

TABLE OF CONTENTS

PREFACE	iii
Copper Interconnect Technology in Semiconductor Manufacturing	1
<i>Daniel C. Edelstein, P.C. Andricacos, B. Agarwala, C. Carnell, D. Chung, E. Cooney III, W. Cote, P. Locke, S. Luce, C. Megivern, R. Wachnik, and E. Walton</i>	
Extendibility of Electrochemical Deposition for High Aspect Ratio Copper Interconnects	9
<i>Sergey Lopatin</i>	
Experimental and Numerical Study of Leveling of Submicron Features by Organic Additives	16
<i>James J. Kelly and Alan C. West</i>	
A Novel Electrolyte Composition for Copper Plating in Wafer Metallization	25
<i>Uziel Landau, John D'Urso, Andrew Lipin, Yezdi Dordi, Atif Malik, Michelle Chen, and Peter Hey</i>	
STM Studies of Halide Adsorption on Cu(100), Cu(110), and Cu(111)	41
<i>T.P. Moffat</i>	
A Model of Superfilling in Damascene Electroplating	52
<i>H. Deligianni, J.O. Dukovic, P.C. Andricacos, and E.G. Walton</i>	
A Mass Transfer Model for the Pulse Plating of Copper Into High Aspect Ratio Sub-0.25μm Trenches	61
<i>Desikan Varadarajan, Charles Y. Lee, David J. Duquette, and William N. Gill</i>	
Numerical Simulations of Fluid Flow and Mass Transfer within an Electrochemical Copper Deposition Chamber	71
<i>P.R. McHugh, G.J. Wilson, and L. Chen</i>	
Model of Wafer Thickness Uniformity in an Electroplating Tool	83
<i>H. Deligianni, J.O. Dukovic, E.G. Walton, R.J. Contolini, J. Reid, and E. Patton</i>	
Bath Component Control and Bath Aging Study for a Cu Plating System Using an Inert Anode	96
<i>Mei Zhu, Yi-Fon Lee, Demetrius Papapanayiotou, and Chiu H. Ting</i>	

The Effects of Process Parameters on the Stability of Electrodeposited Copper Films	103
<i>Brett C. Baker, David Pena, Matthew Herrick, Rina Chowdhury, Eddie Acosta, Cindy R. Simpson, and Greg Hamilton</i>	
Dopants in Electroplated Copper	111
<i>P.C. Andricacos, C. Parks, C. Cabral, R. Wachnik, R. Tsai, S. Malhotra, P. Locke, J. Fluegel, J. Horkans, K. Kwietniak, C. Uzoh, K.P. Rodbell, L. Gignac, E. Walton, D. Chung, R. Geffken</i>	
ECD Seed Layer for Inlaid Copper Metallization	122
<i>L. Chen and T. Ritzdorf</i>	
Thermodynamics of Faceting on the Submicron Scale in Copper Electroplating	134
<i>Q. Wu and D. Barkey</i>	
Deposition of Copper on TiN From Pyrophosphate Solution	149
<i>John G. Long, Aleksandar Radisic, Peter M. Hoffmann, and Peter C. Searson</i>	
Electrochemical Study of Copper Deposition on Silicon Surfaces in HF Solutions	156
<i>I. Teerlinck, W.P. Gomes, K. Strubbe, P.W. Mertens, and M.M. Heyns</i>	
Charge Exchange Processes During Metal Deposition on Silicon From Fluoride Solutions	160
<i>P. Gorostiza, R. Diaz, F. Sanz, J.R. Morante, and P. Allongue</i>	
Evaluation of Effects of Heat Treatment Electroless Deposited Copper	168
<i>Kai Yu Liu, Wang Ling Goh, and Man Siu Tse</i>	
Cu Electroplating on n-Si(111): Properties and Structure of n-Si/Cu Junctions	177
<i>T. Zambelli, F. Pillier, and P. Allongue</i>	
The Use of Copper Based Backmetal Schemes As a Low Stress and Low Thermal Resistance Alternative for Use in Thin Substrate Power Devices	185
<i>T. Grebs, R.S. Ridley, Sr., J. Spindler, J. Cumbo, and J. Lauffer</i>	
Possibility of Direct Electrochemical Copper Deposition Without Seedlayer	194
<i>H.P. Fung and C.C. Wan</i>	
Modulated Reverse Electric Field Copper Metallization for High Density Interconnect and Very Large Scale Integration Applications	201
<i>J.J. Sun, E.J. Taylor, K.D. Leedy, G.D. Via, M.J. O'Keefe, M.E. Inman, and C.D. Zhou</i>	

Electrochemical Codeposition and Electrical Characterization of a Copper - Zinc Alloy Metallization	212
<i>Ahila Krishnamoorthy, David J. Duquette, and Shyam P. Murarka</i>	
Electrodeposition of Cu, Co, and Ni on (100) n - Si	221
<i>A.A. Pasa, M.L. Munford, M.A. Fiori, E.M. Boldo, F.C. Bizetto, R.G. Delatorre, O. Zanchi, L.F.O. Martins, M.L. Sartorelli, L.S. de Oliveira, L. Seligman, and W. Schwarzacher</i>	
X - Ray Photoelectron Spectroscopic Characterization of a Cu / p - GaAs Interface	231
<i>E.M.M. Sutter, J. Vigneron, and A. Etcheberry</i>	
Copper CMP Characterization by Atomic Force Profilometry	238
<i>Larry M. Ge, Dean J. Dawson, and Tim Cunningham</i>	
Anodic Properties and Sulfidation of GaAs (100) and InP (100) Semiconductors	242
<i>R.F. Elbahnsawy and J.G. McInerney</i>	
A Study on Electrochemical Metrologies for Evaluating the Removal Selectivity of Al CMP	256
<i>Shao-Yu Chiu, Jyh-Wei Hsu, I-Chung Tung, Han-C Shih, Ming-Shiann Feng, Ming-Shih Tsai, and Bau-Tong Dai</i>	
Nucleation and Growth of Epitaxial CdSe Electrodeposited on InP and GaAs Single Crystals	263
<i>L. Beaunier, H. Cachet, M. Froment, and G. Maurin</i>	
Formation of II-VI and III-V Compound Semiconductors by Electrochemical ALE	272
<i>Travis L. Wade, Billy H. Flowers, Jr., Uwe Happek, and John L. Stickney</i>	
Electrochemical Synthesis of Thermoelectric Materials by Electrochemical Atomic Layer Epitaxy: A Preliminary Investigation	282
<i>Curtis Shannon, Anthony Gichuhi, Peter A. Barnes, and Michael J. Bozack</i>	
CDs and ZnS Deposition on Ag(111) by Electrochemical Atomic Layer Epitaxy	294
<i>M. Innocenti, G. Pezzatini, F. Forni, and M.L. Foresti</i>	
CuIn_{1-x}Ga_xSe₂ - Based Photovoltaic Cells from Electrodeposited and Electroless Deposited Precursors	309
<i>R.N. Bhattacharya, W. Batchelor, J. Keane, J. Alleman, A. Mason, and R.N. Noufi</i>	

Electrochemical Deposition of Gold on N-Type Silicon	318
<i>Gerko Oskam and Peter C. Searson</i>	
Co-Deposition of Au-Sn Eutectic Solder Using Pulsed Current Electroplating	329
<i>J. Doesburg and D.G. Ivey</i>	
Zincation Treatments for Electroless Nickel Under-Bump Metallurgy in Flip-Chip Packaging	340
<i>Tze-Man Ko, Wei-Chin Ng, and William T. Chen</i>	
Microfabrication of Microdevices by Electroless Deposition	352
<i>T.N. Khoperia</i>	
Notch- and Foot-Free Dual Polysilicon Gate Etch	361
<i>Seung-joon Kim, Hong-seub Kim, Kwan-ju Koh, Kae-hoon Lee, and Jung-wook Shin</i>	
Interfacial Structure of Si/SiO₂ Studied by Anodic Currents in HF Solution	366
<i>Naomi Mizuta, Hirokazu Fukidome, and Michio Matsumura</i>	
Effect of Dissolved Oxygen on Surface Morphology of Si(111) Immersed in NH₄F and NH₄OH Solutions	373
<i>Hirokazu Fukidome and Michio Matsumura</i>	
Porosity and Surface Enrichment by Tellurium of Anodized p-Cd_{0.95}Zn_{0.05}Te	379
<i>B.H. Erné, J. Vigneron, C. Mathieu, C. Debiemme-Chouvy, and A. Etcheberry</i>	
Passivation Process of Hg_{0.79}Cd_{0.21}Te by Oxidation in Basic Media	385
<i>Frank Lefèvre, Dominique Lorans, C. Debiemme-Chouvy, A. Etcheberry, Dominique Ballataud, and Robert Triboulet</i>	