

## TABLE OF CONTENTS

Preface .....	iii
<b>Copper Deposition</b>	
Superconformal Electrodeposition Using Derivatized Substrates .....	1
<i>T.P. Moffat, D. Wheeler, C. Witt, and D. Josell</i>	
Copper Superfilling by PEG-Cl Suppression Breakdown .....	7
<i>M. Hayase, M. Taketani, K. Aizawa, T. Hatsuzawa, and K. Hayabusa</i>	
An Experimental Investigation of the Role of PEG, Cl <sup>-</sup> , and SPS during Copper Electrodeposition .....	15
<i>M. Tan, J. Hutchins, and J.N. Harb</i>	
ULSI Wiring Formation by Copper Electroplating .....	22
<i>S. Miura, K. Oyamada, S. Watanabe, M. Sugimoto, H. Kouzai, and H. Honma</i>	
Multi-scale Simulations of Copper Electrodeposition onto a Resistive Substrate .....	30
<i>T.O. Drews, S. Krishnan, J. Alameda, D. Gannon, R.D. Braatz, and R.C. Alkire</i>	
Suppression by PEG and Halide Ion in Copper Electroplating .....	46
<i>M. Hayase, M. Taketani, T. Hatsuzawa, and K. Hayabusa</i>	
“Seedless” Copper ECD on TiN Barrier Layers .....	55
<i>S. Kim and D.J. Duquette</i>	
In-Situ AFM Observation of Spontaneous Recrystallization at Room Temperature in Electrodeposited Copper Metallization .....	64
<i>S. Ahmed and D.N. Buckley</i>	
Room Temperature Microstructure Evolution in Electroplated Copper Films .....	76
<i>P. Freundlich, M. Militzer, and D. Bizzotto</i>	
Self-Annealing Effect of Electrolessly Deposited Copper Thin Films Based on CO(II)-Ethylenediamine as a Reducing Agent .....	84
<i>J.J. Kim and C.H. Lee</i>	
Superconformal Electrodeposition of Silver from a KAg(CN) <sub>2</sub> – KCN- KSeCN Electrolyte .....	92
<i>B.C. Baker, M. Freeman, B. Melnick, D. Wheeler, D. Josell, and T.P. Moffat</i>	

## Contacts, Barrier and Low-k Inter Level Dielectric Films

Base Contact Issues of Si/SiGe-Heterojunction Bipolar Transistors with Emphasis on Source/Drain Contacts of CMOS Devices .....	103
<i>J. Hohaus and H.-U Schreiber</i>	
Comparison of Amorphous and Crystalline Tantalum Nitrides as Diffusion Barriers in Cu/FSG Structure .....	109
<i>C.C. Chang and J.S. Chen</i>	
Copper-Barrier and Hard-Mask Elaboration by Plasma-Enhanced Chemical Vapor Deposition Using Organosilane Precursors .....	120
<i>B. Remiat, F. Fusalba, P. Maury, V. Jousseau, C. Lecornec, F. Gaillard, and J. Durand</i>	
Development and Characterization of a PECVD Silicon Nitride for Damascene Applications .....	126
<i>A.S. Lee, N. Rajagopalan, M. Le, B.H. Kim, and H. M'Saad</i>	
Structural Properties and Defect Characterization of Plasma Deposited Carbon Doped Silicon Oxide Low-k Dielectric Films .....	133
<i>T. Wong, V. Ligatchev, and R. Rusli</i>	
Evaluation of Activating Process for the Fine Pattern Deposition .....	142
<i>T. Nishiwaki, K. Tashiro, and H. Honma</i>	
The Effect of TEOS/MTES Ratio on the Structural and Dielectric Properties of Porous Silica Film .....	151
<i>S. Yu, T.K.S. Wong, X. Hu, and K. Pita</i>	
Plasma Modification of the Low-k Polyimide Film to Further Reduce Its k Value .....	162
<i>T. Chung, H. Nominada, Y. Kuo, and J. Lu</i>	
Synthesis and Characterization of Hydrophobic Fluorinated Silica Xerogel Films .....	170
<i>Z. Zhang, H. Dong, B.P. Gorman, C. Yao, D.W. Mueller, and R.F. Reidy</i>	
Structural and Thermal Characterization of Spin-on Porous Low-k Dielectrics .....	176
<i>T.K. Goh, S. Yu, T.K.S. Wong, and C. He</i>	
Rapidcuring <sup>TM</sup> of Porous MSQ Films .....	187
<i>C. Waldfried, A. Shiota, M. Sekiguchi, O. Escorcica, Q. Han, and I.L. Berry</i>	

Supercritical CO <sub>2</sub> Post-Etch Cleaning of a Patterned Porous Low-k Dielectric .....	194
<i>D. Peters, M. Egbe, S. Ficner, K. Masuda, K. Iijima, T. Yoshikawa, G. Asai, Y. Muraoka, K. Saito, I. Mizobata, and T. Iwata</i>	

H <sub>2</sub> /He Plasma for Photoresist Stripping over Porous MSQ Low-k Films .....	202
<i>I. Berry, A. Shiota, Q. Han, C. Waldfried, M. Sekiguchi, and O. Escorcia</i>	

### **Copper CMP and Reliability**

Electrochemical View on Copper Chemical Mechanical Planarization .....	211
<i>Y. Ein-Eli, E. Rabinovich, E. Rabkin, and D. Starosvetsky</i>	

Electrochemical Planarization of Copper .....	226
<i>L.J. Loparco and D.J. Duquette</i>	

Mechanisms of Copper Removal during Chemical Mechanical Polishing .....	235
<i>T. Du, V. Desai, D. Tamboli, V. Chathapuram, and K.B. Sundaram</i>	

Abrasive-free Polishing for ULSI Cu Damascene Interconnects .....	246
<i>J-Y. Fang, M-S. Tsai, B-T. Dai, and M-S. Feng</i>	

Copper Chemical Mechanical Planarization Processes in Carbon Dioxide .....	254
<i>G.M. Denison, P.M. Visintin, J.M. DeSimone, and C. Bessel</i>	

Process Development for Copper CMP on Ultra Low-k Dielectrics .....	260
<i>S. Hosali, G. Martin, A. Gonzalez, and S. Joshi</i>	

A Comprehensive Study of Liner CMP for Advanced Cu/Low-k Planarization .....	270
<i>T.C. Tsai, Z.H. Lin, S.C. Hu, A. Yu, C.R. Hsu, L.Y. Fang, H.C. Chen, and W.Y. Hsieh</i>	

Copper Barrier Polishing Chemistries for Low-k Films .....	278
<i>L. Yao, R. Small, and K.Z. Kadowaki</i>	

Improvement of Planarization Efficiency of Cu Electropolishing By Additives .....	285
<i>S-C. Chang, J-M. Shieh, B-T. Dai, M-S. Feng, Y-H. Li, and Y-L. Wang</i>	

Enhancement of Post Copper CMP Cleaning Using CO <sub>2</sub> Cryogenic Technology .....	293
<i>S. Banerjee, H.F. Chung, R. Small, and C. Shang</i>	

Chemical Mechanical Polishing of Amorphous Silicon Carbide and Low-k Carbon Doped Oxide Films .....	302
<i>K.H. Block, W. Chen, and W.D. Gray</i>	
Plasma Charging Damages for Gate Oxide and Hot-Carrier Degradation and Electro-migration Properties in Cu Interconnects .....	310
<i>D.S. Su, J.J. Wang, C.T. Yang, D.H. Chen, H.C. Tseng, H. Chen, and S.Y. Lee</i>	
Microstructure and Interfacial Reaction of Cu(Ti)/SiO <sub>2</sub> Interconnect .....	316
<i>C.J. Liu and J.S. Chen</i>	
Proven Extendibility of Low Damage Cu-CMP Process for Sub-0.13 μm ULSI Interconnects .....	325
<i>T.C. Tsai, S.C. Hu, Z.H. Lin, S.H. Hsu, C.L. Hsu, J. Dai, F. Yang, M.H. Lin, H.C. Chen, and W.Y. Hsieh</i>	
Electrical and Material Stabilities of Cu/FSG and Cu/OSG at Elevated Temperatures .....	331
<i>J.S. Jeng, J.S. Chen, G. Lin, and J. Su</i>	
<b>AUTHOR INDEX .....</b>	<b>339</b>
<b>SUBJECT INDEX .....</b>	<b>343</b>