemical Vapor Deposition by *In Situ* Laser Reflectance 89
C. Dubourdieu, G.Y. Kim, J.D. Meyer, and B. Gallois

PART II: SENSOR TECHNOLOGIES AND THIN-FILM DIAGNOSTICS

***Closed-Loop Control of MBE Using an Integrated Multi-Sensor System** 97
John A. Roth

***Silicon Rapid Thermal Processing With Ripple Pyrometry** 105
A.T. Fiory

***Monitoring and Control in Vapor-Phase Epitaxy** 117
T.P. Pearsall

X-ray Absorption Spectroscopy as an *In Situ* Tool in Materials Science 127
T. Ressler, Joe Wong, and W. Metz

Polycapillary Optics for *In Situ* Diagnostics 133
F.A. Hofmann, N. Gao, S.M. Owens, W.M. Gibson, C.A. MacDonald, and S.M. Lee

***In Situ* Characterization of Laser Deposited Fe/Ag Multilayers by a Combination of Time-of-Flight, RHEED, and Resistance Measurements** 139
Sebastian Fähler, Martin Weisheit, and Hans-Ulrich Krebs

Effect of Current Distribution on Quartz-Crystal Microbalance Measurements 145
James J. Kelly, Christopher J. Durning, and Alan C. West

***In Situ* Characterization of Functional Organic Thin Films by Energy Dispersive Grazing Incidence X-ray Diffraction** 151
Yuji Yoshida, Hiroshi Takiguchi, Nobutaka Tanigaki, and Kiyoshi Yase

*Invited Paper

Cambridge University Press
978-1-107-41356-6 - In Situ Process Diagnostics and Intelligent Materials Processing
Edited by Peter A. Rosenthal, Walter M. Duncan and John A. Woollam
Frontmatter
[More information](#)

Monitoring of Sidewall Spacer Etch by Optical Emission Spectroscopy and Mass Spectroscopy 157
K. Min, J.J. Chambers, G.N. Parsons, and J.R. Hauser

Real-Time Observation of Material Deformation Processes by Synchrotron White Beam X-ray Topography 163
Z.B. Zhao, J. Hershberger, Z.U. Rek, and J.C. Bilello

Particle and UV Imaging With Position Sensitive MCP Detectors - Three-Dimensional Momentum Space Imaging 171
V. Mergel, O. Jagutzki, L. Spielberger, K. Ullmann-Pfleger, R. Dörner, and H. Schmidt-Böcking

In Situ and Ex Situ Ellipsometric Characterization of Oxygen Plasma and UV Radiation Effects on Spacecraft Materials 177
C.L. Bungay, T.E. Tiwald, M.J. DeVries, B.J. Dworak, and John A. Woollam

PART III: IN SITU DIAGNOSTICS OF OXIDE FILM GROWTH AND PROCESSES

In Situ Plasma Characterization of Laser-Ablated Ba_xSr_{1-x}TiO₃ 187
D.T. Venizelos, S. Sengupta, and R.C. Sausa

***Diode-Laser-Based Atomic Absorption Monitors for Physical-Vapor-Deposition Process Control** 193
Weizhi Wang, R.H. Hammond, M.M. Fejer, and M.R. Beasley

Growth of La_{2-x}Sr_xCuO₄ and La₂CuO_{4+δ} Thin-Films by Reactive Coevaporation 203
H. Sato, H. Yamamoto, and M. Naito

In Situ Monitoring During PLD of Complex Oxides Using RHEED at High Oxygen Pressure 209
Guus J.H.M. Rijnders, Gertjan Koster, Dave H.A. Blank, and Horst Rogalla

Spectral-Component Monitoring of the Plumes Generated During the Deposition of RE(Y,Nd) Ba₂Cu₃O_{7-x} Films by Pulsed Laser Ablation 215
R. Biggers, C. Varanasi, I. Maartense, D. Dempsey, D. Mast, D. Liptak, J. Jones, T.L. Peterson, T. Murray, and J. Busbee

***RHEED Studies of a Axis Oriented DyBa₂Cu₃O₇ Films Grown by ALL-MBE** 221
Ivan Bozovic, J.N. Eckstein, Natasha Bozovic, and J. O'Donnell

*Invited Paper

Cambridge University Press
978-1-107-41356-6 - In Situ Process Diagnostics and Intelligent Materials Processing
Edited by Peter A. Rosenthal, Walter M. Duncan and John A. Woollam
Frontmatter
[More information](#)

***Atomic-Scale Analysis of Laser MBE Growth of Oxide Thin Films by *In Situ* RHEED and CAICISS** 227
M. Yoshimoto, T. Ohnishi, G.-H. Lee, K. Sasaki, H. Maruta, and H. Koinuma

***In Situ* Diagnostics at High Pressures: Ellipsometric and RHEED Studies of the Growth of YBa₂Cu₃O₇** 237
Dave H.A. Blank and Horst Rogalla

RHEED Monitoring of Rotating Samples During Large-Area Homogeneous Deposition of Oxides 249
V.C. Matijasevic, Z. Lu, K. von Dessenneck, C. Taylor, and D. Barlett

***In Situ* Initial Growth Studies of (Sr,Ca)CuO₂ on SrTiO₃ by High-Pressure RHEED** 255
Gertjan Koster, Guus J.H.M. Rijnders, Dave H.A. Blank, and Horst Rogalla

PART IV: INTELLIGENT PROCESSING OF ELECTRONIC CERAMICS

***In Situ* Monitoring of the Effects of Gas Mixtures on Ion-Beam Depositions of Diamondlike-Carbon Films** 263
R.L.C. Wu, W. Lanter, R. Monreal, P.B. Kosel, and K. Miyoshi

***In Situ* FTIR Spectroscopic Detection of Adsorbed Species on Sapphire Substrates in a Diamond ECR-PACVD System** 269
F. Shahedipour, S. Zhu, and H.W. White

Spectroscopic Determination of C₂ Densities in Ar/H₂/CH₄ and Ar/H₂/C₆₀ Microwave Plasmas for Nanocrystalline Diamond Synthesis 275
A.N. Goyette, J.E. Lawler, L.W. Anderson, D.M. Gruen, T.G. McCauley, D. Zhou, and A.R. Krauss

Microanalysis of Soot Particulates Using STEM 281
David C. Bell, Lenore C. Rainey, Árpád B. Palotás, and John B. VanderSande

Author Index 287

Subject Index 289

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978-1-107-41356-6 - In Situ Process Diagnostics and Intelligent Materials Processing

Edited by Peter A. Rosenthal, Walter M. Duncan and John A. Woollam

Frontmatter

[More information](#)

PREFACE

This volume is the proceedings of the symposium '*In Situ* Process Diagnostics and Intelligent Materials Processing', held on December 2-5, during the 1997 MRS Fall Meeting in Boston, Massachusetts. The first symposium on this topic to be held under MRS sponsorship, it was organized to focus on the rapidly developing field of sensor technology for process monitoring and control during the fabrication of advanced materials and structures. Research in sensor-driven closed-loop control of the fabrication process (i.e., process-state monitoring,) as well as product-state (e.g., wafer-state) monitoring, were topics of interest. Process techniques discussed include chemical vapor deposition (CVD), metalorganic chemical vapor deposition (MOCVD), plasma-enhanced chemical vapor deposition (PECVD), molecular beam epitaxy (MBE), rapid thermal processing (RTP), reactive-ion and plasma etching, electron beam evaporation, pulsed laser deposition (PLD), and sputtering. Materials of interest include electronic and optical thin-films such as semiconductors, epitaxial oxides, metal, and dielectrics, as well as particles and nanostructured materials. Real-time *in-situ* sensing techniques for monitoring variables such as temperature, composition, optical properties, film thickness and particle-size distribution were discussed.

The speakers and attendees represented a range of academic institutions, national laboratories and industrial organizations. Twenty-three invited speakers provided overviews of sensor technology, applications of *in situ* process diagnostics and sensor integration. In addition, there were 25 contributed oral and 27 poster presentations. One session of the symposium was held jointly with the symposium on 'Chemical Aspects of Electronic Ceramics Processing.'

Overall, the proceedings is organized into four sections largely reflecting common materials systems: Sensor Technologies and Semiconductor Diagnostics, Sensor Technologies and Thin-Film Diagnostics, *In Situ* Diagnostics of Oxide Film Growth and Processes, and Intelligent Processing of Electronic Ceramics.

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