## **Contents**

. Fundamentals	
Chairpersons: D.E. Harrison and C.A. Evans, Jr.	
Invited: The Dynamics of Ion-Solid Interactions: A Basis for Under- standing SIMS By N. Winograd (With 2 Figures)	2
Invited: Simultaneous Measurements of Photon and Secondary Ion Emissions from Ion-Bombarded Metal Surfaces By T. Okutani and R. Shimizu (With 2 Figures)	7
Atom Ejection Mechanisms and Models By D.E. Harrison, Jr., B.J. Garrison, and N. Winograd (With 1 Figure)	12
New Models of Sputtering and Ion Knock-On Mixing By S.A. Schwarz and C.R. Helms (With 3 Figures)	15
Clustering Distances in Secondary Ion Mass Spectrometry By F. Honda, Y. Fukuda, and J.W. Rabalais (With 2 Figures)	18
Basic Aspects in the Sputtering of Atoms, Ions, and Excited States By R. Kelly	21
Cluster Formation in SIMS: CO on PdAg By G.J. Slusser (With 1 Figure)	26
Effect of Partial Oxygen Pressure on Metal Single Crystals Bombarded by Noble Gas Ions By M. Bernheim and G. Slodzian (With 5 Figures)	29
A Comparison of Absolute Yields of Excited Neutrals and Positive Ions from Ion-Bombarded Surfaces By P. Williams, I.S.T. Tsong, and S. Tsuji	33
Correlation Between the Spectral Ionization Probability of Sputtered Atoms and the Electron Density of States By T.R. Lundquist (With 3 Figures)	34
Physical Aspects of the Valence Model's Parameters  By C. Plog and W. Gerhard (With 4 Figures)	37

Bombarded by Noble Gas Ions By M. Bernheim, J. Rebière, and G. Slodzian (With 4 Figures) 40
Angle-Resolved SIMSA New Technique for the Determination of Surface Structure By B.J. Garrison, S.P. Holland, and N. Winograd (With 2 Figures) 44
by b.o. darrison, s.r. norrand, and h. winograd (with 2 rigures) 44
II. Quantitation
Chairpersons: D.B. Wittry and P. Williams
Invited: Factors Influencing Secondary Ion Yields By V.R. Deline (With 3 Figures)
Invited: Instrumental Effects on Quantitative Analysis by Secondary Ion Mass Spectrometry By D.E. Newbury
A Quantitative Model for the Effects on Secondary Ion Emission of Gaseous Absorption at Solid Surfaces Under Noble Gas Ion Bombardment By J.N. Coles, Presented by G.L. Merrill (With 1 Figure)58
The Application of Ion Implantation to Quantitative SIMS Analysis By D.P. Leta and G.H. Morrison
Energy Filtering and Quantitative SIMS Analysis of Silicates for Major and Trace Elements By N. Shimizu
Quantitative Analysis of Doped GaAs by Quadrupole SIMS By W. Gerigk and M. Maier (With 1 Figure)64
Trace Element Analysis of Silicates by Ion Microprobe By C. Meyer, Jr. (With 1 Figure)67
Imaging of Element Distributions by Ion Microprobe By J.H. Schilling (With 3 Figures)70
Secondary Ion Emission from Titanium Alloys Under Argon and Oxygen Bombardment
By J.M. Schroeer, A. Dely, and L.L. Deal (With 1 Figure)
Effect of Alloying in Secondary Ion Emission from AgPd and CrNi Systems By M.L. Yu and W. Reuter (With 3 Figures)
III. Semiconductors
Chairpersons: C.W. Magee and W. Werner
Invited: Quantitation of SIMS for Semiconductor Processing Technology By T.W. Sigmon (With 3 Figures)80

Problems Encountered in Depth Profiling of Nitrogen and Oxygen in Silicon by Means of Secondary Ion Mass Spectrometry By W. Wach and K. Wittmaack (With 3 Figures)
Depth Profiling of Phosphorus in Silicon Using Cesium Bombardment Negative SIMS By C.W. Magee (With 4 Figures)
Chromium and Iron Determination in GaAs Epitaxial Layers By A.M. Huber, G. Morillot, P. Merenda, and N.T. Linh (With 5 Figures)
Thermal Redistribution of Cr in GaAs Due to Damage, Stress and Concentration Gradients By C.A. Evans, Jr., V.R. Deline, and T.W. Sigmon
On-Line Sputter Rate Measurements During SIMS, AES Depth Profiling By J. Kempf (With 4 Figures)
Laser Induced Redistribution of Ion Implanted and Surface Deposited B in Silicon: A SIMS Study By W.H. Christie, R.J. Warmack, C.W. White, and J. Narayan (With 3 Figures)
SIMS Identification of Impurity Segregation to Grain Boundaries in Cast Multigrained Silicon By L.L. Kazmerski, P.J. Ireland, and T.F. Ciszek (With 3 Figures)103
SIMS Studies in Compound Semiconductors By J.E. Baker, P. Williams, D.J. Wolford, J.D. Oberstar, and B.G. Streetman
Characterization for Composition and Uniformity of MCVD Glass Film by Secondary Ion Mass Spectrometry (SIMS) By D.L. Malm and G.W. Tasker (With 2 Figures)
SIMS Study of Metallized Silicon Semiconductors By K.L. Wang and H.A. Storms (With 2 Figures)
IV. Static SIMS
Chairperson: A. Benninghoven
Invited: Molecular Secondary Ion Emission By A. Benninghoven (With 6 Figures)
Invited: Analytical Applications of SIMS  By D.M. Hercules
Static SIMS Investigations of Amino Acid Mixtures By S. Tamaki, A. Benninghoven and W. Sichtermann (With 3 Figures) 127
Static SIMS of Amino Acid Overlayers

Static SIMS Studies of Metal-Covered W(110) Surfaces  By S. Prigge and E. Bauer (With 4 Figures)
Investigation of Surface Reactions by SIMS: Nickel-Oxygen-
Hydrogen-Interaction By P. Beckmann, K.H. Müller, M. Schemmer, and A. Benninghoven (With 3 Figures)
Study of Inorganic Salts by Static and Dynamic Secondary Ion Mass Spectrometry (SIMS) By E. De Pauw and J. Marien (With 2 Figures)
Secondary Ion Mass Spectrometry of Amino Acids by Proton and Alkali Ion Attachment By W. Sichtermann and A. Benninghoven (With 3 Figures)
V. Metallurgy
Chairpersons: J.D. Brown and A.P. von Rosenstiel
Invited: Application of SIMS to Analysis of Steels By K. Tsunoyama, T. Suzuki, Y. Ohashi, and H. Kishidaka (With 5 Figures)
Investigation of Metal Corrosion Mechanisms Using Stable Isotopes with the Ion Microprobe By S.S. Cristy and J.B. Condon
Investigations of Corrosion Layers on Mild Steel with a Direct Imaging Mass Spectrometer By A. Pebler and G.G. Sweeney (With 2 Figures)
The Use of SIMS in the Oxidation of Metals  By J.S. Sheasby and J.D. Brown
Influence of Atomic Concentrations on Ion Emission Yields of Alloys Flooded with Oxygen By C. Roques-Carmes, J.C. Pivin, and G. Slodzian (With 5 Figures) 160
Application of SIMS and AES to Environmental Studies of Fatigue Crack Growth in Aluminum Alloys By A.K. Zurek and H.L. Marcus (With 2 Figures)
Application of Ion Microprobe to Surface Properties of Cold-Rolled Steel Sheet By T. Shiraiwa, N. Fujino, J. Murayama, and N. Usuki (With 9 Figures)
Some Applications of SIMS and Other Surface Sensitive Techniques for the Chemical Characterization of Industrial Steel Surfaces

VI. Indiamentation
Chairpersons: D.S. Simons and F.G. Rüdenauer
Invited: Analytical Requirements of SIMS and the Instrumental Implications By H. Liebl (With 5 Figures)
Invited: Some Considerations on Secondary Ion Optics By G. Slodzian (With 1 Figure)
A Compact Cs-Evaporator for High Sensitivity SIMS By T. Okutani, K. Shono, and R. Shimizu (With 3 Figures) 186
Comparison of Laser Ionization and Secondary Ion Mass Spectrometry for Organic Materials Analysis By L.V. Phillips
Application to Semiconductor Characterization of a Mass-Filtered, Microfocussed Ion Gun and High-Transmission Quadrupole By A. Diebold and C.E. Badgett
Transmission of Quadrupole Mass Spectrometers for SIMS Studies By RL. Inglebert and JF. Hennequin (With 3 Figures) 192
SIMS Apparatus to Study Ion Impact Desorption By R. Bastasz (With 1 Figure)
Digital Mass Control for an Ion Microprobe Mass Analyzer By D.B. Wittry and F. Guo (With 1 Figure)
Computer-Controlled Peak-Top Search Procedure By D.S. Simons, B.F. Schunicht, and J.A. McHugh
A Computer-Based Instrument Control and Data Acquisition System for a Quadrupole Secondary Ion Mass Spectrometry Instrument By B.F. Phillips and N.E. Lares (With 3 Figures)
How to Make the Most of the SIMS Method by Means of the Scanning Ion Microscope A-DIDA By J.L. Maul (With 2 Figures)
Sputtered Neutral Mass Spectrometry Using a Microwave Plasma By T. Ishitani and H. Tamura (With 2 Figures)209
Investigation of Monolayers at High Primary Ion Current Densities By K.D. Klöppel and W. Seidel (With 3 Figures)
VII. Geology
Chairpersons: J. Okano and C. Meyer
SIMS Measurement of Mg Isotopic Ratio in a Chondrite By J. Okano and H. Nishimura (With 4 Figures)

Negative Molecular Ion Analysis of Inorganic Sulfur-Oxygen Salts
by SIMS By J. Ganjei, R. Colton, and J. Murday
SIMS Measurements of Tracer Diffusivity of Oxygen in Titanium Dioxides and Sulfur in a Calcium Sulfide By M. Someno and M. Kobayashi (With 2 Figures)
SIMS Analysis of TiO <sub>2</sub> , Including Depth Profiling By J.L. Peña, M.H. Farias, and F. Sanchez-Sinencio (With 3 Figures) 225
Ion Microprobe Analysis of Small Heavy Metal Particles and Their Compounds By J. Gavrilovic (With 3 Figures)
VIII. Panel Discussion
Chairperson: I.L. Kofsky
Applications of Particle Accelerator-Assisted Ultra-High Sensitivity SIMS By G.H. Morrison, K.H. Purser, C.A.Evans, Jr., N. Shimizu (With 2 Figures)
IX. Biology
Chairpersons: M.S. Burns and G.H. Morrison
Invited: Biomedical Applications of Secondary Ion Emission Micro-Analysis  By P. Galle (With 7 Figures)
Diffusible Ion Localization in Biological Tissue by Ion Microscopy By K.M. Stika and G.H. Morrison
Determination of Isotope Ratios of Calcium and Iron in Human Blood by Secondary Ion Mass Spectrometry By K. Wittmaack, F. Schulz, and E. Werner (With 1 Figure)245
Biogenic and Non-Biogenic Carbonates of Calcium and Magnesium:  New Studies by Secondary Ion Imaging By J. Archambault-Guézou and R. Lefèvre (With 26 Figures)248
Localization of Elements in Botanical Materials by Secondary Ion Mass Spectrometry By A.R. Spurr and P. Galle (With 5 Figures)
Secondary Ion Emission Microanalysis of the Pigments Associated with the Eye: Preliminary Data By C. Chassard-Bouchaud and M. Truchet (With 3 Figures)256
Comparison of Spectra of Biochemical Compounds and Tissue Preparations By M.S. Burns, D.M. File, A. Ouettier, and P. Galle

X. Combined Techniques
Chairpersons: C. Johnson and W.H. Christie
Invited: High Sensitivity SIMS Using DC Accelerators By K.H. Purser
Combined SIMS, AES, and XPS Investigations of Oxygen-Covered 3d Transition Metal Surfaces By O. Ganschow, L. Wiedmann and A. Benninghoven (With 4 Figures) 263
Oxidation of Nickel Base Alloys Flooded with Oxygen Under Ionic Bombardment By J.C. Pivin, C. Roques-Carmes, and G. Slodzian (With 4 Figures) 266
Matrix Effect Studies by Comparative SNMS and SIMS of Oxidized Ce, Gd and Ta Surfaces By H. Oechsner, W. Rühe, H. Schoof and E. Stumpe (With 4 Figures) 269
XPS/LEED/SIMS Study of the Ni(100)/0 <sub>2</sub> System: Origin of the Two O(1s) Features By C.R. Brundle and H. Hopster (With 2 Figures)
Combined SIMS, AES and XPS Study of Cd <sub>x</sub> Hg <sub>1-x</sub> Te By O. Ganschow, H.M. Nitz, L. Wiedmann, and A. Benninghoven (With 4 Figures)
SIMS Depth Profiling of Thin and Ultrathin Films of Covalently Bonded Organic Overlayers By J.F. Evans, M. Ross, and D.M. Ullevig (With 2 Figures) 278
Alpha-Recoil and Fission Fragment Induced Desorption of Secondary Ions By O. Becker, W. Knippelberg, D. Nederveld and K. Wien (With 3 Figures)
XI. Postdeadline Papers
Use of the IMS-3f High Mass Resolving Power By JM. Gourgout (With 6 Figures)
The Bombardment Angle Dependence of the Sputtering and Secondary Ion Yield for Oxygen Ion Bombardment of Silicon By N. Warmoltz, H.W. Werner and A.E. Morgan
Secondary Ion Mass Spectrometry of Small Molecules Held at Cryogenic Temperatures By H.T. Jonkman and J. Michl (With 4 Figures)
Index of Authors